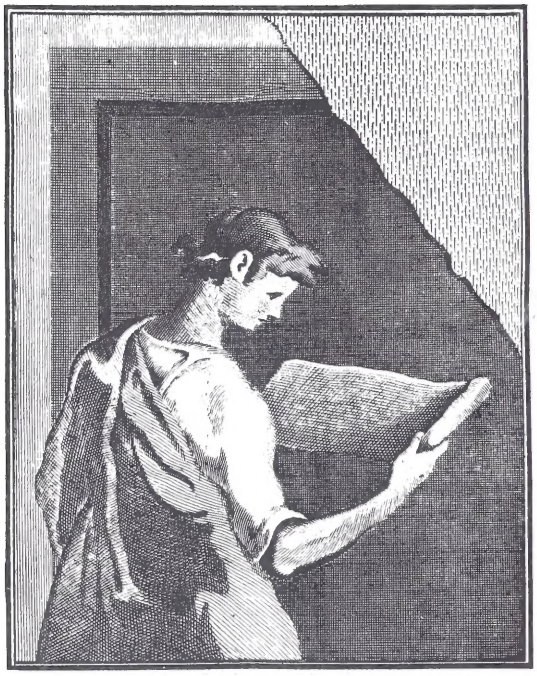
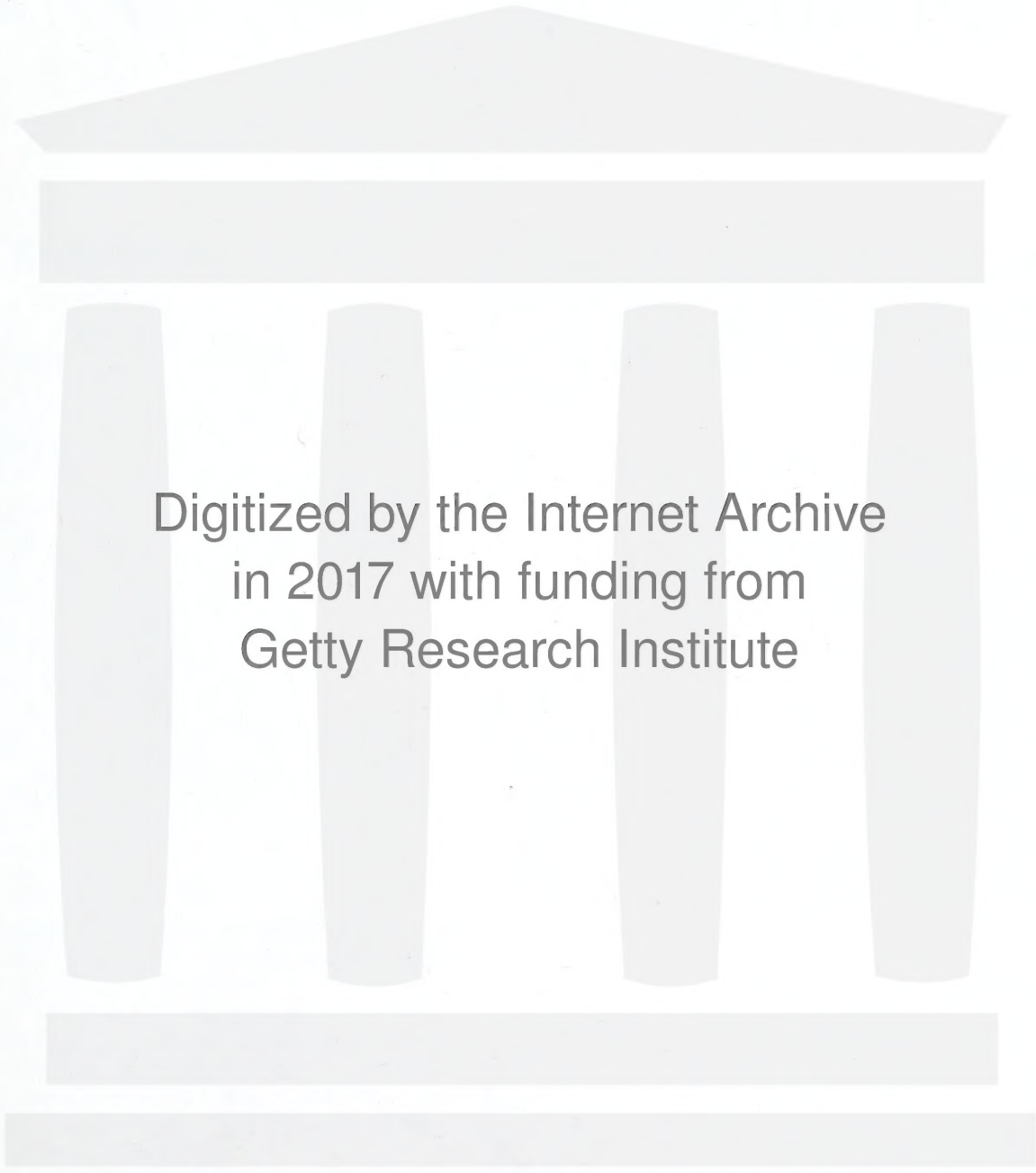


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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	1
A New Basis for Photo-mechanical Processes	2
Leaderettes:— Large Telescopes and Distorted Star Photographs—A Rival to Calcium Carbide—A Newly Discovered Source of Water Contamination—The Argentaurum Mystery	3
The Multiple Stop in Process Work.—I. By W. B. Bolton	4
Photographic Formulæ. By G. Watmough Webster, F.C.S., R.P.S.	5
Photographic Workers at Work:—XIX The Carl-Zeiss Stiftung	6
Violating the Fitness of Things. By J. Rees	7
Astronomical Photography with Photo-micrographic Apparatus. By A. Clifford Mercier, M.D.	8
Royal Photographic Society	9
Micro-photographs	9
Dowsing's Apparatus for Producing X Rays, and Showing their Effect on a Prepared Plate or Screen	10
Smith's Improved Tray for the Illuminant in Optical Lanterns and for Centering	10
View-finders for Twin Lens or Divided Cameras: Stanbury's Improvements	11
A Novelty in Interior Photography. By G. Godfrey Cunninghame	11
Recently Elected Officers of Societies	12
Our Editorial Table:— *The Photographer's Diary for* 1898—Transparent Photo Colours—*The Gloucester Diary*—Morgan & Kidd's Bromide Papers—*The Entr'acte Annual*—*Popular Photographic Printing Processes*	12
News and Notes	13
Patent News	13
Meetings of Societies:— London and Provincial Photographic Association—Croydon Camera Club	13
Forthcoming Exhibitions	14
Correspondence:— The Gum-bichromate Process—Metallic Contact Printing without Light—Fuzzigraph Discussion—Is Photography a Played-out Profession?—The Yarmouth Convention	14
Answers to Correspondents	16

EX CATHEDRÂ.

The Eastman Photographic Materials Company inform us that they are now removing their wholesale premises and general offices from 115-117, Oxford-street, W., to No. 43, Clerkenwell-road, E.C., to which address, in future, all business communications should be made to them. In the new premises the Company will be well situated for the dispatch of business, the building having a floor area of 16,000 square feet, conveniently disposed upon three floors. Nos. 115–117, Oxford-street will be continued as retail premises.

* * *

The Alexandra Palace, situated in the North of London, is to be opened once more to the public in the forthcoming spring. From the prospectus it appears that the establishment is to be conducted on somewhat conventional lines; nevertheless, it is to be hoped that the venture will prove successful, as there is ample scope for such a place of recreation. We note that the season-ticket holders are to be provided with tickets bearing the portraits of their owners. These portraits are to be taken by the Palace authorities on the occasion of the season-ticket holders' first visit. It will be interesting to know how this plan will work out in practice—especially if large numbers of season-ticket holders should take it into their heads to visit the Palace for the first time on a fine Good Friday or Easter Monday. We trust the Palace authorities fully realise the possible difficulties of their innovation.

* * *

An important copyright case was heard last week at the Leek Petty Sessions, in which a local photographer, Mr. Phillips, sued three members of the Conservative Working Men's Association, also a local printer, for infringement of copyright of a photograph of Mr. Charles Bill, M.P. for the Leek Division in 1894. Mr. Bill gave Mr. Phillips sittings, and received without payment one dozen prints. The defendants used a block made from the photograph in printing tickets for a *soirée* in connexion with the Association, at which Mr. Bill was the chief speaker. After a long hearing the defendants were each fined 20*s.* and 25*s.* costs, in all 9*l.*, the block to be given to the complainant. This decision which, of course, is strictly in accordance with the most recent interpretations of the Copyright Act, appears to have excited some surprise among writers in the general press, who seem to be incapable of realising the obvious fact that photographers are scarcely likely to be animated solely by philanthropic motives in conducting their businesses.

* * *

What is styled a new Christmas game for children consists of the purchase by parents or children of a stamp album of British manufacture, fixing therein two Prince of Wales's Hospital Fund stamps, and then presenting the children to be photographed free of cost by Messrs. Speaight, 178, Regent-street; it is said to be becoming very popular. Messrs. Speaight have opened special studios, where the children's photographs will be taken free of cost, and where stamp albums and stamps can be obtained by parents and children. With the Prince of Wales's approval (states a contemporary), it has been determined to create a great roll of children subscribers, and a midget photograph and the autograph of each child who purchases the album, and places in it a half-crown and shilling stamp, will be entered in the great roll, which will be offered for the acceptance of His Royal Highness. The Duke of York last week commanded Messrs. Speaight to Sandringham to take a special photograph of his children, so that they may appear in the roll as the first children subscribers.

It is announced that, after forty-eight years, the Arundel Society, established to reproduce in colour and popularise the masterpieces of painting, has come to an end, the improved and cheapened methods of reproduction having made its work unnecessary. Isochromatic photography has been, it is stated, one of the most powerful factors in rendering work of this nature obsolete.

* * *

Last week we briefly referred to the Glasgow Exhibition medal, and the producers, Messrs. Thomas Smith & Sons, of 25 to 31, Queen-street, Glasgow, have since been good enough to send us a copy of it in metal. The medal takes the form of a plaque, and the design is a refined piece of photographic symbolism.

* * *

Messrs. Smith inform us that it was designed and modelled by Mr. A. McF. Shannon, who executed the bronze bust of Lord Kelvin, shown in last year's Academy. From his model they made the copies by the electrotype process, which, they say, has this advantage, that the actual work of the artist is accurately reproduced in the copy, whereas in a struck medal the artist executes the design only, and a workman has to cut it in the die, and he may not realise the design as the artist intended.

* * *

Our last week's note on winter photography has brought us a letter from Mr. E. Fenske, of 44, Beaconsfield-road, St. Margaret's-road, Twickenham, who is good enough to send us a few stereoscopic slides from negatives made in his garden during the frost on the 26th ult. Mr. Fenske touches a tender spot in our heart when he says that, to appreciate hoar frost, snow, and ice, stereoscopic photography should be resorted to. No pleasanter seasonable "cards" than these have reached us. We wish that this beautiful branch of work was more largely followed than it is, as the charm of a properly prepared stereoscopic picture, whether on glass or paper, amply balances whatever little extra trouble it involves. Mr. Fenske's slides embrace not only hoar-frost studies, but snow and ice views in the garden and on the river, and, seen through the stereoscope anything more fascinating, realistic, and truthful could not be imagined.

* * *

The album of prints commemorative of the Yarmouth Convention, and contributed by about twenty-five of the members who attended that meeting, has been at length presented to the local Honorary Secretary, Mr. Harvey George, who was asked to accept the album as some slight recognition of his valuable services to the Convention. The album contains nearly 200 prints by almost every ordinary process, and in size from whole-plate downwards. Some of the prints were very good; some, however, were not. A Convention meeting is notorious for the opportunities it affords many eminent and able photographers of demonstrating that there are times when they are unable to do justice to their photographic powers, so that, on the whole, the album is qualitatively not what it otherwise might have been made. The little matter was kindly carried through in an unofficial way by Mr. F. A. Bridge.

* * *

The index to last year's volume will be published next week. Will our readers note that in future all communications must be addressed to us at 24, Wellington-street, Strand, W.C.?

A NEW BASIS FOR PHOTO-MECHANICAL PROCESSES.

The novel method of making gelatine reliefs, described by Herr R. E. Liesegang in the *Photographisches Archiv*, a translation of whose article appeared in these columns on December 3, page 774, promises to place a new power in the hands of process workers, since it offers points of difference from the ordinary carbon process, or the Warnerke method, which render it available under conditions in which those processes are not applicable, namely, for making reliefs direct in the camera, or without the necessity for transfer. Unlike previously known processes, in the new one the soluble portions of the gelatine are washed away from the front or outer side of the film instead of from the under side, and consequently the sensitive material may be coated directly upon the support upon which it is to finally remain in place of being transferred thereto from a temporary support of paper.

The solvent action of the persulphates of the alkalies upon the silver image can scarcely be said to have been generally known until Herr Liesegang indicated it, although most workers with gelatino-chloride paper are aware of the bleaching or "fading" action that alum has upon the image if allowed to act for any length of time. This is, no doubt, frequently set down, and probably correctly so, to sulphuration arising from the decomposition by the alum of traces of hypo left in the prints; but it is undoubtedly true that a perfectly washed print, either on gelatine or albumen paper, will be gradually bleached out if left for a sufficiently long time in a clean solution of alum. Possibly, if the latter salt were more soluble, it would be as effective an agent for the purpose as the ammonium salt, which is soluble in its own weight of water, and it will be noticed that Herr Liesegang recommends the use of a concentrated aqueous solution, and this is said to bleach the print in about a quarter of an hour.

Some sixteen or seventeen years ago, Mr. Warnerke pointed out, at a meeting of the Photographic Club, that ferric sulphate was an effective solvent of silver, and this salt has been quite recently recommended as a substitute for ferric chloride in etching on copper. Soon after Mr. Warnerke's mention of ferric sulphate, experiments were recorded in these pages in the application of the same salt, or, preferably, on account of its greater stability, ammonio-ferric sulphate, or "iron alum," to the purpose of making reversed images by dissolving out the developed impression and then reducing the remaining bromide of silver. But, though the operation is perfectly successful with collodion plates, and has been frequently referred to for the purpose since as being preferable to nitric acid, it failed entirely when applied to gelatine plates. This is not on account of any want of solvent action on the gelatine-enclosed silver, but because, in removing the image, it deposits in place of the silver a precipitate of basic ferric sulphate, or probably an indefinite compound containing variable quantities of iodide of iron.

It has occasionally been noticed that gelatine plates so treated have shown more or less transparency in the portions from which the image has been removed, but this effect has been attributed to the partial washing away of the basic iron salt from the surface of the film, and not to any solvent action of the treatment upon the gelatine, though it is probable, in the light of Herr Liesegang's communication, that such was really the case, since, as will be shown, the same chemical reaction takes place as with the ammonium salt.

With regard to any solvent action of the persulphate of

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ammonia, as such, or of ferric sulphate, upon the gelatine, the idea cannot be entertained for a moment, since the sulphates generally, but more especially alum and aluminic sulphate, are well known to exercise a precisely opposite effect, and are commonly used for the purpose of hardening the gelatine film. So long ago as the year 1876 the late Rev. H. J. Palmer used sulphate of magnesium, or Epsom salts, for the purpose of preventing frilling, and sulphate of potash is also known to be equally effective for the same purpose. It can scarcely, therefore, be supposed that these salts possess a dual power in contrary directions, and Herr Liesegang is, undoubtedly, correct in attributing the softening effect to a secondary action resulting from the removal of the silver from the gelatine, though he does not suggest any definite explanation.

In offering "a practical" suggestion in that direction, it may be well to point out that, when oxidation goes on in contact with the gelatine film holding the sensitive silver salts, hardening or insolubility occurs, and this effect is most commonly known in connexion with pyro development, though, no doubt, it occurs more or less with all developers in ordinary use. Even in the case of gelatine chloride papers the gelatine becomes less soluble in those portions forming the image, or where the light has acted; and, this being the case, it is not unreasonable to assume that a contrary action, or, in other words, deoxidation, will result in an increase of the solubility of the gelatine, or in a softening, or even decomposition, of the portions in the immediate vicinity of the action.

This is precisely the result that seems likely to accrue in treating a developed gelatine proof with a strong solution of persulphate of ammonia. The only possible action of that salt in removing the silver image is to convert the metal into sulphate either alone or in some kind of combination with ammonia, but in a form in which it is soluble. It may be sulphate of silver that is formed, or it is more probably ammonio-sulphate, or possibly one of the compounds described by Rose & Misterlich (*vide* Watt's *Dictionary*, vol. v. 610) under the name of sulphate of argent-ammonium; but, whichever form the decomposition product may take, hydrogen is eliminated. Thus, in the case of sulphate of silver, for instance,

$$NH_4HSO_4 + 2Ag = Ag_2SO_4 + NH_3 + 2H$$

though it is more likely that the ammonia remains in combination to form ammonio-sulphate, when the reaction will be

$$NH_4HSO_4 + Ag = NH_4AgSO_4 + H$$

In either case it will be seen that for each atom of silver converted an atom of hydrogen is eliminated, and the same thing occurs if the product is argent ammonium sulphate; but, in this case, with the liberation of sulphuric acid. With ferric sulphate in place of the ammonium salt, the formation of the basic iron salt is accompanied by liberation of hydrogen, so that the same action may be supposed to occur in that case, possibly modified to some extent by the counter hardening effect of the iron.

Looking at the powerful affinity that *nascent* hydrogen has for oxygen, it is almost certain that, if set free on the gelatine film, as seems likely by the action of the sulphate of ammonia on the silver, it would attack the gelatine, and not only neutralise any hardening effect that may have occurred from the result of development, but still further exercise a decomposing action, which would account for the ready solubility of the parts affected. At the same time it must be borne in mind that the unexposed portions of the film, or those containing no silver, and therefore not subjected to this deoxidising action, are simultaneously undergoing the normal hardening effect of the concentrated solution of persulphate, and are therefore correspondingly able to withstand the application of water at a temperature sufficient to remove the softened or partially decomposed gelatine, and thus the requirements for the formation of a relief are fully satisfied.

This theory entirely coincides with the experiments detailed by Herr Liesegang, which effectually disprove the existence of any direct effect of the ammonium salt itself on the solution of the gelatine.

Turning to the possible application of the process to the production of reliefs direct upon copper in the camera, the importance from a practical point of view of a method by which this can be attained with an extremely short exposure, and without the necessity for the transfer process, hitherto unavoidable, is incalculable. But it does not seem probable that a practicable process is to be based upon the use of an emulsion applied to the bare copper or to silvered copper. There is nothing surprising in the fact of the coated metal plates retaining these properties for a considerable time, since pure bromide of silver is free from any soluble saline accompaniment, especially when enclosed in gelatine, and in the dry condition there is nothing to set up any decomposition.

The films might be expected, moreover, to pass fairly well through ordinary alkaline development, but the fixing operation must, as it proved, turn out instantly fatal, as, indeed, would any protracted contact of the film with the copper in the moist condition. It is not quite clear why the attempt to form the relief without fixing the film failed, whether from failure to produce the necessary solubility or from other causes; but it seems tolerably certain that the application of the persulphate solution would in any case set up electro-chemical action between the copper and the silver, whether the latter was in the metallic state or in the form of bromide, and by causing solution of the surface of the copper effectually detach it from the gelatine film, to say nothing of other effects. Silvering the copper, as proved to be the case, forms no remedy, since the action of the persulphate of ammonium would take place upon that as upon the image, and by the liberation of hydrogen at the surface of the plate produce the same effect, detachment of the gelatine film.

Herr Liesegang's suggestion of coating the copper with resin appears a feasible one, or perhaps simpler still would be a film of collodion, which would probably suffice to sufficiently isolate the copper and silver. In Obernetter's etching method, based on the etching action of a wet-collodion film transferred to the copper plate, the substitution of an emulsion film in which the particles of silver were imbedded in collodion instead of being on the surface, sufficed to arrest all action; but a film of resin would remove all doubt, and probably render the process quite practicable.

Large Telescopes and Distorted Star Photographs.—Professor Schaeberle has been casting a scientific bomb shell among the astronomers. It appears that, until a recent pronouncement of this learned astronomer, the fact that large reflectors of comparatively short focal length have all been faulty in their definition of star images at some trifling distance from the axis of the instrument has been entirely unknown. He was led to the investigation, which resulted in his making the statement referred to, by observing that the large Crossly reflector at the Lick Observatory

failed most signally to come up to expectations in its definition of star images. He worked out the matter, and found out that, for scientific reasons unnecessary to quote here, such want of defining power was a necessary corollary to the construction of these instruments. Put in brief, what he says is, that large parabolic mirrors having a ratio of focal length less than fourteen to one are, as regards their defining power, "theoretically unfit for making observations of extreme delicacy."

It is evident that there is much to learn and much to unlearn yet as to the true functions of the various optical components of instruments used for photographing stars and nebulæ. Already, by other writers, some very heterodox opinions have been given as regards the use of short-focus objectives for the purpose. Seeing that the image of a star with a high-class instrument, no matter how long its focus, is theoretically only a point, it would appear to follow that, contrary to what happens in photographing objects of determinate magnitude, there should be no gain in rapidity in using short-focus (relative to aperture) photographic objectives upon the fixed stars, while there would be the disadvantage of the light from the sky having increased opportunities of impressing itself to the obliteration of faint impressions imbedded, so to speak, in the sky haze image. But, with objects of measurable dimensions, such as the planets, or some nebulæ, the usual rule might be expected to hold good.

A Rival to Calcium Carbide.—M. C. Matignon has recently presented to the Paris Academy of Sciences a memoir, in which he describes a new carbide—the carbide of sodium—which possesses some remarkable properties. He states that it forms a non-explosive white powder, which, when heated in the air, burns slowly, leaving a residuum of sodium carbonate. Its chemical activity is far in excess of that of the well-known calcium carbide.

A Newly Discovered Source of Water Contamination.—That impurities in the water employed are the cause of many mysterious cases of failure in various departments of photography is extremely probable, and now Mr. Percy A. E. Richards has added another to the long list of causes of impurity. He found in a sample of water, used for drinking purposes, a notable quantity of zinc. He was examining some water from a source in Berkshire, and, to his surprise, discovered the presence of zinc, which was contained to the extent of 5·12 grains per gallon. It is by no means improbable that water with such a percentage of zinc might be injurious in some cases of photographic practice; but, in any case, it is well to draw attention to the point that a sample of water so contaminated may possibly occur, and should not be employed for photographic purposes.

The Argentaurum Mystery.—Though one of the morning papers has gone to the extent of sending a special commissioner to interview Dr. Emmens, and to report upon his process, it is singular, in these days of scientific canards, to note the apathy with which the press at large treat an alleged discovery of a process which, if it really existed, would infinitely transcend in importance any scientific discovery of the century. The daily press, which every period of a year or two for the last score of years or more has gone into hysterics over such a subject as the imagined discovery of photography in colours, is practically silent upon the alleged discovery of a process for transmuting silver into gold. Yet Dr. Emmens goes steadily at work selling ingots of gold to the U.S. Mint, and duly advising the public of the fact. A correspondent of *Nature* sends to that journal a possible explanation of Dr. Emmens' plans by pointing out that Mexican dollars all contain gold in differing but really appreciable quantity. *En passant*, it may be observed that the explanation is by no means a new one, but in this instance actual tests have been made to ascertain the amount of gold present in these coins. Four such dollars were assayed, with the result that gold to the extent of 0·06, 0·09, 0·08, and 0·01 per cent. was found. Now as it pays to extract gold from rocks when it is present to the extent of five dwts. per ton, it is evident that such percentages as these should leave a handsome margin of profit, provided the silver coins could be sold for their original face value when reduced to ingots. A thousand dollars would contain nearly an ounce of gold, *i.e.*, a thousand pounds' worth would hold about four ounces of gold, worth, say, seventeen pounds. Here is a very feasible explanation, without any suggestion of trickery. We are afraid there is not going to be a slump in chloride of gold at present.

THE MULTIPLE STOP IN PROCESS WORK.

I.

Since writing on this subject two or three months back, a continuation of the investigations, with the assistance of the microscope, has resulted in much interesting and instructive information, not merely on the working of stops with multiple apertures, but also in the formation of the screen dot generally. In *Process Work* for November I gave a series of diagrams showing the pattern formed by the stop I have been experimenting with at different screen distances, the relative intensity of the light being shown by dots of different size, and since then I have made photo-micrographic enlargements of the actual screen patterns, which entirely bear out the impressions thus attempted to be conveyed.

The experiments detailed in my previous article were commenced with a stop having five apertures, whose centres coincided with those of five squares of a chessboard, or placed at the centre and extremities of a St. Andrew's cross or multiplication sign (×). But the original plan was extended so as to include nine apertures, the additional ones being placed at the extremities of a St. George's cross or sign of addition (+) drawn through the other, the apertures then forming three rows, and the stop is used with the rows running in the direction of the lines of the screen. This particular form was decided upon as conforming in every respect to the same rules as the five-aperture stop, with the advantage of nearly double the amount of light, and in practice it utilises to the fullest extent possible the principle of multiple openings, as it secures the co-operation in the formation of the dot of nine adjacent screen apertures, the largest number practically available under ordinary optical conditions; that is to say, within the restricted area of ordinary lens diaphragms there is no advantage in dividing the space up into smaller fractions, though, putting the lens on one side, there is no restriction to the number of openings in the luminous surface to which the screen is exposed, provided that the proper conditions are observed. For instance, a negative or transparency may be exposed at a suitable distance behind the screen in a printing frame, and a precisely similar result obtained to that produced under ordinary conditions, if the source of light is so arranged as to conform to the same rules as when the camera is employed, and, under these circumstances, there is practically no limit to the area of illuminated surface that may be used, provided it is properly broken up to suit the screen distances.

It is not my intention in the present article to go into the principle of the multiple stop or screen as thus applied, but to confine myself to the particular pattern I have already referred to; but I may briefly state that the dot is formed by the overlapping of the images of the stop projected by several of the screen apertures. If we imagine the image of such a stop as I have described projected on to the lantern screen at a certain distance, and the screen gradually moved further from the projecting lens, we shall naturally have an enlargement of the image; and, while the centre aperture of the figure remains stationary, the others constantly recede from it. This is precisely what occurs when the multiple stop is used with the cross-line screen, which may be taken to represent a vast number of projecting lenses, each one of which throws its own image of the stop on to the sensitive plate. If the total area covered by the stop be small enough, and the screen be close enough to the plate, each screen aperture will throw a complete and distinct image of the stop on to the sensitive surface; and, as the distance between screen and plate is increased, while the centre point of each image

remains stationary, those that are ex-central spread outwards until the different images meet and mix up one with another; but, as they all travel in the same straight lines—the direction of the screen-ruling—it is evident that at certain points the openings of adjacent images will coincide or exactly overlap, and, instead of forming a chaotic mixture, will describe a definite pattern.

I showed in my previous article that, in using the multiple stop, there are at least two different screen distances at which it forms a definite dot, whereas, with the single stop, there is but one. Provided the openings in the stop are small enough in proportion to the solid portion, the dot or pattern will go on repeating itself at regular intervals as the screen distance is increased, but for practical purposes we are only concerned with the earlier stages. The first definite pattern is formed, as I have shown in *Process Work*, when the adjacent images meet or overlap to the extent that their marginal apertures coincide. The pattern on the plate then assumes the form, when examined with an ordinary magnifier of low power, of a *luminous* network or cross-line pattern, enclosing dark spaces; but, when examined with a higher power, this is resolved into lines of bright dots of varying size, the enclosed spaces also exhibiting a *faint* transparent spot. The second definite pattern which is the working screen distance takes the form of a heavy *dark* cross line or network enclosing small bright spots, and is formed when the travelling portions of the image meet on the stationary centre points, and when the original form of the screen is reproduced only modified by diffusion of focus and diffraction.

This latter pattern is in every respect precisely similar to that formed by a single aperture of the same dimensions, except that it is much brighter, owing to the fact that the transparent dots are formed by the coincidence of portions of nine separate images. I was, at first, inclined to think that it showed more evidence of diffraction, the dark cross bands showing very distinctly the diffraction effects in the shape of alternate dark and light stripes; but this, again, is only caused by the stronger illumination, as it is just as prominent in a photo-micrographic enlargement made with a correspondingly increased exposure with a single stop as from another with the multiple apertures.

But I think it is the other pattern which affords the greater amount of instruction when analysed. As I have said, the pattern consists of a transparent network made up of dots of variable size, these dots constituting the images of the outer or travelling portions of the stop, and they differ in size (and brightness) because they are, some of them, formed by the overlapping of two, the others of four of the diaphragm apertures. Thus the apertures that form the extremities of the St. Andrew's cross travel in contrary directions diagonally and meet in *pairs*, whereas those forming the extremities of the St. George's cross travel in opposite directions vertically and horizontally and meet in *fours*, two in each direction meeting in the same point. These are the dots that go to form the prominent part of the pattern while the centre aperture is left by itself to faintly lighten the dark spaces they enclose.

I was at first inclined to think that this screen distance was entirely useless for practical purposes; but, though I am not now prepared to say that it *is*, I think it is possible. Some little time back, on examining a negative with the magnifier after development, it was found to have an altogether abnormal style of dot, although otherwise it appeared in perfect gradation, and on examination I found I had accidentally moved the screen gear until I had got the distance as nearly as possible for what I call the first "pattern." A close scrutiny of the negative led me to think it possible that perhaps that pattern of dot may not be so altogether useless, as it seemed at first, for, although the result is attained in a different manner, the effect is similar in the end. Instead of, as in the ordinary way, a number of bright, luminous dots, increasing in size with exposure until they encroach upon and destroy the dark screen pattern, we have the reverse, the screen pattern, made up of luminous dots, gradually encroaching upon and closing up the dark enclosed squares. The result in the high lights was exactly the same as under ordinary circumstances, and in the half-tones little, if any, difference, except, perhaps, more complete "closing up" and no "chessboard," while the shadows were formed of more or less heavy cross lines with transparent dots intervening. Whether the effect in practice would prove "screeny" I cannot say, but it does not look so in my negative. There is one noticeable point in connexion with this result, namely, the entire suppression of the centre dot; in fact, the centre aperture in the diaphragm, if used in this manner, would be not only useless, but actually injurious. As a matter of experiment I closed the central aperture, when the effect was a much better cross-line network.

A further experiment suggested itself. As equal-sized apertures produced an unevenly illuminated network, it occurred to me that, by graduating the size of the aperture, a uniform effect would result on exposure. With this idea in view, a new stop was made, in which the apertures bore the relation to one another of 1, 2, and 4. The centre was drilled with a one-eighth-inch drill, the corners of the square with a one-sixteenth, and the remaining apertures forming the centres of the sides of the square with a drill measuring ·088 of an inch in diameter, or the *diagonal* of a square of which the side is one-sixteenth. This is a standard size in twist drills that I happened to have, and which I found accidentally to bear the relationship it does to the other two.

Upon trying this stop it fulfilled my expectations and more, for I had quite overlooked the fact that, by making *all* the dots the same size, I should introduce a new line into the ruling, and, in fact, form a pattern of just double the number of lines or dots. Such proved to be the case, for the hitherto scarcely noticeable centre of aperture in its magnified form took as prominent a part in the pattern as the rest, with the result mentioned, a perfect double ruling. With the central aperture closed, this stop gives a perfect transparent cross-line ruling of the normal size that retains its cross-line effect even when greatly magnified.

A photo-micro enlargement of this stop pattern is particularly interesting, for it constitutes, as I have said, a perfect series of equal-sized and equidistant dots; but, though equal in size, they are not quite so in intensity. The difference is not great, but it is marked enough to be readily noticeable, and I think, under certain conditions, would be more so. The central dot of each figure is the weakest very noticeably, and the corner ones are slightly, though not very much, denser than the other four; or, to put it in another way, although the same amount of light has acted in each case, the dots formed by the smallest apertures on the stop give the strongest image, while the weakest comes from the largest. This is entirely in accordance with other experience with the multiple stop with small apertures, as compared with a single stop passing the same amount of light, and, though the difference is not great under equal conditions of lighting, it is greater—in favour of the multiple stop—as the light becomes weaker. For instance, in the micro enlargement referred to, at the extreme margin of the field of the objective, when the light falls off, the central dots of the figure are dropped altogether, although the corner ones further removed from the centre are distinctly rendered.

W. B. Bolton.

PHOTOGRAPHIC FORMULÆ.

Is it permissible to hope that Lord Crawford's most valuable paper on the metric system of weights and measures will rouse photographers to a sense of the great desirability of making a radical change in the system or want of system they adopt when they wish to convey to the brother workers a knowledge of the proportions in which they mix the ingredients for any particular process they are explaining? Weighty though his authority is, it is to be feared that the action of photographers will be parallel to that of the fishes in the old song, when

> "St. Anthony at church
> Was left in the lurch,
> And went to the ditches,
> Preached to the fishes."

The saint gave them all sorts of good advice:—

> "Much delighted were they,
> But preferred their old way."

So, it is probable, will the photographers act. But there is a word to be said here. The plate-manufacturers, with a few conspicuous exceptions, are the greatest sinners of all; indeed, their action is positively injurious,

in so far as they are wasters of men's time. When I open a packet of plates of a new brand and desire to experiment with them, what possible justification have the manufacturers for putting me or any one else to the trouble either of compounding a series of mixtures according to their own particular formulæ or wasting time, which I choose to consider valuable, in calculating the exact relative proportions of the ingredients to each other, to see whether their solutions agree with or differ from the various stock solutions I already have on my shelves? It is disheartening in the highest degree to have to disentangle the grains, and ounces, and percentages, and grammes, and put them in such a form that I can at once see their relative strengths. I consider myself a fairly expert calculator, but I certainly shrink from the waste of time involved in such arithmetical operations as I refer to.

The representative of a plate-maker called upon me not very long ago with some special plate which he wished me to try. We went into the dark room; I told him the strengths of my pyro solution, my alkaline solutions, my bromide solutions. Oh, no, he could not tell me how to utilise these; he could only say that his formula was the usual one of Nos. 1, 2, and 3, by the pint, or quart, or pint and a half! If the maker thinks, as some say, that the amateur likes these recipes, let him, if he like, plaster the whole of his packet of plates with occultly selected recipes and quantities—nine ounces of this solution, sixteen of that, twenty-five of another, and so on *ad nauseam;* but, in the name of common sense, let every maker reduce his formula to a standard which admits of comparison all round. There is no necessity for him to adopt he metric system if he think it undesirable, but there is absolutely no objection to him bringing all his formula down, either to percentages or to grains per ounce. At present the Briton who is not in close touch with scientific matters will have nothing to do with grammes and cubic centimetres, but most people who have to do with making up formulæ understand the meaning of percentages. When, however, the abstract has to be converted into the concrete, a difficulty often arises, therefore my advice would be for plate-makers to state, in association with every lot of solution they direct to be compounded before using their plates, the exact proportion of the ingredients contained in a standard quantity of solution. In the case of developing solution, which is practically the one instance where most trouble arises, let them tell us how much of each constituent goes to make one ounce of developing solution ready for use: I would join issue with Lord Crawford here. He prefers to assume four ounces as a probable standard quantity, but I am sure he would agree with me in saying that, if all makers would give the grains per ounce, the plan would be fraught with benefit. When any one makes up a fixed quantity of solution, it is generally so many ounces; if, then, he has the proportion of ingredients in one ounce, he has only to multiply the quantity of each ingredient by the number of ounces he is going to make up. If he take four ounces, he at once has to begin to calculate for any quantity not a multiple of four, and ought not to have to do this for one figure beyond the unavoidable.

Those who do not experiment much will possibly not see the weightiness of this complaint, yet it will be easy to bring it home to them. Let us suppose that it is desired to experiment with, say, half a dozen makes of plate; the first thing to do is to make up solutions. Now, if the worker, confining himself, say, to pyro, has stock solutions of pyro, ammonia, carbonate of soda, carbonate of potash, caustic soda, caustic potash, bromide of potassium, bromide of ammonium, of a certain strength—either so much per cent. or so many grains per ounce—he would, with just eight bottles of solution, be able to at once use any maker's formula with only the most elementary calculation if each maker expressed his instructions in grains per ounce or percentages. As the maker, however, does not do this, there are the traditional three courses open. First, he may make up the various solutions according to each maker's many recipes; this would involve the making of about a hundred or so different bottles of solution, which, with the necessary labelling, could not be done under a day or two. Second, he could for his own satisfaction reduce the various instructions to a standard—percentage or grains per ounce—and then be able to use his eight only bottles. This would occupy some hours, and it is thus that the sin of the makers will be shown. Thirdly, he can guess the quantities, or use his own ready-made solutions regardless of their applicability. Is not this third plan the one commonly adopted? and, if so, can the makers wonder that justice is not done to their products?

Possibly it may be thought that enough has been written in a grumbling strain, and I may be asked for something practical. I proceed to offer it. Most of us know that, among not only lady amateurs, but others, the power of computing and calculating is often almost absent, or is grown rusty through disuse; and, for the benefit of these, I append a few rules which I have devised for the purpose of simplifying calculations and proportions.

Let us take first a formula in which the proportions are expressed in percentages. The non-expert says, "A hundred what—ounces, grains, or what?" Here is a rule for converting the abstract into the concrete.

A. *To convert percentage formulæ into grains per ounce.*

Rule: Multiply the percentage figure by 4, and add to the result its tenth part. (This is correct to the $\frac{1}{196}$th part.)

Example, a five per cent. pyro solution: 5 multiplied by 4 = 20, one-tenth of 20 = 2; 20 and 2 = 22. Therefore five per cent. is the same as 22 grains per ounce.

B. *The converse of this—to reduce grains per ounce to percentages.*

Rule: Double the grains per ounce, and add to the result its one-tenth; then place a decimal point before the last unit figure. (This is correct to about $\frac{1}{38}$.)

Example, a 22 grains per ounce pyro solution: 22 doubled equals 44; a tenth of 44 is 4·4, which, added to 44, gives us 48·4; the decimal point placed before the last unit figure gives us 4·84, which is only wrong to the extent of about an ounce in a quart, less than ordinary errors of compounding.

C. *To convert ounces per pint into percentages.*

Rule: Multiply the ounces by 5.

Example, pyro solution an ounce bottle made up with water to a pint of liquid: 1 multiplied by 5 = 5; therefore the solution is five per cent. and so on.

I do not intend this paper to drift into a treatise on arithmetic, but it is worth pointing out (bearing in mind that, when percentages are mentioned, it is assumed that the concrete quantities are all expressed in one mutually convertible unit—say, ounces), when a formula is given in percentages, no calculation is needed to convert it into grammes and cubic centimetres, as the following example will show:—

Pyro	0·5	part.
Carbonate of potash	1	,,
Bromide of potassium	0·5	,,
Water to	100	parts.

This is exactly the same thing as—

Pyro	0·5	gramme.
Carbonate of potash	2	grammes.
Bromide of potassium	0·5	gramme.
Water to	100	cubic centimetres.

Those conversant with these matters will see where, in dealing with liquids of different specific gravity from water, some revision would be needed; but excessive minutiæ should be avoided in popular calculations, and I offer the rules on the broad basis of useful working methods, sufficiently near to exactitude; and I venture to express a hope that they may prove really useful. With regard to plate-manufacturers, I conceive that it is their bounden duty to amend their ways in one of the directions indicated.

G. Watmough Webster, F.C.S., R.P.S.

PHOTOGRAPHIC WORKERS AT WORK.

XIX.—The Carl-Zeiss Stiftung.

The old town of Jena, in the Principality of Weimar, whose reputation until recent years has depended upon its ancient University and the men of literature and science who have made it their home, is now acquiring additional fame as the seat of certain industries, which have made most important contributions to the advancement of research. At the head of these is the Carl-Zeiss Stiftung, the outcome of a small business, founded in 1846 by Carl Zeiss, for the construction and repair of instruments used at the Jena University. For this work he had specially prepared himself by a previous course of study in natural science and mathematics at the University. In this way he was brought into contact with the professors, and it was probably due to the influence of Schleiden, the botanist, and Schacht, his assistant, that Carl Zeiss devoted himself chiefly to the study of optics, and made the improvement of the microscope the business of his life.

Prior to 1850 the only optical appliances made by the firm were simple magnifiers from ordinary window glass, but ten years later the Zeiss microscopes had reached a degree of perfection warranting their comparison with the best instruments made by Oberhäuser of Paris. The business prospered, and in 1866 the staff had increased to twenty hands. Zeiss endeavoured to raise the quality of his work by two special means. He systematically trained his workmen and apprentices to a high standard of precision, and he also endeavoured to render the instru-

ments of his make independent of the dexterity of individual workmen, by supervision on higher scientific grounds. But, notwithstanding the ardour with which he prosecuted his studies in mathematics and physics, he was at last compelled to recognise the fact that he could not efficiently superintend his business and yet devote the necessary time to these pursuits. Early in the fifties he secured the services of the mathematician Barfuss, but the calculations which were then undertaken for the improvement of the microscope proved fruitless. Undaunted, he pursued his course, and late in the sixties made a fresh attempt to realise his ideas, this time happily with the help of Abbe, who afterwards became Professor at the Jena University. Abbe's great skill in mathematics at last crowned Zeiss's ideas with success. The correct theory of the microscope was worked out, and the details of workmanship were systematised and brought under control. Empirical methods were superseded and the way at last prepared for an important extension of business. Although Zeiss's microscopes were expensive instruments as compared with others of German manufacture, the sales increased so rapidly that in 1886 the number made had risen to 10,000. Ten years later this total had been increased by a further 17,000. Meanwhile Abbe had been taken into partnership, and, the business having gradually assumed a wholesale character, the works were transferred in 1880 to their present site, which has been subsequently enlarged, to afford scope for the further development of the industry. In the year 1876 Abbe drew attention, in an exhibition report, to the fact that the defects of microscopic objectives were dependent upon the optical properties of the crown and flint glasses used in their construction, and that further improvement rested upon the possibility of making other kinds of glass whose refraction and dispersion would enable opticians to eliminate the secondary spectrum. A few years later he met with Dr. Schott, of Witten, and numerous experiments were made for the purpose of surmounting these difficulties.

The outcome of these experiments was the production of the now celebrated Jena glasses, which have been the starting point of a fresh advance in the perfection of optical instruments. The important improvements effected in the microscope through Abbe & Schott's discoveries were soon extended to the field of photographic optics. The desirability of rendering a large industry independent of the fluctuating demand for a particular class of instruments induced the firm, in 1890, to open a department for the manufacture of photographic lenses. The anastigmats of Carl Zeiss achieved a great success. Series specially adapted for various purposes were introduced, and their popularity and the importance of this branch of the business may be inferred from the fact, that in the year 1895–6, one-fourth of the total value of the instruments made by the firm consisted of photographic lenses. Other departments have since been opened, and comprise the manufacture of optical measuring instruments, telescopes, field glasses, &c.

Carl Zeiss refrained from taking out any patents for the many important improvements made in the microscope, and it is now a rule of the firm not to protect any inventions of purely scientific interest or that may tend to the advancement of research. The patents secured by the firm of recent years relate to instruments used for ordinary practical purposes, and the innovation has been partly prompted by a desire to protect fine technical work from cheap competition. But, although the inventions connected with photographic lenses have been patented, the firm has not retained its exclusive right of manufacture. Under certain conditions licences have been granted to leading opticians of high standing, and the anastigmats have thus been made by Messrs. Ross & Co., Voigtländer & Sohn, the Bausch & Lomb Optical Company, E. Krauss & Co., Karl Fritsch, and F. Koristka. This system of licences might be thought inimical to the interests of the patentees, and, doubtless, it stimulates considerable rivalry. But there are compensating advantages. The inventors are compelled to maintain a high standard of workmanship, and the photographer derives some benefit from this limited form of competition.

In connexion with photographic optics Messrs. Zeiss's latest invention is the Planar, a lens of very large angular aperture, possessing at the same time great flatness of field and fineness of definition. The angle covered is somewhat narrower than that of other series of anastigmats, but the special qualities of this lens will render it especially valuable for photo-micrographic work and other purposes where great rapidity and exceptionally fine definition are essential.

We recently had the pleasure to visit Messrs. Zeiss's works, and, under the guidance of Dr. P. Rudolph, the head of the photographic department, inspected the several blocks of buildings which it has been found necessary to erect to meet the growing demand for their instruments. The works now give employment to 850 hands, and are excellently planned for the special requirements of the business and for the health and comfort of the workmen. The large volume of business permits of considerable subdivision of work and the manufacture of many subsidiary articles. The castings for the brasswork, &c., are all made upon the premises, and there are workshops for plating, lacquering, engraving, cabinet work, polishing, locksmiths, &c. In the optical and brass-finishing departments a very high standard of accuracy is maintained. Many of the users of photographic lenses would be surprised at the smallness of the margin within which the curves must be ground to secure the excellence of modern lenses. The following standards to which the men must work will give some idea of the precision that must be observed, especially when it is remembered that the lenses of some of the microscopic objectives do not exceed a few tenths of a millimetre in diameter. The lens surfaces must not deviate from mathematical sphericity by more than $\frac{1}{10000}$ mm., and the thickness must be true within $\frac{1}{50}$ to $\frac{1}{100}$ mm. In mounting the lenses the distance of separation must be true within $\frac{1}{50}$ to $\frac{1}{100}$ mm., and the centering must be accurate within some thousandths of a millimetre. On reaching the studio used for testing the photographic lenses, we had the opportunity of trying the qualities of the new Planar upon some test objects. We were also shown some enlargements of instantaneous photographs of galloping horses, and, notwithstanding the brevity of exposure, these pictures were marked by exceptional detail. Some photographs of microscopic slides taken direct, upon a scale of enlargement exceeding thirty diameters, were as crisply defined as though the objects were of large dimensions and photographed in the ordinary way. The new portable binoculars and stereo-telescopes also attracted our attention as being a marked advance upon the older instruments in giving a larger field and enhanced stereoscopic effect. The tubes carrying the object-glasses may be given greater separation by means of a hinged joint. The image is transmitted to the astronomical eyepieces by sets of reflecting prisms, which at the same time erect the inverted image. As the object-glasses may thus be placed farther apart than the eyepieces, greater relief may be obtained in examining distant objects. These binoculars are becoming very popular, and some thousands have already been sold.

For some years past the Carl-Zeiss Optical Works have not been carried on as a private undertaking. The founder of the firm died in 1888, leaving his son, Dr. Roderich Zeiss and Professor Abbe joint partners in the business. In the following year Dr. Roderich Zeiss retired, and Professor Abbe then decided to reorganize the business and found the Carl-Zeiss Stiftung. The firm has been converted into an industrial trust, with the Duke of Saxe-Weimar as Chairman, whose duties partake of the dual character of trustee and referee. Professor Abbe appears to have been actuated by a desire to place the important industry, which has been built up upon a permanently organized basis, and in such a manner that it shall conduce to the welfare of the *employés* and the advancement of science. When the reconstruction was effected, the various interests in the business were capitalised, and became charges at a fixed rate of interest. At the same time Professor Abbe terminated his ownership, and voluntarily became one of the staff. The workmen enjoy various privileges, some of which are probably unique, and their position contrasts favourably with any other German industry. The period of apprenticeship is four years, and the men are then gradually transferred to the permanent staff if they have become skilful workmen. A sick and burial fund, managed by the men, has existed for many years, and the firm adopted a scheme of old-age pensions prior to the compulsory State system now enforced in Germany. Provision has been made for grants to the Jena University from the surplus profits, and that institution has already received substantial sums from the firm. We wish the industry continued prosperity, and trust it may do further good work.

VIOLATING THE FITNESS OF THINGS.

One need not go far, nor do much in the way of searching, to find proof ample, in the shape of photographs and their reproductions, of the frequent—the common, indeed—violation of the natural and the fit.

Here, for instance, in a current magazine is a railway article, one of the illustrations in which is the photograph of an express train, taken whilst it was travelling at the rate of fifty or sixty miles an hour. As an example of instantaneous work it is very good, still it grates upon our sense of truth, in that no eye could possibly have seen the clear detail shown, under the conditions of taking. It should have been taken with the train about to start, or, if that were impracticable, owing to insufficient light, or any other cause, blocked in the open by a signal set

against it. Whether a due and artistic suggestion of the motion could be given by photography is doubtful. Let men anxious to pioneer try; but, if out of the question in an artistic way, far better let it be, as beyond or outside of, the special powers of the camera. As a dry recorder of fact, the camera, admittedly, can be made of first use and importance in the direction of showing arrested action; would be of great value in illustrating such features as strokes in golf, positions in batting, bowling, and fielding, in cricket, and so on; but this is a different matter altogether, in there being no attempt at anything pictorial or artistic, and, in the particular, one, special point aimed at being successfully accomplished; which was not the case in the train illustration, of showing rapid motion.

To the photographer, knowing the difficulties conquered, the picture referred to might appeal, and bring out an expression of admiration; but it must not be forgotten that the great mass of people at large will not look upon it from such a narrow point of view, and, knowing nothing of the technical difficulties, are not to be led by any one such issue into admiration, but, looking upon it as a whole, express their opinion, favourable or otherwise, upon the broader ground as to whether everything about it is in keeping and character. To satisfy this should be the higher aim, and results to fulfil the requirement must have something of the architect's design about them, as well as the builder's particular work; or otherwise we stand the chance of having, as it were, a Norman doorway and Gothic windows in the same building, a Gothic front crowned by Byzantine domes, or some other untoward feature introduced that grates more or less upon our sense of the fit. The pity of it is, that so much excellent work is wasted so often upon a wrong design, or without a design at all. Such a style of working we regard in the ordinary affairs of life as decidedly foolish, and common sense should dictate the introduction of the same feeling into photographic directions; indeed, in the main, success is far more dependent upon the exercise of this same common sense, than upon being well posted up in the special laws and rules of art.

Here is a bit of landscape, for instance, that we have seen many a time before, but which never appealed so closely to us as to-day, and the cause of which appeal must be, some particular light-filtering, or modifying, quality in kind and amount of cloud. Does it not stand to reason that, if we wish to experience the same feelings of pleasure in looking at the picture determined upon as we do at the reality, the important factor of sky should have its fair share in it? Yet how rarely, by comparison, is this thought of, and, when thought of, instead of the obvious and common-sense plan of immediately exposing a second plate upon the sky, and using that, we must needs introduce our own stock skies, must enter into competition with nature in building clouds, and matching them with earthly shadows! and are surprised that the result is not quite the thing! or, worse, have the ineffable assurance to feel pleased and satisfied with it!

"Sunset effects," with the sun evidently some time off setting, and moonlight ones without a moon at all, though less common, are equally deplorable, and, however carefully built up and doctored, have an inherent air of unreality about them that readily brands them as bastard productions, and gives rise to dissatisfaction.

Are not our lanes, landscapes, and country bits, again, so very desolate-looking in the absence of life in them, or worse than desolate in the introduced and carefully arranged life? The country is quiet, but not lifeless; there is some amount of life travelling along the quietest lanes, and it is a suggestion of its particular kind, and small, deliberately moving amount, that should be given to complete the picture and satisfy the mind, or it comes to a kind of unconscious conclusion of the unfitness of things, in that it is a useless road or lane, in not being used at all. No one, probably, would go so far wrong as to introduce a town dweller, in gloves, cuffs, frock coat, and top-hat, chaffing a milkmaid, into a rural scene; but worse is oftentimes done in bringing in a rustic trying to look at his ease doing nothing, or over-consciously doing what he has been directed to.

It isn't a matter for deliberate arranging so much as persistent watching for the favourable chance, and, although tedious work, when we do catch the timber wain coming round the turn, or the cows filing in through the gate for evening milking, we are repaid for it, for the picture has now the spark of life in it, a natural, every-day life, and not the Frankenstein carefully composed and arranged one.

The same thing applies in town as well as country; we see the fine old church shown, with closed doors, or with open doors, but no one in, or going in; or the town hall, the centre of the town life, the corporate soul, if a corporation have a soul, and which we associate naturally with the bustle of council, court, and assize, is represented with but one or two individuals about. It's all very well taking it at its easiest, but what is the use if the suggestion of the centered interest of the town be absent? Why cannot we get the living value? Surely plates are rapid enough, and the true opportunity, in view of the added interest of the result, well worth a little thinking over and waiting for!

Finally, with regard to figures and portraits, where it is easiest of all to violate the fitness of things, or where, perhaps, its detection is easiest, for a mistake, or a slight exaggeration, in a face or pose is so very evident to all; and no less marked than the ease with which such a blemish can be detected, is the feeling of satisfaction felt in finding it, a result, possibly, of the Calvinist's "Old Adam," and "fall from grace," in us. We cannot help it, I suppose, and the best thing that can be done is to give a first place to persistent thought in keeping out as much unfitness as possible.

Supreme naturalness is, without doubt, the keynote of successful portraiture, but impossible of attainment in the majority of cases, owing to self-consciousness, and the fatal desire to look as well as possible—or a little better. The piquant smile turns into a simper on the young girl's face; his worship the mayor's air of dignity is apt to show, in a touch of woodenness, its assumption for the occasion; whilst the young man in the glasses next to him would probably look more intellectual had he made a little less effort to appear so. This to a degree we must accept as inevitable, although a good photographer, by his manner, knowledge of human nature, and non-interference with natural pose, can greatly minimise it; but it should be within the reach of all not to show us old people without wrinkles, smug cheeks and pug noses classically lighted, and faces, generally, showing the evident marks of maximum amount of retouching. There is quite as much, often, in attention to minor matters of accessories; they are all very well in the right place, but all so very wrong in others, that they may be the cause of an unfavourable feeling against a picture otherwise good. That old gentleman, for instance, only too clearly shows in his face that he is trying to read an album, even if we could not guess it to be one by its appearance. Why not have given him a book, in a paragraph of which he might have half lost consciousness, to the unspeakable gain of the picture? The stout and motherly woman, again, how can we possibly conceive of her as natural, posed by the side of that palm? If we cannot introduce a crumb brush or a feather duster instead, why, let accessories go altogether, for it is far better to have none at all than false ones.

It is clearly, again, a question of common sense and a little thinking; and although the professional, as the one chiefly interested, with bread and cheese to find for himself, wife, and children, can hardly be expected to go in for trying many experiments, yet he may, in portraying a well known man in a natural and easy position, in place of the conventional one, which is decidedly neither one nor the other, turn out work that, judiciously displayed, would mean a step or two up the ladder of pre-eminence in a town, and the equally important and satisfactory lifting of prices to a wider and higher range of customers. J. Rees.

ASTRONOMICAL PHOTOGRAPHY WITH PHOTO MICROGRAPHIC APPARATUS.

[Transactions of the American Microscopical Society.]

On October 20, 1892, occurred a partial eclipse of the sun, and my heliostat was placed on a shelf outside a south window. Within the room was a portrait lens of 81 inches focus and a microscope in the small axial line. The substage condenser was removed, and a camera connected with the eye end of the microscope tube. Such sunlight as fell on the mirror of the heliostat was reflected through the portrait lens. The portrait lens projected an image of the clouded sun's disc about $1\frac{1}{12}$ inches in diameter, in the plane usually occupied by an object on the stage of the microscope. The tiny image was itself projected by a microscope objective of $1\frac{1}{2}$ inches focus to form a second image, $2\frac{3}{8}$ inches in diameter, on the ground glass of the camera. The clouds made sharp focussing impossible. Only an imperfect focus was obtained. The clock of the heliostat kept the image steadily on the ground glass.

During the eclipse sensitised plates were substituted for the ground glass. Exposures were made when the clouds were thin enough to permit. Thus six negatives were secured. The first print shows the moon's black disc, advancing apparently from the north-east across the sun's disc, while the second shows the moon's disc, passing off to the west.

This is the first record of an attempt to use photo-micrography astronomically. All of the necessary apparatus could be easily packed in a trunk. If an unaided telescope objective were used to project an image of the size obtained, a focus of 21 feet would be required, and the lens would have a diameter of about 16 inches. Such an objective, properly mounted, would result in an instrument nearly half as large as the great Lick telescope, with its photographic objective. By using a portrait lens having a focus of 15 inches or 16 inches, a size commonly used for cabinets in photographers' studios, instead of the portrait lens, the apparatus will produce a negative image equal in size to that produced by the unaided Lick lens; or, leaving the portrait lens in place, the same result could be obtained by substituting for the microscope objective of $1\frac{1}{2}$ inches focus another of about double the power, one of $\frac{3}{4}$ inch focus. The Lick instrument has a tube about 50 feet long and 42 inches in diameter, while this apparatus has two tubes less than 1 foot long and about 1 inch to 6 inches in diameter respectively. To the smaller tube is attached a camera with a bellows extending from 1 foot to 6 feet. Stability and freedom from vibration are very easily obtained with the small and short apparatus. The difference in cost is enormous. In several respects the photo-micrographic arrangement has advantages over the great Lick photographic instrument.

If, however, we turn to matters of light and separating power, the

very great superiority of the Lick objective is seen. The results given in the following tabular comparison are only approximately accurate. The loss light suffers by absorption as it passes through glass and by reflection at incident surfaces is not taken into account, the Lick objective consisting of three thick lenses, and the photo-micrographic arrangement having more than twice as many, but comparatively very thin, lenses and the mirror's reflecting surface.

	Lick Objective.	Larger Portrait Lens.	Smaller Portrait Lens.
Diameter of objective	33 in.	3·75 in.	2 in.
Focus of objective	550 in.	15 in.	8 in.
Focus divided by diameter	16·66	4	4
Relative value of light in first image	1	16	16
Size of first image	5·1 in.	·1395 in.	·0744 in.
Total equivalent focus, 550 in., divided by diameter	16·66	147	275
Relative value of light in final image	1	$\frac{1}{77}$	$\frac{1}{277}$
Time of exposure, eclipse of sun (about)	$\frac{1}{1000}$ sec.	$\frac{1}{20}$ sec.	$\frac{1}{5}$ sec.
Separating power	1	$\frac{1}{8·8}$	$\frac{1}{16·66}$

Other things being equal, separating power varies with the aperture or diameter of the objective. If the Lick objective, having a aperture of 33 inches, could barely show a certain double star as two distinct stars, it would be impossible for any objective having an aperture of 4 inches or 2 inches to show such a double star as two distinct stars. A star apparently single when seen through any objective having an aperture of 2 inches might be seen to consist of sixteen or seventeen stars in line, almost touching one another when seen through the Lick photographic objective. A star apparently single when seen through any objective, having an aperture of $3\frac{3}{4}$ inches, might be seen to consist of eight or nine stars in line, almost touching one another, when seen through the Lick photographic objective. The power of resolving an apparent single star into two or more, or of showing the details of sun spots or other objects, is known as separating power. A superior correction of aberrations is now possible in lenses made of small discs of glass, which are produced in great variety as to optical properties, a variety not yet realised, in large discs.

A. Clifford Mercer, M.D.

ROYAL PHOTOGRAPHIC SOCIETY.

Attendances of Officers and Members of Council during 1897.

Number of Council Meetings.	Number of Committee Meetings.	Name.	Number of Attendances at Council Meetings.	Number of Attendances at Committee Meetings.
16	19	The Earl of Crawford...	6	9
16	4	T. R. Dallmeyer	14	4
16	3	Chapman Jones	16	2
16	1	John Spiller...	3	0
16	1	Sir H. Trueman Wood .	3	1
16	19	G. Scamell	15	18
16	19	H. Wilmer	16	15
16	2	E. Clifton	10	1
16	7	F. Ince	1	0
1	3	Capt. W. de W. Abney .	0	0
16	4	T. Bedding	15	3
16	1	T. Bolas	13	1
16	3	F. A. Bridge...	10	2
16	1	J. Cadett	8	0
16	1	A. Cowan	5	0
16	4	W. E. Debenham ...	13	2
12	0	A. Haddon	11	0
13	0	F. E. Ives	8	0
13	1	Rev. F. C. Lambert ...	5	1
16	19	A. Mackie	15	15
16	10	J. W. Marchant	12	8
11	11	J. C. S. Mummery ...	9	10
13	2	A. Pringle	8	0
16	5	J. A. Sinclair	13	5
13	0	A. Spiller	8	0
16	1	J. W. Swan	0	0
16	11	E. J. Wall	11	7
13	0	H. Snowden Ward ...	9	0
16	1	L. Warnerke	9	0
16	1	P. L. Waterlow	0	0

MICRO-PHOTOGRAPHS.

[Translation by Henry Dietrich.]

Although not so much in demand as in former years, these extremely small photographs, so often found in ivory watch charms, pen-holders, &c., are inquired about quite frequently by professionals and amateurs. How are they made?

The instruments used are an objective of very short focus, and a small camera with a movable holder. This camera and the original negative to be reduced are fastened to the opposite ends of a long, heavy board, says *Anthony's Bulletin*, similar to the arrangement in use for the making of lantern slides. The camera must be movable in the direction of the objective axis, and the negative must be fastened to a vertically stationary stand. It is then uniformly lighted from the reversed side by either daylight or artificial light. Some difficulty is experienced in getting a sharp focus of the picture. The ordinary ground glass cannot be used, not being fine enough, and the best medium for this purpose is a perfectly plain piece of glass, coated with pretty strongly iodised collodion, and sensitised in the silver bath, the same way as in the wet process. The focussing is done with a small lens or even with a microscope. The plate intended for the picture has, of course, to lay in exactly the same plane as the plate used for focussing. To be certain on this point, it is best to focus upon the picture plate, inserting for this purpose a yellow glass between objective and plate. If satisfactory sharpness has been obtained, the apparatus is once for all in order for these distances. Bromide of silver gelatine plates, on account of their comparatively coarse grain, are not suitable for these small pictures, and the collodion process has to come to the rescue.

Dagron in Paris, a prominent specialist in this branch, gives the following directions: A glass plate is well rubbed on both sides with a mixture of 1 litre of water, 50 grammes powdered chalk, and 200 cubic centimetres of alcohol, applied with a cotton tuft, after which it is gone over with a dry cotton tuft, and thereafter cleaned with a fine chamois leather. The side used for taking the picture is then finally cleaned with old collodion. The collodion must be a little thinner than ordinarily used for wet plates. Dissolve—

Ether	400 c. c.
Alcohol	100 ,,
Collodion cotton	3 grammes.
Iodide ammonia	4 ,,
Bromide ammonia	1 gramme.

The plate coated herewith is silvered in a silver bath of seven to eight per cent. From twelve to fifteen seconds are sufficient for this.

The plate is then washed in a tray or under a faucet with distilled water, to liberate it from the free nitrate of silver, and is afterward placed upon blotting-paper, to drip off. The still moist plate is then coated with the albumen mixture:—

Albumen	150 c. c.

Add—

Water	15 c. c.
Iodide potassium	3 grammes.
Ammonia	5 ,,
White sugar	2 ,,
Iodine	A small cake.

With a wooden quirl this is beaten to snow (foam) for about ten minutes, after which it must stand for fourteen hours, to settle. The albumen is poured on to the plate the same as collodion, and the surplus filtered back. After drying, the plate is laid for fifteen seconds in a silver bath, consisting of 100 cubic centimetres of water, 10 grammes nitrate of silver, and 10 cubic centimetres of acetic acid. The plate is then carefully washed and left to dry. If carefully kept, it will retain its properties for years. To the second silver bath, when it assumes a dirty colouration, is added 25 grammes kaolin to each 100 cubic centimetres, by shaking the same well, and the bath is then filtered, after which a little nitrate of silver and acetic acid is added.

After each exposure the plate-holder is moved a certain length, so that ten or more reproductions are obtained upon one and the same plate. The time of exposure depends upon the density of the negative and differs according to light. It varies between a second and a minute.

The developer is composed as follows:—

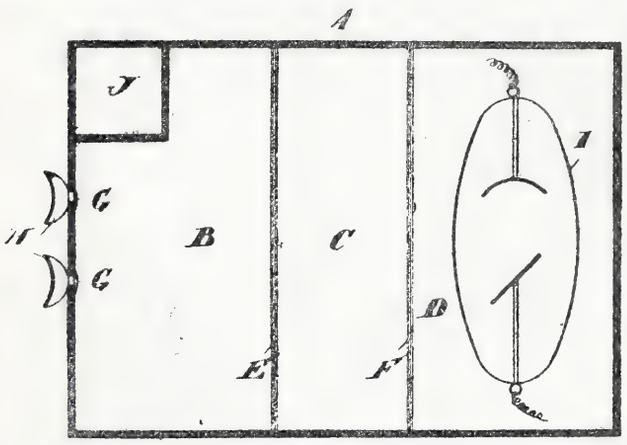
Water	100 c. c.
Gallic acid	0·3 gramme.
Pyro	0·1 ,,
Alcohol	2·5 c. c.

The exposed plate is immersed in this bath, and after ten to twenty seconds, from 1 to 2 drops of a two per cent. nitrate of silver solution are added to each 100 cubic centimetres of the solution, whereby the picture becomes visible. To follow the process exactly, the plate has to be laid —in yellow light—under a weakly enlarging microscope, and only a few drops of the developer are put upon the same. As soon as the picture has reached the desired strength, it is rinsed and fixed in a fixing soda solution, 1 : 5. Ten to fifteen seconds are sufficient, generally. Finally it is washed well.

After the drying of the plate, the several small pictures are cut with a dismond and fastened to the small enlarging lenses. For this purpose, the latter are laid upon a metal plate heated from underneath, a drop of Canada balsam is put to one end of the same, and, after it has become soft, the small diapositive is taken up with a pair of fine pincers, and is gradually put in contact with the fastener. Both glasses are then allowed to lie until the fastener has become hard. If bubbles appear, the whole method of fastening the picture has to be repeated.

DOWSING'S APPARATUS FOR PRODUCING X RAYS, AND SHOWING THEIR EFFECT ON A PREPARED PLATE OR SCREEN.

A is a box divided into three parts, B, C, D, by two partitions, E, F. The part or division, B, is blackened inside, and is provided at one end with eyeholes, G, preferably provided with eyeshades, H, and at the other end with a fluorescent screen, E. The part or division, C, is intended to receive the object to be exposed to the X rays. The part or division, D, contains the Crookes tube, I, and is provided with a side, F, opposite to the screen, E, made of wood or other material which is transparent to the X rays. The entire apparatus must be made impervious to ordinary light except at the eyeholes, G. J represents a coin-freed apparatus of any suitable construction into which the electrical connexions between the battery or other source of electricity and the primary of the Rhumkorf coil are brought and arranged in such manner that when a coin is dropped into the coin-freed apparatus, J, the said connexions are put into circuit with the source of electricity. The said coin-freed apparatus is also provided with a clockwork or other suitable time-measuring



apparatus, which is liberated or set going by the introduction of the aforesaid coin, and cuts off the supply of electric current at the expiration of any predetermined time.

A counter or other numerical indicator may also be attached to the apparatus to indicate the number of times the apparatus has been used.

The electricity required for working the Crookes tube may be obtained from a primary or secondary battery, or from a supply circuit. It is caused to pass through the primary of a Rhumkorf induction coil, and the high-tension current from the secondary of such coil is led off to the Crookes tube.

The action of the apparatus is as follows:—

Assuming that the object to be submitted to the X rays is placed in the division, C, of the box, A, between the fluorescent screen, E, and the partition, F, which is transparent to the X rays, on introducing an appropriate coin into the coin-freed apparatus, J, the electric circuit is completed and the X rays are produced in the Crookes tube, I, and are reflected in the usual way so as to throw the shadow of the object on to the fluorescent screen, E, and, on applying the eyes to the holes, G, such shadow will be clearly seen on the screen. The introduction of the coin into the apparatus, J, not only closes the electric circuit, but also liberates the clockwork or other time-measuring device which is then set in motion by its spring, weight, or other actuating means, and breaks the said electric circuit automatically at the expiration of a predetermined period of time, such as one or two minutes, for example, during which the effect of the X rays will remain visible on the screen, E, through the eyeholes, G.

The coin-freed apparatus, J, may be provided with suitable devices for winding up the clockwork or other time-measuring device before the coin is inserted in order to secure the full maximum period of action of the apparatus in return for each coin inserted.

It will be obvious that, instead of the electric circuit being closed directly by the insertion of the coin into the apparatus, J, it may be closed by the time-measuring device after the same has been liberated by the coin, and then opened by the said device at the end of a certain period of time as above explained.

When an influence machine is used in place of a Rhumkorf coil the action of the coin-freed apparatus is, in the first place, to release mechanism by which the influence machine can be operated by the person using the apparatus or otherwise, and secondly to control the time during which such influence apparatus can be operated.

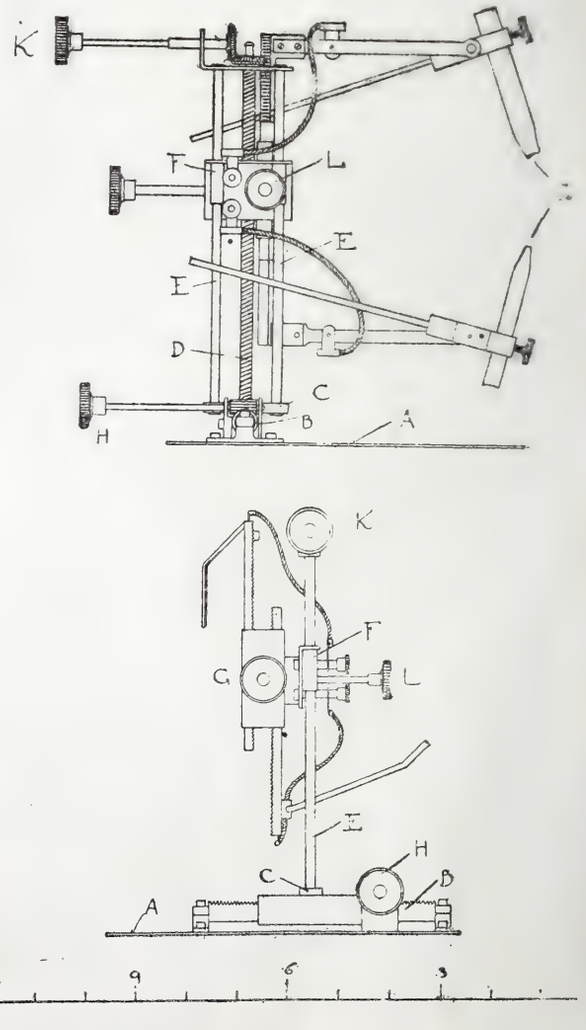
Instead of a Rhumkorf coil a suitable transformer may be used where an alternating current supply is available, in which case the secondary circuit with a suitable condenser is connected directly with the Crookes tube, and the automatic coin-freed apparatus is arranged to open and close the primary circuit which receives the alternating supply.

The object or objects intended to be exposed to the X rays may be inserted separately into the division, C, or one or more objects may be placed on a disc or other device mounted on an axis which can be rotated by the person using the apparatus so as to bring either of the objects at pleasure into the line of sight, or the objects may be mounted on a slide which can be drawn out and pushed in by the person using the apparatus, or they may be presented or held between the screen, E, and the Crookes tube, I, in any other suitable way.

SMITH'S IMPROVED TRAY FOR THE ILLUMINANT IN OPTICAL LANTERNS AND FOR CENTERING.

The tray consists of a bedplate, A, to fit the guides in the lantern. On this plate is fixed a bar of metal, B, with a toothed rack along one side; two bars may be used if desired. On this bar is a carriage, C, provided with a pinion to engage with the rack, and a suitable handle, H, to turn the pinion. By this means the illuminant is made to move parallel to the bedplate.

From the carriage two or more rods, D, E, rise to suitable height. One of these rods, D, is screwed, and is free to turn, a proper handle, K,



being provided by which to turn it. Threaded on the upright rods is a metal plate, F, with plain and screwed holes to fit the rods. When the screwed rod is turned, this plate moves up and down, the direction depending on which way the rod is turned. On the plate a suitable arm to carry the illuminant is fixed. By means of the screwed rod and guides, the illuminant is made to move at right angles or perpendicular to the bedplate.

When an electric arc lamp is used, there is provided a movable carrying arm, L, so that the lamp can be turned in a circle with the arm as a centre. By this means the carbons can be used in a perpendicular position or at any anple with the bedplate, A, which may be desired. A thumbscrew at L is provided to lock the lamp in place.

The drawings show a tray, with an arc lamp, with all adjustments.

A is the bed plate, B the toothed bar for the parallel and horizontal adjustment.

C is the carriage.

D the screwed rod, E plain guide rods.

F is the plate for carrying the lamp.

G is an electric arc lamp in place.

H is the handle for the parallel and horizontal motion.

K is the handle for the perpendicular motion.

L is the thumbscrew for adjusting the position of the lamp.

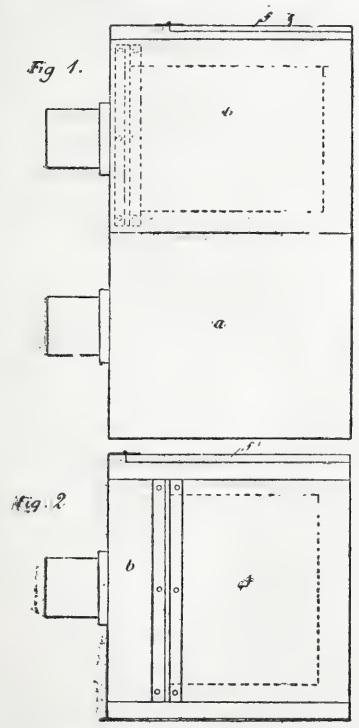
VIEW-FINDERS FOR TWIN LENS OR DIVIDED CAMERAS: STANBURY'S IMPROVEMENTS.

FIG. 1 is a side elevation, fig. 2 is a plan, fig. 3 is a part transverse section, and fig. 4 is a similar section with some of the parts in a different position.

Mr. Stanbury says: The camera I form as a rectangular box divided into two chambers, *a* and *b*. To the front of the lower chamber, *a*, I attach a lens for the purpose of taking the picture.

To the front of the upper chamber, *b*, I attach a second lens to act as the finder.

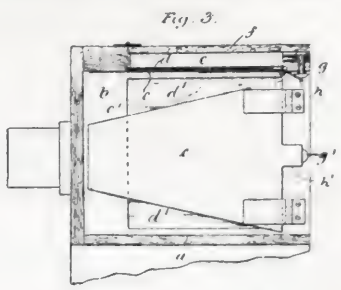
In two of the sides of the upper chamber, *b*, adjacent to the front and at right angles to each other, I form suitably sized openings, *c* c^1, and I fit into such openings finely ground plates of glass or celluloid, *d* d^1. These form what are commonly known as focussing screens. At or near

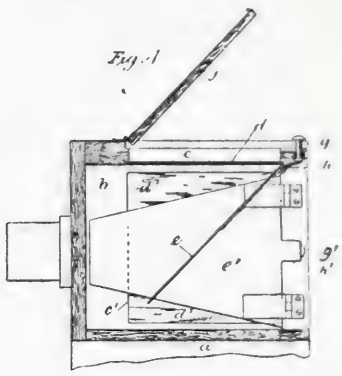


the edge of each of the openings, *c* c^1, which is furthest from the lens, I hinge reflecting mirrors, *e* e^1, which can be allowed to fall to any suitable angle in order to project the image formed by the upper lens on to the screen. When the camera is not in use I cover each of the focussing screens, *d* d^1, with doors, *f* f^1, and so arrange that when one of these doors is opened, the mirror in connexion therewith shall fall into a suitable position for use, and that, when the door is closed, the mirror shall be moved into a position parallel to the screen and out of the way of the second mirror, should it be required to use it. This I do in the following manner:—

The door when closed rests on the head of a pusher, *g* g^1, the lower end of which rests on a finger, *h* h^1, projecting from the back edge of the mirror. Thus, by closing the door, the mirror is held up in the required position as shown, and may be there secured. Upon opening the door the mirror falls automatically into the required position for work, at the same time raising the pusher into position to be acted upon when the door is again closed. In place of the above arrangement the mirror might be raised and lowered by cords, or any other suitable device. In fig. 3 the camera is shown closed, and with the mirror raised. In fig. 4 the camera is shown in use, with the door open and the mirror lowered.

When holding the camera in a horizontal position the operations will





be exactly the same, except that the door, f^1, screen, d^1, and mirror, e^1 will be used in place of *f*, *d*, and *e*, the arrangement being such that it i impossible for the parts to conflict.

A NOVELTY IN INTERIOR PHOTOGRAPHY.

[Transactions of the Edinburgh Photographic Society.]

THE "novelty," as I am told it is, that I am to speak about to-night embodies no new and startling discovery, but merely a combination of ordinary photographic operations familiar enough separately, but not usually associated for the production of one and the same picture. Instead of a single exposure by daylight, or by means of an artificial illuminant, the negatives from which prints are exhibited were taken by means of a double exposure, or rather by two independent exposures, the first in the evening after dark, the second in the early morning soon after sunrise; the former constituting, as it were, the basis of the whole operation, the latter being in a sense only supplementary, but in point of fact the secret by which the special effect aimed at has been more or less successfully secured. The object, as will appear from the examples on the wall, has been to obtain certain interior views in which windows, large or small, form in each case a conspicuous feature.

The difficulty peculiar to such subjects is one with which every photographer is only too familiar. Halation, the *bête noire*, as it has been rightly called, of the photographic art, is scarcely ever absent from pictures in which windows have to be faced—unless, indeed, they can be covered over for the time being, and an otherwise excellent result may be marred by the unwelcome grey halo fringing the window frame, or the impenetrable blur beneath which some portion of the picture is hopelessly obscured. It is this particular evil that the combination now to be explained most unquestionably prevents, and that without any serious increase either of difficulty or risk. My first attempt at discovering a solution of the problem how to obtain a photograph of a window and its surroundings within and without free from the blemishes adverted to was in the kitchen of a house in which I frequently reside when in Westmoreland. The apartment, quaint and old-fashioned, with massive beams overhead, and a long low Elizabethan window at one end, looking due west, is admirably suited for the purpose. Outside, a profusion of trees and shrubs tones down the glare of the sun, and the window itself is further shielded by sprays of clematis pendent from the supports of a verandah above. In spite of these advantages, my first efforts were failures so far as anything *external* was concerned. Misled by the apparent dulness of the early morning light, the secondary exposures were much too long, and outside objects appeared for the moment only to vanish, as clouds usually do, before development was complete. My first experiment, though a failure in this respect, proved at least that halation was not insurmountable. This was a great point gained. It remained to cut down the daylight exposure to the shortest possible limit, and I came to the conclusion that there would be no more difficulty in securing a view of the lake and mountains from within than from without, with the additional and novel charm of its being framed

in by the window with which, as seen from within, it was naturally associated. So little had I to fear from halation that I speedily discarded the use of backed plates, as involving unnecessary trouble in preparation, and found the results quite as satisfactory as before.

For the first exposure I have invariably used the Todd-Forret lamp, with which all here are, doubtless, familiar. Two flashes by this lamp are amply sufficient for any apartment of moderate size, the plate being one of Paget's XXXXX, and the stop *f*-32, or even, when the colour of the walls and character of the room admit of it, *f*-44. The flashlight exposure over, it has been my custom, after capping the lens, to stop down to *f*-64 to obtain as much sharpness as possible in distant objects, and then to leave camera and room for the night, under lock and key, if practicable, as a safeguard against accidents. The morning exposure in the case of the pictures shown varied from ten to forty-five seconds, according to the light. Of choice, I prefer for a composite exposure a somewhat dark and cloudy morning, with the sun to the side, though even with the sun newly risen, and shining almost directly upon the glass, the picture may turn out well, the exposure having been regulated accordingly.

It is remarkable how the power of daylight, comparatively feeble as it is at the early hour, which I have found to be most suitable for the secondary exposure, asserts itself in modifying the effects of the primary exposure made the evening before. Not only are various details sharpened and improved, but at least one feature which we might expect to find objectionally prominent is either obliterated altogether or toned down so as to be virtually harmless. I allude to the reflections on the window of objects in the room, including the camera, and probably the photographer himself. These, during the flash, appear to the eye distinctly mirrored on the glass, but are, nevertheless, generally conspicuous by their absence in the finished negative. An exception to this occurs, or may occur, according to the position of the camera, when masses of dark foliage appear in the scene. Against such a background, if reflections exist at all, traces of them will most probably be found. In two instances only have I discovered such traces on negatives. Prints of these are exhibited. In one it will be seen that the image is shadowy and nebulous in the extreme, barely discernible; in the other it is more obvious, though hardly so much so as to mar the photograph. This phenomenon is, doubtless, inseparable from the use of an artificial light of great power within, while darkness reigns without.

Cross shadows resulting from the combination of two illuminants, if conspicuous, would be undoubtedly objectionable. These, however, can be to a great extent avoided by placing the lamp above the camera, and as much as possible in a line with the axis of the lens. If set in this way, the lamp will cast no horizontal shadows, and the general effect will be similar to daylight at its best. Even when a less favourable position has been assigned to the lamp, any shadows thrown by it will be modified considerably by the subsequent secondary exposure.

In addition to these reflections and cross shadows, another matter requires to be noticed, which, however, is rarely a source of difficulty, so far as the photograph itself is concerned. I allude to the smoke caused by the combustion of the magnesium. This rises almost instantaneously to the highest accessible point, and eventually descends again, leaving a grey residuum unless carried away by a current of air. An open window, provided the atmosphere be not in a state of absolute stagnation, effects a speedy clearance; and it is satisfactory to know that the residuum, if any, is absolutely innocuous even to the most delicate fabric or the most sensitive lungs, and, so far as the furnishings of a room are concerned, requires nothing more than a feather brush for its removal. Other points relating to the use of the Todd-Forret lamp might be touched upon; but, as these have no special bearing upon the "novelty" upon which I have offered these few remarks, it is unnecessary to consider them here.

In conclusion, then, what are the advantages that may be claimed forthe "novelty in interior photography?" They are, I submit, the following:—

1. Entire immunity from halation, making effects which would otherwise have been photographically impossible of easy attainment by the camera.

2. The extension of the picture, so as to include not only the immediate surroundings, but the landscape beyond.

3. In conjunction with the above, an abundance of detail which could never be expected from daylight alone.

4. Certainty as to exposure, one of the most important boons resulting from the use of the artificial illuminant. G. Godfrey Cunninghame.

RECENTLY ELECTED OFFICERS OF SOCIETIES.

(*Received too late for the* Almanac.)

Cape Town Photographic Club.—Established 1890. Meetings held at the Y. M. C. A. Building, Cape Town. *President:* Dr. David Gill, LL.D., F.R.S., &c.—*Vice-President:* Mr. A. D. Fuller.—*Committee:* Messrs. F. W. Cairncross, J. P. Edwards, A. McLeod, J. Powell, E. J. Steer, H. Bishop, J. Denham, and W. T. Hoal.—*Secretary and Treasurer:* Mr. E. E. Harrhy, General Post Office, Cape Town.

Columbia Photographic Society.—Organized 1889, incorporated 1894. Meetings held at 1811, North Broad Street, Philadelphia. *President:* Dr. G. J. R. Miller. *Vice-Presidents:* Messrs. Charles J. Cole and Herbert E. Havens. *Board of Directors:* Messrs. William W. Chambers, P. A. Mitchell, Theodore J. Taylor, George R. Siddell, Frank E. Gartley, G. W. Quint, John N. Reeve.—W. W. Hilt. *Treasurer:* John S. Newman. *Secretary:* John Curtis, jun., 1811, North Broad-street, Philadelphia.

Fylde Amateur Photographic Society.—Established 1896. Meetings held in Blackpool. *President:* Mr. G. H. Holmes. *Committee:* Mrs. Grundy, Miss Caton, Messrs. J. R. G. Grundy, F. Ilett, and H. Jones.—*Treasurer:* J. Turnbull.—*Hon. Secretary:* J. Smith, 58, Wishnell-road, South Shore, Blackpool.

Hull Photographic Society.—Established 1881. Meetings held at 71, Prospect-street, Hull. *President:* Mr. A. H. White.—*Vice-Presidents:* Messrs. J. Pybus and J. Hollingworth.—*Treasurer:* Mr. W. M. Lyth.—*Secretaries:* Mr. J. V. Saunders, 151, Park-avenue, Hull; and Mr. R. Ethelbert Johnson, Aulaby-road, Hull.

Mid-Cheshire Society of Art.—*Committee:* Messrs. George B. Cliff, J.P., Thomas A. Johnson, J. J. Hardie, H. J. Reid, H. Yeomans, and Edward T. Ward.—*Hon. Secretary:* George Holland, 125, Chester-road, Northwich.

Photographic Club of Baltimore.—Incorporated 1891. Meetings held at 703, West Madison-street, Baltimore. *President:* A. S. Murray.—*Vice-President;* Dr. F. Slothower.—*Board of Directors:* Mr. A. S. Murray, Dr. F. Slothower, Messrs. E. M. Barker, Jordan Stobler, James B. McKee, F. W. McAllister, and B. G. Buck.—*Treasurer:* Mr. E. M. Barker.—*Secretary:* B. G. Buck, 1308. Linden-avenue, Baltimore, U.S.A.

South Australian Photographic Society.—Meetings held at the Chamber of Manufactures, Adelaide. *President:* Mr. A. W. Dobbie, J.P.—*Vice-Presidents:* Messrs. C. L. Whitham and R. F. Griffiths.—*Committee:* the Executive Officers and Messrs. A. W. Marshall, A. H. Kingsborough, and C. E. Kerr.—*Treasurer:* Mr. S. P. Bond.—*Secretary:* Mr. J. Gazard, Mutual Life Chambers, Grenfell-street, Adelaide.

Sunderland Photographic Association.—*President:* Mr. William Milburn.—*Vice-President:* Messrs. William Bartram and Charles E. Cowper.—*Council:* Messrs. William Pratt, William Horan, G. Bartram, A. Peddie, R. G. Posgate, A. G. Boulton, J. W. Broderick, and E. R. Kirkley.—*Treasurer:* Mr. Thomas Walton.—*Hon. Secretary:* Mr. William John Pope, New Arcade, Sunderland.

Working Men's College Photographic Club, Melbourne.—Meetings are held in the Club Room, Latrobe-street, Melbourne. *President:* Professor Kernot, M.A., C.E.—*Vice-Presidents:* Messrs. F. A. Campbell, C.E., and T. C. Camm.—*Committee:* Miss Cecil, Messrs. H. P. Bennett, H. Goodall, T. J. Eastham, and W. Stutterd.—*Hon. Instructor:* Mr. L. Hart, F.R.M.S.—*Lantern Engineer:* Mr. A. B. Sturtevant.—*Press Correspondent:* Mr. J. P. Campbell.—*Hon. Treasurer:* Mr. E. C. Moore.—*Hon. Secretary:* Mr. Arthur J. G. Relph, Government Printing Office, Melbourne; or 33, Palermo-street, South Yarra.

Our Editorial Table.

The Photographer's Diary for 1898.

Published by Charles Letts & Co., 3, Royal Exchange, E.C. Price 1s.

This useful little pocket diary has again reached us. It contains, besides a mass of well-condensed information likely to be of service to amateur photographers, a tourists' directory of hotels and dark rooms, spaces for a daily diary, and facilities for making entries of 350 exposures, &c. It can be readily carried in the pocket, and in the course of the year it should pay for its price many times over.

Transparent Photo Colours.

Joseph Levi & Co., 97, Hatton-garden, E.C. Price 1s. 6d. per set.

Messrs. Levi are issuing a set of transparent colours suitable for colouring lantern slides or photographs, or for tinting enlargements. The colours dry glossy on glossy surfaces, and matt on matt surfaces. The set comprises six colours with a medium for treating the picture before the colour is applied to it; palette and brushes are also given. For a variety of purposes this handy little set should be found extremely useful.

The Gloucester Diary.

The Gloucester Railway Carriage and Wagon Company, Gloucester.

This diary includes a "Directors' Calendar" and a note on each day throughout the diary to enable the periodic recurrence of fixed engagements to be recorded, such as board or council meetings, fixed to be held, for example, on the second Tuesday in each month. The notes for visitors to Gloucester have been considerably extended, and particulars are given respecting many features of interest, including the Severn "Bore," the Gloucester "Mop," and the "Festival of the Three Choirs," which is perhaps the oldest and most important annual musical meeting held in Great Britain. We can speak from experience of the practical utility of this diary, last year's issue having proved very handy to us.

MORGAN & KIDD'S BROMIDE PAPERS.

Morgan & Kidd, Richmond, Surrey.

As a reminder of the various kinds of bromide paper they prepare, Messrs. Morgan & Kidd are sending out, in the form of a neatly produced little book, a number of specimen prints on those papers. Matt, glossy, and tinted-surfaced prints of remarkably beautiful quality are included, and, as examples of what can be produced in the way of bromide printings, these specimens would be difficult to excel.

THE ENTR'ACTE ANNUAL.

Edited by W. H. COMBES. Published at 3, Catherine-street, Strand.

MR. COMBES'S annual chiefly appeals to inhabitants of stageland. Brief stories and sketches by well-known hands tell us of the curious experiences and adventures that are met with behind the footlights, and there are many good-humoured cartoons by Mr. Alfred Bryan of some of the figures who are prominent in the entertainment world. The *Entr'acte Annual* is a merry little book, and is also one of the few illustrated publications that do not give process-blocks.

POPULAR PHOTOGRAPHIC PRINTING PROCESSES.

By HECTOR MACLEAN, F.R.P.S., F.G.S. 167 pp. London: L. Upcott Gill, 170, Strand, W.C.

THERE was room for Mr. Maclean's book, for we are unable, at the moment of writing, to call to mind any volume which concerns itself exclusively with modern photographic printing processes. The author appears to have set about his task in a thorough-going manner, and he deals fully with the practice of printing in silver by print-out and development processes, carbon, and platinum, while the many references to the authorities he quotes evidence a painstaking desire to do every justice to his subject. The gum-bichromate process comes in for notice, and, in respect of this very much-debated system of printing, we observe it stated that it is one by which "it is practically impossible to get two identical prints from the same negative, and the most experienced worker cannot tell exactly what result he will get until he has finished developing the print." Such being the case, the bichromated gum process is clearly a step in the wrong direction. Mr. Maclean's book is very well and fully illustrated, and there are chapters on facing, backing, and mounting, and painting and crayon work on prints, that add to its value. It would be an exaggeration to describe the book as exhausting the subject; but, as far as it goes, it is decidedly useful, and should be found of great service for reference.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, January 12, at eight o'clock. Members' Open Night. Slides, &c.

THE KROMSKOP.—Messrs W. Watson & Sons of 313, High Holborn inform us that the kromskop is on view and sale at their establishment.

RÖNTGEN SOCIETY.—The next General Meeting will take place on January 11, at 11, Chandos-street, Cavendish-square, W. Paper at 8.30 p.m. by W. Webster, F.C.S. *Practical Work with the X Rays.*

ROYAL PHOTOGRAPHIC SOCIETY.—On Tuesday next, January 11, Messrs. Hurter & Driffield will read a paper at 12, Hanover-square at 8 p.m. entitled *The Latent Image and its Development.* Any one desiring to be present, and not being a member, should communicate with Mr. Child Bayley at the above address.

HERR GOLDSTEIN has reported to the Berlin Observatory (Germany) that he is able by the means of cathode rays to imitate experimentally various phenomena observed in connexion with the study of comets, such as the luminous radiation of the nucleus and the formation of the tail. He has also been successful in his attempts at reproducing some of the more recently observed effects.—*Revue Scientifique.*

THE Fourth Annual Exhibition of the Woolwich Photographic Society will be held at St. John's Schools, Wellington-street, Woolwich, on February 24, 25, and 26. The first evening will take the form of a *Conversazione*, the other two evenings being as usual. There will be besides the usual pictures, lantern lectures and vocal and instrumental music each evening. The Society does not give awards for pictures, but relies solely on its members to make the Exhibition a success.

PICTURES BY TELEGRAPH.—The *New York Herald* has discovered at St. Paul, Minnesota, a young watchmaker, named Herbert Hummel, who claims to be able to transmit pictures by telegraph. Some of the pictures said to have been telegraphed were reproduced in the *Herald* a couple of weeks ago, and some further specimens are published to-day, and have attracted a good deal of attention. The claim to absolute novelty made by Mr. Hummel and his journalistic patron cannot, however, be conceded, as the *New York World* about three years ago published particulars of an invention of the same kind by Mr. Edison, and gave in its pages specimens of the work done. Nothing further was done in that matter owing, it is believed, to the discovery that the system would cost too much to be of any real practical use. Nevertheless, the *Herald* appears to think it has now got hold of a good thing.—*Central News.*

Patent News.

THE following applications for Patents were made between December 20 and December 24, 1897:—

COLOURING PHOTOGRAPHS.—No. 30,115. "Improved Process of Applying Colours to Photographs." Communicated by F. von Bentivegni. Complete Specification. V. I. FEENY.

ANIMATED PHOTOGRAPHY.—No. 30,151. "Improved Animated Photograph Apparatus." W. F. BUTCHER.

HAND CAMERA.—No. 30,152. "An Improved Hand Camera." W. F. BUTCHER and G. HARROP.

ARC LAMPS.—No. 30,246. "Improvements in Arc Lamps for Projection." J. STUART and J. H. BARTON.

ARC LAMPS.—No. 30,247. "An Improved Centering Motion for Arc Lamps and Limelight Jets." J. STUART and J. H. BARTON.

STEREOSCOPES.—No. 30,334. "The Contrivance for the Exchange and the Exact Fixation of the Pictures as well as for the Temporary Limitation of the Views in Revolving Stereoscopes." E. G. LOCHMANN.

SNAP-SHOTS.—No. 30,489. "Snap-shots." J. C. W. ROFE.

PHOTOGRAPHIC PAPER.—No. 30,526. "A Novel Manufacture of Paper for Photographic Purposes." LA SOCIÉTÉ TH. DUPUY ET FILS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

January.	Name of Society.	Subject.
10	Bradford Photo. Society	*Lenses.* C. C Vevers.
10	Putney	*Reminiscences of Several Years Residence in India.* George Western.
10	Richmond	*Some Practical Photographic Dodges.* C. M. Hepworth.
11	Brixton and Clapham	Ninth Annual General Meeting.
11	Hackney	*Finishing Enlargements in Black and White.* W. L. Barker.
11	Isle of Thanet	*Negative-making.* John A. Hodges.
11	Manchester Amateur	Open Lantern Meeting
11	Royal Photographic Society	*The Latent Image and its Development.* Messrs. Hurter & Driffield.
11	Shropshire	*History and Development of the Locomotive.* P. W. Pilcher.
12	Coventry and Midland	*Carbon Printing.* James Simkins.
12	Croydon Camera Club	Trial Night for Slides to be Shown on the 19th.
12	Edinburgh Photo. Society	*Composition in Architectural Studies.* Hippolyte J. Blanc, R.S.A.—*Composition in Figure and Landscape Studies.* James Hay.
12	Kingston-on-Thames	*Old Kingston: Going! Going! ——!* W. F. J. Hodgson.
12	Leicester and Leicestershire	Election of Officers.—*Cloud Photographing.* A. Horsley Hinton.
12	Leytonstone	*A Year's Photographic Work.* G. E. Cox.
12	Photographic Club	Members' Open Night: Slides, &c.
13	London and Provincial	*Paper Negatives.* W. T. Wilkinson.
13	Manchester Photo. Society	*Enlarging by the Aid of the Incandescent Gas Light.* A. E. Casson.—*How to Obtain Warm Tones in Bromide Prints.* Harry Wade.
13	Oldham	*Lantern-slide Making by Contact and Reduction.* S. L. Coulthurst.
13	Southport	Southport Society of Natural Science and S.S.C.P. Joint *Soirée.*
13	Woolwich Photo. Society	*Pictorial Composition in its Relation to Photography.* H. J. Spencer.
14	Ireland	Lantern Evening. Greenwood Pim, M.A., and E. Fitzgerald Stapleton.
14	West London	*Experiments with Photo-aquatint Process.* G. F. Blackmore.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 30,—Mr. E. H. Bayston in the chair.

A short discussion took place on the question of copying oil paintings, and in reply to a query on the subject, the inquiring member was advised to use an orthorchromatic plate and a yellow screen. He related that in his trials, although the image looked very nice in the camera, the negative on development consisted more of brush marks than anything else, and the result was far from satisfactory. The mode of lighting the painting, thus raised, was the object of some further remarks, and mention was made of the use of reflectors, this being preferable to direct illumination. However, no rules for lighting could be laid down, the particular and most suitable means for a certain painting depending so much on the painting itself.

EXHIBITION MANAGEMENT.

The subject set down for consideration at this, the last meeting of the year, was "Exhibition Management," and as might be expected drew forth a long and interesting discussion, affording an opportunity for the ventilation of the many grievances, both fancied and real, which are such inseparable accompaniments of a photographic exhibition.

Mr. W. D. WELFORD was of opinion that, as far as the exhibitor was concerned, the provinces had a great deal to learn from London in the management of photographic exhibitions; so he concluded from the lessons of the past year. From an exhibitors' or a business point of view, there was no Exhibition so well managed, generally, as the Royal Photographic Society's annual show, which was certainly handled in a very able manner. There the rules were strictly and fairly carried out, and exhibitors were not annoyed by enormous labels being attached to the frames, which for small work meant ruination and nothing less. Many exhibitors suffered from the non-arrival of their work in time, and he had experienced the annoyance of his pictures meeting with this fate after allowing a whole week's grace between their dispatch and the last date for their reception. There was such a thing as sending off too early, he believed, and this was the excuse he made to himself for the case mentioned. There appeared to be a difficulty, too, in England in the matter of sending on exhibits from one Exhibition to another, which should not be. The practice of compelling the entry of a certain number of pictures in a class although an award was only given for one was most unsatisfactory; as was also the too common custom in the provinces, of omitting to advise the exhibitor, who was the support of the Exhibition, of any result whatever. After some remarks on the question of responsibility for damage done to frames, &c., at exhibitions, he came to the clause usually inserted in prospectuses, to the effect that the Judges' decision shall be final. He recalled a case where an award had been made, and where this clause was in force; but it was subsequently discovered that a rule had been infringed, which debarred it from the competition. To meet such cases, he favoured such a clause as "The Judges' decision on all questions of merit shall be final," which would leave the matter in the hand of the committee.

Mr. ROBERT BECKETT thought exhibitions might be conducted on better lines perhaps, and he agreed with much that had been said. For instance, when a society engages to take every care of pictures intrusted to it by an exhibitor, very often at great expense, the greatest care should be taken to see that he had them back in good condition. He was of opinion that the judges themselves wanted a little looking after. They had done good work undoubtedly, and made a great improvement. The Hanging Committee should be more strict and get rid of a great deal of rubbish. Mr. Beckett held that Judges should give the reason for their opinions if they have any. It was necessary that judging should be quite beyond question, and if these reasons were held to the light and it was seen that any of the Judges were incapable, they would soon fall. Beginners, for instance, did not know what to aim at; they did not know the difference between good and bad, or why a picture received so many marks, and they wanted teaching these things.

Mr. A. MACKIE disagreed with the suggestion that Judges should state their reasons. The whole system of judging was based upon the fact that there was no such thing as a definite quality in a picture. There was no possible way of gauging the qualities of two given pictures, and, when one asked a Judge to decide upon the best, it was asking him, not which was the best, but which he thought the best. He used his ability to the utmost, and his decision showed which he liked best. It was not like judging dogs, where so many points went for this and so many for that part, and the largest total carried away the prize; this method was not applicable, and Judges could give no satisfactory reason for their decision in a great many cases. He believed that the bulk of the mistakes made at exhibitions were due to the fact that the enormous responsibility and amount of detail work were not realised. Again, in Society exhibitions the chief part of the work was necessarily done by voluntary labour, and voluntary labour was one of the most difficult things to organize that could be imagined.

Mr. BECKETT discussed the question of the position of portraiture in relation to other work in open classes, and was convinced that it was quite disregarded. For instance, if an award could reasonably be withheld from portraiture the inclination was to do so, in favour of the landscape or other branch of work.

Mr. WELFORD did not think there was the same scope in portraiture as in landscape photography.

Croydon Camera Club.—A large muster of members attended to hear Mr. S. H. WRATTEN'S paper on

NEGATIVE-MAKING AND DEVELOPMENT

on 29th ult. After reviewing various methods, past and present, and passing round a large number of negatives of uniform excellence, developed with pyro-soda according to the Watkins time method, Mr. Wratten developed several negatives of varying exposures getting like good results by using 4 as the development factor. In cases of hand camera work where a minimum exposure has been given on high speed plates, Mr. Wratten said he always obtained satisfactory results by using pyro-soda and doubling the multiplying factor. Mr. ROGERS showed some fine 12×10 gum-bichromate prints, one, a large head being highly praised, as illustrating the capabilities of the process for reproducing almost stereoscopic relief.

FORTHCOMING EXHIBITIONS.

1898.

January 17–22..... Blairgowrie International. Hon. Secretaries, T. C. Gorrie, Rattray, and J. B. Maclachlan, Blairgowrie.

,, 29–Feb. 26. Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.

January–February... Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.

March 5–12... ..... South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.

April 22–30 .... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 27–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE GUM-BICHROMATE PROCESS.

To the EDITORS.

GENTLEMEN,—In his letter in the BRITISH JOURNAL OF PHOTOGRAPHY of December 24, Mr. Maskell, instead of frankly admitting that the term *Photo-aquatint* is essentially incorrect and misleading when applied to the gum-bichromate process, and that it was probably chosen without due consideration, defends its selection as "peculiarly applicable and appropriate," while it is neither.

That the name is in every way unsuitable, incorrect, and misleading, there can be no question. Aquatint is the recognised name of a method of engraving that has been practised in this country for more than a century, the name signifying that *tints* or flat tones are produced by successive baths of *aqua fortis*, thus distinguishing it from mezzotint, in which the tint effects are produced by burnishing and scraping a previously prepared ground tone, these two being the two great departures from engraving in pure line previously exclusively practised. Mr. Maskell is certainly in error in stating that the name aquatint is in itself misleading, and that it is so called because it is an imitation of a water-colour drawing. It clearly expresses the method of producing the plate as distinct from mezzotint, which is equally an imitation of a wash drawing if it is correct to so describe either process. The power of rendering effects in flat tones, however, is not confined to water-colour drawings.

Considering how well known and recognised these terms are, *photo-aquatint* could only convey the idea of an intaglio plate similar to an aquatint prepared by photographic means—practically the modern photogravure; in which sense Mr. Huson has correctly used the name for some time. To apply the term to carbon prints of any kind is not only misleading, but an absurd affectation; there is absolutely nothing in common between the two processes, not even the appearance of the finished prints. Whatever may be its motive, it can only have the result of leading the public to infer that they are produced by some photographic adaptation of the method known by the name borrowed, or that there is at least some recognised resemblance.

Mr. Maskell says that "etched aquatint has no monopoly of the term;" this is certainly not correct. When a word is a thoroughly well-known and recognised name for any particular substance or process, that unquestionably has a monopoly of the name, and applying that term to something essentially different, in order to pass it off as something which it is not, is generally called by a very ugly name. He gives as his reason for stating that the term *aquatint* is so suitable, that "gum-pigment prints . . . . are *actually* water colours . . . . the colour is not even held on the surface in a skin or film of gelatine, as is the case with other carbon printing processes." No, it is held in a film of gum, and wherein does it then differ from any other carbon print? If Mr. Maskell's argument that etched aquatint has no monopoly of the term, and that the name is suitable for a result because it is "water colour," means anything at all, it certainly means that any one, in selling a water-colour drawing in monochrome would be justified in describing it as an "aquatint;" a proceeding that would inevitably lead to a prosecution for fraudulent mis-representation. Does he not recognise the fact that this misuse of the term photo-aquatint must of necessity lead those who are well acquainted with the fine arts to infer that gum-pigment prints are produced by some new and noteworthy departure in photographic work, or in photo-engraving, and take interest in them accordingly, instead of being only the resuscitation of a method of carbon printing long since discarded in favour of something better?

Mr. Maskell may be quite satisfied that "the amiable *Cosmos*," as he designates your esteemed contributor, is not alone in his "contemptuous scorn" for the crude monstrosities in gum pigment at the Salon. How can any sincere and educated picture-lover experience any other sensation, in spite of thirty-two pages of the *Revue des Deux Mondes*? Are they in any way comparable with the paintings, drawings, or etchings by leading artists at our exhibitions, or with the engraved or photographic monochrome reproductions of them? Nature is beautiful,

and while her traducers only produce caricatures of her, and, talking "art" jargon, call them by high-sounding names, they must expect nothing but scorn, contempt, and ridicule.—I am, yours, &c.,

HENRY W. BENNETT.

[Mr. Bennett's known ability as an engraver and his experience of engraving processes impart additional value to his remarks on the misapplication of the term "photo aquatint" to carbon printing.—EDS.]

METALLIC CONTACT PRINTING WITHOUT LIGHT.

To the EDITORS.

GENTLEMEN,—We really must take exception to your correspondent's further comments upon the similarity of our patent No. 13,751 and that of M. Vials.

You very kindly pointed out that our process was essentially different to the one in question, and we had hoped that Mr. Kirkwood would have seen his way clear to have granted this likewise. His erratic mind seems now to have got the idea that we make a claim to produce prints without the action of light, and, because we acknowledge working with similar material to that used in this obsolete process, he insinuates that we have been forestalled. A house decorator uses oil or water colours and brushes, so do our R.A.'s; but the results obtained are admitted to have a difference. We have read and reread this French process, but fail to find any one point in common with our method of producing prints—in fact, nothing to bear out the assertion that any claim for printing from metal was made at all; and, as to that attributed to M. Niépce de St. Victor, he cuts the ground from under himself by stating that it (whatever it was) could not be fixed without exposure to light.—We are, yours, &c.,

January 3, 1898. H. SOAR AND J. W. COOPER.

P.S.—Enclosed are a print or two made during our experimenting, with the particulars of their formation at the back.

[Those interested in Messrs. Soar's process will find it described in the JOURNAL of September 24, 1897. The examples sent show that this method of printing on gelatine and similar papers from metal blocks is capable of yielding results of very great excellence.—EDS.]

FUZZIGRAPH DISCUSSION.

To the EDITORS.

GENTLEMEN,—Thanks are due to you for your kindness and generosity in devoting so much of your valuable space to the discussion, as above, inaugurated by Mr. C. Moss and myself, at the Croydon Microscopical and Natural History Club.

It seems a pity that the Editor of the *Amateur Photographer*, did not adopt a similar liberal course, instead of taking only *one* of the papers (mine), minutely dissecting it, and criticising it in a most uncharitable manner, attributing to me thoughts and sentiments which were entirely foreign to my mind when I wrote the paper. But possibly the Editor himself unconsciously explains the meaning of all this, *i.e.*, the little dinner he referred to, supplemented, no doubt, by another at Christmas, produced an attack of indigestion.—I am, yours, &c.,

Croydon. J. H. BALDOCK.

[The discussion between Mr. Baldock and Mr. Moss struck us as being extremely well reasoned, able, and temperate on both sides. Though our sympathies mainly incline towards the views put forward by Mr. Baldock, we, nevertheless, recognised that Mr. Moss stated the case for "pictorial" photography with a moderation and ability not always conspicuous in the utterances of "pictorial" photographers.—EDS.]

IS PHOTOGRAPHY A PLAYED-OUT PROFESSION?

To the EDITORS.

GENTLEMEN,—"When I left school, at the age of thirteen, I used then to dabble in photography, so my father told me; as he could not help me at all, he thought I had better be a photographer."

Thus, in brief but saddening language, "W. W. R." relates, in the last issue but one of the JOURNAL, the unfavourable conditions under which he and photography became associated.

Introduced, as a mere child, to a calling for whose professors he had already learned to entertain contempt, unassisted financially, unprepared educationally, with even a boy's ambition cooled at the outset by visions of patched trousers, what wonder if, after years of business struggling, he is found to-day writing as a confirmed pessimist?

The sequel to that unlucky start is thus given: "I used to work till about two o'clock every morning except Saturdays, when I knocked off at twelve p.m. I did my own operating, printing, developing, toning, mounting, book-keeping, and everything, even to sweeping out my studio and cleaning the windows at eight a.m.; but at the end of ten years I was as poor as when I began, and, what was more, completely knocked up."

How that poor man has lived to tell the story in this present year of grace is a mystery, but he has done so, and, bringing his business history up to date, describes, with no little pathos, the spectacle of a weary man trudging homewards through the rain, envying the happier lot of a poor chimney sweeper.

Now, Sir, I cannot agree with the sentiment of "W. W. R." that "it does not matter to one photographer whether the photographers in other towns get on or not;" on the contrary, I am always pained at heart (and I am sure there are scores of other professionals who have this feeling) when I see or hear of members of our profession going under, and becoming a spectacle of commiseration in the eyes of the world, and it was with the hope of cheering some brother photographer, or assisting, if possible, in a modest way, to point a road which has led to success, that I penned the notes from a "Busy Man."

"W. W. R.," however, finds in those remarks "not one single piece of advice which is neglected by photographers in their every-day practice," while some of the advice is "quite unnecessary." He adds, "The 'Busy Man' puts his success down to his own exertions and the exercise of common sense, and thinks that, if all other photographers had done as he had done, they would have got on equally well." "W. W. R." gives it as his final opinion that only "if you have abundant capital, and are lucky," should you anticipate success.

Well, I am one of those men who have little faith in luck. I honestly believe a man may be the architect of his own fortunes, and, if he has health, and the sense to perceive that every business career requires its own special self-preparation, he may reasonably count upon reward.

But, alas! it is the self-preparation that is so often neglected by young men starting business as professional photographers. The "Busy Men" of to-day have seldom left school at the immature age of thirteen, nor have they commenced business until really careful and artistic training had given them a chance in the battle of life with the older and well-established houses.

It really seems incomprehensible that thinking men should imagine the photographic profession so easily learned that they have only to buy a camera and a few chemicals, exclaim "Sesame!" by the light of a ruby lamp, and the locked cave of good fortune will open before them with no more ado.

It is true that in the early days of photography, men with apparently few qualifications beyond a splendid commercialism and perseverance, did often succeed in a marvellous manner, but those days are gone for ever, and when the "Busy Man" exclaimed "Labor omnia vincit!" he never intended the absolutely literal sense of the words.

Hard work to-day means something different to sweeping floors and cleaning windows if a man is to succeed as a master or manager of a business worth anything at all. It means that he should have every detail of photographic work at his fingers' ends, but that he himself must be the mainspring which keeps the whole mechanism of his establishment going.

No man can possibly make a decent income by operating, printing, toning, mounting, cleaning windows, &c. "W. W. R." is, no doubt, right in objecting to such employment being called a "profession." It has not even the advantage of a dog's life! Surely to perfect oneself in one particular branch and to take a situation were wiser than to court disaster for an imaginary freedom, with the haunting dread of "patched trousers."

The prospects of professional photography will never grow really brighter till the tone of hopelessness is abandoned and we all realise the truth of the Darwinian theory, that in an overcrowded world, or an overcrowded profession, it is the SURVIVAL OF THE FITTEST.

December 27, 1897.

THE YARMOUTH CONVENTION.

To the EDITORS.

GENTLEMEN,—As it is impossible for me to write and thank individually the members of the Photographic Convention who have so kindly presented me with the handsome and valuable album of views taken during the 1897 meeting, will you allow me to do so through the medium of your columns?

I received the album from Mr. Bridge, the Secretary, on Christmas Eve, and it will be valued both by my wife and myself as a very pleasant remembrance of a most enjoyable week.—I am, yours, &c.

H. HARVEY GEORGE,

Local Hon. Secretary Photographic Convention, 1897.

The Tower, Gorleston, Great Yarmouth, December 29, 1897.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

J. CUMMINGS (Alloa).—Many thanks ; an oversight, of course.

AJAX —We will endeavour to carry out your suggestion by an early date.

JOHN A. RANDALL.—Impossible, for obvious reasons, to publish your letter.

LIGHT.—You have omitted your name and address. We do not answer questions emanating from anonymous persons.

TOM REVELEY.—1. The 1882 edition is the last published. 2. We will bear your suggestion in mind. 3. Thanks for good wishes.

J. WILLIAMS.—We do not answer questions through the post. It is out of our province to recommend solicitors. You have taken the only course that was open to you.

DAMAGE IN TRANSIT.—W. A. As the claim made is over ten pounds, the carriers are not liable, unless, indeed, the value was declared at the time of booking or the package was insured.

BEN NEVIS—The inventor's method of preparing the paper has not been disclosed. At page 886 of our ALMANAC for 1898, however, a process is described which is said to give results similar to Artigue's.

F. MOORE.—Better write Messrs. Penrose & Co., Upper Baker-street, Lloyd-square, W.C. Some time ago such screens as you require were advertised in our columns at a price of 10*s.* 6*d.* for half-plate size.

SERVICES.—S. R. W. The offer seems fair enough for this season of the year, but it is for your consideration as to whether it will be during the summer months. The salary seems to us very small, unless you have much over-rated your abilities.

MAGNESIUM LIGHT —BIRMINGHAM. We know of no magnesium flash lamp or light in the market in which the smoke is condensed, or not allowed to escape in the room. We have been told that such an apparatus is in use in France, but know no particulars about it.

OLD NEGATIVE.—T. WILLS. The paper negative sent is an old calotype one, and a good one, too. It was probably taken about the late forties or the early fifties. Although waxed, it is not by the wax-paper process. The negative has been returned as desired.

W. E. WRIGHT.—The only method of ascertaining whether it is copyright is to make a search at Stationers' Hall. From the particulars given we should be inclined to think you would be quite safe in reproducing the picture. Could you not submit it to a dealer or connoisseur so as to obtain some clue to the name of the engraver?

INTENSIFICATION.—HELIX writes: "*Re* Mr. Bennett's letter on *Intensification* in your issue of the 17th ult., will you kindly suggest the quantities to be used—how much silver, and ditto sulphocyanide, to each ounce of water, and oblige?"—If our correspondent will reread the article, he will see that the proportions are given explicitly.

GELATINE MOUNTANT.—T. BAKER. The formula is quite right. The trouble has arisen through the use of an unsuitable—for the purpose—gelatine. The kind used should be of a very soluble character, such as those known as soup gelatine. Nelson "No. 2 Soluble" answers admirably. Tough or hard gelatines, such as you have tried, should be avoided.

H. FRANKLIN.—We have looked up a full translation of the original paper. Some of the working details are so obscure that we advise you to defer your experiments until more definite instructions are available. When these are accessible, we will publish them. Whatever answers we gave to your questions would only be conjectural and therefore possibly not of service.

COPYRIGHT.—PIRATED says: "Eighteen years ago I made a photograph, a view, copyright. Since then the place has been entirely altered, and now the ——— has just produced in its pages a copy of my photograph. Have I any remedy after so long a time?"—Certainly, just the same as if the photograph was taken yesterday. Proceed against the paper at once.

WINTER PHOTOGRAPHY.—H. BEST. The small pictures of hoar frost are very pretty. But, if you are going to offer the negatives for sale to publishers of Christmas cards and the like, we should advise you to submit proofs printed in a cold tone—say, on platinum paper. Winter pictures on highly glazed gelatine paper, toned to a warm reddish-brown, are not in keeping with the subject depicted.

PLAIN SALTED PAPER.—R. BELL. The formulæ given in the earlier editions of Hardwich's *Photographic Chemistry* for this paper may be relied upon, but it is necessary, as there stated, that it be sensitised with the ammonia nitrate of silver; that is imperative if the rich velvety blacks of old are desired. The toning bath must be used much weaker than is usual with albumen paper, as the prints tone very quickly.

MIXED JET.—CYMO. If you take our advice, you will not commence with a mixed jet, but will adopt the blow-through until you have gained some experience by its use. Moreover, with only a six foot screen, the latter jet will give all the light necessary. We do not recommend the mixed jet in the hands of novices in their first essays, though it is perfectly safe with experienced workers.

CARBON PROCESS.—W. J. B. The piece of sensitised tissue sent is quite insoluble, and it would have been quite impossible to produce a picture upon it. The piece that was not sensitised was made with an unsuitable gelatine for carbon tissue—it is of much too insoluble a nature. For carbon tissue gelatine of a soft and soluble character is necessary. Hence the kinds best suited for, say, dry plates and the like, should be avoided.

DAGUERREOTYPE.—J. ANDREWS. Yes a Daguerreotype picture can be "restored," that is, cleaned by heating it with a solution of cyanide of potassium. That will remove the tarnish that now impairs the image, and restore it to its pristine state. The work, however, should be intrusted to one who is familiar with the working of the Daguerreotype process as, in the hands of a novice, as we gather you are, the picture might be utterly ruined.

COPYING.—LITHO. With a lens of ten and a half inches focus, of the rapid rectilinear form, you must not expect to obtain negatives fifteen by twelve evenly in focus all over, even with a stop of *f*-32. Such a thing is possible with some of the newest forms of anastigmats, but not with lenses of the rapid type. They have not a flat field, and, what is more, the field is not evenly illumined at the margins when the lens is strained much beyond what it is designed to cover.

AGNOSTIC.—1. The "line is drawn" by the particular magistrate before whom a prosecution is heard, and totally different decisions may be given in England and Scotland; but this is a point upon which the discretion of the individual is perhaps the best guide. 2. The production of such a photograph is not illegal. We ourselves, at a public photographic Exhibition held in your city in December, 1896, saw a photograph of this character by one of the chief photographers of the day.

ELECTRIC LIGHT.—W. H. SCHWARTZ asks: "Can you let me know, at earliest convenience, which is the best system of electric lighting to adopt for working collodion and ferrotype portraits with good results, and from whom could it be obtained (not to be of too great an outlay)?"—Either the arc light or the incandescent will answer. The Watford Engineering Company, Watford, make a speciality of the former for photographic purposes, and Messrs. Adamson & Co. the latter.

TONING DIFFICULTY.—G. PORTER complains that he cannot get his paper to tone. It is ——'s ready-sensitised, double albumenised. The acetate bath is the one used, and that is the one recommended by the makers. We should recommend our correspondent to try the effect of passing the prints through a weak solution of common washing soda, after washing out the free silver, and then rinsing them in plain water, prior to toning. Some ready-sensitised paper is very acid, and does not tone easily unless the acid is got rid of.

LIPPMANN'S PROCESS.—COLOUR says: I am anxious to make some experiments in Professor Lippmann's interference colour photography, and should be greatly obliged if you would inform me, through the columns of THE BRITISH JOURNAL OF PHOTOGRAPHY whether a "transparent and grainless" plate, which I understand from your report of the Professor's lecture is essential to the success of the process, is to be obtained commercially, or, if not, what is the best method of preparing such a plate?—In reply: Such plates are not commercially obtainable, although we believe Messrs. Cadett & Neall are contemplating making them. Professor Lippmann's paper is published in full this week. See this JOURNAL of May 25, 1893, for the emulsion formula.

COPYRIGHT.—NEMO writes: "One of the photographers in our place some time ago obtained the loan of two very old engravings, one a map of the town and the other a view of it as it was in the last century. These he photographed, copyrighted, and published. Since then I have copied his photographs, and, because I am selling them at a lower price than he does, and made lantern slides of them, he is trying to bounce me by threatening proceedings and no end of things. Can he really stop me?" Certainly he can. It is a clear case of piracy, as clear as any case can be. If he does take the threatened proceedings he will obtain substantial damages, as well as all the negatives and prints in your possession. In addition to that you will be mulct in all the costs, and rightly, too. What right have you to pirate your neighbour's work.

CRACKED PRINT.—WORRIED says: "1. I enclose a copy of an 'At Home' portrait, printed on Three-star (I think that is the correct name) albumen paper. Some of the prints have several cracks dotted about here and there on the print—this one, as you will see, is cracked all over the surface. Can you kindly give me a reason for it? Is it in the manipulation during toning, or is it the fault of the paper. It is toned with the borax bath. 2. Can you recommend a good British make of albumenised paper, as I should prefer it to a German make?"—In reply: 1. Most high-glossed albumen papers are liable to crack unless they are carefully dried, that is, not allowed to curl up, as then the albumen surface is liable to crack when the prints are uncurled. The prints should be kept flat while drying, *i.e.*, by drying between blotting-boards. If the prints be mounted as they are taken direct from the washing waters, the cracks will be avoided. 2. Consult the advertisement columns, as it is against our rule to recommend any particular manufacturer's goods.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
EX CATHEDRÂ	17
PHOTOGRAPHY, PROFESSIONAL AND AMATEUR, IN 1858 AS COMPARED WITH 1898	18
HEADERETTES:— Photography and Light — Detection of Hypo or Sulphite—Photographs of a Human Effluve—Equine Photographs for Purposes of Exact Measurement — A New Test for Nitrites—Applications for Patents in 1897 — Another Cinematograph Accident—The late Sir John Gilbert	19
PHOTOGRAPHY A FINE ART? A REPLY TO MR. JOSEPH PENNELL IN THE "CONTEMPORARY REVIEW"	21
JOTTINGS. By Cosmos	22
SOME THINGS IN GENERAL. By Free Lance	23
DILATION AND BACKING. By W. E. Debenham	24
MY FIRST YEAR'S EXPERIENCE AS A PROFESSIONAL PHOTOGRAPHER	25
PORTOL	25
OUR EDITORIAL TABLE:— *South African Health Resorts — How to Make Lantern Slides and Transparencies on the Cadett Lantern Plate* — The Standard Air-tight Calcium Tube	26
NEWS AND NOTES	26
PATENT NEWS	27
MEETINGS OF SOCIETIES:— Royal Photographic Society - London and Provincial Photographic Association—Photographic Club —Brixton and Clapham Camera Club — Croydon Camera Club — Gospel Oak Photographic Society — Richmond Camera Club — Bootle Photographic Society — Bradford Photographic Society	27
FORTHCOMING EXHIBITIONS	29
CORRESPONDENCE:— The Gum-bichromate Process — Oil Lanterns — Photographers' Fire Insurance—"Audi Alteram Partem:" Mr. Joseph Pennell and Photography as a Fine Art —Animated Photography	29
ANSWERS TO CORRESPONDENTS	32

EX CATHEDRÂ.

THE award of the progress medal of the Royal Photographic Society to Messrs. Hurter & Driffield for their work in the determination of the speed of plates, announced elsewhere, is a tardy but well-deserved recognition of one of the most important contributions to the science of photography that has been made. In the course of last summer [BRITISH JOURNAL OF PHOTOGRAPHY, August 6, 13, 20, 1897] we published some articles dealing with the reduction of Messrs. Hurter & Driffield's theories to practice, and it is therefore a source of great pleasure to us to find the Council of the Royal Photographic Society so soon afterwards singling out those gentlemen's work for the high distinction of the progress medal.

* * *

THE paper read by Mr. Driffield on Tuesday night on the subject of *The Latent Image and its Development* may appear somewhat heterodox, and will probably provoke some amount of discussion; but the work it describes has been more than a year in hand, and experience has shown over and over again that when Messrs. Hurter & Driffield take up a position in connexion with photographic science, they are not easily dislodged from it. If they can settle the vexed question of the "latent image"—and it will be seen that their paper has a most important bearing on the subject—they will have made a rich addition to the valuable work they have already accomplished.

* * *

IT is understood that the present Honorary Secretary of the Royal Photographic Society, Mr. Horace Wilmer, will be unable to accept re-election to that office by the Council next month. Mr. Wilmer has worked hard during his tenure of a by no means easy position, and he has the satisfaction of feeling that he has materially assisted in lightening the labours of his successor, whoever he may be, in the heavy undertaking of organizing the International Crystal Palace Exhibition of next April.

* * *

IF we are rightly informed, the difficulty of finding a successor to Mr. Wilmer will fortunately be smaller than the Council night have anticipated. We believe, indeed, that Colonel J. Waterhouse could be prevailed upon to accept the Honorary Secretaryship of the Royal Photographic Society were it offered him by the Council. Such an appointment, we are sure, would give the greatest satisfaction throughout the Society and the photographic world.

* * *

COLONEL WATERHOUSE'S qualifications for the position need scarcely be discussed. He recently returned from India after nearly thirty-eight years spent in the service of the Government. He was Chairman of the Board of Trustees of the Indian Museum, President for a term of the Asiatic Society of Bengal, Honorary Secretary to the Committee of Management of the Calcutta Zoological Garden, and President of the Photographic Society of India. For nearly thirty years he was chief of the Photographic Department of the Indian Survey Office in Calcutta, and on p. 828 of this JOURNAL (for December 24 last) appears a report of the paper he read at the Society on the work of his department. For his work in the reversal of the photographic image by means of thiocarbamides, Colonel Waterhouse received the Progress Medal of the Society in 1891. He has also turned his attention successfully to many other branches of photography. Colonel Waterhouse

is only fifty-six years of age, and we sincerely trust to hear of his election to the Honorary Secretaryship of the Royal Photographic Society.

* * *

In our article on December 31, relative to the subject of photographers' insurances, we alluded to certain forbidden risks introduced by the insurance offices, and mentioned that one of them required a fee for each oxyhydrogen entertainment given on insured premises. The same office appeared disinclined to give a definite reply to an inquiry as to whether permission could be obtained for the use of the cinematograph. A correspondent now sends us the copy of a letter he has received from his insurance office in reply to a similar query. The company say: "We were asked whether we would allow a cinematograph entertainment. In reply, we informed—that we could not, as we understood it to be an entertainment similar to that which brought about the Paris disaster. On your assurance, however, that no ether lamp would be used, that the risk would be similar to that of an ordinary magic-lantern entertainment, and that no danger would arise through the concentration of the lime light on the celluloid films, we should be prepared to allow same." The office from whose letter we quote is the Commercial Union. It is evident that the Paris disaster has compelled the insurance offices to look askance at the use of ether saturators.

* * *

Lecturing the other night on *The Language of Line*, at the College of Preceptors, Mr. Walter Crane threw out a suggestion for the establishment of a newspaper illustrated on somewhat novel lines. He said that one of the earliest languages was that which took the form of signs, in which men depicted their views by hieroglyphics. The language of line was also associated with decorative art, in which it attained its highest form. In its graphic developments it imitated the facts, and forms, and service of language. The signs used in the early ages were, in many cases, in vogue at the present day, and from many of the characters of the ancient sign-writers we were able to obtain glimpses of the dead races. Even some of the letters of the English alphabet had been derived from the hieroglyphic system of the Egyptians. The graphic expression of lines had become a means of delineation of character, and a faithful chronicler of temporary life, manners, and history. There was a great increase of illustrations in literature, especially newspapers, and he expressed surprise that no one was enterprising enough to try to start a newspaper depicting the news of the day in the line language pictorially. There could be special artists for the various kinds of news, which should be illustrated in suitable forms. There could be the political thermometer, and a scale giving the relative attitudes of capital and labour, and the interests of sport—now so essential a portion of a newspaper—could be looked after by experts, whilst the Stock Exchange news might be illustrated with "bulls" and "bears."

* * *

Public confidence in the identification of accused persons by means of photography must be fatally shaken by the release last week from prison of Mr. F. W. Spriggs, who was recently convicted of assaulting a lady cyclist in North Wales and sentenced to five years' penal servitude. The defence was an alibi, and a Home Office inquiry has resulted in establishing the injured man's innocence after two months' imprisonment.

This is the story of the case in brief: "The assault took place about mid-day on July 10. A young lady, Miss Annie Hughes, was riding her cycle in the neighbourhood of Rhyl, North Wales, when she was followed, attacked, and robbed by a young man on horseback. Miss Hughes complained to the police, who showed her a number of photographs of men and youths who had been in custody. Among these happened to be one of young Spriggs, who some time since while in Rhyl got into trouble through what most people regarded as a piece of youthful folly. For this, however, he was convicted and sentenced. *Miss Hughes picked out his photograph as that of the man who had assaulted her, and five other witnesses swore to his identity, mainly through the production of this picture.* The evidence for the prosecution was undoubtedly very strong, but it was met with almost overwhelming testimony that at the time of the assault young Spriggs was with his parents at Forest Gate. No less than twelve witnesses were called by the defence, and one after another they told practically the same story; unless each and every one had committed perjury of the grossest kind, it was clear that the accused could not have been within hundreds of miles of the place at the time the crime was committed. This evidence, however, availed him nothing. Mr. Justice Grantham described it as the most perfect alibi ever brought before a Court, but he made it clear to the jury that he placed no reliance upon it, and a verdict of guilty followed his lordship's very pointed summing up. Thereupon Mr. Justice Grantham sentenced the youth to five years' penal servitude, and this terrible punishment he would have had to undergo had it not been for the efforts which were made by his friends." It is, of course, notorious that some uncommonly hard swearing takes place at times over the defence of an alibi, which may in some measure account for the Judge's scepticism on this occasion; aside of this matter, however, the fact that six persons were enabled to swear away an innocent man's liberty by means of a photograph should for the future make judges and juries very cautious how they receive even photographic evidence—of this nature.

PHOTOGRAPHY, PROFESSIONAL AND AMATEUR, IN 1858 AS COMPARED WITH 1898.

One is sometimes told that, with all the improvements which have been made in photography during the last decade or two, little is done now that was not done as well thirty or forty years ago. That may be true, but it was done only under the greatest difficulties as compared with the facilities now existing. We also read of the "good old days" of professional photography. It will be interesting to many modern workers if we glance back and look at the state of photography, both professional and amateur, as it existed, say, forty years ago, and the advent of a new year is an opportune time for doing so.

At that period the Daguerreotype process was still in vogue though it had passed its zenith as a business, and was rapidily giving place to collodion for portraiture. Glass positives by that process were well to the front for the cheaper kinds of portraits, and negatives for the more expensive ones. A large proportion of the paper portraits were then printed on plain salted paper, with masked-in backgrounds. They were usually touched up in monochrome on the print, or finished in water colours, and they commanded good prices. The whole-

late size in good houses was charged from two guineas pwards. There were, however, but few professional portrait sts compared with what there were a few years after. It vas about this time that the *carte-de-visite* style of portrait was ntroduced which two or three years afterwards became such a age.

In the early—"the palmy"—days the price of *cartes* ranged rom fifteen shillings to two guineas the dozen, and many ortunes were rapidly made through them. Fifty sitters and pwards a day was no uncommon thing in some houses. The vet-collodion process was, of course, the only one then used or portraiture, and the negatives were all untouched, as etouching had not then been introduced. Hence the quality f the pictures was dependent entirely upon the skill of the perator, who then commanded a good salary. This was, owever, more gauged by his technical skill than by his rtistic abilities.

The process most worked at that time by amateurs in the eld was waxed paper, though that was fast giving way to ollodio-albumen and moist collodion, and the plates had to be repared by the user. Dry collodion had not then come to the ront. Not a few amateurs, however, worked the wet-collodion rocess in the field, and, when it is considered what that nvolved, one can but admit that they were enthusiasts in hotography indeed. A dark tent or box, often on wheels, ad to be taken about; also all the necessary chemicals, as ell as water for washing, for the plates had to be coated, ensitised, developed, fixed, and washed on the spot. If very apid exposures were necessary, then the bulky Petzval lens ad to be used. The only lenses then to be had were the ortrait lens and the single landscape lens with its distortions, s the orthoscopic, with its distortions of an opposite character, as only just then being introduced commercially.

There were no light portable cameras, and folding stands, as f to day. There was, it is true, a folding camera, but it was s heavy as a rigid one. The old box form of camera with a olding tail board was very generally used for out-door work, nd some of the paraphernalia was usually packed inside. and cameras were unheard of; notwithstanding the weight, ulk, and inconvenience of the out-door kit, amateurs worked rger sizes than they usually do now. The whole-plate and he stereoscopic were the favourite sizes, and the stereoscopic as then in the height of its popularity. Then some pro-ssionals who made a speciality of stereoscopic pictures, land-capes, or figure subjects, did a splendid trade at large profits. lbumen transparencies, for example, were in good demand at alf a guinea and upwards each. In working the wet-collodion rocess, whether in the studio or the field, the operator ways had the inconvenient fact before him that the plate had o be developed within a few minutes of the time it was put nto the dark slide, or it would be spoilt. That was, necessarily, constant source of anxiety, particularly in hot weather, or hen dealing with children or animals.

How different is the case now, for the operator is no longer ependent upon skill in keeping his chemicals in order. He is mply supplied with plates ready for exposure, and they keep or any length of time, so that he can pose and light the sitter, nd leisurely wait for a favourable opportunity for exposing. hat too is now but a second or two, whereas with collodion it ften, in a dull light, occupied the best part of a minute and ometimes more. After the modern plate has been exposed it as not to be developed at once, as with collodion, another great convenience. If the professional photographer is now called upon to do an out-door job, say, to take a wedding group or the like, he has not to cart with him a dark tent, or, what was more generally done, fit up an extemporaneous dark room at the house of his sitters. If he has to photograph buildings, &c., say for legal purposes, he is now provided with lenses that will give pictures free from distortion, which was not the case forty years ago. If a picture has to include moving objects, gelatine plates are so sensitive that the bulky and costly portrait lens of Petzval is not now a necessity, as it once was.

With regard to amateur photography the toil of old is absent, for now everything is made as light and portable as possible. Heavy wood in the cameras is replaced, to a great extent, by leather, and brass by aluminium. The stands are both light and portable, and the lenses now in vogue are but a tithe the weight and bulk of the early ones, while, at the same time, they are infinitely superior. All these great advantages in connexion both with professional and amateur photography, enable the worker to devote a greater amount of attention to the art side of his work, particularly in the studio, than was possible when so much was dependent upon the technical portion of it. Not the least important point in modern photography is the extreme cheapness of everything connected with its practice as compared with what was the case forty years ago.

Photography and Light.—According to the New York correspondent of the *Standard*, Mr. Tesla makes the announcement that his vacuum tubes are now so perfect as to take photographs surpassing flashlight pictures. "Two seconds' exposure is used at a distance of four feet from a tube, with a radiating surface of two hundred square inches, giving a thousand candlelight from oscillations of two millions per second." Mr. Tesla states that his system will give an equivalent light, without heat, from tubes the size of ordinary incandescent bulbs. Further information on the subject will be waited for with interest.

The same correspondent further states that "an inventor named Nickum, hitherto obscure, has obtained a brilliant permanent light from chemicals within a sealed globe." There are, he says, "reputable witnesses of Nickum's light, which gives a cool, steady glow, theoretically, for ever, being inextinguishable and without waste. When it is not wanted it is laid away in a cupboard, or otherwise obscured." The writer cautiously adds that "the only flaw in the story is that Nickum declares that the discovery which his light attests also disproves the theory of gravitation, and shows that a vacuum is impossible," &c.; also "that those admitted to his confidence have no scientific authority." We should think that more than probable. By the way, what a curious name, "Nickum," for an inventor. It will be interesting to see how some of the lay press will deal with this valuable (?) discovery.

Detection of Hypo or Sulphite.—A portion of the liquid to be tested is mixed with a solution of zinc oxide in ammonia, then heated to expel the ammonia and filtered. Six times its bulk of ninety-five per cent. alcohol is next added and then cautiously a solution of bismuth sub-nitrate in nitric acid. If hypo be present, a dense precipitate of bismuth thiosulphate is produced. When this has subsided, the addition of a further quantity will produce a further white precipitate.

Photographs of a Human Effluve.—Some time ago we described a series of photographs which had been produced to show that the human body emitted a species of effluve capable of im-

pressing itself upon a dry plate, a concrete proof of the existence of "od" as it was termed. Recently, however, M. A. Guérhard brought before the Paris Academy of Sciences, a series of five photographs to illustrate a paper showing that substances whose temperature differed but slightly from that of the atmosphere might be made to produce developable effects upon a dry plate. He argued that the "human effluve" photographs were simply brought about by the heat of the hand.

In connexion with this subject of heat or light radiations it may here be noted that Herr K. Wessendonck has recently (in Wiedermnnn's *Annalen*) shown that a luminescent body is capable of imparting heat to a body warmer than itself. He further shows that this fact is not in opposition to the second law of thermodynamics, as luminescence is not ordinary thermal radiation.

Equine Photographs for Purposes of Exact Measurement.—Mr. Francis Galton, well known in connexion with *Composite Photographs* and with various methods of measurement of the human figure and face for anthropometrical and detective purposes, gives an interesting and carefully thought-out paper in last week's *Nature* in regard to a mode of taking photographs of horses so that they should be available for purposes of exact measurement to an extent superior to the old-fashioned plan of using tape and standard. It will be found that, with one exception (unfortunately, one diagram is minus reference letters) every difficulty and possible source of error has been successfully grappled with. The one point he does not allude to is the difficulty of getting a horse to stand in the desired position in a very limited and circumscribed place.

In front of a wall, the ground at whose base is hard and truly level, he marks off a rectangle eight or nine feet long and twenty inches wide, and with a mark in the middle of the length cutting the rectangle into two. Two nails are driven in the wall, and suspended over them is a string weighted at each end, thus forming three sides of a square. To enable the camera to be "trued," the ground glass must be truly vertical. A station point for the camera at the end of a line at right angles to the rectangle is marked off. "The horse is to be led to the rectangle, and kept in it, taking care that all his feet stand within its margins, that the cross line referred to lies clear of his front and hind legs, and that the tip of each hoof and each corner of the rectangle is visible from the camera." Any one who has had experience of photographing horses will at once see that this placing, in the case of fresh and high-spirited animals, would be almost an impossibility. Mr. Galton recommends the camera to be tilted down from a height of five feet, so as to get the hoofs well shown, and the back of camera then adjusted so as to be perfectly vertical; otherwise the photographs would be useless.

It will be obvious to all that, even if the animal could be got into the rectangular space, it would be impossible to get it exactly square to the camera, and a slight departure from the desired position would lead to false measures being made. But Mr. Galton has thought this matter out also; he finds that, if the animal is in the oblong space entirely, the utmost possible deviation from its being at right angles to the lens is 7° 39′. He gives a method of observing the rectangle to find the amount of obliquity, and finally an easy mode of calculation for the allowance to be made. He suggests the attaching to certain parts of the horse small paper discs to form measuring points. If the horse should be so fat as to hide the true outline of his back, he places a small projection upon the top of a surcingle, previously ascertains its height, and then, taking this projection as his measuring point, makes the allowance of its actual height above the back, reduced, of course, to the same scale. We think we have given a sufficient *précis* of Mr. Galton's paper to enable it to be understood. We would finally say that the result is for science, not for art; indeed, Mr. Galton says that, by paying strict attention to his instructions, "an ordinary photograph will be transformed from a mere picture into a record of real scientific value!"

A New Test for Nitrites.—The presence of nitrite of silver in the collodion sensitising bath has long been known to exercise a disturbing influence, one possible source of the impurity being found in the very means taken for purifying the nitrate, namely, an excess of heat during the operation of fusing the crystals, their fusion being often recommended for obtaining the purest form of neutral nitrate of silver. The new method is: a ten per cent. solution of antipyrin in acetic acid is made, and, if necessary, diluted to ten times its bulk. About a drachm of this reagent is added to an equal quantity of the suspected liquid. If nitrite, even to so small an extent as 1 in 20,000, be present, a permanent green colouration is produced.

Applications for Patents in 1897.—The number of patents applied for last year was 30,936. This is the largest number of applications made in any one year, and exceeds that of 1896 by nearly 800. That year, however, beat the record of the previous year by more than 5000. Ever since the reduction in the cost of patents in the initial stage, the number of applications has annually shown an increase, except in 1895, when there was a falling off of some 300 or so. The number of patents applied for must not, however, be taken as a criterion of the number that will be completed, as probably not half, possibly not a third, will be carried beyond the nine months' protection stage.

The continual increase in the number of patents would seem to show that the present generation are of a more inventive turn of mind than past ones, or that they are more anxious to turn their inventions to a commercial account than used to be the case.

Some of the applications, which only entail the outlay of a sovereign, have probably been made—they often are—with the idea of using the word "patent," or "patented," in connexion with the article. We have known that to have been done in the case of photographic appliances. That, as we have pointed out before, is distinctly illegal, and subjects the user to a heavy penalty. All he is entitled to do is to use the term "patent applied for," and that not after the nine months unless the complete specification has been lodged. It may be a question that will one day have to be decided—we are not aware if it ever has been—as to whether any one is entitled to use the title "patent" after the patent has expired, for that is very commonly done. A patent that has lapsed at the end of the four years—and cost four pounds—does not carry the title of "patent" for all time; and to apply the term patent to anything which is not patented entails a heavy penalty. It is very commonly done, however, and deters others from making or supplying the thing, as they are legally entitled to do.

Another Cinematograph Accident.—Last week we alluded to an accident with the cinematograph at the Huddersfield Infirmary, which ended with nothing worse than the abandonment of the exhibition for the evening. At Bolton another accident has occurred. In this instance it is reported the operator and two others were burnt about the face and hands, and others were knocked down in the rush to the exits. These continual accidents, and the prominence given to them in the daily press, trivial though they be, do not tend to inspire confidence in entertainments in which animated photographs form a part. However slight the accident, visions of the Paris disaster are likely to arise in an excited audience, which may lead to serious results, which, but for that calamity, would not be the case. During the past few years quite a number of patents have been taken out for denitrating celluloid and similar compounds so as to render it incombustible, or rather non-inflammable; but what practical use has been made of the processes we are not aware. One thing, however, is certain, which is, that a non-inflammable cinematograph film is at the present time a desideratum.

The Late Sir John Gilbert.—One frequently hears artists spoken of as being poor—"the struggling artist," and the like. But

clearly this did not apply to the late President of the Royal Society of Painters in Water Colours at the time of his death, which occurred in October last, at the age of eighty. His personal estate has just been valued at 231,584*l.* Artists, as a rule, are not millionaires, and few die leaving a personality of nearly a quarter of a million. Let struggling young artists now take heart.

IS PHOTOGRAPHY A FINE ART? A REPLY TO MR. JOSEPH PENNELL IN THE *CONTEMPORARY REVIEW*.

To the intelligent and cultured man the present low state of criticism in this country is saddening, and here we have another example of a nugget of gold beaten out into molecules in a mass of journalese. When we have our *Saturday Review* finding Mr. H. G. Wells' pseudo-scientific journalism first-rate, and encouraging "D. S. M." in writing upon art, and we may add upon photography, need we go further for evidence in proof of our contention? Since the days of the *National Observer*, under Mr. Henley's editorship, there has been no critical paper worthy of serious consideration.

But to our muttons—Mr. Joseph Pennell and his tirade against photography.

He begins with all the *naïveté* and conceit of the "original" amateur, who pretends to have discovered something new when it is as old as the hills. Mr. Pennell tells us the claim that photography is an art is new, that serious critics, who may be counted upon the fingers of one hand, two of whom Mr. Pennell evidently thinks are "D. S. M." and himself, have hitherto ignored this point, and that *he*—great man—must step in and put matters to rights, as the "weight of art criticism is now swinging from the Continent to England." Won't they laugh on the Boulevards when they read this, and merrily hum:—

"Yonder town is full of statues, pictures, verses, music's din:
At the door stands Merry Andrew with his trump, and cries come in."

Such exalted notions are worthy of an amateur photographer. However, in brief, to show Mr. Pennell he is mistaken, absolutely mistaken or disingenuous, we will go a little into the history of photography. This claim that photography is one of the fine arts is almost as old as photography itself. It has exercised artists much more than critics—those poor deluded and conceited nonentities who ought all to be shot down in rows as disturbers of the peace. Sir J. Newton, Sir C. Eastlake, Mr. Ruskin, Mr. Hamerton, Mr. Adam Salomon, and others, "worried at it" before Mr. Pennell was known. All were second-rate artists who ought to have been doing something else, and two, Messrs. Ruskin and Hamerton, posed and prospered as critics until Mr. Whistler set them in their proper places. "Serious" critics, who in their day were considered the apostles of "sweetness and light," such as ex-painter F. G. Stephens of the *Athenæum*, and Mr. Quilter of the *Spectator*, have even made pronouncements on the subject, as also did the pseudo-scientific J. A. Symonds, who showed his remarkable "critical" powers when he wrote a number of the *Sun Artists*, and gave himself away on Mrs. Myers' photographs to a scornful world. Artists themselves have written on the subject, and in an early issue of the *Studio* expressed their views on the matter. These names are written haphazard from memory, but so many are sufficient to prove our point, that Mr. Pennell is no historian, and not even fit to be a "clerk of the collection," as Mr. Whistler has aptly put it. Again, the matter has been seriously thought about by photographers, and the wisest have concluded that photography is not art.

Next, let us dispose of "D. S. M.," one of these four or five critical geniuses. Any photographer who frequents studios, and knows artists, knows well that "D. S. M." is, in certain quarters, a "smiling stock" as a critic, and if he does not believe us, let him go and hear "D. S. M." criticised by artists who are, at any rate, *his* masters, second-rate though they be. But the most perverse "artist photographer" should *realise* and note well that all the professionally trained critics conclude, and rightly, that "photography is *not* art."

Mr. Pennell next calls attention to the two Exhibitions, that of the Royal Photographic Society and the Salon, and compares them, much to the advantage of the Royal Photographic Society. Now, Mr. Pennell affirms there are, at most, five great artists and five great critics in any age, so we assert, in our modesty, there are no more than five great photographers. It has been computed that there are 100,000 photographers in practice to-day. Those who know the men and their work know, too, that only some three or four can produce work that interests great artists. And here Mr. Pennell's unfairness and incapacity again leak out. Does Mr. Pennell know that the "blatant amateur" reigns supreme in a certain show, and that he is more dreadful in photographic circles than in any other? These amateurs decry a knowledge of chemistry, optics, and mathematics because they have them not. Let Mr. Pennell understand that these amateur writers, this "beef-extractor," and others of their kidney, are the laughing-stock of most really educated and intelligent photographers. Mr. Pennell has only to refer to an old file of this paper to prove the point to the hilt.

Mr. Pennell then naïvely asks, Are there any men who devote a life to photography? To a photographer such a question is childish. We can name many men who have devoted all their energies to it—able men who have worried over its problems, and are worrying over them—but these have nothing to do with "forewords" and the gilded gauds of the blatant amateur. In fact, Mr. Pennell has been tilting at individuals—individuals, too, that the able photographer laughs to scorn.

Next we have an eulogy of the artist. Now, we who know trained artists of all classes know the ropes too well to swallow such rubbish. Almost any one can be taught the technique of art in, at most, seven years—it requires no genius—which word he has defined as "the man capable of tremendous hard work," or, as one should say, the compiler of a Bradshaw. Mr. Pennell goes on to brag—there is no other word—of the artist's deep knowledge of anatomy—the laziest medical student knows more of anatomy at the end of his first year than any artist we ever met at the end of his training. He brags, too, of other knowledge (esoteric, doubtless) of the artist. While the fact is, artists are, as a body, about the worst educated men of the so-called educated classes, and photographers could easily give them points, men to men, in educational matters, and disperse them stricken and shamed to confusion. The very education that it has taken to make many an "amateur" in photography places him at once at an advantage in this respect. Mr. Pennell then hints "photographers" are anxious for social recognition. Suffice it to say, that it amuses gentlemen very much to see how "artists" depict them—the "barmaid" type for a lady and the "barmaid follower" for a gent. is the usual thing.

But a truce to such irrelevant side-issues, the training to be an artist is not nearly so difficult as that required for many of the "learned professions," and the pushing artist with his demand for social recognition only amuses the *haut ton*. Now, these artists should be like the great Greek sculptors—journeymen workmen true to their trade.

It did not require several pages of a monthly review to prove that photography is not "a personal expression," and therefore not an art. A child with a logic primer could have seen this which the "highly educated" (?) artist has tried to prove. Photography is impersonal of course; if art is only that which is "personal" of course photography is not art, and by the same token no art is realism, for realism must be impersonal, all this able photographers already clearly acknowledge. But where Mr. Pennell juggles is that he "ignores the results" of the machine, as compared with "Art." Yet *as records* he prefers the results of the machine as we believe does the great "D. S. M."—poor belated "D. S. M." To talk of so many thousand artists recording the Jubilee procession is nonsense—they could not do it—as Mr. Pennell himself says, only four or five are worthy to work, let alone 11,000. If Mr. Pennell had to buy a property from pictures or photographs, had to select a wife from pictures or photographs—in both cases, honestly done, we will assume—would he or would any sensible man prefer the "drawing" to the "photograph?" We trow not. It seems useless to argue, for science, which has to do with records has decided the question once and for all, and photo-

graphy is preferred "for records" because *it is impersonal.* As a record the cinematograph will take precedence of anything. Would any series of drawings of the Corbett-Fitzsimmons fight *convince* like photographs of the same?

Now, as to personality in choice of subject, here, too, Mr. Pennell gives himself away, for he hints that, if artists took to "snap-shooting" pictures, the amateur would have a bad time of it. Why, unless the artist could put some of his personality into the result? Of course, he admits this. The amateurs and their absurd scribblings have dragged photography down to the level of an "Aunt Sally" for the educated. There is not a single amateur amongst the leaders and promoters of amateur shows worth a moment's thought or regard quâ critic. Their prominent letters to the journals of their "show," or newspaper critiques—which Mr. Pennell justly scoffs at—are a mixture of plagiarism, crude ideas of art, and of photography, illogical deductions, and all the drivel of weak intellects allowed to have their say. Really *educated* professional photographers have already condemned them and their blatant presumptions.

And finally Mr. Pennell, himself an ex-amateur photographer, should give up writing columns of "criticism" on the self-evident, and devote himself to his work, and leave photography to develop itself.

Photography can get on without him and without the vain amateur, at whom he justly rails, and whose poor weak life was doomed to an ignominous death before ever it was born.

To progress, we want to be rid of the amateur in every guise—the amateur show, the illiterate amateur scribbler, the amateur journal, the amateur photographer writing on "art."

Photography is as certain to take the place of the bulk of so-called art as was the printing press certain to replace the hand work and illumination of the professional penmen of the Middle Ages; and photographs are, of course, no more art than the records of the phonograph. Even the common fool is beginning to see this.

JOTTINGS.

Surely Professor Lippmann's lecture, which was listened to a month ago by some hundreds of photographers at the Society of Arts, will give an impetus to experimental work in interference colour photography. There is probably no great difficulty in the preparation of the transparent "emulsion" plates, while the adaptation of a dark slide for holding the mercury in contact with the film during exposure cannot be a task beyond the skill of an intelligent photographic cabinet worker. These are the two respects in which interference photography differs from ordinary photography. I hope to hear that suitable plates and slides will soon be on the market, for the advances already made in shortening the exposures from hours down to minutes are the best encouragement to others to follow Professor Lippmann in his experiments. And yet, though the interference process has now been before the world seven years, probably not more than two or three workers in this country have taken it up.

The lecture is given in full in last week's Journal. At p. 325 of the volume for 1893, Lumière's formulæ for the preparation of the "emulsion" are given; and at p. 407, for 1894, Mr. Wall illustrates the form of dark slide that is used by Professor Lippmann. The professor, in the course of his lecture, stated that the glass "negatives" could be duplicated, and that enlarged copies could also be made from them, so that those to whom the commercial possibilities of colour photography are of paramount consideration may be able to perceive in these two hints some scope for remunerative experiment. I observe that at the meeting of the London and Provincial Photographic Association on December 23, Mr. Banks suggested, instead of the use of mercury as a reflecting surface, the coating of the "emulsion" on silvered glass, and the subsequent stripping of the film, which, of course, would have been exposed direct instead of through the glass. I pen these notes on the subject in this place with the view of drawing renewed attention to it, and of inducing some of your experimentally inclined readers to strike fresh ground in their photographic labours.

Those who have not seen any of these interference photographs can have little idea of their beauty, and what appears to be their colour fidelity. Professor Lippmann's pictures, exhibited by him at the Society of Arts, were shown by dark lantern—or megascopic—proj-ction, and they included a solar spectrum, which was wonderfully good and brilliant. Some of the views he produced appeared to me to be truer to nature—less "metallic" in the blues and greens—than even Lumierè's remarkable results, that were projected in the Society of Arts theatre four or five years ago. I should say that Lippmann had made a decided advance in interpreting the colours of sunlit views. As regards viewing the prism-bound and "backed-up" pictures in the hand, no more trouble is entailed than in looking at a Daguerreotype. I am alive to the fact that these Jottings have their own circle of readers, and it is mainly for their benefit that I make this plea on behalf of a very interesting process, which conceivably has a world of possibilities immediately before it.

I congratulate the North Middlesex Photographic Society on having decided to hold, throughout the year, a series of instruction lectures adapted to the requirements of beginners. Twelve subjects have been chosen, capable lecturers have been selected, and as far as possible practicable demonstrations will be given. Thus, by going through this course of free lectures it is possible for a young fellow taking up the study of photography to acquire an excellent acquaintance with manipulatory details, by watching qualified men go through the various operations. A few announcements in the local press should bring the North Middlesex a large attendance of would-be photographers, who are beyond the reach of the photographic papers. It is an old complaint of mine that too much is *talked* about photography, and not enough *done*; and, when I see a live and progressive Society like the North Middlesex deciding to try and teach photography by practical demonstrations, I think it should not only be encouraged in its good work, but held up as an example to other societies.

One of the curiosities of newspaper controversy, which I first noted down many years ago, is that very often when you put an opponent in a corner, and state your case against him in unambiguous language, the most crushing retort he thinks he can make upon you is either that you have the liver complaint, or that he never dreams of taking you seriously. This kind of thing is the veriest commonplace of provincial journalese. I was astonished to find Mr. Alfred Maskell, who on December 24 replied to my last month's criticisms of the gum-bichromate process and his book on *Photo-aquatint* (*sic*) adopting the weak and platitudinous don't-take-you-seriously line of defence, and then going on to prove conclusively that he takes me very seriously indeed. Otherwise he would scarcely call me a Jesuit in disguise. Jesuits, as, of course, Mr. Maskell knows, are clever men; but *disguised* Jesuits are obliged to have a double stock of astuteness, so I have to thank thee, Alfred, for a by no means unacceptable, if unintentional, compliment.

Mr. Bennett's effective letter on the misapplication of the term photo-aquatint to carbon printing, and Mr. Pouncy's evidence that treatment of the paper support with the bichromate solution was practised by his father, absolve me from saying anything in reply to Mr. Maskell on these points. As regards my services to the Photographic Salon, which he so gratefully acknowledges, I have only to add that I believe they are not quite finished. I may one day write the history of the Salon, and I certainly hope to have the great happiness of composing its epitaph. It is surely time for the administration of the happy dispatch to that institution when Mr. Maskell is so hard pressed to find weapons with which to defend it that he is driven to call in the name of a "distinguished" French critic, M. de la Sizeranne. Hitherto the *Times* enjoyed the melancholy distinction of being the only journal of importance that

supported the Salon, but now, after four years' effort, a "distinguished" Frenchman in a Paris review has been unearthed to keep the *Times* "critic" company. I have not time to read M. de la Sizeranne's article, and, if I had, I should no more dream of taking my opinions of the gum-bichromate process and the Salon from a foreign review than I should from—the *Times*. COSMOS.

ON THINGS IN GENERAL.

"AUTRE temps autres mœurs:" when nearly forty years Pouncy first introduced the gum-bichromate process—his own invention, though founded on previous discoveries by others—to the "Photographic Society," as the R.P.S.G.B. was then called, there was so much heated discussion, such imputations upon his motives, and such adverse criticism of his results, as might have deterred any but the most enthusiastic from further prosecution, or, at any rate, publication, of his experiments. But the meeting was adjourned, and when next the process was brought forward its merits were handsomely admitted and the scoffers silenced. Every one admitted the marvellous improvements that in a few short weeks since his invention he had been able to bring out in his prints. The scene changes to the present day; we find a society's room packed with an earnestly attentive audience, quiet and orderly, hearing Mr. Packham, and watching him develop gum-bichromate prints by a process which is a simple modification of Pouncy's.

Even the very mode of laying on the gum and pigment was almost a copy of Pouncy's original instructions. It seems a pity that the first inventor's name should not be attached to the process, whether coupled with another or not, but the modern tendency seems to run entirely contrary to the old plan, which attached an inventor's name to an application of his methods. Where is the old photographer who does not recollect "Taupenot's process," the "Fothergill process," and so on; but who ever hears Swan's name given to carbon prints as now made, or that of the inventors of emulsion photography to dry plates? Even poor Archer, who brought fortunes to so many, was ignored—perhaps that was the beginning of it all. If Pouncy had only discovered a strange beetle or landed on a barren island that no one cared twopence for, his name, beautifully Latinised, would have been handed down to all ages, but now he stands a fair chance of his barren island, made fertile by his labours, being stolen from him because some one has fixed a landing stage to it to convey its products to distant markets. I don't wish to say anything disparaging of the modern exponents of the Pouncy process, for they deserve every praise for showing what it is capable of, from the things of beauty, at one end of the scale, to the nameless and shameless atrocities at the other. *Apropos* of the mucilage employed, it may be worth noting that the popular name of the gum is "gum arabic." It is found in commerce in tears of various sizes and all shades of colour, and the more carefully all but the white tears are rejected the higher the price. As received, it is called "sorts." If the mucilage is made cold, it keeps well; if made hot, it soon turns "sour." A common quality is largely used in calico printing. I well remember an occasion at a large works when the usual workman on the job was away ill and one of his mates volunteered for the task of dissolving a hundredweight. It seems such a simple thing in the hands of the expert; but the novice did make a mess of it, the more he stirred the more it wouldn't dissolve, till at last he had to acknowledge himself beaten, and gave up the task in despair. Moral, even the Pouncy process, if practised on a large scale, would want trained hands; but the personal equation necessarily involved is too important a factor for it ever to become a cheap commercial process.

By the bye, I don't agree with those who attack it on the ground of the necessary manipulations taking it out of the range of photography. Precisely the same thing was said about retouching, which came to stay, even if it did ruin the integrity of photography. It certainly ruined most of those who tried to make a living without its aid.

I notice a paragraph in the pages of this JOURNAL to the effect that Messrs. Johnson & Sons call attention to the fact that their label is being imitated on chloride of gold tubes. This firm and a few others, who are real manufacturers, deserve well of photographers for introducing an article of guaranteed strength, a strength stated on the label; for, of all the photographic chemicals ever produced, this lends itself to chicanery and deception. No one should ever buy chloride of gold unless the label guarantees the contents of the tube or bottle to contain a given amount of metallic gold.

In glancing over Society proceedings for the month, I noticed an excellent and very practical lecture, given by Mr. Oakden, at the Brixton and Clapham Club; but one of his statements is too comprehensive, that where he is reported to have said, "Single lenses are next to useless, as they distort lines near the margin of the plate." Now, as a matter of fact, if a well-stopped-down single lens be used on a plate whose length is not more than two-thirds the focal length, he will be a clever man who will find distortion in an average architectural photograph so taken.

I notice of late a recrudescence of another very old plan—the producing of vignettes direct in the camera by means of a screen with central aperture, placed outside the camera. Thirty or forty years ago Lee, of Liverpool (whose business was taken by Robinson & Thompson), made the larger proportion of his portraits in that manner. They were, of course, glass positives, and there was nothing in the kingdom to surpass, and very few to equal, them.

The inventors of the word *Frena* titillated our sense of humour in their delightful account of the genesis of the term. I think Mr. Roxby must have been unconsciously plagiarising their method (or, should I say that of the author of *Alice in Wonderland?*) when he wrote of "gulfing the breach." It is an irresistibly comic expression, and what he intended to write was, no doubt, "bridging the gulf." Observe the unconscious humour of the thing in a man, writing with grim determination, in the interests of the Naturograph Syndicate, Limited, giving us this airy trifle, though it is really a matter of no consequence to us whether he wrote tweedledum or tweedledee.

When one sees the name of W. J. Stillman attached to a letter, as in last week's JOURNAL, it gulfs a breach in, I mean it bridges a gulf of time of, over a quarter of a century. One of the earliest of the modern portable cameras was described in a price-list of the time with Mr. Stillman's name attached to it. It was a great improvement on the Kinnear, and is, indeed, the parent of most of the modern portable cameras. Here, again, must a lament be made. Kinnear's name, in the early days, was attached to his invention; but who ever gives credit to Stillman, whose ideas were stolen, and whose invention was filched, to reappear, indeed, with another name attached, but happily not for long, as the game of follow-my-leader has been carried on more merrily in camera manufacture, and the appropriation of other men's ideas, more freely than in any manufacture known? Who ever hears of Kershaw's name attached to a shutter now?

"When doctors differ, who shall decide?" This proverb would be forced into the recollection of any one who read or heard Mr. Harold Baker's lecture on *Portraiture*, and noticed what he said about developers. He spoke of the "antiquated pyro," a term to which Mr. Welford took exception, but was controverted in turn by Mr. Fall, while yet again Mr. Hana declared he had returned to pyro. Now, it is a fact that some of the most eminent professional photographers are at present using metol in their daily work, but how long they will continue to do so before imitating the Chairman, and returning to their old love, it is impossible to say. Pyro will take a deal of killing. On the same topic Mr. Mackie had some useful remarks to offer, but they might with advantage have been extended by pointing out that, to use the front glass of a portrait lens to get the effect he described, it should be unscrewed and placed in the position of the back lens previously removed; but, if it were wished to get greater sharpness, it should remain in its usual position, where, but in a limited field only, the image would be very sharp.

And now I will finish my lucubrations, delayed through illness, by wishing all my readers a Happy New Year and all business prosperity. FREE LANCE.

HALATION AND BACKING.

[Paper read before the Hackney Photographic Society.]

HALATION, photographically, is understood to mean an encroachment of the lights on to the shadows which lie adjacent to them, this halation generally taking the form of a great weakening of the shadows close to, and especially those surrounded by, high lights; the weakening gradually dying off for a greater or less distance from the lights which originate it. One cause, and the cause which, in the general way, prevents the use of gelatine emulsion for process work, is the light falling on the film, causing it to emit light laterally, so that a fine, black line, which ought to be transparent in the negative, being lit up on both sides by the illumination of the film, becomes much weakened thereby. This kind of action, called irradiation, does not travel far on the plate, and is for most purposes of so little consequence, compared with another cause, that it will not be discussed further now. The main cause of halation is reflection from the back of the plate. That this is so may be shown by the fact that film negatives are almost free from halation. Irradiation may exist on these as freely as on glass plates; but, the film being so thin, the light which is reflected from the back returns very nearly to the same spot on the film as that from which it started.

Reflection from the back of the glass may be general or total. If a glass with parallel sides, such as ordinary glass used for emulsion plates, be covered on one side with a paint or backing material, the general reflection can be seen from the other side. This reflection is, except for very small lights, such as a distant candle, interfered with by the reflection from the front surface of the plate. The total internal reflection, however, which is the chief cause of photographic halation, cannot be seen at all, since it does not exist on the plate until the front surface is coated with a dispersive material, such as sensitive emulsion.

When light passes from a rare medium (air) into a denser one (glass) at any angle not perpendicular to the surface, the light is deflected (refracted it is called) towards the perpendicular, and conversely on passing from glass into air it is refracted from the perpendicular. A ray of light passing diagonally through a glass plate will follow lines through the air on both sides at an equal angle with the perpendicular, whilst these lines will be joined through the glass by a line more near the perpendicular than these two exterior ones. When the ray in the glass is at an angle of about 41°, the refracted exterior ray will be nearly parallel with the surface of the glass, and consequently the ray must have fallen on to the glass originally at the same angle, *i.e.*, almost along the surface. If light strike the second surface of the glass at an angle of about 41° 45′, or more, it cannot be refracted out into the air, and suffers total internal reflection. As is evident, this angle cannot be reached on a flat uncoated glass plate, and such a plate is therefore useless for the investigation of the principal cause of halation.

When a plate is coated with a dispersive material, such as an ordinary sensitive emulsion, the light passing through the film is diffused, and, on reaching the glass, passes through the latter in all directions, as shown in the accompanying slide. A single point of the film is supposed to be illuminated, and from this point lines pass through the body of the glass at all angles. Those which reach the opposite surface at an angle of less than 41° 45′ are partly passed through into the air, and partly reflected back to the film, but, when the angle mentioned is reached, the light, being unable to pass into the air, is wholly reflected back, causing a bright circle or halo to surround the point of light. In photographing a scene at dusk, when the lamps have been lighted, a halo or ring may be seen surrounding each gas jet. This ring has nothing to do with any visual effect, but its size is simply determined by the thickness of the glass on which the negative is taken, the ring commencing suddenly with a diameter of about three and a half times the thickness of the plate, and extending more or less, according to the power of the light, until it gradually dies away.

The slide now shown is made from a set of pinholes on plates of three distinct kinds, each kind having a set of exposures both on a backed and on an unbacked half. Each plate had five exposures, and the exposures increased by a ratio of four to one, so that, starting with fifteen seconds for the top row, the next row had one minute, the third row four minutes, the fourth row sixteen minutes, and the bottom row sixty-four minutes, or 256 times the exposure of the first row.

The first two vertical rows were made on a rapid commercial plate of good repute, unbacked and backed; the next two on a Gem universal plate, chosen because of the thorough sound coating, which mitigates halation to a great extent, and gives better gradation in the lights; and the third pair on a Sandell double-coated plate.

The effect of prolonged exposure in causing halation is very clearly shown in the row of unbacked exposures on the ordinary commercial plate. No halation is visible with the shortest exposure; with the next a faint ring is just seen; with the third exposure there is a strong ring due to total reflection, and a considerable enlargement of the central spot due principally to general reflection, though probably to some extent caused by irradiation. When we come to the fifth or longest exposure the halation has extended to a circle of about an inch in diameter. In these longer exposures on this plate the central spot due to direct exposure has become reversed and prints dark. There is no trace of this reversal on the other two plates, and this, independent of their greater freedom from halation, is another reason for their superior rendering of the gradations in the high lights. On the backed half of No. 1 plate there is no halation ring due to total reflection, but there is a spreading of the central images in the longer exposures, and the same black spot of reversal. With the plates Nos. 2 and 3 the backing has been successful even with the longest exposure, whilst on the unbacked half of each there are only two images on the Gem, and only the last one on the double-coated plate, that show any ring at all. It may be noted, however, that the central spot is considerably enlarged in the long exposures on the unbacked halves of the plates, showing the desirability of backing even with these plates, for subjects that are at all trying.

Of course, the longer exposure given (several minutes) having been to the light from a gas jet, may answer to only as many seconds, or even considerably less, when compared with a well-lighted subject in the camera.

For investigating total reflection a flat glass plate is, as has been mentioned, useless. An idea, however, may be formed from it of the general reflection present with various mixtures. Thus, on the plate coated on three squares with pure caramel, with caramel and Vandyke brown, and with caramel and sienna, the last-named shows as the lightest, and the pure caramel as the darkest. For investigating total reflection a prism is used, as, if one side is coated with backing, light from any angle may fall upon it through one of the other sides, and the inspection made through the third side. The prism now shown has a row of such backings, one of which is singularly bad, and attention is called to it as something to be avoided. This backing mixture was composed of a commercial black varnish with which some additional black pigment was ground up, but not very fine. Looked at from the back, the mixture might be supposed to be excellent, but the part of the prism covered with it reflects almost as much light as the uncoated surface. There seems to be scarcely any optical contact. This is, doubtless, due to coarse particles of pigment causing a strain upon the drying film. In further investigations with the help of a prism, I have attached one to the front of the lens, as for producing reversed negatives, and made exposures from a sensitometer screen used as a slide in a lantern, the screen being focussed in the camera with the lens carrying the prism. The camera was arranged to take many exposures on one plate, the reflecting surface of the prism being coated with a fresh backing mixture and dried between each exposure.

The essentials of an effective backing are, firstly, that the refractive index of the medium shall be as nearly as possible equal to that of the glass; and, secondly, that the medium shall be so absorptive of photographically active rays, that there shall be no appreciable quantity of these left after passing through to the surface farthest from the glass and back again. These conditions are fulfilled in a very high degree by pure dry caramel, but, until quite recently, it has not been generally practicable to employ it without the addition of a pigment, or of some substance such as gum or gelatine, to cause it to dry. The pigment that has been most generally added is burnt sienna, but I have lately substituted Vandyke brown, as there appears to be less general reflection with it.

The addition of pigment to the caramel has been made with a threefold purpose: First, in order to help the caramel to dry, and prevent its becoming tacky again; second, to give so much opacity to the backing that a moderately thin film will suffice; and, third, to prevent the caramel from drawing together in drying, and so leaving spots almost uncovered. Equal parts by weight of thick caramel and of pigment (Vandyke brown or burnt sienna ready ground in water) are well worked together with a knife on a slab or plate, and squeezed through coarse muslin. Any pigment that does not go through is returned to the slab and worked up again with some of the mixture until it will all go through. A little methylated spirit, say equal to a sixth of the whole, is now well stirred in. The mixture is applied with a soft brush, and the plate stood up in a drying box or cupboard till dry.

The manufacture of caramel is included in the syllabus, and will therefore be shortly described; but Messrs. Lichtenstein, of Silvertown, have quite recently issued a make of such excellence that I would strongly advise the use of it instead of such as is likely to be manufactured privately. I have here a dry lump of it and a plate partly coated without any admixture, and there does not seem to be any tendency for it to become tacky, as what I have hitherto used does, in such weather as the present. To keep the engagement given in the syllabus, however, and for those who may not be within reach of the new commercial article, the following directions are given: Put a pound of loaf sugar into an iron saucepan that will hold two or three quarts. Place it on a fire or gas stove and stir until it first melts, blackens, and thickens, and then becomes somewhat thinner again. Continue the heat with constant stirring until the mass again becomes thicker—an hour may be required altogether, when it is stood aside to cool somewhat. Half a pint of water will have to be added, but it must not be done until the mass is partly cooled down, or there will be an explosion of steam. When the water is incorporated, which may not be until the next day, the solution is strained through muslin and should be as thick as treacle. The caramel must be kept stirred all the time it is on the fire, and, if it rise near the top of the saucepan, must be removed from the fire to prevent a dangerous blaze.

I believe the principal reason why so many photographers do not

back their plates is that they have no convenience for drying them out of the reach of light. I have therefore brought with me a drying box which answers every purpose up to 12 × 10 plates, and which is made from two milk cases, obtainable at any grocer's. It will be seen that air is admitted at the bottom and allowed to escape at the top by openings which are furnished with light baffles covered with black velvet. In the bottom of the box a tin can or bottle of hot water is placed, and a movable shelf, made rather in skeleton fashion, stands over the bottle. The plates, if large, stand on this shelf, with one edge of each pushed into a groove in the side of the box. For small plates, a rack is stood upon the shelf. With the aid of the hot bottle, half an hour generally suffices for small plates, and an hour or so for large ones.

I have not had time since the hard-drying caramel has been introduced to make exact comparative experiments with it alone as against the usual mixture with a pigment. I notice, however, a further advantage that it possesses as well as its dryness, in the smooth manner in which it covers a plate without running away and leaving pits such as have been mentioned earlier in the paper. W. E. Debenham.

MY FIRST YEAR'S EXPERIENCE AS A PROFESSIONAL PHOTOGRAPHER.

In connexion with the discussion on the subject, "Is Photography a Played-out Profession?" that has been going on in our pages, the following extract from an article in the January number of *Photographic Scraps* may be found of interest:—

I commenced business in R—— in the autumn of last year. I had grown tired of putting all my energy into the business of another man without getting any appreciation in return, and, having some capital in hand and some fifteen years' experience in general photography, I thought I could not do better than make a start on my own account.

I was fortunate in being able to fix on this town as the scene of my work, as there was no photographer previously established here and the place was a growing one. In addition to this, I was within a short train ride of my old situation, where I had been several years as operator, so that I could count on some few sitters from those who knew me personally.

I was lucky enough to see some premises in a good position which I thought would, with a little alteration, make a capital start. Having made inquiries, and finding from the landlord that there was no objection to my erecting a studio, we came to terms to my satisfaction, and an agreement was drawn up by a solicitor, so that no bother should crop up in the future, and by what I have seen since I am sure the three or four guineas paid as fees were well spent.

My next thing was to get the studio built, and, as I had no previous knowledge in the building line, I thought I could not do better than employ a competent architect, as I found that, before commencing, the plans would have to be passed by the local authorities. This course proved to be the cheapest in the end, as for a small matter of five per cent. on the total cost I had the affair completely taken out of my hands and was free to do many things in the way of fitting up the rooms, &c., ready for work.

The plans, after some alteration, having been passed by the Council, a specification was sent to two or three builders for tenders. Finding that the original size would cost too much, the size of the studio was cut down to 24 ft. × 12 ft. This size I have found to be quite large enough for all the work I have had up to the present.

Being a handy man, I found plenty to do while the studio was in course of erection. The place was in a very bad state, and by doing many things myself I saved some few pounds, which came in very useful afterwards, as I found that, what with extras, &c., which could not be foreseen, the studio would cost a great deal more than the contract price.

One thing that troubled me was how to get specimens. This difficulty I got over, however, by asking a few friends to give me sittings. This answered very well, as many copies were ordered afterwards and paid for.

Now, in spite of all these things and the winter approaching, I found on opening that sitters began to come in—some who knew me; some strangers, who, being pleased with the work, recommended others, till I could see that the thing if properly managed was going to be a success. The class of business I was doing was a middle-class trade—5*s.* per doz. for *cartes-de-visite*, 10*s.* 6*d.* per doz. cabinets. By the end of three months I had managed to get a little of my capital back again, which was very encouraging, especially as business was still on the increase, notwithstanding it was reckoned to be the slack time. Now, after a little more than a year's work, I find that, after making various improvements, increasing the stock, &c., I have got back all the capital sunk in the first instance, and have a rapidly increasing connexion which I think will stick to me.

Now, a few hints as to my method of working may be of use to some of your readers. First of all, I made it a rule to do all the work I possibly could myself. Of course, this meant working a great many hours, but this I did not mind, as I was determined the venture should be a success.

I managed my work something in this way:—Opened at nine, looked over negatives retouched previous evening and gave to assistant to print for proofs; did what spotting I had to do between taking sitters; by four o'clock ready for assistant to burnish; after tea, toned, assistant having washed prints; developed negatives taken during the day, and retouched, then mounted prints.

This meant a pretty good day's work sometimes, but I have managed to survive. I always make it a rule to keep in front of my work if possible, and let sitters have proofs in a week. By doing this I save a lot of worry. If I make a promise, I do my utmost to keep it. Whatever comes along, I try to meet it with a smiling face, and to this I attribute not a little of my success.

I also believe in posing the sitter as little as possible, as it seems to me that every touch a photographer give to his sitters beyond what is absolutely necessary only tends to make them more nervous, and consequently wooden and rigid. I spare no pains to get a natural pose, and always make at least two or three exposures. In the case of nervous sitters and children I increase this to four and six.

I do the same where the sitter is specially attractive and likely to make an unusually good picture. This pays, because sitters are gratified, and will usually order more copies than they intended to have, and also recommend others. I always prefer to give a resitting even if the objection is a little frivolous. I also believe in simple accessories and background as giving the best results. I do very little advertising, believing that the work, if good, will be sufficient by itself.

Now, what is the lesson to be learnt from all this? That, in spite of the dismal wails from some members of the profession that photography is played out, there is still a demand for good photography at a moderate price without resorting to coupons and suchlike tricks. That it pays in the long run to be liberal in the use of plates, and in giving resittings.

Without referring to the specially gifted or the specially situated leaders in the art, I see sufficient to know that the man who does an every-day middle-class trade can, by careful attention to his work and judicious management, build up a good trade and make a satisfactory living. If he does not, he is more than usually unfortunate in his surroundings, or unbusinesslike in his methods.

At the beginning of another year it may help some one to read my experience, and in writing it I have had my own thoughts turned to one or two points which will, I trust, turn out to my own advantage during the coming season.

Points for a successful photographer:—Cleanliness and order, tact, courtesy, cheerful manner, however trying things are; punctuality, a thorough knowledge of all details of the business; judicious liberality in resittings, careful printing and finishing; proofs to be sent out properly finished, mounted and burnished.

ORTOL.

On Thursday last week Mr. C. H. Bothamley had an interested and attentive audience at the Camera Club to listen to what he had to say respecting Dr. Hauff's last bantling—the new developer Ortol. To the same chemist photographers are indebted for both amidol and metol, excellent developers for certain purposes, as many of our readers have found out for themselves; it remains to be seen whether ortol, their brother, will meet with as much approval as the rest of the family.

The lecturer described ortol as a yellowish-white substance, minutely crystalline, which readily dissolves in water, producing a practically colourless solution. It has a strongly acid reaction, which causes a solution of it, on addition of litmus, to turn red, as acids have a way of doing.

Chemicals of modern origin have invariably long titles, and it is said that the writer of pantomimes, burlesques, or fairy stories, when he wants a blood-curdling name for a giant or goblin, does not trust to his imagination, but turns to the Journal of the Chemical Society, when he is pretty sure to find a polysyllabic name of sufficient atrocity to suit his purpose. Ortol is but a nickname—a sportive short rendering of the full cognomen, which is written thus, ortho-methyl-amidol-phenol. By taking the first and last syllables of this word in nine parts we get ortol—just as the boon companions of the prophet Jeremiah would call him Jerry for short. Rodinal, it is interesting to learn, is a near relation to ortol, his complete baptismal name being para-amido-phenol. These words having been chalked upon the black board, those gentlemen who objected to the rollicking evening of frivolity which they presaged were induced to creep out of the room, and retire to the more serious pursuit of billiards upstairs; the larger number, however, bent on festive amusement and chemical formulæ remained.

"Considering its composition," said the lecturer, "we should expect ortol to give reactions of an interesting character." He thereupon produced three goblets—and thirsty folk immediately began to ponder on his words, and wonder what form these interesting reactions would take. But they assumed their normal attitudes when they learnt and saw—for this was an experimental lecture—that ferri perchlor. caused ortol to turn first purple, and then reddish-brown. Then we learnt that all these amido compounds could be converted into diazo compounds, and that ortol would yield in the same manner was proved by the addition to a solution of it of some potassic nitrite, followed by a small quantity of acetic acid—when the diazo compound was formed, in this case a bright scarlet colour.

The next thing which we learnt of the new developer was, as might have been expected, that it has considerable reducing power, which was proved to demonstration by the addition to a solution of it of some silver nitrate, when the latter was precipitated in the metallic form.

Ortol, of itself, has no developing power. Exposed plates of different brands left soaking in a solution of it showed no trace of an image at the end of twenty-four hours. Even the most persistent advocates of tentative development would not care to wait longer than this for the appearance of an image, and we may therefore conclude that by itself ortol is of no use. Mixed with it some sulphite alone, and no alkali, in the ordinary sense of the word, and the image will come out, but very slowly indeed. The image will eventually be as satisfactory as if a normal developer had been employed, but the action is so protracted that it would drive a photographer of ordinary intelligence mad. It was all very well as an experimental thing, and Mr. Bothamley showed two plates which had been thus made to yield a tardy image after seventeen hours' persuasion. The ordinary developer, as recommended by Dr. Hauff, stands thus :—

A.

Ortol	15	parts.
Metabisulphite	7	,,
Water	1000	,,

B.

Soda	100	parts.
Soda sulphite	125	,,
Water	1000	,,

Add 1 grain of potassic bromide per ounce of mixed developer—A and B—in equal quantities.

The lecturer has found that the sulphite can be reduced to fifty parts without any disadvantageous results, and recommended this course, if only on the score of economy. As a matter of interest he had been at the pains to calculate from the published formulæ the amount of ortol employed in this formula as compared with the amount used of other developers per 100 parts. Here was the result :—

Amidol	·4
Rodinal	·4
Metol	7·5
Ortol	7·5
Quinol	1·
Eikonogen	1·25
Glycin	1·50
Pyro	·46

In developing ordinary plates with ortol at the normal temperature the image, if properly exposed, made its appearance in about fifty to seventy seconds. The image came up with great regularity. The colour of the deposit was blacker than that obtained with pyro-soda, but not so blue as that given by metol or amidol. The gradation of tones was everything which could be desired. For example, with the Warnerke sensitometer a plate showed the number twenty-three, and there was a distinct difference of opacity on all the squares from one to twenty-three. The developer could be modified by special treatment. Thus a solution of bromide would exercise a very marked retarding effect, but the effect was not permanent, the negative coming up to normal density if sufficient time were given to it. Changes, too, might be rung on the other constituents of the developer, an increase of the alkali hastening the action; but the character of the negative in the end would not be influenced, they simply retard or hasten the speed of the developing action. For rapid plates he would double the amount of bromide, and possibly such a course would be advisable in hot weather; but, for most plates, a grain of bromide per ounce of developer was all that was needed. Incidentally he might remark that most published formulæ were far too sparing of the bromide constituent of the developer.

It would seem a strange course to recommend to introduce such a salt as hypo into any developing agent, but Dr. Hauff advises the addition of a small quantity of hypo to ortol, and Dr. Eder endorses the recommendation. This may answer with plates of German manufacture, but the lecturer experimented with a developer with the addition of hypo and found that he obtained no more detail from his plate than without it, It has, besides, a tendency to produce general fog, and is, on the face of the thing, a dangerous item to add to a developing solution.

Ortol more nearly resembles pyro in its action than any other of the modern developers, but it has this most important difference, it has no tendency to produce stain, and very little to cause fog. He had mixed up an ordinary pyro-soda solution in order to compare its staining possibilities with a solution of ortol. These two solutions he had poured into separate dishes, and had kept them for three hours exposed to the air, rocking the dishes at intervals. He had then bottled the two solutions, and they would now be shown side by side on the screen. The pyro solution was dark brown and almost opaque, and the ortol solution was clear and colourless. A not unimportant consideration was that ortol would not stain the fingers, even after prolonged contact, and, so far as he could see, there was no poisonous action about it. Indeed, it gave all the advantages which were valued in pyro without the staining action, which made the latter so useful as a hair dye.

The reason why pyro discolours so quickly is that it is peculiarly sensitive to the action of the air, and therefore one cannot go on using the same solution over and over again, or the plates are spoiled. Ortol is but slowly affected by the air, and one may use the same solution for four hours or more, the only apparent change being that it is slower in action than at first. This makes ortol an economical developer, although its first cost per ounce is two and a half times that of pyro.

Another important feature of the new developer, which has not been put forward by the manufacturers, is its possible use in intensification. We all know the ordinary method of bleaching by mercury and afterwards darkening the film by sulphite, ammonia, or some other agent. Mr. Chapman Jones had gone into this question, with the result that he recommended ferrous oxalate developer as being the only safe thing to use after mercury, the other agents forming compounds of very weak stability. The lecturer finds that ortol can be used very well for the same purpose, using it dissolved in water, with a few soda crystals added to it without sulphite. He had not made any detailed examination into the action brought about, but he believed that it resulted in such stable things as metallic silver and metallic mercury. Moreover, the action could be repeated, the image rebleached in the mercury, and again darkened with ortol. He showed in the lantern two pictures, the first intensified as regarded one half of it, and the second doubly intensified on one side and singly intensified on the other half. The reintensification gives a brown image, and he believes that the method will be found of great value for weak images generally.

For bromide paper—and he had tried it with several different brands—he found ortol to be the best developer yet recommended for that purpose. He used the formula already given, but diluted it with an equal bulk of water. Of course the image made its appearance more slowly, but with regard to colour and general effect it was everything that could be desired.

The same dilute solution was also capital for lantern slides of different brands, and he would show on the screen a variety of plates and subjects all developed with this new agent.

One more use he had for ortol, and that was for the development of partially printed gelatino-chloride prints. This was a course very commonly adopted on the Continent, but not so often heard of here in England, still it was a useful thing to know of. He used for this purpose a very weak solution of ortol, 1 : 1000. The picture was printed to only one-third its proper depth, and this solution would soon bring it up to what it ought to be. It is more under control when one-quarter of its volume of glycerine is added to it.

The proceedings closed with a demonstration of developing negatives, bromide paper, and lantern slides with ortol, which Mr. Bothamley described as being the most serious competitor to pyro yet introduced.

Our Editorial Table.

South African Health Resorts.

The General Manager of the Cape Government Railways, Cape Town, has been good enough to send us an illustrated guide to the health resorts of South Africa. The line touches at many spots of interest between Cape Town and Buluwayo, the names of which have recently appeared somewhat frequently in the newspapers. To judge by the illustrations, the Cape Railway system also extends to places of beauty as well as interest, and searchers after health and pleasure can probably find both in this part of the world.

How to Make Lantern Slides and Transparencies on the Cadett Lantern Plate.

Cadett & Neall, Ashtead.

A copy of this little pamphlet may be obtained on application to any photographic dealer. Brief instructions for exposure, by contact and in the camera, development, and other manipulations are given.

The Standard Air-tight Calcium Tube.

David Allan, 157, Whitfield-street, Fitzroy-square, W.

Although primarily designed for platinum paper, the Standard air-tight tube is equally applicable to the storage of other kinds of sensitive printing papers. The tube is neatly japanned in black, and gilt lettered; at one end it has a receptacle for the calcium chloride, which is separated from the paper by a perforated division. Air-tight caps fit into both ends of the tube, which is a distinctly useful addition to the resources of the photographic printer.

News and Notes.

Photographic Club.—Wednesday evening, January 19, at eight o'clock, a lecture on *Enlarging*, by Mr. J. H. Gear.

MESSRS. ADAMS & CO. inform us that they have removed from 81, Aldersgate-street, E.C., to 26, Charing Cross-road, W.C. They will shortly introduce, early in the coming season, an entirely new series of high-class hand cameras. This series will be known as the "Adams de Luxe," and will be fitted with the new Dallmeyer stigmatic, working at *f*-6, whilst the three-foci pattern will be fitted with the Zeiss convertible anastigmat.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—The Thirteenth Annual Exhibition will be held at the Royal Society of Artists, New-street, on February 28, March, 1, 2, 3, 4, and 5, 1898. Five open classes will be included in the competitions, with silver and bronze medals and certificates in each class. The Judges are Messrs. J. Craig Annan, J. H. Gear, and W. J. Morgan, R.B.A. The Exhibition will be opened at two p.m. on Monday, February 28, and continue from ten a.m. to ten p.m. each following day. There will also be an exhibition of apparatus and cinematograph and lantern entertainments. Vocal and instrumental music will be given each evening. The Hon. Secretary is Mr C. J. Fowler, Court Mount, Erdington, near Birmingham, from whom entry forms and all particulars may be obtained.

MESSRS. R. & J. BECK, of 68, Cornhill, announce that, having obtained extra premises for the purposes of photographic instruction, they are prepared to give lessons in photography. The following are the particulars :—Lesson I., Taking the Photograph: Description of the Frena, Setting the Shutter, Holding the Camera, Changing the Film, Length of Exposure, Hints on Exposure, Diaphragms, Frena Magnifiers, Loading and Unloading Camera. This lesson is applied to the use of the Frena camera, but can be given to suit any other camera. Lesson II., Development: Developing Solutions, Process of Development, Dark Room, Under-development, Over-development, Fixing, Washing, Drying. Lesson III., Printing and Toning: Description of Printing Frame and *modus operandi*, Putting Paper and Negative into Frame, Masks, Depth of Printing, Toning, Washing, Drying. The fees are 5*s*. 6*d*. each lesson, or 15*s*. for the full course of three.

AT the Montgomery Quarter Sessions, Welshpool, on the 6th inst., Walter James, described as a photographer, carrying on business at Wolverhampton, was charged with obtaining money by means of false pretences from David Roberts, farmer, of Llanwyddlen. The prosecutor stated that in August, 1896, the prisoner went to his house and asked to be allowed to take his photograph. Witness agreed, and the photographs were taken there and then. Prisoner afterwards asked for the money, saying it would save further trouble. Witness paid the money, and prisoner promised to send on the photographs in a few days, but they never arrived. John Tymm, a farmer of Llanllogan, stated that on August 6, 1896, prisoner went to his house, and asked if he could take his photograph. He did so, and as soon as he had finished he asked for the money, saying he would send them on in two or three days. Witness paid the money, but had seen nothing of the prisoner or the photographs. He gave witness a receipt for the money, and the name and address thereon was "Wallace James, Hill-street, Wolverhampton." Prisoner, in defence, admitted having received the money, but contended that he had no intention to defraud. He took to drink, spent the money, and neglected to send on the photographs as promised. Prisoner was eventually sentenced to one day's imprisonment.

AFFILIATION OF PHOTOGRAPHIC SOCIETIES—.The first of, it is to be hoped, a series of meetings of provincial photographic societies affiliated with the London Royal Photographic Society was held, under the auspices of the Leeds Camera Club, in their rooms at the Grand Restaurant, Boar-lane, on Wednesday evening, January 5. Appropriately enough, Mr. W. Thomas, F.R.P.S., the chairman of the Affiliation, and to whom the success of co-operation is due, was the first leading worker to be enticed into the provinces by the Yorkshire affiliated societies. His subject, too, was a most suitable one for the occasion, *Picture-making with Small Cameras* being his *forte*, and the possibilities of producing artistic work with hand cameras being, even in these enlightened days, a debatable one. Mr. Thomas, however, succeeded in convincing, without difficulty, the enormous audience that had gathered from all parts of Yorkshire on Wednesday last that pictures can be made with small cameras, and pictures that cannot be surpassed by any results obtained by the use of the larger and correspondingly weighty and expensive outfits usually adopted by those who desire to attain a prominent position in the photographic world. Mr. Thomas's lecture was pre-eminently a practical one, and, in addition to numerous specimens of his own well-known studies, he brought down with him over a hundred carefully selected examples of all the best workers and medallists throughout the kingdom, together with a choice selection of lantern slides from similar works.

LEIGH PHOTOGRAPHIC SOCIETY'S EXHIBITION.—The Annual Exhibition was held on Tuesday, Wednesday, and Thursday, January 4, 5, and 6, in the Grammar School, and was fairly attended. The members made a poor show in numbers, but the work was of a good quality, and some of it was framed. Mr. P. Seddon had an improved collection, all framed. His three of Chat Moss were admired for their artistic treatment; also views of Rostherne Church, Old Hall Mill, and a pretty view of a waterfall near Llangley Platt, were admired. Mr. Thos. Haddock had a fine display of platinotypes, which were very good, both artistically and technically, including views of Chat Moss and Welsh and Scottish scenery. Mr. Miles F. Burrows had a neat collection of views in Switzerland and Cornish Coast. Altogether Mr. Burrows had a most pleasing selection. Mr. W. Hampson, with a series of enlargements, *The Ebbing Tide* and his picture *On Chat Moss* are worthy of mention, but those snap shots of Mr. Hampson's are missing; surely he ought to have made a better show. Mr. T. Lee Syms's two best new pictures are *Field Labour* and *Expectations*. *After School*, *Timidity*, *Portrait*, *Children's Children*, and *A Lancashire Farm* are worth the praise bestowed upon them. Mr. W. R. Moore's exhibits on Velox paper consisted of Chat Moss and Scottish scenery, and enlargements of *Clinden Mill*, *Sweetheart's Abbey*, and *Glen Trool* are praiseworthy efforts. Mr. Adam Preston showed a good series of stereoscopic views of the Isle of Man, and Mr. T. Johnson three effectively mounted enlargements. The Loan collection, which was to have been a leading feature of the Exhibition, was lost by the railway, and caused much disappointment. The lantern exhibition was superintended by the Secretary. A magnificent series of slides, taken on Sandell plates by the Sandell Works Company, give great pleasure, were said to be the best slides ever shown in Leigh, and Mr. Seddon operated the lantern very satisfactorily.

THE CHICAGO COLISSEUM FIRE.—The Chicago Colisseum, which was burned on Christmas Eve, is said to have been set on fire by a pet dog, an explosion of gasolene having set the dog on fire. Lolita, a dancer, says that Frank Murphy, an *employé* of the X-ray booth, confessed to her that he caused the explosion. She says he told this to her and her mother when he called on them about the benefit to be given the exhibitors. Lolita said: "Murphy told me to-day how the fire started. It was caused by the explosion of gasolene in the X-ray exhibit. A big lamp was used to light the booth, but it was not considered sufficient, and the manager of the show sent for a gasolene torch. Murphy said a man named Bowen gave the gasolene torch to the manager, and about 5.20 o'clock Murphy carried in a five-gallon can of gasolene. The lamp was burning close by, and when Murphy went to fill his gasolene torch he was quite near the burning lamp. Morley, the manager of the exhibit, was on a ladder almost over the lamp, arranging the drapery about the booth. Murphy started to pour the gasolene into the tank of the torch, which had been extinguished, but the fluid caught fire and went up in a puff. There was a little pet dog in the place, connected with the exhibit, and when the gasolene exploded the dog was covered with the burning oil. The poor beast rushed around in terror, and set fire to the drapery of the booth, which hung to the floor. Quicker than a flash the whole trimming of the booth was on fire, and the blaze was rising to the balcony, where our show was located. The men about the booths near by ran and got the extinguishers, but they would not work. A hose was turned on, but they could get no water. J. Morales, a Mexican dancer, warned me to get out, and were just getting to the doors when the gas tank that supplied the lights for the tight-rope walkers exploded, and the place was a mass of flames." Murphy, when seen, denied that the explosion of a can of gasolene was the cause of the fire. He thought the drapery caught fire from a cigarette or cigar stump.

Patent News.

THE following applications for Patents were made between December 28 and December 31, 1897 :—

CAMERAS.—No. 30,588. "Improvements in and connected with Cameras." R. BALLANTINE and M. BALLANTINE.

ANIMATED PHOTOGRAPHS.—No. 30,815. "Improvements relating to Animated Photographs." W. J. H. JONES.

COLOUR PRINTING.—No. 30,863. "Improved Method of Preparing and Printing a finely divided Coloured Surface." J. JOLY.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

January.	Name of Society.	Subject.
17.....	Bradford Photo. Society	Annual Meeting: Election of Officers.
17.....	Ealing	*Photographic Fallacies.* W. T. White.
17.....	Richmond	Demonstration: *Alfieri's Printing-out Paper.* J. A. Hodges, F.R.P.S.
17.....	Stafford Photo. Society.....	*Photographic Advances of the last few Years* T. C. Hepworth, F.C.S.
18.....	Aintree	Lantern Lecture. E. P. Heron.
18	Birmingham Photo. Society ..	Annual General Meeting.
18	Bootle	*Six Days in North Wales.* C. St. C. Crawley.
18.....	Brixton and Clapham	*Success and Failures, or Different Ways of Treating the Negative.* C. F. Archer.
18.....	Gospel Oak	Exhibition of Prize Slides.
18.....	Hackney	
18	Leeds Photo. Society	Social Evening and President's Address.
19.....	Croydon Camera Club	Thirty-fourth Public Lantern Show.
19.....	Kingston-on-Thames	*Through Switzerland with Camera and Knapsack.* Ben. Cox.
19.....	Leytonstone	*Some Practical Photographic Dodges.* Cecil M. Hepworth.
19.....	Photographic Club	*Enlarging.* J. H. Gear.
19.....	Southport	*Photographic Advances of the last few Years.* T. C. Hepworth, F.C.S.
20.....	Bolton Mutual Photo. Society .	*Chat on Lenses* Alex. Roscoe.
20.....	Darwen	Lecture: *Developers and Development.*
20.....	Isle of Thanet	*Autotyping.* A. D. Sackett.
20.....	Leigh	*Photographing under Difficulties.* Dr. J. Jones.
20.....	Liverpool Amateur	*Lantern-slide Making.* William Harvey.
20.....	London and Provincial	Lantern Night: Members' Slides.
20.....	Manchester Amateur	*Lantern slide Making by Contact and Reduction.* S. L. Coulthurst.
20.....	Putney	*Ways and Means.* W. Thomas.
20.....	Woodford	Informal Meeting: *Dark room Illumination.*
21.....	Wakefield	Thornton-Pickard Specialities. Mr. Scott.

ROYAL PHOTOGRAPHIC SOCIETY.

JANUARY 11,—Ordinary Meeting,—the Earl of Crawford, K.T., F.R.S. (President), in the chair.

New Members.

Seventeen new members were elected, and a similar number of candidates were proposed.

Affiliation.

The Great Yarmouth Amateur Photographic Association and the Photographic Section of the Wolferton Science and Art Society were admitted to affiliation.

The Progress Medal.

The President announced that the Council had awarded the progress medal for the year to Dr. Ferdinand Hurter and Mr. Vero C. Driffield, in recognition of their researches in connexion with the subject of the determination of the speed of plates. The announcement was received with hearty applause by an unusually large assembly of members and visitors.

Scrutineers.

The nomination of Scrutineers at the ensuing election of members of Council, &c., resulted in the appointment of the following members:—Messrs. Bennett, Oakden, Townsend, Rapson, Beckett, Shepherd, Agar Baugh, Plank, Gear, and Sinclair.

The Keeping Properties of Plates.

Mr. J. Sterry presented to the Society three negatives which had been developed fifteen and a half years after exposure. It appeared that a dozen exposed plates had been put aside for some years, and, upon development being attempted, it was found that no image whatever could be obtained; but the remaining plates had recently been treated with one of the newer developers with fairly satisfactory results. The particular developer employed was not mentioned, but the plates were made by Dr. Hill-Norris's dry-collodion process.

The Latent Image and its Development.

Mr. V. C. Driffield read a paper, prepared by Dr. Hurter and himself, upon the above subject. He prefaced it by stating that Dr. Hurter, who, for some time past, had been in bad health, had recently paid a long and arduous business visit to Canada and the United States, and had returned two or three weeks ago thoroughly exhausted, and was consequently unable to be present on this occasion; Mr. Driffield, however, expressed the deep gratification with which he had heard the announcement that the progress medal of the Society had been awarded to his colleague and himself, and tendered their cordial thanks for the proud distinction thus conferred upon them. The paper was divided into six heads, and two further divisions required to complete it would shortly be forwarded to the Society; it was very long and complicated, with many tabulated summaries of experimental evidence showing the bearing of the authors' investigations upon practical development, and the influence of length of time of development, and it is obviously impossible for us in this column, and in the time available before we go to press, to give an adequate *résumé* of such a technical and exhaustive communication. The paper stated, *inter alia*, that thermochemical considerations render it highly probable that the energy which is necessary to separate bromine from silver bromide may all be supplied by the chemical changes which take place in the developing solution, so that the light need only supply a small part of the energy required. As a matter of fact, the amount of metallic silver produced by a given illumination on a photographic plate is so far in excess of that which the energy supplied by the source of light could yield in the time, that the latent image must be regarded as consisting essentially of ordinary silver bromide, a theory which was by analysis proved to be correct. Other considerations showed that, if illumination of the plate were carried so far as to produce free bromine, the extinction of the latent image, or reversal, would be brought about. The relative rapidity with which the same developer attacks the exposed and the unexposed portions of the sensitive film led the authors to the conclusion that there is little difference between the exposed and the unexposed silver bromide from the chemist's point of view. Experiments on the rapidity with which a developer attacks the unexposed silver bromide on fast and on slow plates showed that there is little difference between such plates with respect to the constitution of the silver salt, but that the rapidity of the plate is due more to the purely physical properties of the film, its power of reflecting and absorbing light, &c. It was pointed out that the differences which various plates exhibit during development are to a great extent due to the quality and quantity of the gelatine used in the manufacture, and the properties of gelatine in its behaviour to solutions were dealt with, and it was shown how the composition of the developer may affect the results obtained.

Mr. Chapman Jones, referring to the question of the estimation of speed, thought Messrs. Hurter & Driffield had, on this occasion, somewhat limited the statements set forth in their original paper, and he thought they had in the present communication generalised rather more than the experimental results appear to justify; there was plenty of evidence that the speed of a plate was not a purely inherent quality in the plate, and that it varied with the thickness of the film and the constitution of the developer. In his opinion a great deal of the difficulty that one had in accepting some of the earlier work of the authors arose from the fact that it was not sufficiently qualified. If they had said, for example, that the proportional speeds were estimated under fixed conditions, that would meet the case; but to put down the speed as a fixed quality of the plate when really it was altered by the circumstances under which the plate was treated was, he thought, a mistake. Mr. Chapman Jones also dealt at some length with other points arising out of the paper, as did also Mr. C. H. Bothamley, Mr. Banks, Mr. Cadett, and others.

Mr. Driffield briefly answered one or two questions, and said he preferred to postpone his reply to the discussion until he had had an opportunity of reading the remarks of the speakers.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 6,—Mr. E. George Harvey in the chair.

Mr. E. H. Bayston, referring to the discussion upon the copying of an oil painting at the last meeting, said he had brought the results of a further trial. As suggested, he had used an orthochromatic plate, but, having no yellow screen, had used an oil lamp for the illumination of the painting. The negative on the ordinary plate was practically nothing but brush marks, but that on the orthochromatic plate was a very good reproduction of the original.

Mr. J. E. Hodd questioned whether the improvement lay altogether with the use of the orthochromatic plate instead of the ordinary plate. The latter appeared to him to be decidedly under-exposed, in which case it had not received a fair chance.

Exception was taken to this, and the contrary opinion, that it was much over-exposed, was expressed.

Mr. Bayston remarked that the ordinary plate had received two minutes to daylight and the orthochromatic half an hour to lamp light.

Leaving the actual question, the discussion centered in the matter of over and under-exposure, the peculiarities of each, and the possibility of confusing the two and making the under-exposed resemble by development an over-exposed image.

A question was asked as to the simplest way to photograph the partial eclipse of the moon which was shortly expected.

Mr. Parfitt asked if by telescope or by an ordinary camera and lens were meant. The size of the image subtended on the plate was about one-eighth of an inch to the foot focus. Hence it was not of much use to attempt such work with lenses of shorter focal length than thirty-six inches. The exposure necessary for an ordinary plate, with the lens working at *f*·8, would be about half a second.

Other suggestions were made, such as the tele-photographic lens, which should give a fair result, or the front combination of a portrait lens in its correct position, that is, not reversed, which would give a lens of considerable length of focus.

Mr. P. Everitt drew attention to the advertisement of a lens of two-and-a-half inches focus, which was stated to cover a 7×5 plate. It was not mentioned whether this represented inches, and he was inclined to think it a catch.

Mr. Hodd had seen such a lens, which was of extreme wide angle. It was a lens with the combinations close together. He believed they did cover an enormous baseline of plate in proportion to the focal length.

PHOTOGRAPHIC CLUB.

January 5,—Captain M. H. Hayes in the chair.

Mr. R. R. Beard brought forward an injector jet now claimed by the Manchester Oxygen Company as their patent. He reminded the Club that he had brought it up five or six years before, and shown it to the members. Since then, the Manchester Company had brought out their jet, which, from his experience, was admirable for a single jet, but for the biunial, with a poor supply of gas, it was a failure, giving a snap in dissolving. It was curious that, when this Company first brought forward their jet, it was not made in the form shown. The oxygen nipple did not come into the head of the jet, but somewhere about the centre, and the gas went along the single tube to the nipple. Since then, it had been altered to his own pattern. His object in bringing it up was to show that it was a previous invention to that of the Manchester Company. It was subsequently used in the lantern for projecting purposes.

The Chairman detailed his recent experiences in Russia, and gave his opinion of the present position of photography in that country. From these it appeared that photography in Russia was in need of improvement. There were no restrictions to the practice of photography except in the neighbourhood of military places, but it was better to be provided with a pass.

The Recorder read Mr. R. Child Bayley's Affiliation lecture on

Elementary Photographic Optics.

After discussing the nature of light itself, the undulatory theory of which was that generally accepted at the present time, it became necessary, said the author, to realise that one of the properties of light was that it moved in straight lines, which, however, was open to exception. Slides were shown, explaining what happened in the passage of light through different bodies, and the principle of refraction. By means of diagrams, the function of the lens and that of the pinhole in forming the image of the plate was described. Strictly speaking, the pinhole did not form an image, but isolated a particular one from the infinite number which would, in the absence of the camera front, fall upon the plate. The necessity for focussing was explained at some length, and illustrated by means of lantern slides. A lens was to be regarded as a series of prisms, the curved surfaces of which were caused by increasing the number of prisms towards infinity, and its function lay in causing the rays of light to converge so that the light from a given point shall, on traversing the lens, be concentrated upon a particular part of the screen. The paper went on to treat of the condition of things introduced by the fact that white light was not of that uniform description which, up to the present, it had been taken to be. Being composed of a mixture of coloured rays, which were also refracted to a different extent, and split up into its components, as was to be seen by the use of a prism, it was only reasonable to expect a lens, which was a collection of prisms, to do the same. This led to the necessity for correcting the lens so as to obtain the refraction without dispersion, and this was done by constructing the lenses of different kinds of glass. Spherical aberration, roundness of field, and astigmatism were touched upon in the course of the paper, and their effects explained. The effect of the stop and the quality known as depth of focus were the subjects of the concluding remarks of the author.

Mr. Birt Acres said some years ago, in his work, he required a powerful beam of light with as little heat as possible, and he availed himself of the fact mentioned in the lecture, that the heat rays were brought to a focus at a different point to that of the other rays, and constructed an apparatus with lenses so arranged as to yield the maximum intensity of light and a minimum of heat. He discovered that the method had been suggested years before by the Rev. J. B. Reade, but he hit upon it independently.

Mr. J. R. Gotz went into the question of astigmatism, a point which had of late called for a good deal of attention, and which was supposed to have been overcome to some extent by the use of the new glass. He compared on the blackboard the astigmatism of the eye and that of the lens, illustrating his remarks with several sketches. The correction was arrived at by combining a glass with greater refraction and smaller dispersion with another having smaller refraction and larger dispersion. He described a means of deciding upon the equivalent focus of a lens. A camera racking out backwards was focussed exactly on a distant object, and a mark made on the baseboard at this point. A piece of paper, say, four inches square, is then set up and sharply focussed same size, and a second mark made. The distance between the two marks measured the absolute focus of the lens. As regards stop ratios, the principle of measuring by fractions of focus was optically and theoretically correct, but practically it was of no use whatever. What was required to be known was how much light proportionately was received on the plate, and what exposure was necessary. A system which told the amount of light with a given stop was a much better system.

Brixton and Clapham Camera Club.—January 4.—Mr. H. N. Harvey gave a demonstration on

FRAME-MAKING FOR AMATEURS.

The moulding is purchased in nine or twelve-feet lengths, and can be had in great variety at low figures, making the cost of frames very little. The most important requisite is a mitre-cutting machine, which is practically everlasting, costing 2*s.* 6d. With a saw the moulding is first cut into something near the right lengths, and then with the mitre cutter the angles are trimmed so as to join up true and square. A small vice, glue-pot and brush, hammer, and bradawl complete the necessary tools, and the operations were shown by Mr. Harvey to be simple enough, and within the range of any amateur.

Croydon Camera Club.—The first meeting of the new year was held on Wednesday, the 5th inst., when there was a fair muster to see the velograph (an instrument for projecting moving photographs). This, in the hands of Mr. Harrison, turned out to be a more than usually efficient instrument, several of the animated pictures shown being uncommonly effective, notably some horse jumping and a contortionist, both of which will be included at the public lantern show of the 19th. Amongst a number of lantern slides brought up for display on the last-named occasion were interesting examples, including *Baulbec and the Mediterranean*, by Mr. Richardson; *Cornwall*, by Mr. Kough; *The Flowing of the Bourne*, by Coun. Noaks; *Home Scenes*, by Mr. Rogers; and an unusually delightful series of North Wales by Mr. H. E. Holland. Mr. G. F. Andrews was elected a member.

Gospel Oak Photographic Society.—January 4, the Vice-President in the chair.—Mr. G. R. Brown showed a series of slides taken by himself of Winchester and neighbourhood and Plymouth. This was accompanied by a very lucid and interesting description of the principal places of interest, and might almost have been described as a lecture. The slides, of which the following were the most interesting, were very fine:—*High-street, Winchester; Butter Cross; The West Gate; The Rectory; Ruins of Wolsy Castle; Soke Bridge; New Town Hall; Ruins of Chapter House; Winchester College; St. Swithin's Church; College Grounds; King John's Canal*, &c. Of Plymouth, he showed views of *The Hoe, The Drake Statue, The Armada Monument, The Law Courts*, &c., and several slides illustrating some of Her Majesty's warships lying in the Sound.

Richmond Camera Club.—The winter session of 1898 was opened auspiciously on January 3 by a very successful exhibition of lantern slides by members of the Club. Friends of members, ladies included, were present in good numbers, and an exceptionally good selection of slides was shown, comprising scenes from France, Spain, Switzerland, Italy, Norway, India, and Ceylon, besides various parts of the British Isles. Amongst the exhibitors were Messrs. Neville, Etherington, Hunter, Richardson, Gibson, Purcell, Ardaseer, Davis, Little, and Cembrano, though the last-named paid the penalty of occupying the place of honour at the close of the show, for scarcely had his slides been reached ere the oxygen gave out, much to the disappointment of the audience.

Bootle Photographic Society. — January 4.—The Bootle Photographic Society held an Exhibition of competition prints and slides. The lantern was worked with acetylene gas by Mr. Clarkson, of the Fowler Acetylene Gas Company, of Bootle. The light was fairly satisfactory, on the whole. Seven new members were elected.

Bradford Photographic Society.—The children of the members of the Bradford Photographic Society have every reason to be happy youngsters. On Monday night, January 3, the annual gathering of the Society for these young people was certainly one of the best we have visited, and, if we can judge by the happy faces and loud smiles which went round—well, the affair suited down to the ground. The proceedings started at 7.30 prompt with a display of lantern slides, some of them good, some of them bad, after which a fearsome boxing contest took place between two tiny little men, whose actions, although spasmodic, had plenty of go in them, at all events. After this, Mr. R. J. Appleton gave a most liberal display of cinematography, and brought down the house with some really first-rate films. Mr. Appleton, when he takes a thing of this sort in hand, does not believe in doing it by halves, and, as a result, we do not ever remember witnessing so many pictures put on so expeditiously before. There were views to suit all tastes, from breaking waves to ballet dancers, and the "ohs!" and "ahs!" of the little ones showed how they enjoyed the exhibition. During the intervals between the displays of the cieroscope, games were introduced, including a most terrible cock fight between the worthy Secretary and the chairman of the evening. The feathers did fly, and no mistake! and it ended in a complete victory for the Secretary, the chairman being knocked out of time in a couple of rounds. Then oranges and apples were distributed, and Miss Ethel Briggs gave a pleasing solo on the auto-harp. The whole of the proceedings finished with a short dance, which was enjoyed by the bigger children, of whom there were a great many present. The Chairman should have been Mr. Alex. Keighley, but unfortunately he was prevented from being present, as was also the Vice-President, Mr. Percy Lund. The genial Mr. Geo. Thistlethwaite, however, made an excellent substitute for these gentlemen, and in no small measure helped to make the entertainment a success.

FORTHCOMING EXHIBITIONS.

1898.	
January 17–22.....	Blairgowrie International. Hon. Secretaries, T. C. Gorrie, Rattray, and J. B. Maclachlan, Blairgowrie.
,, 29–Feb. 26.	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
January–February...	Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
March 5–12.....	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30	National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,, 27–May 14.....	International Photographic Exhibition (Crystal Palace). R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE GUM-BICHROMATE PROCESS.

To the Editors.

Gentlemen,—If Mr. Packham supposes (as his letter implies) that I made any personal claim of originality for the method of sensitising paper prior to coating it with the carbon mucilage, he is grievously mistaken. If my father had been living, my name would not have appeared. I simply wrote to state the fact, and also experience with it, and also as to the kind of paper employed, which had largely to do with the purity of the whites.

I would have Mr. Packham remember that my father worked this process mainly over thirty years ago, but in later years devoted himself more entirely to his later process, which he considered offered a larger field. I am not sure whether he referred publicly to this method, or that of sensitising the paper after coating, as he would do sometimes, though if he did not, no one at this date would be surprised at it, if they were acquainted with some of the treatment he received, which led Mr. Sutton to write him, and publish his letter too, in November 1862—"Have nothing to say to the Photographic Society, or to any of the photographic journals;" rather sweeping advice, I admit—and am not prepared to say it was fully acted on. Probably, had my father lived closer in touch with the members of the Photographic Society, they would have got to understand one another better, or, had there been sundry photographic clubs as to-day, he would have been often found amongst them, giving what information he could to such as were, like himself, interested in this particular work to which he had devoted himself so entirely. I should not have felt it right to write on any of the methods my father employed during his life.

Since his death, I have, of course, observed references now and again to the revival of his older process, but as having the feeling that it was mainly suitable for those who were riding particular hobbies, and had ample time at their disposal so as to master it, simple though it be, it did not once occur to me that I could be of any service to those laborious investigators who were so ardently working for the public good. As to the "acknowledgment I may have received for my valued services," if it was anything akin to what my father received in his lifetime, I should expect it to land me where it would have landed him had he been dependent upon it in any way. No, sirs, it fell to my lot to work hard in the business my father established in order to give him that leisure which unremitting attention for years in this one direction demanded, and I have the satisfaction of thus sharing with him the difficulties attendant thereon, and I do not want the thanks of any who do not until obliged to render to him the honour that was his due. It was clear to me for years that his name was often omitted by writers and speakers as though he had no part in the introduction of carbon printing in this country. Some of your readers will probably recollect how, not long ago, it became neccessary for yourselves to call attention to the fact that a statement, made apparently incidentally by Mr. Maskell, giving some hints of a process that would give good results, was nothing more than my father's *later process*, though his name was not alluded to in-

any way; and here you will perhaps allow me to make a quotation, because in some measure it replies to a challenge made to Mr. Chapman Jones by Mr. Maskell in some such style as the challenge he made to you in a later letter. I refer to the following, February 14, 1896. Mr. M. writes: "As regards priority of invention, will he (Mr. Jones) say when (prior to Artigue's production) he himself was first aware by actual example that pigmented prints could be successfully developed from the front, preserving half-tones," &c.? The Editor of *Photographic News* writes, October 8, 1858, respecting two specimens of carbon prints submitted to him by Mr. Pouncy, "The one, a print from a photograph of a farm house, ... our opinion is, on the whole, favourable, the great difficulty, the delicate rendering of the half-tints, being most successfully overcome. We could scarcely desire anything more perfect."

I should not have expected Mr. Packham or any one to refer to the whole history in a paper such as he read. It would seem but ordinary courtesy at least to have mentioned the name or names of those who introduced it nearly half a century ago, and thus have avoided the necessity for any one who took part in the discussion to have quoted my father's name as entitled to more credit than he has received since its reintroduction. Although, as Mr. Packham informs us correctly, the Duc de Luynes' prize was divided, and that the initiatory discovery was attributed to M. Poitevin, there seems to have been no evidence forthcoming at the time that he had produced a *direct carbon print* prior to the publication of my father's method. Be that so or not, it is clear enough, from all that occurred and was written at the time upon it, no prints were seen in England, and the anxiety to get my father to disclose his method is proof enough that he had a very large share in its introduction here.

Those who read the discussion could hardly fail to notice how qualified the credit was given to him. It was, however, the statements that my father *did not saturate his paper just before coating*, that "*there was no certainty as to what the result would be*," that "*by this new method the purity of the whites was assured*," that led me to write on the subject; and here I may make one more quotation as confirming my remarks on the latter: September 1, 1858, "J. Archer" writes to *Photographic Notes*: "The carbon print is very interesting; I think full of promise. . . . One good feature observable is the purity of the whites."

Forgive my taking up so much of your valuable space. None more than my father would have rejoiced to hear of any who were paying sufficient attention to work the process he had so long ago worked successfully, but which he felt, nevertheless, needed more thought and care than could be given ordinarily for commercial use; and I think the remarks of those who are now working in this direction but confirm his feelings on the matter.—I am, yours, &c., W. Pouncy.

Dorchester, January 4, 1898.

OIL LANTERNS.

To the Editors.

Gentlemen,—Will you kindly allow me a little space in the Journal to set forth my disappointments in attempting to use the mode of illumination which your correspondent, Mr. Armstrong, eulogises in your issue of the 7th instant. Some time ago I brought back with me a large number of slides which I had made from negatives taken during a seventeen years' residence in New Zealand. I had there used a two-wick sciopticon, which gave a beautifully white steady light on a six-foot disc Thinking that a four-wick lamp would double this illumination, I obtained a four-wick lamp, price 16*s.* 6*d.* A long illness, together with business engagements, prevented me making use of it until recently, and with most disappointing results. The top of the lamp is dome-shaped, the bottom of chimney is practically square, but a projection of the lap-joint made the chimney rock to and fro, until it finally reached the floor. A blacksmith filed it into shape for me. Then came trouble with the wicks. The tubes were unequal in space, so that thicker wicks had to be put in slackest tubes. After lighting wicks, the air chamber was closed, this action extinguishing the two outer flames. On one the air grat ng rested, instead of being outside it, the wick on the other side being extinguished by the air dome *overhanging* it by fully *one quarter of an inch*. A friend cut this piece away, which I send for your inspection. I ought rather to have returned the lamp instead of seeking to cure it. On trying the lamp I got nothing but thin tongues of flame running along the wicks in most fantastic fashion, while the open, clear space of nearly one quarter of an inch between air dome and ends of wicks caused the air to rush from below, reducing the flame to a flicker of very small dimensions. I have now blocked up these spaces, drilled four air holes in lamp chamber, and made a dozen perforations in the air dome, with the result of a steadier, but still unsatisfactory, light. I believe that, so long as the edge of the flame is presented to the condenser, a four-wick lamp is an egregious mistake, the air from the dome carries the outer flame into the adjoining one, while the dark space in the centre between the two combined flames shows upon the screen with painful distinctness. Moral: *Use only three-wick lamps.*

Your correspondent writes on the assumption that a scientifically constructed and mechanically perfect lamp is to be had. My own, as truthfully described above, fails to be one of them. I quite agree with the desire expressed by Mr. Ewing, of Calcutta, on p. 783 of this year's Almanac, for a lamp having a central draught—I presume he means a *round* wick. If any expert manufacturer of oil lamps will place such upon the market, he will confer a favour upon such as myself, not the least of which will be clearing away very many so-called lamps which are unworthy of the name, and fail to accomplish what their dealers profess. With Mr. Ewing I would say, "We want less brass and more honesty."—I am, yours, &c., Petrolus.

PHOTOGRAPHERS' FIRE INSURANCE.

To the Editors.

Gentlemen,—You give us occasionally a warning article on the above subject, which should remind all professional photographers to look to their interests in that way, especially as the cold weather of winter approaches.

Perhaps, as an insurance man as well as an amateur photographer, I may be able to throw a little light on the subject, and to show that photographers need not consider themselves hardly treated by insurance offices under proper conditions of proposal.

In the old days of wet-collodion work, photographers proved a dangerous branch of insurance business on account of the constant use of volatile compounds and the storage of considerable quantities of collodion, alcohol, ether, and the like, to say nothing of pyroxyline, used for home manufacture of collodion, the premises being usually constructed of light materials, as timber and glass, and warmed artificially in cold weather by stoves, made up altogether a very combustible arrangement, and no doubt the experience of Fire offices in those times proved sufficiently hazardous and unprofitable to make them fix a high rate of insurance upon these risks, which, once admitted as appropriate, is not so easy to break down again.

Nowadays, under dry-plate work, the case is considerably altered, and there is comparatively little about an ordinary photographer's studio to render it hazardous, except that the constructions are still mostly of the flimsy character which, once set alight by accident, will burn fiercely and rapidly, and render the result a "total loss" before help in the shape of a fire brigade can arrive to suppress it.

This is always an important point in estimation of fire risks, and, as it is customary to charge a rate of 5*s.* per 100*l.* upon *all* erections constructed mainly of timber and glass, no matter whether they are used as greenhouses, conservatories, or any other non-hazardous purpose (as compared with photographic studios); photographers should not consider themselves overcharged if they can get insured at 5*s.* per cent. for their studios and contents.

Again, the methods of warming such premises are important. If a good system of hot-water pipes is adopted, with the heating apparatus securely fixed in a bricked-off basement, and free from contact with all woodwork, any office would be satisfied; but, if fire stoves are used with smoke pipes from them longer than three feet between the stove and chimney fire, or exit into open air, it is customary (in all risks) to charge an extra rate of 6*d.* *per* 100*l.* *for every such stove;* but so much depends upon the position and care with which such stoves are erected that every case must be treated on its own merits or demerits.

The actual stock-in-trade instruments and accessories of a photographer are not now hazardous in themselves as formerly, and if a proper "stock-book" is kept, showing their nature, quantity, and values, a settlement is easily arrived at in case of loss by fire; but there is one disturbing element which (unless it is treated as a special feature in every risk) tends to make fire offices demand higher rates than they otherwise might do, I mean the *estimation of values of negatives destroyed or damaged* by any such calamity as a serious fire; there is an uncertainty and risk of possible imposition about these items of stock which it is very difficult to determine even by the aid of experts.

A photographer in a good way of business may possess many hundreds, possibly many thousands, of negatives, which have done their temporary duty; the greater part probably are never likely to be of any further use as a means of earning money, but are laid aside and cherished on the chance of being wanted again some time or other. These are practically worth little more than the glass they are upon, the time, labour, and expense of producing them *has been recouped by the original orders received* for portraits, and paid for; and, apart from the off-chance of second orders, they may be said to have served their purpose, and if destroyed within a year of production may be deemed to be no actual loss to the owner, This, of course, does not apply to negatives of eminent persons, stage or professional beauties, and suchlike, where a continuous production of portraits for public sale may be going forward; but I am dealing now principally with the average professional portraitist, whose negatives are of an evanescent kind as to demand, but directly a fire occurs this "stock" becomes of great value in the eyes of their owners, and forms probably the most serious item in their loss claims. Offices have no means of gauging the real value of them, and eventually have to adopt one of two courses, either they doubt the estimated value, and offer a moderate sum in discharge of the claim; or they pay up what they believe to be an excessive amount, rather than have a serious dispute, which may injure the reputation of the office for prompt and liberal settlements.

You will understand that *this liability* makes them place a higher rate on such risks to meet *the probability* of increased claims, and no business man will dispute the correctness of their position in doing so, but the matter might be provided for in advance between the office and the insured by acting somewhat in the following manner :—

In making a valuation for "*proposal*" for insurance, the photographer should lump together *in one sum* as "stocks, fixtures, and utensils in trade," all his effects in the way of instruments, furniture, chemicals, plates, backgrounds, fixtures, and fittings (exclusive of all negatives), which would be taken at a moderate normal rate, determined by situation, surroundings, and construction of his premises. Negatives should be insured under a special item for whatever value he might desire, but with a proviso that not more than a certain sum (to be agreed upon) shall be claimed for any one negative in case of loss by fire or damage, and if he is wise he would take such special care in storing valuable negatives in some safe place, or strong-room, fire-proof safe, or place apart from the studio building, that the danger of destruction by fire would be reduced to a minimum, or even their need for insurance at all.

Any fire office would look upon such a proposal as "good business," in which they were not likely to "stand to be shot at" unfairly in case of fire, and would treat the case liberally in the matter of rate. It is this "bogey" of uncertainty in claim value that puts up the rate of insurance.

There is another point of importance in estimating photographers' fire risks. Studios are usually placed high up on buildings for the sake of light and air; this, apart from their combustible character, make them inaccessible to assistance for extinction in event of fire, and the result "total loss;" also the kind of business risk existing in the premises below or a communication with them, occupied probably by other persons, which, if of a "hazardous" nature, fixes the *higher rate* necessary for the *block* of building (independently of the photographer's risk), and which he *must necessarily pay* as forming *part thereof*, or go uninsured.

If a photographer occupies the whole of the set of premises, the case is simple enough: he pays his own rate in accordance with its character; if he is one of a multiple tenure, he pays the highest rate applicable to the other tenants, plus an additional rate for "joint tenure," a well-recognised principle in fire-insurance business.

These are the main points of issue in photographers' insurances—minor ones may arise in individual cases which can only be dealt with on the spot, but I hope my hints may be the means of photographers obtaining easier terms from their offices, if they conform to such regulations as their local surveyors or agents may point out to them.

London photographers must expect to pay higher rates than country ones. London rates and conditions are higher all round, and are necessitated by the frequent and terrible fires which occur from time to time, and from the risks being enhanced by *neighbouring risks*, over which no insured person can have any influence or control, and therefore they have to pay for other people's risks and carelessness or culpability.

Should this lead to any discussion in your pages, I will do my best to answer any points which may arise to smooth away difficulties, but my communication may now be longer than the editorial scissors may permit.—I am, yours, &c.,

"FIREMAN."

"AUDI ALTERAM PARTEM:" MR. JOSEPH PENNELL AND PHOTOGRAPHY AS A FINE ART.

To the EDITORS.

GENTLEMEN,—Mr. Joseph Pennell is, of course, an artist of high standing, and a very superior art critic. I have no doubt that, like the artist he so picturesquely describes, "he has lived so much in his own world that he scarcely knows what is happening about him. He has been so absorbed in his own affairs that little else interests him or appeals to him. He has learned to wash his master's brushes, and set his master's palette, &c.;" but does all this either justify him or qualify him in his unkindly attack on the photographer, who makes a claim to the title of artist, on the modest grounds that by study and natural taste he has obtained that amount of control over his work as to secure something more than an ordinary copy of nature? Well, may one turn against such an adversary his own arguments? He says that, when a photographer is refused the title of artist, "he shows frequently a degree of temper which a man morally conscious of his right would think superfluous." Well, ought not the artist, confident of his direct descent from Apelles and Phidias, and *morally conscious* of his rights, consider it superfluous to devote angrily written pages to prove that photographers have no right to assume titles that belong only to them. We have certainly seldom seen any of these photographers, who are supposed to fume and fret, display more spiteful anger than is displayed by Mr. Pennell in his article in the *Contemporary Review*.

His anger gets the better of his common sense: nothing that a mere photographer does can please him. If, in his desire to show his respect for artists and their training, the photographic Exhibition asks them to judge the art qualities of his pictures, he is told that he ought to be able to do it himself, and the "humble associates of the Royal Academy who accept the task" are, I scarcely know why, compared to "makers of frames and manufacturers of colours!"

The description Mr. Pennell gives of the life and training required to make an artist applies to comparatively few, and these the very giants of art, who certainly do not require to be defended from the onslaught of the ambitious photographer. One would think that there was a conspiracy going on amongst these latter to do away with its higher forms of graphic art, and replace them by photography. Why, then, all this high-flown language, culminating in that extraordinary and incomprehensible assertion that "photography, even in the hands of artists, will never destroy art?"

The demands put forward by photographers are moderate in the extreme, all they ask is to be allowed a modest position amongst the humble but conscientious workers in monochrome, whose methods are different to theirs, but whose results they seek, not to imitate, but to take as models, founded as they are on the experience of ages. A few photographers, led away by the enthusiasm inspired by a young art, have perhaps claimed more for it than could, in strict justice, be granted; but these have been an exception, and the mass of photographers of taste and artistic feeling have only sought a recognition that might easily be granted to them by any artist not blinded by prejudice or ignorance. Surely the fact that a photographer adopts a rough surface, a brown or red tone, a softened focus for the same reason that an artist does because it suits his subject, does not justify the accusation that his productions are a poor imitation of some kind of drawing. Mr. Pennell shows his ignorance of the matter he is treating by asserting "that a red photographic print looks as much like red chalk as that useful commodity does like cheese," quite unconscious that a red print is usually produced by the carbon process, and is actually formed of red chalk or some closely allied pigment!

Why, may we well ask, are all these hard blows reserved for the poor photographer? Consider the number of persons now studying drawing and painting in the art schools of England, under those trained artists who are so thoroughly disdainful of anything photographic, and note what are the results produced. Visit some of the hundreds of exhibitions that each year throw open their doors to the public in London and the provinces, and you will find, in nearly all, pictures utterly beneath an average photograph; incorrect in drawing, eccentric in colouring, when they are not mere daubs, and yet we do not find artists writing magazine articles about them, and dinning into their ears that they have no claim to art, and never will. Perhaps its reason is that these same artists have been their masters, and that it is under their tuition that they have learned to caricature nature, and that to criticise them too severely would be to discourage the ambitious amateur, who is such a source of profit to the teachers of the fine arts.—I am, yours, &c.,

G. M.

ANIMATED PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN, — Will you allow me to supplement the admirable summary of the above subject in your ALMANAC as regards the historical notes?

Claudet, patented March 23, 1853, No. 711, "An improvement in stereoscopes," by means of a peculiar construction and arrangement of some of the parts, which are made movable, so as to impart to the picture the appearance of moving figures.

Tundzill, patented May 24, 1856, No. 1245, "An application of the stereoscope to the apparatus well known under the name *phanakisticope* (phenakistoscope?) or sobroscope, invented by Plateau." This is very much like Claudet's, but is interesting because the inventor calls it the "kinimoscope."

Benoist, obtained August 23, 1856, No. 965, provisional protection only for the same thing.

Dean, patented April 13, 1858, No. 794, "An improvement in stereoscopic slides," which was the obtaining of movement in the stereoscope by cutting the figures out and sticking them to a piece of cardboard, which was moved at pleasure.

Desvignes, patented February 27, 1860, No. 537, "An apparatus for obtaining the idea of motion;" and this is an interesting patent, because the drawings are complete and it describes the use of endless bands and other combinations of moving slots and pictures.

Shaw, W. T., May 22, 1860, No. 1260, same thing.

Du Mont, H., June 8, 1861, No. 1457. This is the patent for "a photographic apparatus having for object to reproduce the successive phases and shiftings of a motion," and it describes a succession of sensitive surfaces succeeding each other at regulated intervals, being exposed when "perpendicular to the axis of the ray;" also another means of obtaining the quick succession of the sensitive layers by placing them together side by side on an ordinary sash, but much longer, and moving intermittently in its groove, vertically or horizontally. Another method is to set them behind each other in a long box with vertical grooves and moving in a contrary direction to a similar box situated under it and intended to receive them, a ratchet wheel and ratchet movement actuates the boxes. Exposure is made "by a black, movable screen, the regulated motions of which are connected with the motions of the system bearing the sensitive layers."

I think this must claim to be the first animatograph camera.

On August 19, 1863, No. 2063, provisional protection was granted to Gaetano Botelli and H. Cook for an improved method of obtaining motion by taking the different phases of a movement on a circular disc, which is mounted on a central spindle, which is made to revolve at the proper focal distance from the object-glass of a compound microscope, so that this ante-dated Fox-Talbot's notion mentioned by Mr. Cole.

No. 1443, May 2, 1868, patent granted to J. H. Johnson (a communication from Langlois & Co.) for improvements in apparatus for exhibiting minute photographic pictures, which also includes the mounting of two or more successive images of the same object in different positions on Stanhope lenses, or the placing of microscopic views on movable strips of glass, by means of which "the production of apparently animated microscopic photographic pictures" is accomplished.

No. 4344, November 9, 1876, provisional protection to Wordsworth Donisthorpe for an apparatus for taking a succession of photographic pictures and exhibiting. In principle this is somewhat similar to Du Mont's.

The next patent is No. 2746, July 9, 1878, granted to Muybridge, and beyond this it is hardly necessary to carry these data.

I thought that possibly these few notes may be of some use in establishing or refuting some of the claims for priority in the now well-trodden field of animated photography.—I am, yours, &c., A. D. PRETZL.

P.S.—I find that I have omitted to include a paper read by Claudet, in September 1865, before the British Association, on *Moving Photographic Figures*, which describes a combination of the stereoscope and the phenakistoscope; also Patent No. 1588, June 12, 1865, granted to Gaetano Botelli, which is the application of the principle of the phenakistoscope, whether simple or stereoscopic, to microscopic photography.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

McIsaac & Riddle, Esplanade, Oban.—*Photograph of curling in Glen Nevis.*

F. E. Williams, Newquay, Cornwall.—*Photograph of Victoria Hall, Newquay, Cornwall.*

J. W. Freckleton, 63, Long-row, Nottingham.—*Photograph of the Rev. Francis Fry.*

ST. MUNGO.—We think it preferable to withhold your letter.

J. O. FLYNN.—Many thanks. We may probably use next week.

J. HORSBRUGH (Edinburgh).—Many thanks for the paper. Pressure on our space prevents us quoting.

CHARLES HOWARD.—Many thanks. We have returned. The apparatus you refer to is described in another part of the ALMANAC.

W. H. C.—Thanks, we had seen the paragraph, but the whole thing is a canard, such as several that have appeared in the same publication.

B. M.—Messrs. Clement & Gilmer, 8, Rue de Malte, Paris, might undertake the work for you. Possibly the purchase of a new condenser might be the simplest and cheapest way out of the difficulty.

D. J. MICHAEL (Abertillery).—We will address a stamped letter to the gentleman named if you will forward it. It is against our rules to give the addresses of contributors or to reply to questions through the post.

CHARLES E. BOLLES.—The work seems exceedingly good. We should advise you to send some of it to the South London and Crystal Palace Exhibition, particulars of which are given in each number of this JOURNAL.

RETOUCHING PENCIL.—MOSDILL asks: "I should be glad to know if it is possible to obtain a retouching pencil designed by Mr. Mortimer Johnstone?"—In reply: So far as we know the pencil is not on the market.

GRYPHON.—Hypo is universally employed for the purpose. The use of chlorides for fixing has not yet been demonstrated to have any real practical value. The gentleman to whom you wrote has been dead over two years.

DIES.—T. DANIELLS. We do not know any one who makes a speciality of making dies especially for stamping photographs with. Any die-sinker will, however, cut such dies as you require to your order and to your design.

IMITATION LEATHER.—L. GAUMONT & Co. We regret we do not know the address of the manufacturers referred to in your note; but imitation leather of different kinds is supplied by all the large dealers in bookbinders' materials in this country.

SALE OF BUSINESS.—H. G. C. We should say that a low-price business, the gross receipts of which are 450*l*. a year, is not worth 500*l*.—with the plant, &c., at a valuation; particularly with premises at so high a rental. The business being "capable of improvement" must not be taken into much account. The purchaser should look at the present value.

COPYRIGHT.—We do not think it is suitable matter for copyrighting, but you could patent the *method* by which the stamping was done. Do this before submitting the invention to the railway companies. This, however, appears to us a case in which the advice of a patent agent should be sought.

LIONEL KOUGH.—We should be inclined to consult Messrs. Perken, Son, & Rayment, or Chadwick of Manchester. We do not recommend apparatus, but in our own lecturing experiences we have found nothing simpler and more effective than the small oil lamp in which the movement of a lever exposes a red disc to the lanternist. A lamp constructed on this principle would probably suit you.

STEREOSCOPIC PICTURES.—NOTTS. There seems some prospect of the stereoscope being revived; but whether it would prove worth your while to devote the whole of the summer months to taking stereoscopic negatives, with the view to printing and publishing the pictures in the winter, is what we should not like to offer an opinion upon. Why not sound the print-publishing trade on the subject?

HENRY THOMPSON.—We do not answer questions through the post. In cases such as you describe we have hitherto found that a letter to the local superintendent of the police has produced the desired effect. You had better now be guided by the advice of a solicitor. It is impossible for us to help you as you suggest. Do you really think an editor can possibly find time to undertake the recovery of negatives from recalcitrant retouchers?

PARCHMENT PAPER.—S. L. W. Parchment can be used for the purpose, but it has one great drawback, namely, that it expands greatly when wetted, and much more in one direction than in the other. It is also easily stretched while wet; for instance, a strip a couple of feet long can be stretched so as to measure fully twenty-six inches. Hence it will be seen that this paper is not suitable for work that has to be produced to scale, such as architectural subjects, maps, and the like. But for this, your idea would be good.

INTERFERENCE PHOTOGRAPHY.—A. LINDSTRÖM says: "Wishing to make some experiments with Professor Lippmann's discovery on coloured photographs, I should feel greatly indebted to you if you can assist me with advice. What I chiefly wish to know is which plate in the market is thought the best for this purpose, or if films are supposed to possess any advantage before plates?"—In reply: See answer to "Colour" last week. This, with a careful perusal of Professor Lippmann's paper, also published in the same number, will give you all the information available.

CARBON PRINTING.—HENRY PURKINS says: "I get some trouble with the enclosed marks in my carbon printing. Can you help me to find the cause? I expect you will say bubbles directly you see the fault, but I am sure it isn't bubbles or air holes in laying down upon the single transfer. Probably, however, you will be able to help, and I thank you in advance."—We certainly should have said bubbles, and we can offer no other suggestion from merely the sight of a few square inches of paper with three or four marks upon it like those sometimes due to air bubbles and imperfect manipulation.

WARM TONES BY DEVELOPMENT.—H. FRANKTON says: "Having obtained several warm-toned prints by ordinary development without the addition of any foreign matter, as recommended in a recent issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, I am sending you a specimen, thinking it will interest you a little, and hoping that you will give me your opinion of the tone, as I believe that a still browner tone can be obtained by the same method; but up to the present I have not had time for experiments. The paper I use is Ilford smooth slow, and the developer is a mixture of eikonogen and hydroquinone."—The result is decidedly promising.

ENLARGING.—W. COULSON. An ordinary lantern will answer all purposes of enlarging as well as one specially made for the purpose, provided the condenser is of sufficient size to take the negative, that is, supposing the objective has its chemical and visual foci coincident. That is not the case with all lanterns constructed solely for projection purposes, and it is better that they should not be, except when the lantern is to be used for the dual purpose. The trouble of not being able to get the enlargement sharp is, doubtless, due to the cause indicated. All that has to be done is to substitute for the present objective an ordinary photographic lens of similar focus, all will then go well.

PHOTOGRAPHS ON WOOD.—H. J. writes: "I should be much pleased if you could give me any information for the transferring of a collodion film from glass on to wood for a guide for the wood-engravers. I have looked up the old JOURNALS, and find a method of sensitising wood, but that, I think, is not what I want. I also find several articles on transferring collodion film, but in these a solution of gelatine has to be floated over as a support, and that would be no good whatever for my purpose, as they require the film as thin as possible, so that it does not interfere with the graver. The wood is first prepared with a vegetable black, and a positive film, I suppose, transferred on to it as a guide in preference to drawing. If you could give me any information that would help me particularly to do it quick, as the blocks are sometimes wanted urgent, I should be extremely obliged."—In reply: A collodion film may be detached from the glass and floated on to the wood, to which it will adhere, even without a layer of gelatine, by simply immersing the plate in water, to which a few drops per ounce of hydrofluoric acid per ounce have been added. But a film of collodion on a wood block is quite unsuited for the engraver, inasmuch as it will chip up under the graver. You will do better to try sensitising the wood by the method referred to.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1968. Vol. XLV.—JANUARY 21, 1898.

Contents.

	PAGE
Cathedrâ	33
Measurement of Astigmatism and Curvature of Field	34
Derettes:—Photographs as Evidence—More about Acetylene Insurance Companies—Commercial Production of Oxygen—A New Explanation of Spirit Photographs—The Poisons Act—Photographing Invisible Celestial Objects having a Proper Motion—The Forthcoming Eclipse—Official Stations for the Eclipse—The Spectacle-makers' Company—Adulterated Art	36
The Way. By Dogberry	38
Eign News and Notes:—Acetylene Incandescent Gaslight—Printing from Harsh Negatives—Brenzcatechine—Yet another Backing—Exhibition Sales—Toning Bromides—The Chassagne Radiotint Process—A Jelly Developer for Aristotype Paper—Line Drawings from Photographs—Aldehydes in the Developer—Klary-Colour—A Rapid Developer	39
Multiple-coated Plates	40
Paper Negatives. By W. T. Wilkinson	41
International Exhibition at Blairgowrie	41
News and Notes	42
Photographic Exports	43
Patent News	43
Meetings of Societies:—Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Camera Club	44
Forthcoming Exhibitions	46
Correspondence:—Photographing on Wood—Oil Lanterns—Plain Language about the Spectrum: A Reply—Animated Photography—Is Photography an Art?—Lectures at the Bolt-court School	46
Answers to Correspondents	48

EX CATHEDRA.

ofessor G. M. Searle, professor of mathematics and astronomy in the Catholic University of America, has been appointed the Pope to succeed the late Father Denza as Director of Vatican Observatory. Professor Searle has for a great ny years occupied himself in practical photographic work, l was once a frequent contributor to our American ntemporaries.

* * *

According to a daily contemporary, photography is to be essed into the service of the "temperance" "reformer." e are told that, at a public conference held at Kingston last ek in reference to the sale of intoxicating drinks to children, representative from Croydon spoke of an ingenious plan hereby the temperance party at Croydon hoped to convince e licensing justices that interference by them in the sale was solutely necessary. He said snap-shots were being taken of ildren entering and leaving public-houses, and these would displayed at a public meeting to be held at Croydon on a nday evening next month. Afterwards they would be placed before the licensing justices with memorials praying for their interference with the traffic. The town of Croydon, we believe, is somewhat severely afflicted with vigilance associations, and other groups of enthusiasts, whose discretion occasionally outruns their zeal. It is possibly a deplorable thing that children should be sent to public-houses, although it is conceivable that nothing of a harmful nature is thereby necessarily wrought in them, but we doubt if photographing them entering and leaving those establishments is either a wise or a charitable thing in itself, or calculated to influence the licensing authorities in arriving at common-sense decisions in the granting of licences. If the Croydon "temperance" party persist in utilising photography in the manner and for the purposes above specified, we shall not be surprised to hear of indignant parents and others forcibly preventing the production of these inquisitorial snap-shots. But how do the Croydon temperance party propose to make their exposures at night time?

* * *

Among the names of the new Chevaliers of the Legion of Honour are those of M. Albert Gauthier-Villars, the well-known Parisian photographic publisher; M. Auguste Lumière, dry-plate manufacturer; and M. Molteni, manufacturer of projection apparatus. We in this country can supply no parallel to this peculiarly French system of officially recognising and encouraging photographic industry.

* * *

Messrs. W. Watson & Sons, of 313, High Holborn, inform us that they are now making a special form of dark slide suitable for use in the Lippmann system of interference colour photography. This slide enables the sensitive film to be placed in contact with a layer of metallic mercury during exposure, a condition demanded by the Lippmann process.

* * *

The Camera Club *Journal* for January contains a great deal indicative of an earnest desire on the part of the executive to make the Club attractive to its members, and successful in other essential respects. A proposal is on foot for the formation of classes of instruction to meet the needs of beginners in photography. *The Camera Club in* 1897 is the title of an excellent *résumé* of the Club's work during last year. It is

obviously inspired by a feeling of legitimate pride at a very successful twelve months' work. This year, among other features, there are to be discourses by eminent artists, "not photographic," it is pointedly added. We wish the Club a continuance of its useful career.

* * *

THE many friends of Mr. Thomas R. Dallmeyer, F.R.A.S, Managing Director of Messrs. J. H. Dallmeyer, Limited, will, we are sure, welcome the news that he has fully recovered the attack of hemorrhage of the lungs from which he has recently been suffering. One of the leading physicians of the day has pronounced Mr. Dallmeyer quite convalescent, and, after a few weeks' change of air, he will resume his attendance at business. We heartily congratulate Mr. Dallmeyer on his restoration to health.

* * *

THE second number of the *Birmingham Magazine of Arts and Industries*, a monthly publication, has been sent us. It is edited by Mr. W. J. Spurrier, an old photographer and experimentalist, whose name will, doubtless, be familiar to many of our readers. The *Birmingham Magazine* gives particular prominence to local art, and is remarkable for the lavish use it makes of phototypic reproductions. Dr. Hall-Edwards has an article on the part played by Birmingham in photography, and we commend the enterprise of the Editor in giving as a frontispiece a three-colour half-tone reproduction of one of Mr. Arnold G. Mountfort's pictures, by the Cox Illustrating Company. We welcome the *Birmingham Magazine* as a beautiful and interesting production.

* * *

A SHEERNESS correspondent informs us that the contract for photographing Her Majesty's ships at the local dockyard is to be taken from professional hands, and the work passed over to amateurs. The Admiralty recently issued an order stating their intention of having the photographs of the ships, either in course of construction or undergoing repairs, taken by a member of the Drawing Staff of the Naval Construction Department, and directed that the name of any draughtsman capable of undertaking the work should be reported to the Controller of the Navy for consideration. It is said the Admiralty hitherto paid about 10*l.* for each set of photographs, but whether any portion of this is to go to the favoured amateur photographer on the staff who in future is to do the work is not clear.

* * *

WE are asked to announce that the Boston Camera Club, representing a gentleman of high standing in matters pertaining to aërial navigation, is authorised to make the following offer for prizes for instantaneous photographs of large soaring birds:—A prize of one hundred dollars ($100) is offered by the Boston Camera Club for the best instantaneous photograph of a large bird in the act of soaring. An additional prize of fifty dollars ($50) is offered for the greatest number of instantaneous photographs, offered by one photographer, of large birds in the act of soaring. By "soaring" is meant the attitude of the bird in the air when no wing motion is apparent. The purpose for which the photographs are desired—namely, the study of wing angles and a possible movement unappreciable to the eye of the observer—necessitates that the figure of the bird should be at least half an inch long on print. If the figure is small, but clearly defined in de enlargements will be preferable to contact prints, and will judged of equal merit with direct prints. Careful notes sh be written on the back of each picture, detailing the app ance to the eye, the quickness of the shutter, the angle of camera, &c., also the full name and address of the co butor. Two prints of each picture should be sent. All tributors must prepay the transportation charges of t exhibits (which may be simply card mounts), and in no will they be returned. Photographers throughout the w are invited to compete. The offer remained open u October 1, 1896; but, as on that date at least 100 diffe photographs had not been received, the limit of time was tended to October 1, 1898. All contributions should be sen the Boston Camera Club, 50, Bromfield-street, Boston, M U.S.A., and marked "Cabot Competition." For further formation apply to Mr. Samuel Cabot, care of the Bo Camera Club.

THE MEASUREMENT OF ASTIGMATISM AND CURVATURE OF FIELD.

IN our ALMANAC for 1897 we briefly described the princ types of modern photographic lenses, and pointed out that ordinary photographer who was anxious to test or compare lens with another for flatness of field and anastigmatism—two qualities insisted upon as more or less characteri lenses of recent introduction—possibly could not find the tas easy one. We at the same time drew attention to a pape Professor W. K. Burton, printed in the Camera Club *Jou* for October 1895, in which that gentleman described w appeared to us a method of ascertaining and plotting off amounts of astigmatism and curvature of field that migh present in lenses, simple enough in application and near eno in accuracy for ordinary photographic use. We have since several applications for a fuller description of Profe Burton's method of testing lenses for astigmatism and curva of field, and, assuming the author's permission, we shall giv the present article the substance of the paper above referre not, however, omitting to acknowledge the courtesy of Committee of the Camera Club, who have allowed us to re duce the article.

Four of the contributors to our 1898 ALMANAC write on subject of the testing of modern lenses, and among t Professor Burton himself, who points out that photograp might reasonably demand of opticians the publication in t advertisements of curves of astigmatism and field, just as o necessary details as regards aperture and so forth, are gi Professor Burton's suggestion is a not untimely one, whic commend to the notice of those more immediately concer There are, we believe, no less than ten or eleven distinct m of anastigmatic flat-fielded lenses offered for sale in country, which it is of course possible do not uniformly out the claims made on their behalf. We confess we l little immediate hope of seeing Professor Burton's sugges adopted, for a variety of reasons we need not here enume but that does not detract from its reasonableness.

Let us summarise the plan, as far as possible in his words, by which Professor Burton proposes to place in hands of the photographer the power of measuring the am of astigmatism and curvature of field that *may* be present

alleged to be more or less innocent of those optical and ographic drawbacks. Our author says :—

I had been for some time looking for an easy method of ing out the curves of astigmatism and of field for the y lenses that I use, and I will begin by saying a word on methods commonly adopted, in which examination is made a screen of considerable size, covered with circles, radial tangential lines, dots, printed matter, &c. It seems to me , apart from the expense and trouble of preparing such a en, it has the disadvantage that it does not constitute a y definite test for curvature of field. Before we can nitely measure curvature of field it is necessary that we e a clear definition of flatness of field, or at least of the erties of a hypothetical lens that shall be free from all ature of field. I describe such a lens as one that will g the image of a plane at a 'distance' into focus on a e.

A lens that would bring the image of a 'near' plane into s in a plane would really have, I consider, a plane convex ne lens, as, in the case of the near plane, the centre of the e is appreciably nearer the lens than the margin, and the r conjugate foci of the central pencils are appreciably thened as compared with the lesser conjugate focus of an l pencil.

The 'distance' here mentioned is that distance beyond h all greater distances will appear to be equally in focus. the purposes of lens-testing it is approximately given by following equation—

$$D = f \times 100\, d.$$

In which

D = the shortest 'distance' for the particular lens.
f = the focal length of the lens.
d = the diameter of aperture in inches.

Now, however, when we come to the question of a ant' test object for photographic lenses, it is of no conse- ce whether it be in a plane or not, so long as all parts are ant.' The starry firmament would make the very best t of all, were it not for practical difficulties in the way of g it. Any distant object in the form of a part of a sphere d be suitable in the matter of form, and this means that, ng as we secure 'distance,' it comes to the same thing her we have the camera fixed, with an object subtending angle covered by the lens, or whether we have a small t and revolve the camera. The former method is im- icable or nearly so, the latter is a practicable and easy

Having come to this conclusion, the first thing was to design table object. Fig. A shows the object that was decided on some consideration. The height is 5 feet; the breadth, t; the outer diameter of circle, 3 feet 6 inches; the h of all lines, 3 inches; the clear space between vertical 3 inches; that between horizontal lines the same; the eter of dots, 1½ inches.

These dimensions were determined on the supposition that bject would, in every case, be fixed at approximately the ance' given by the equation which figures above. This d have given for one of the lenses tested a distance of t 1000 feet. As a matter of fact, it was found convenient e a piece of spare land close to my house, where a con- nt fixed distance of about 400 feet could readily be ned. The nearness of the object has, theoretically at , resulted in appreciable error in the field curves of two of the thirty lenses tested, but these are lenses giving such pronounced curves that the error may certainly be neglected in comparing their qualities with those of other lenses. Experience proved that the object would have served quite as well had it

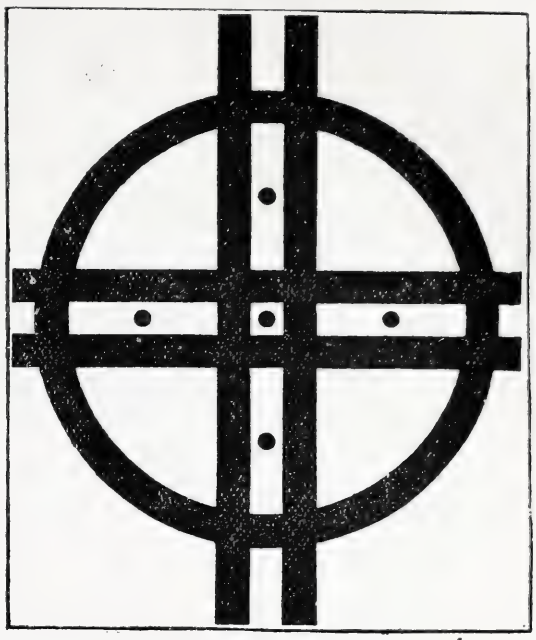


Fig. A

had only half these linear dimensions. The dots, all except the central one, were found to be 'works of supererogation.'

"For the tests, a camera with a ground glass substitute—made by coating plate glass with a gelatine emulsion of sulphate of barium—was used. The dimensions of this plate were 18 × 14 inches. The film was marked with lines one inch apart, scratched with a steel stylus.

"In marking the glasses, Japanese inches or 'sun' (practically $\frac{1}{10}$ English foot) were actually used, as section paper marked to 'sun' was more easily procurably than such paper marked either to inches or to centimetres. A high-class achromatic eyepiece of about 1½ inches focus was used in all focussing.

"The exact method of testing was as follows :—

"The camera being placed in position, and due care being observed that the plane of the focussing screen was at right angles to the axis of the lens, the centre of the object illustrated above was carefully focussed in the middle of the ground glass. The camera was then revolved till the object fell one sun from the middle of the focussing screen, when the camera was readjusted to make the *vertical* lines of the object sharp. The deviation was noted for this one sun and for every other, till the edge of the ground glass was reached. By this means a curve for *tangential* lines was worked out.

"The operation was repeated, focussing the second time for the horizontal lines, thus getting the curve for radial lines.

"Finally, a curve for general 'field' was plotted, by getting the best average focus for each sun. As long as possible the dot in the middle was focussed; when it became invisible, the square enclosed by black lines; when this could no longer be distinguished, the square formed by these black lines themselves; at last, in the case of some lenses, for the whole figure.

"It may be urged that it was needless to work out the 'field' curve, after working out those for radial and tangential lines, as the field curve ought to lie mid way between the two last-mentioned curves. This appears to be true, till such

obliquity of pencils is reached that the lens mount, or tube, limits the pencil. When this amount of obliquity is reached, the vertical and horizontal, or tangential and radial, elements have different intensities, and the curve of field does not practically of necessity lie mid way between the other two curves.

"In the case of some lenses the curves for tangential and radial lines are on different sides of the axis (the plane of the ground glass), in most cases they are on the same side."

Professor Burton then gives a short description of the method in which the curves were plotted down from the data obtained by the way just described.

"In the first place," he says, "let it be premised:—

"All lenses were reduced to a common focus, namely, five inches.

"In every case ordinates are on twice as large a scale as abscissæ, so that the faults of astigmatism and of curvature of field are in every case shown twice as great as they actually are. The lowest curve is, in every case, the curve of astigmatism, and is worked out by plotting the *difference* between the curve for tangential lines and that for radial lines. The middle curve is the curve of field, obtained in the way already described. The upper curve is the sum of the other two, and roughly represents the sum of the vice of the lenses tested, in the matter of astigmatism and curve of field. I say *roughly*, because the highest curve would represent the sum of the two vices mentioned *accurately* only on the assumption that astigmatism and curve of field, *as measured by the method described*, are equal evils, but this is a matter by no means certain. Indeed there are, as is well known, some subjects with which curvature of field is a positive advantage. I know of none with which astigmatism is an advantage."

We are obliged by exigencies of space to very much condense Professor Burton's paper, but we have given those portions of it that are essential to an understanding of his proposed plan for taking the two important "characteristic curves," if we may use the term, of photographic lenses. A few of Professor Burton's curves are here reproduced together with the remarks made on each test.

List of Lenses Tested, Referring to Diagrams, with Remarks.

I.—2R portrait lens, $8\frac{1}{4}$ inches focus, worked at f-3, full aperture.

II.—Quick-acting portrait lens, focus $6\frac{1}{2}$ inches, tested full aperture = f-3·25.

III.—Cheap portrait lens, probably French make; focus $7\frac{1}{4}$ inches; tested at full aperture = 3·625.

IV.—A very old portrait lens, focus 26 inches, full aperture, 5 inches; tested full aperture, f-5·2. This lens has an adjustment for altering the distance between the anterior and the posterior combinations. This diagram is from the lens with the combinations as far apart as possible. The next,

V.—Is with the combinations as near as possible. It will be seen that opening out the combinations decreases astigmatism, but increases curvature of field.

VI.—An aplanatic $7\frac{1}{4}$ inches focus; tested full aperture = f-6·3.

VII.—An aplanatic $13\frac{1}{2}$ inches focus; tested full aperture = f-6·3.

VIII.—Universal symmetrical 18 inches focus; tested at full aperture = f-5·7.

IX.—Rapid Weitwinkel Euroscope, 11 inches focus; tested full aperture = f-6·3.

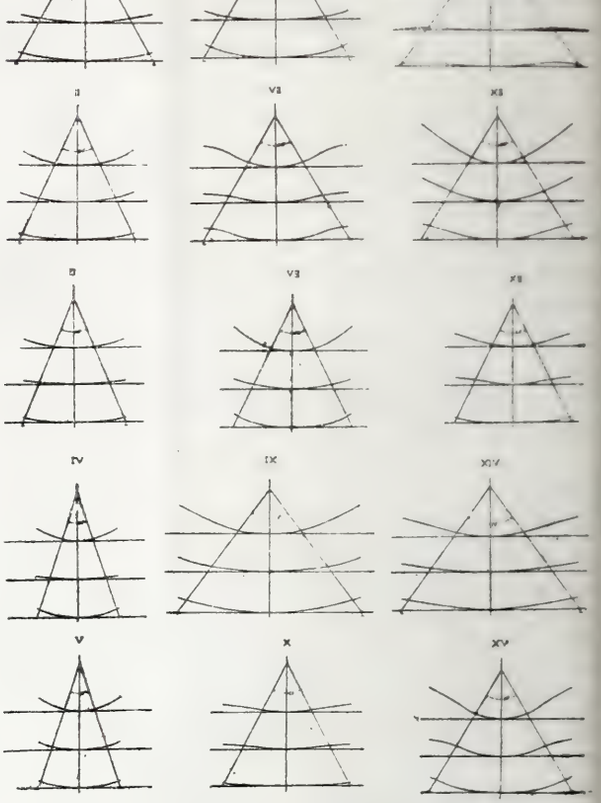
X.—Anastigmatic, Series II., focus $16\frac{3}{4}$ inches; tested aperture = f-6·3.

XI.—Double anastigmatic, 12 inches focus; tested at aperture = f-7·7.

XII.—Rapid rectilinear, 14 inches focus; full aperture f-7, but tested at f-10.

XIII.—Anastigmatic, Series III., ; tested full aperture f-7·2; focus, 18 inches.

XIV.—Rapid Weitwinkel Lynkeioscope, $7\frac{1}{2}$ inches foc tested at full aperture = f-8. This lens has the pecu



property that the field for a tangential line does not ap ciably vary from flatness.

XV.—Rapid rectilinear lens, 15 inches focus; tested at aperture = f-8.

Only one half of the diagrams made by Professor Bu are here reproduced, but a study of those shown will serv give the reader some idea of the characteristic differences betv lenses of old and new construction. Diagrams X. and XII particular, well illustrate this.

Photographs as Evidence.—Photographic portraits means of identification are now usually received with caution Judges in the Law Courts, particularly in the Divorce Court. week, in this Court, evidence was given in support of the coun opening statement, but none was forthcoming as to identifica except photographs of the respondent produced by petitioner identified by witnesses. But Mr. Justice Barnes said he was prepared to act upon the evidence as it stood, adding that evidence might be perfectly correct, but any case could be prove this Court by means of photographs alone, if evidence of that was accepted. He further said that proper corroborative evid must be given, and ordered the case to stand over. At one t now a long while ago, photographs were accepted as evid Possibly, however, the pencil and knife of the retoucher has

much to bring about this altered condition, and rightly too, perhaps, seeing what a skilful retoucher can do in the way of "improvement" in portraiture.

More about Acetylene Insurance Companies.—A correspondent hands to us the following communication which he has received from a large insurance company:—

"There has been a fresh circular on this subject to the effect that all rules hitherto issued regarding the use and storage of the above be cancelled, and that the following be substituted, namely:—1. That every apparatus for generating and storing acetylene gas, except portable apparatus holding a charge of not exceeding two pounds of carbide, must be outside the building which is, or the contents of which are, the subject of the insurance. 2. That liquid acetylene be in no case permitted to be made, used, or stored upon the premises. 3. That offices agree not to admit liability for explosion of acetylene gas occurring elsewhere than in the building which is, or the contents of which are, the subject of the insurance."

It would appear that the fire insurance offices experience some difficulty in making up their minds as to how to treat this terrible new agent as it presents itself to them. We are at one with them as to their objection to the use of the compressed gas, but surely enough has been known of the nature of the gas under slight pressure to have enabled them, long ago, to have permitted its use, though not its manufacture, under due restrictions as to amount of pressure. But let our readers act upon our suggestion that they, before using acetylene in any form, let the office they are insured in endorse upon their policies the requisite permission. This will cost nothing, and may save a great deal of trouble.

Commercial Production of Oxygen.—According to the *Journal de Pharmacie et de Chimie*, MM. Dutremblay and Lugan hope to reintroduce, with improved apparatus and methods, Tessié du Motay's process, introduced in 1867 but afterwards abandoned. It consisted in decomposing by superheated steam (at 500°), and then regenerating at the same temperature by dry air, the alkaline manganates. The apparatus needed are an air pump to remove carbonic acid and steam, a purifier, an automatic distributor to introduce alternately dry air and steam, and a gas-holder with a refrigerator to condense the water vapour drawn in. The reactions take place at a low pressure, and, as the oxygen is carried into the gas-holder by means of the steam instead of through a pump, it is kept perfectly free from carbides. In the old method the charge was liable to cake and the soda to be evaporated, but these difficulties are now avoided, and the risk of explosion done away with.

A New Explanation of Spirit Photographs.—A singular experience in connexion with spiritualistic *séances* is given by a correspondent in the *Daily Telegraph*, and it suggests that, in a modified form, something of this sort might be carried out in photographic spiritualistic experiments. In the case under consideration, a medium who made a *specialité* of luminous apparitions has lately been in much demand, and upon a recent occasion was operating at a *séance*, when an untoward event put an end to the show, and almost to his existence. He has on these occasions his hands securely tied behind him; yet, when the lights are turned down, weird luminous apparitions of deceased celebrities are seen, and were in this particular exhibition; but a gasping, gurgling sound was heard, and the medium's face swayed to and fro as if in pain. It appears that just before his hands were tied he placed in his mouth a miniature electric light, communicating by a fine wire with a small pocket battery. But the best "laid schemes of mice and men oft gang agley." In this case the electric light ganged much agley, in fact down the poor man's throat, and he was very near to being choked, as, being hand-tied, he could not help himself, but that a gentleman rushed forward, discovered what was going on, and fished up from his thorax the origin of the trouble and of the luminous ghosts!

The Poisons Act.—A few weeks back, it will be remembered, we called attention to a rebuff the Pharmaceutical Society had received in connexion with its vexatious proceedings under the Poisons Act. We then advised the Society to look more after the sheep in its own fold, who were continually infringing the law, instead of, for their 5*l.* penalty, trapping those who might occasionally sell an ounce or two of bichloride of mercury for photographic purposes, a fly paper, or a weed-killer for garden use.

Last week a chemist was prosecuted at the Marylebone Police Court, on three summonses issued by an inspector of police, for selling a preparation of atrophine and morphia sulphate, a poison, to a person then unknown to him; also failing to enter particulars of the sale in a book kept for that purpose; and, lastly, for selling the poison without having his name and address distinctly labelled thereon. The defendant admitted two breaches of the Act, but pleaded not guilty of the other. It appears, according to the report in the *Standard*, that the defendant had been asked by the purchaser's husband not in future to supply her with the poison, which he afterwards found he had done. He then reported the matter to the Pharmaceutical Society and to the police, and the latter took up the prosecution, with the result that one summons was dismissed; on another a fine of 3*l.* and costs was inflicted, or one month; and on the third a fine of 5*l.* and costs, or one month.

It is noteworthy that this prosecution for the infringement of the Poisons Act was not instituted by the Pharmaceutical Society, although the matter was reported to it, but by the police. In the case of a photographic dealer selling an ounce or two, say, of bichloride of mercury to one of the spies of the Society, or an oilman a fly paper, he is at once sued in the County Court, unless he "pays up" without, for 5*l.* for infringing the Poisons Act. This, the Society alleges, it does for the safety of the public, but most think for the sake of the 5*l.*, and to protect the trade interest of pharmaceutical chemists; yet it now seems that the safety of the public, so far as chemists are concerned, must be looked after by the police, while the purity of the things the chemists sell rests with those who look after our interest in the matter of our butter, coffee, &c. Still, a trades union cannot well be expected to prosecute its own members.

Photographing Invisible Celestial Objects having a Proper Motion.—Some little time ago we described Professor Barnard's method of doing this by means of a clockwork attachment to move the plate in the right direction, and with which a guiding telescope kept an adjacent star in the centre of the field. According to *Nature*, Herr J. Jan Fric, of Prague, has devised a somewhat similar plan, in which the plate is moved in the direction the subject is travelling; "The holder is driven by a fine screw, which derives its motion from the intermittent action of a ratchet wheel, moved by a 'powel,' which in turn is moved by an electro-magnet. The length of stroke can easily be altered so as to give any varying motion which may be necessary; but, of course, in consequence of the discontinuity of the movement produced in this way, the change in the position of the plate must be so small as not to interfere with the perfectness of the image photographed."

The Forthcoming Eclipse.—Sir Norman Lockyer is repeating on this occasion the Norway arrangement of last year, namely, impressing into the service of the observations party the volunteer assistance of the trained faculties and the keen sight of the officers and men of the ship's company. Already 115 volunteers have given in their names. If all goes well, it is expected that the results obtained by the large band of observers will tend to give a unique value to the results of the expedition, one that is hoped will be memorable in the annals of astronomy.

Official Stations for the Eclipse.—At the time this meets the eye everything will be in readiness for the event at the different stations taken up by the British astronomers. The English Astronomer Royal and his party are at Sohagpoor, Sir Joseph

Lockyer and his party at Viziadurg, the Astronomer Royal of Scotland near Nagpur. Another official party, under the direction of Mr. Newall, of Cambridge, occupy a post at Pulgaon, near Wardha, on the railway between Bombay and Calcutta, while a number of other astronomers are located at various points along the line of totality. Great things are expected from this eclipse if the weather only be favourable to-morrow, and it is said that meteorological evidence gives evidence that it will be. It is to be hoped that it will, for several expeditions of late have been sadly marred at the last moment through the weather. It is indeed disappointing to be months arranging and journeying so far, to do a few minutes' work—the totality only lasts from one to two minutes, according to the station—and then to be defeated by the clerk of the weather. It is only those who have taken part in an eclipse expedition that can realise the disappointment to the full. By the way, it will be over a century before a total eclipse of the sun will be visible in England.

The Spectacle-makers' Company.—A short time back we alluded to a proposal, on behalf of the Spectaclemakers' Company, for the examination and registration of opticians, and the admission of members of the trade to the Company and its benefits, on exceptional terms. At a meeting of the Court, held at the Mansion House, one day last week, under the presidency of the Lord Mayor, who is Master of the Guild, the proposal was heartily adopted. At the meeting were present Sir Wm. White, Chief Constructor of the Navy, and Sir Robert Ball, the President of the Royal Astronomical Society, both of whom congratulated the Company on its new departure.

MANY of the City Companies are very wealthy, and, with few exceptions, its members are in no way connected with, or interested in, the trades with which their names are associated. The Companies are, however, as a rule, very liberal in the matter of charities, and now some of them, to their credit, are devoting some of their income to the furtherance of the technique of their craft. That has already been done by the Plumbers, the Carpenters, the Turners, and others. We are pleased to see that the Spectaclemakers' Company has come forward in the interest of optics, seeing the importance they are assuming on the Continent. The number of such things as spectacles, folders, opera glasses, and the like, that are imported into this country would surprise most people—to say nothing of photographic lenses.

Adulterated Art.—The art critic of our contemporary, the *Standard*, never misses the opportunity of decrying photogravure, and last week, in a notice of some engravings by that method, is, as usual, very severe. In reviewing an etching, he says, "This work of unadulterated art, as distinguished from mechanism, is from the etching needle." Later on he says, "The two photogravures on which we propose to bestow a not over-cordial recognition are good enough of their kind—absolutely bad work it is better to simply ignore." Of one of these works the critic, patronisingly says, "It is pretty, and even decorative, after its fashion," &c. If this critic's ideas are correct, how is it that so many artists, and their publishers, prefer to have their works reproduced by photogravure rather than the etching needle; and why have line and mezzotint engraving practically become things of the past?

BY THE WAY.

WITHOUT doubt, the gum-bichromate process is, at present, enjoying its apotheosis, but whether the momentary "boom" means that, to use a modern colloquialism, it has "come to stay" is more than doubtful. On all sides, and by its most enthusiastic supporters, it seems to be admitted that it is not the process for every-day use by any one, but requires the most careful manipulation of a skilled worker, and, under those conditions, it has been fully demonstrated that it is capable of yielding results that leave little to be desired as regards quality; but the process is certainly not one in which, as Dr. O. Clark remarks in his paper, "those with only limited time can dabble," and is therefore not likely to be "over-worked."

But it is a curious fact that the very difficulties of the process are cited by its promoters as "advantages." I leave out of the question altogether the "personal equation," the immense power of "individuality," so much talked about, which may or may not add to the quality of result, according to who may be the judge. Every stage of the process, it appears (I quote again from Dr. Clark's paper), is beset by difficulties, and yet, owing to the "latitude in modification" they allow—or rather, from the context, I would suggest, *compel*—these very troubles prove beneficial, as they promote "individuality as opposed to mechanism," whatever that may mean. I will admit that sawdust, mops, pieces of sponge, ink-eraser, paper on wooden stumps, &c., do not represent the most highly developed forms of mechanism, but perhaps these are supposed to stand for different phases of the "individuality" so much talked about. After all, we must remember that the prehistoric savage was not aided by any elaborate "mechanism," yet he has left us many a monument of the patience and individuality, and what he himself probably considered, though opinions may differ, "high art."

But surely the most curious claim ever made in favour of a process is that made by Dr. Clark, "the difficulty of making two prints alike!" A popular saying has it that "variety is charming," and so no doubt it is when it is well under control; but, when that variety is forced on us, turns up, in fact, when and where least expected, like the prizes in a lottery, it seems to me that the "artistic" quality it leads to, or is said to, and which is so much to be admired according to Dr. Clark, must partake very much of the nature of a series of flukes. Just imagine, or try to imagine, some of the great guns of the Salon finishing off their exhibits in a hurry at the last moment, and not being aware, until they *are* finished and stuck in the correct position in a proper coloured frame, what they are going to look like. Under such conditions it is really wonderful that the "artist" is able to select his frame at all; at the same time the reason of the extraordinary outbreak of gum-bichromate eccentricities at the last Dudley Gallery show is at least partly explained. Not even the "artists" themselves knew until the last moment what surprises were in store for them.

I don't know that I should have referred to gum bichromate again if Mr. Alfred Maskell had not set me thinking by repeating an absurd "challenge" he issued two years ago. If I were to accept that challenge, which I have not the slightest intention of doing, I should consider that I was going out of my way to prove an absurdly palpable fact, namely, that photographically, even by the admission of the best workers of gum bichromate, the ordinary carbon process is far away its superior. The excitement of the meeting at Anderton's Hotel must, I think, have partially upset Mr Maskell, and caused him to indulge for my amusement in a little metaphorical "cock-crowing" before the performance is quite due. If two dozen, not two, negatives were placed before me, it would not require any *choice* to select one that, under any circumstances, printed in ordinary carbon, would give a technically more perfect result than gum bichromate, while it would perhaps not be very difficult to pick one that would floor Mr. Maskell completely. Mind, I am speaking of photographic or technical qualities, for the artistic character is independent of process, and I have no wish or ambition to undergo such a course of "sawdust soup" as would fit me to appear before a jury of "bichromaniacs."

So far as the gum-bichromate process is concerned, my opinion is still practically the same as it was two years ago, when I penned the remarks that elicited Mr. Maskell's challenge. I believe I said that the text-books which Mr. Maskell challenged were right in teaching that gradation, correct or true gradation in carbon printing or pigment printing, call it what you will, can only be obtained by developing from the back of the proof, and the same I still maintain. Mr. Maskell, on the contrary, says he will produce a better print with gum bichromate, which only proves, if it proves anything, that Mr. Maskell is a very clever man. That the gum-bichromate pro-

ess, when properly worked, is capable of rendering certain classes f "effects" that have of late years obtained a certain popularity is n undoubted fact, but to attempt to compare the results techni-ally with the "ordinary carbon process" is in the highest degree bsurd.

By the way, Mr. Maskell will perhaps remember that, in the ourse of the discussion of the process two years ago, I pointed out hy and how, in the Artigue process, in which it was stated the olouring matter was applied to the already coated paper, and in he somewhat analogous method known as the "dusting-on" pro-ess, the fact that the sensitive material lay between the colouring natter and the support was altogether in favour of the successful ormation of an image without transfer. Some years ago it was ttempted to introduce the system of sensitising ordinary carbon issue from the back, that is to say, it was proposed to float the aper instead of the gelatine side; but it was soon found that, for he very same reasons, but under reverse conditions, the practice vas wrong. In printing without transfer, the sensitising of the nder side of the layer of colouring matter promotes the adhesion to he support of the exposed portions, and at the same time facilitates he dissolving and removal of the unexposed parts; but, when ransfer is used, the reverse is the case, and general insolubility and dherence of the picture to its temporary support are the result.

I mention this because the latest development of the gum-bichro-nate process is in the direction of applying the sensitising solution o the support before the colouring matter, which produces precisely he effect I have referred to. And this method was "suggested" by Ir. Maskell in his recently published handbook, though he modestly epudiates any claim to originality in the matter. Can it be that me unconscious sequence of ideas has led him to adopt my sugges-on of two years ago? If so, while the present "boom" is on, if here is anything to be got out of gum bichromate, he might stick ny name down amongst the "inventors."

But, turning from gum bichromate to Mr. Joseph Pennell's article n the *Contemporary*, it is refreshing reading to find how outsiders idge the Salon style of work generally, but gum bichromate par-cularly, though it is distinctly humiliating to find photography enerally judged from that standpoint. Although Mr. Pennell says me very absurd things that are evidently intended to be cruel, I hink, on the whole, his "Philistinism" is of the right sort, for he eems to set his face only against that phase of photography which hotographers themselves, as a body, look askance at. But it would ake a column or two to "touch up" his absurdities and inconsis-ncies. I am beginning to believe the *dictum* that it only takes a enny bottle of ink, a sharp-pointed pen, and a troublesome liver to ake a successful critic.

I see a notice in the columns of Foreign News and Notes f December 3 of the discovery in the Museum at Lille of two ictures which are claimed to be stereoscopic, and which were pro-uced in the sixteenth century by an artist named Chimenti. Now, any one who is particularly interested in this matter will turn up he volume of this JOURNAL for 1864, he will find, in the early part f that year, a number of articles showing not only that these ictures had been discovered thirty odd years ago, but a further iscovery that they were *not* stereoscopic, that the differences that xisted were merely the accidental variations natural in two hand rawings. Such, at least, is my recollection of the discussion, for I ave not the volume to refer to at hand. I will endeavour to look up before my next notes.

DOGBERRY.

FOREIGN NEWS AND NOTES.

Acetylene Incandescent Gaslight.—Chertemps states, n the *Bulletin Technologique*, that, by suitably modifying a Bunsen urner, acetylene may be burnt in it, and that it gives a very hot ame, which, when used with the ordinary incandescent mantles, ives a light which is three times as bright as the ordinary incan-escent light.

Printing from Harsh Negatives.—The old idea of modifying hard negatives by coating them on the glass side with a sensitive emulsion and exposing to the light, and then toning and fixing, has been revived, though in a modified form. It is now suggested, in the *Revue Suisse de Photographie*, that a print should be made from the negative on albumen or other paper without a baryta substratum, and that this, after toning and fixing, should be made transparent with vaseline; fixed one centimetre away from the negative in the printing frame, the contrasts are thus lessened. This, however, does not seem so easy as the old plan of coating the glass with a collodio-chloride print-out emulsion, and then exposing, and toning, and fixing.

Brenzcatechine, or, as it is more generally known in England, pyrocatechine, has found but little favour as a developer, in consequence of its high price; but Dr. Ludwig Ellon & Company, of Charlottenburg, Berlin, have patented a process for producing it at a very reasonable price, and in a state of great purity, which is likely to attract more attention to it. Dr. H. W. Vogel recommends the following formula:—

Water	1000 parts.
Sodium sulphite	25 „
Sodium carbonate	50 „
Brenzcatechine	10 „

Yet another Backing is suggested, and this time by Ducos du Hauron; it has, however, the disadvantage of being a greasy mess. It is composed of—

Paraffin	20 parts.
Olive oil	20 „
Lamp-black	10 „

and has obviously to be melted each time before use; it should be applied with a broad camel's-hair brush, and, before development, removed with a flexible knife.

Exhibition Sales.—In the current issue of the *Photographische Rundschau* there is an interesting analysis of the recent Exhibition at Hamburg. No less than fifty-five pictures were sold for a total of 1930 marks (a mark=one shilling). The processes by which the pictures were made, and their value, were as follows:—

17	Gum-bichromate	for 1139 marks.
14	Platinotypes	„ 350 „
8	Carbons	„ 198 „
5	Bromides	„ 96 „
10	Collodio-chlorides	„ 87 „
24	Transparencies	„ 60 „

It was an international exhibition, and the following table shows where the money went:—

Hamburg	16	prints for 925	marks.
Germany	19	„ „ 332	„
Austria	6	„ „ 305	„
England	7	„ „ 183	„
France	3	„ „ 70	„
America and Belgium	1	„ „ 50	„

Working this out, it will be found that the average price of the prints was, in round numbers, for—

Hamburg	57 marks.
Germany	17 „
Austria	51 „
England	26 „
France	23 „
America and Belgium	50 „

There was a profit of 69*l.* on this Exhibition; 1673 people paid 1*s.* and 2003 paid 6*d.* for admission, whilst 189 bought season tickets at 3*s.* Probably the R. P. S. would like to go and do likewise.

Toning Bromides.—Mussat uses the following solution to obtain warm tones on bromides and enlargements:—Sulphate of copper, 1 part; water, 100 parts; carbonate of ammonia, sufficient to redissolve the precipitate first formed. Five parts of this solution are added to 200 parts of a two-and-a-half per cent. solution of potassium ferridcyanide. The prints should be soaked in water prior to treatment with this solution.

The Chassagne Radiotint Process. — According to Ludwig Schrank, in the *Photographische Correspondenz*, the three solutions have been spectroscopically tested and proved to be indigotine, eosine, and Bayer's blue mixed with picric acid. The patent specification, however, reads differently.

A Jelly Developer for Aristotype Paper. — Herr R. Ed. Liesegang who has, since the lamented death of his father, the late Ed. Liesegang, been the editor of the *Photographisches Archiv*, contributes to the *Correspondenz* a note under the above title, in which he states that, if a mixture of about 50 parts of a ten per cent. solution of gelatine and 25 parts of a saturated solution of gallic acid be coated on glass and allowed to set, and a faintly printed gelatino-chloride print be squeegeed to the damp film, the image will be fully developed exactly as if an aqueous solution of gallic acid were used. The progress of development can be watched through the glass, and, as a rule, it only takes from two to four minutes, and the print can then be stripped and fixed. Liesegang does not consider that this process will be found to be of much practical value, but it is interesting because of a phenomenon which has some bearing on physical development. When the print is stripped from the gelatine and gallic acid, there will be seen on this film a negative impression of a blue-black colour which is, of course, formed by the diffusion of the free silver nitrate from the paper into the gelatine, and this diffusion only takes place in the unexposed parts.

Line Drawings from Photographs.—Dr. Eder points out that many formulæ have been given lately for bleaching the silver image after it has been drawn on with Indian ink, &c., which rely upon the bleaching property of mercuric chloride, but that these are very unsatisfactory, as the mercury-bleached image still remains on the paper, and may give trouble in reproduction. If, on the other hand, Farmer's ferridcyanide reducer, or a four per cent. solution of potassium cyanide with a little iodine tincture be used, the image is entirely dissolved.

Aldehydes in the Developer.—MM. Lumière and Seyewitz have continued their researches on the use of the acetones or aldehydes in the place of the alkalies. Formaldehyde produces foggy results, much inferior to those with acetone. The best results were obtained with the following formula:—

Water	100	parts.
Sodium sulphite (anhydrous)	5	„
Pyrogallol	1	part.
Formaline	0·5	„

Para-amido-phenol, in consequence of its low solubility, does not give a useful developer. With hydroquinone the results are very satisfactory, and the contrasts given by the following developer are very great, so that it will be extremely useful for reproduction of line or black-and-white drawings:—

Water	100	parts.
Sodium sulphite (anhydrous)	15	„
Formaline	2	„
Hydroquinone	1·5	„

Ordinary aldehyde gives results identical with those obtained by the use of formaline or formaldehyde, and precisely the same formula as above may be used, replacing the formaldehyde by three parts of a fifty per cent. solution of aldehyde.

Klary-Colour.—M. C. Klary, the principal of L'Ecole Pratique de Photographie, and editor of *Le Photogramme*, has placed on the market, under the above title, some solutions for colouring photographs, which are sent out in a box containing a colourless liquid called the medium, and three solutions—blue, red, and yellow. This is obviously an imitation of the Chassagne process, but M. Klary is honest enough to advertise them merely as a simple means of colouring photographs.

A Rapid Developer.—Michel strongly recommends, for instantaneous exposures, bathing the plates in a five per cent. solution of lithium carbonate for one minute, and then developing in the following:—

Amidol	20	parts.
Sodium sulphite	200	„
Water	4000	„

MULTIPLE-COATED PLATES.

Before the Photographic Section of the Croydon Microscopical and Natural History Club, on Friday evening, January 14, a demonstration was given by Mr. J. H. Baldock, F.C.S., on *Multiple-coated Plates*. Mr. Baldock said that he had prepared this paper, and had undertaken to give this demonstration, at the request of several gentlemen who had tried the multiple-coated plates, but had not been very successful in the manipulation of them, which was, he thought, due to the fact that the image might become lost on the surface, and possibly quite invisible at the back—a result which, of course, did not happen with singly or thinly coated plates, and he further stated that in treating of this subject it was necessary to consider the objects for which these special plates were designed, and, further, how to make the best use of them. He took it that the object was twofold—*i.e.*, to enable a maximum of exposure to be given without danger of losing the negative from over-exposure, and for the prevention of halation. Mr. Baldock continued: "I may say at once that for *under-exposure* these plates possess no advantages over any other good plate, although, by reason of the first rapid film, snap-shots may be taken on these plates, but then not much advantage is gained by having the second or third film. For all ordinary purposes, the double-film plate is amply sufficient; it is only under exceptionally difficult conditions—such, for instance, as white windows with sun on them—that the triple-coated plate is required. As a striking example of this, I am enabled, through the kindness of Mr. J. T. Sandell (of the Sandell Works Company), to show you a really extraordinary negative, taken by himself, of the unclouded sun on a triple plate. When, on dissecting it—*i.e.*, separating the three films—we find on the first rapid film total reversal, but on the second film, and still more on the third, a good negative image—a result that could hardly be attained with any other plate. But this very interesting experiment I think amply proves the value placed on these multiple-coated plates by their makers, because, if *over-exposure* and *halation* could spoil a plate, surely any attempt to photograph the orb of day, set in a blue sky, would certainly have that effect. Four other negatives I am enabled to show you, illustrating the same kind of thing—two lent to me by Mr. Sandell and two taken by myself; in fact, any of you can verify this result for yourselves. They consist of photographs of an incandescent mantle on ordinary and on Sandell plates. The result is sufficiently striking, as in one case all trace of the mantle is gone in a general halo, while in the other not only the mantle, but the crutch supporting it, is quite distinct. Do not, therefore, be afraid to give plenty of exposure, because, even if the first film be over-exposed, the image will be found on the film or films below. In the case of stained-glass windows, or a landscape, containing pronounced colours, especially blue (flowers), it is necessary to employ a yellow screen of such intensity that the blue appears green when viewed on the focussing screen. I show you four negatives I took last October, giving two, four, eight, sixteen seconds respectively, on Sandell II. plates, and prints from them. You will see that, notwithstanding the difference of exposure, the result is practically the same. They were all four developed in the same dish, and revealed the fact that probably four seconds was the best exposure, though two seconds gave a very good negative. I also show you a plate I took a week ago, to which I intended to give ten seconds' exposure at *f*-32, but, in the hurry to get the fowls while they were fairly still, I forgot to stop the lens down, and so gave ten seconds at *f*-8, equivalent to eighty seconds, or eight times what I intended to give; and yet, as you see, I got quite a printable negative. To compare with this, I show you two other negatives, one on an "Imperial" ordinary plate, and one on a Marion's "Academy" plate (five years old), which had two and three seconds respectively, which proved to be ample; the Sandell, therefore, had at least twenty-four times the exposure it need have had, and yet was capable of giving a good result. I also show you two interiors of the Old Parish Church, Croydon, giving the magnificent east window (now, unfortunately, marred by a rood screen), and one of the organ screen, with prints and transparencies of the same, from which you will see that the details of the window are perfectly rendered, without a trace of halation; the exposure in these cases was one hour at *f*-32. I also show you four whole-plate negatives on Sandell II. of the interior of the interior of the Temperate House, Kew, in which you will notice that the ribs supporting the roof, &c., are quite distinct, notwithstanding that the house is glazed with white glass, and the sun was shining at the time.

"The developers I use are generally the Nos. 1 and 3 of the Sandell Works Company, *i.e.*, pyro-potash and metol, though I have got very good results with No. 2, *i.e.*, hydroquinone-metol. The best mode of procedure is, if the plate is thought to be *somewhat* under-exposed, use metol developer till you see the detail well out, then pour off, and finish off with pyro-potash or hydroquinone-metol. On the other hand, if exposure has been ample, then start at once with either No. 1 or No. 2. If exposure has been *excessive*, such as I have indicated in a previous part of this paper, then only half the quantity of alkali must be used, and more bromide may be added. Development may be carried on for twenty to thirty minutes, depending on how soon the image first makes its appearance. You need not be frightened at losing sight of the image on the surface altogether, neither need you expect to see anything at the back, except perhaps the very highest lights, and not even then if using a Sandell III. You will find your picture all right after fixing. But,

should the plate then show signs of serious over-exposure, it must be reduced, either after fixing with the hypo still in the film, or after washing, placed in a ten per cent. solution of hypo, with sufficient of a ten per cent. solution of ferridcyanide of potassium to impart to it a canary yellow colour; in the first case a little water must, of course, be used. Reduction will proceed slowly, that is, it may be slower, and may require more ferridcyanide than ordinary plates, by reason of the greater thickness of the films, and, consequently, the greater depth to which the image has penetrated; after this the plate must be again well washed. The alum bath may, of course, be used with these plates, as with others, and perhaps in summer time it is advisable to use it, although I never do myself. It must, however, be borne in mind that if it is used the plate must have a good rinse after fixing *before* being placed in the alum bath, and a rinse and a wipe with cotton-wool *after* it comes out, previous to its final washing. Another point to remember is, whether with these plates or any others, that the alum hardens the film, and consequently reduction, if it has to be resorted to, will take longer with an alumed film than with an unalumed one; allowing the film to *dry* before reduction also has a somewhat similar effect. With multiple-coated plates it is essential that both fixing and washing should be very thorough. It is a good plan to use the hypo bath double the usual strength (say, eight ounces to the pint), or the *acid fixing bath* of the Sandell Works Company, and to allow half an hour for fixing and about four hours for washing: it is handy to let them wash all night in a washer. The *acid* fixing bath has three advantages, *i.e.*, it acts as a clearing solution, it hardens the film, and so renders it less liable to frill, and it remains clear and white to the last. It is as well to put the negative direct into this bath after development instead of washing it first; this, too, helps to prevent frilling. Drying, too, of course, takes much longer, but this can be hastened by employing spirit in the usual way. These are some of what might be, by certain workers, considered drawbacks to the use of these plates, but I do not think, in view of their certain great advantages, they can be considered very serious ones. I am indebted to the Sandell Works Company, who are at present the only makers of multiple-coated plates, in this country at any rate, for the plates I have used for the purposes of this demonstration, and I trust I have done no injustice either to the Company or its products in the remarks I have made, but rather that I have succeeded in giving the information which I stated in the commencement I had been requested to impart. Intelligently used, I see no reason why a negative should ever be lost if multiple-coated plates are used."

PAPER NEGATIVES.

[Paper read before the London and Provincial Photographic Association.]

To the photographer of forty years' experience the above title recalls almost endless trouble, first in the difficulty of procuring paper at all suitable for the purpose, then the mess and trouble of waxing, iodising, sensitising, etc. After all this trouble the tedious operations of exposure and development had to be faced, but after an expenditure of time and trouble a present-day amateur would shirk; the process gave negatives leaving little to be desired, as may be seen by the example No 1, a waxed paper negative made in 1855.

To the amateur of twenty or twenty-five years ago the title has also a meaning in mess and trouble, but only after the picture had been dried, after which the negative required greasing, in order to mitigate the Salonesque fuzziness of the print taken from a negative not so treated.

To-night it is intended to show you that negatives can be made upon paper, from which prints can be made free from granularity without the negatives having to undergo any greasing or waxing operation, in fact are quite as easily manipulated as a glass plate.

There are certain advantages which a paper negative has over a glass one, viz., in lightness, in absence of halation under all circumstances, and in the fact that they are more easily stored than glass plates.

The absence of grain is due to the fact that the paper supporting the sensitive film is very judiciously selected by Messrs. Wellington & Ward, and, if the film is properly exposed, developed, and dried upon glass, no grain will show in the print.

These films are supplied in cut sizes, or in rolls for use in a roll-holder. These last require no comment, as they fit any of the roller-slides in general use; in cut sizes they fit into the slide just like plates, and when backed with a piece of stout card lie perfectly flat. The speed is a good average one, viz., P 70 on Watkins's exposure meter, F 56 on Wynne's scale, and if either of these meters are used and relied upon, one great difficulty in the road to success will be removed.

About development I am sorry to say I do not agree with the manufacturers upon this point; they recommend pyro ammonia, but it is not a success neither in my hands or with my friends. Now, pyro-soda is a success, and it is reliable, which pyro-ammonia cannot be. My formula is as follows:—

No. 1.

Water	9 ounces.
Potassium bromide	60 grains.
Nitric acid	10 drops.

Add this to pyrogallic acid, 1 ounce, and make up to 10 ounces with water.

No. 2.

Sulphite of soda	1 lb.
Water (cold) up to	80 ounces.

No. 3.

Carbonate of soda	12 ounces.
Water, up to	80 ,,

For two ounces of developer for film negatives take

No. 1	3 drachms.
No. 2	5 ,,
No. 3	8 ,,

For plates as a rule I use 2 drachms of No. 1 and 6 of No. 2, because paper films require a stronger image than an ordinary glass negative to avoid the granularity of paper in a flat image.

As it is not so easy to watch the development of the image by looking through the film, Mr. Watkins' most excellent method of timing the development should be adopted, and if this is done another stumbling-block is removed. With the developer given above the factor I use is six.

These films do not curl up in the developer, and do not need to be wetted before putting into the developer, and once in they lie as flat as prints do in the toning bath. For fixing, the usual strength hypo is used, preferably made acid with alum, which will prevent any blistering of the film in hot weather; the fact of the image being fixed can be determined as easily as in the case of a glass plate. After fixing, these paper films can be washed just like ordinary P.O.P., which is a great saving of room and trouble. When thoroughly washed, each negative must be squeegeed in contact with a sheet of glass cleaned with French chalk, and when dry they will strip off perfectly flat, and with a very smooth surface,

Paper films offer great facilities for retouching, stopping out, etc., an advantage that will be appreciated by many.

In cases where intensification or reduction may be required, either operation can be performed just as easily as is the case of intensifying or reducing a negative on glass; in the case of intensification, precaution must be taken that the film is perfectly fixed, i.e., all the soluble haloid is removed, and, if this is done, there will be no danger of any staining in the operation of intensifying with the usual mercury and ammonia methods.

The examples sent herewith comprise negatives with prints from them upon Sylvio, bromide paper, a collotype print, and a print from a half-tone block, as well as lantern slides by reduction from paper negatives, and one slide made by contact.

The paper has little effect upon the time of exposure in any of the printing methods. Of course I have no commercial interest in these films, but I have an interest in trying to induce Messrs. Wellington & Ward to keep the paper negative films upon the market more especially for a purpose I have not mentioned, viz., the making of large negatives from small ones for use with the gum-bichromate process and other printing methods, as enlarged negatives upon paper are much more satisfactory than glass ones.

W. T. Wilkinson.

INTERNATIONAL EXHIBITION AT BLAIRGOWRIE.

The Second Exhibition, held under the auspices of the Blairgowrie and District Photographic Association, was opened in the Public Hall, Blairgowrie, on Monday, January 17, at noon, by Sir John G. S. Kinloch, M.P. for East Perthshire, before a representative audience. The Exhibition may well be ranked first-class, and shows a distinct advance on the first Exhibition, held two years ago, which at the time was considered "one of the best." The exhibits on the walls (prints) show a decided increase, but there are fewer lantern slides, although the quality of them is fully maintained. The catalogue had a specially decorated cover, drawn by Mr. George Murray, a student at the Royal Academy, London, and at the beginning of the list of exhibits we noted a quotation from Shakespeare, which seemed particularly applicable to photography—

"The glorious sun
Stays in his course, and plays the alchemist."—*King John.*

There are nearly four hundred prints shown, and over one hundred and fifty lantern slides. The pictures are arranged round the walls, and well lighted by a top light; they have been artistically hung by the executive, under the guidance of Mr. Ewan Geddes.

Class A. (open, Champion Class for previously medalled pictures) has a small but "class" entry. Harold Baker, Birmingham, has a beautiful picture of a girl and violin—*Andante Dolcemente*—(second prize), with a graceful, natural pose and a beautiful tone. John Stuart, Glasgow, is represented by two frames, *Merry Tommy* (silver medal), an artistic photograph of a boy's head, showing slight diffusion of focus; and the *St. Leonard's Hospital, York* (commended), being a fine architectural picture, with light and shade well rendered. W. Smedley Aston, Birmingham, has three frames. *The Day's Work Done* (commended) shows good composition and a grand distance. *May on the Teme* (commended), by Viscount Maitland, is a very effective little picture. W. J. Croall, Edinburgh, has two frames, including *Sporting Dogs at Work* (commended), a picture which gained much popularity at the Glasgow

show; it is a "live" picture, and is sure to be popular. John C. Warburg, Cannes, sends three pictures, his *Blind* having a nice sketchy effect. Space forbids notice of the other works, which includes pictures from Robert Burnie, Glasgow; W. Fisher Ward, Bantry; W. J. Anchorn, Arbroath; W. Howell, London; C. S. Baynton, Birmingham; W. D. Welford, London; Robert Ayton, Edinburgh; Charles Sweet, Rothesay, and Duyshart & Co., Chelmsford.

Class D. (Professional, Landscapes and Seascapes) is a small class, but some good work is shown. John Stuart, Glasgow, has secured a good thing in *The Tinker's Camp* (first prize); the picture is beautiful and the composition complete. In his *Haunt of the Water Hen* he shows a sweet little picture, quiet in feeling. *An Autumn Morning*, by John G. Pratt, Greenock, is very effective; the foreground shows a field of corn, and the misty distance is well rendered. *The Lovers' Walk*, by John Spark, Perth, deserves attention, showing good perspective and first-class technique. H. W. Bennett, London, shows some good work, including *North Choir Aisle, Ely Cathedral*, for which he is awarded second place, and *Gloomy Winter*, by James Patrick, Edinburgh, is an effective snow scene. H. P. Wane is represented by two pictures, and all the way from Cape Town come two pictures from Augustus J. Taylor, both seascapes, *Wind against Tide* being perhaps the more effective.

Class E. (Professional, Figure Studies and Portraiture) is a large and representative class, showing much good work, being perhaps the strongest class in the Exhibition. The first exhibit to catch the eye is a large frame containing Fred Marsh's well-known *Gas Works* pictures (for which he gains a special bronze medal); they are three entitled *Clinkering*, *Charging Retorts*, and *Warm Work*, and as examples of the possibility which some writers would fain make us believe impossible, of having really artistic pictures, and at the same time good technical photography, they will be hard to surpass. The action of the figures is vigorous, perhaps particularly in *Charging*, and, when one considers that these photographs have been taken by flashlight under most adverse circumstances, the award of the R.P.S. medal to Mr. Marsh will be thoroughly homologated. *Oliver Baker, Esq.*, by Harold Baker (first prize), is a brown carbon print, soft in tone, of an artistic head. Two portraits by James L. Crichton, Glasgow, represent a girl with a violin, and are beautiful photographs of a beautiful girl, with no unnecessary accessories. *Study of a Head*, by John Stuart, is a capitally posed head, and betrays the work of a man who knew his business. *Bessie at her Spinning Wheel* is a well-arranged *genre* picture of good tone. *Tramps in Britain*, by A. G. Roxburgh, Cowdenbeath, are good character "sketches," but they would be improved printed in platinotype, they are too interesting to print in silver. A few portraits by William Lawrence, Dublin, merit commendation, being good technical photographs—above the average—well finished, with a nice soft effect, yet perfectly in focus. Pirie Macdonald, Albany, U.S.A., sends five fine pictures, the *Head Study*, a fine old head of a grizzled veteran, such a head as Rembrandt would have liked to paint; it is an outstanding portrait, good in every respect, and finished with breadth—a too rare quality in photography as well as in painting. For his *Lady's Head* he has received the commended ticket. Charles Sweet, Rothesay, showed two lovely treated pictures with the same title—*Child's Head*, for one of which he receives "commended" (118). John Stuart's *Little Coffee Eyes* is a "taking" picture in an uncommon frame, and his *Study of a Head*, for which he gains second place, is a powerful piece of work. W. J. Byrne, Richmond, shows some first-class work, his frame *Studies of Children*, in red chalk carbon, being particularly effective. C. M. Wane, Edinburgh, has some good work, and George B. Cowen sends "An Old Book."

Class F. (Amateur, Landscapes or Seascapes) is the largest class in the Exhibition, and, while it is true many of the pictures are not up to exhibition standard, yet the quantity of really good work submitted is highly creditable. C. S. Baynton, Birmingham, in *Whitby*, has an exhibit that is sure to attract much attention; it is a gum-bichromate print of a greyish colour on very rough paper. To the left are a couple of fishing boats; the rest is lost in a dense mist. As an example of the "fuzzy" type of picture it is one of the best we have seen; the method of work is suited to the subject, and the whole effect is striking in the extreme. It shows that it is possible, in spite of the many absurd productions shown by the fuzzy school, to really make a picture that does not offend the eye, although out of focus, with an out-of-focus feeling; it does not jar on one, rather the reverse, and the "fuzziness" is not thrust upon one. The frame is particularly suitable. *Market Day—Returning Home*, by Viscount Maitland, reflects much credit on the artist; it is an evening effect taken against the setting sun, with strong cloud effect, and the light from the sky reflected off the flock of sheep in the foreground. The tone of the picture may seem too dark for some, but it is quite in keeping with the subject. W. Smedley Aston, Birmingham, has a showy exhibit, and takes first place with *An Autumn Evening*, one of those low-toned evening effects. *'Twixt Day and Night*, by W. Grant Murray, a member of the local association, is sure to attract much attention; it is a large panel picture of a brick-red colour in gum-bichromate. The colour is perhaps a little loud, but the arrangement of the lines of the picture are excellent, and the effect is vigorous and striking. *Against the Stream*, by Clifford Young, London, shows a cheery, open-air effect, giving a desire for the breezes of the seaside; his *Street in Old Cairo* shows good technique, and Eustace Young's *Beneath the Palm Trees* is an admirable rendering of the clear atmosphere of an Eastern day. Houses, as a rule, are a difficult subject to treat artistically, but Miss Christian H. Cuile, Melrose, in *Mentone Harbour*, has obtained a good, clear, sunny effect, without losing the artistic feeling; and for her *Melrose Abbey*, a charming winter view of the old abbey, she has obtained the bronze medal. The old ruin in *An Irish Burial*, by John A. Courts, Cupar Fife, is singularly in keeping with the little band of mourners. His *A Moorland Cottage* is a charming little picture, and is commended. Amongst other prominent exhibitors in this class are Messrs. W. F. Slater, Camberwell; C. F. Inston, Liverpool; G. J. T. Walford, London; W. J. Croall, Edinburgh; Viscount Maitland; W. Boden, Derby; J. Kearney, junr., Liverpool; Henry Troth (commended) Philadelphia; and Mrs. Welford, London.

Class G. (Amateur Figure Studies and *Genre*) is also a large class. W. Smedley Aston takes first place with a powerfully rendered old head, entitled *A Philosopher*. In *Meditation* (commended) a local exhibitor, W. Grant Murray, makes a notable exhibit. The picture shows a most artistic head, in gum bichromate, of a good colour, with an original frame, in splendid keeping with the picture. *Choirmaster*, by J. E. Dumond, Rochester, U.S.A., is one of the most striking character studies in the Exhibition. It represents an ecclesiast with violin, evidently conducting his choir (there is only the choirmaster shown), using his bow as a baton. The lighting is strong, with perhaps a tendency to hardness, but the whole forms a striking picture. Clifford Young's *Water-carriers* is noticeable for the artistic treatment of the palms in the background; the figures are well posed. *A Fisher Maiden*, by C. S. Baynton, is a splendid object lesson, and the graceful treatment of hands a rather rare accomplishment. *A Bacchanti*, by Viscount Maitland, is a picture of outstanding merit, artistic in feeling and refinement, and peculiarly happy in the treatment of the hair. *Mending Nets*, a gum-bichromate photograph on Michallet paper, by C. S. Baynton, is perhaps the finest *genre* picture in the Exhibition, but is spoiled by the abrupt ending of the lines of the boat. He is more successful with *The Last Load*, a long narrow picture, full of atmosphere, with which he gains second prize. *My Boy*, by A. Geekie, Coupar Angus, is also recommended.

Class H. (Amateur hand-camera work, Moving Figures) is not such a large class. Dr. E. G. Boon, Allasio, Italy, takes first place with a charming little print of *Pasturing in the Olive Yard*, in which the light and shade are charmingly rendered. In *The Mistral Threatens* (commended) he shows some men and women drawing ashore a fishing boat; it is a breezy little picture, and the action of the figures is capital; he has also a good picture in *Italian Bathers and Chums* by W. J. Croall, Edinburgh—a capital incident, the action of the "moke" and the boy being well shown. *A Stiff Climb* by Eustace Young, Blackheath, is an enlargement of a party climbing a snow-clad mountain, the texture of the snow is exceptionally well rendered; sure to be a popular picture. Some rapid shutter work by R. C. Ryan, Brighton, merits attention, the technique being excellent. R. Burnie, Glasgow, has two excellent studies of lions, *Forty Winks* being the more noticeable and indicating the great strength of the brutes, perhaps the fore shortening is a little too pronounced; they certainly show a very great improvement on prints from similar negatives that he exhibited at Glasgow; second place is taken by *The Lonely Alcove*, a very good picture by J. Kearney, junr., Liverpool, in a low key with *A Wet Day*; C. F. Inston, Liverpool, deservedly takes a commended ticket. The Members' Class is a very creditable show for such a young association, and contains not a few creditable pictures, the more noticeable exhibitors are Mr. W. Grant Murray (first prize), and the President, Mr. A. Geekie (second prize). The section "for exhibition only" has a wall reserved for work sent from Mr. Craig's Annan's firm; his *The Church and the World* is here exhibited, it is so well known that description is unnecessary, but it has attracted very considerable attention, mainly, perhaps, for the painter-like quality of the work, if we may so describe it; W. J. Byrne, Richmond, shows a frame of those *Studies of Children*, associated with his name; C. M. Wane exhibits some frames of his instantaneous work at Athletic Sports, at which work he is an acknowledged master. There are three *genre* pictures by the late Robert Terras, whose decease robbed Scotland of one of her best *genre* workers; J. Watson Craig has two lovely flower studies, and the local photographers, D. Milne and Son, exhibit some good studio work, *Miss Chrissy Shaw* being, perhaps, the best of these. The lantern slides Classes B. (Champion) and C. show some very good work.

News and Notes.

MR. ADOLPH LANGFIER, late of the firm of Bender & Langfier, Croydon, has removed to 494, High-road, Brondesbury, N.W.

THE Birmingham Photographic Company, Limited, have removed to new premises at Criterion Works, Stechford, near Birmingham.

THE AUSTIN-EDWARDS MONTHLY FILM-NEGATIVE COMPETITION.—The prize camera for the current month has been awarded to Miss Nellie Fordham, 4, Foster-lane, E.C., for her negative, *Group of Apples*.

PHOTOGRAPHIC CLUB.—Anderton's Hotel, Fleet-street, E.C., Wednesday evening, January 26, 1898, at eight o'clock, the Annual Lantern and Musical Entertainment (Ladies' Night). An excellent programme is being arranged, and will include a selection of animated photographs by Mr. R. R. Beard's cinematograph.

IN a memoir presented to the Paris Academy of Sciences, M. Yvon directs attention to the fact that pure alcohol does not exercise any action on calcium carbide; but the presence of even a trace of water leads to the production of acetylene, and that therefore it is comparatively easy to obtain absolute alcohol from spirit of 90 per cent. strength. Possibly the calcium carbide may be found useful in abstracting water from other substances.

THE following are the relative costs for equal illumination in New York city (as revised by Professor D. S. Jacobus) at sixteen candle power per hour. For the incandescent electric light it is 1 cent; gas, for the ordinary burner, at 1·25 dollar per thousand, 0·5 cent; the Welsbach, 0·17 cent; acetylene, calcium carbide, at 40 dollars per ton, 0·5 cent. The price of calcium carbide for domestic light, to be as economical as kerosine at 8 cents per gallon, would have to be 45 dollars per ton, or 6½ cents per pound of liquid acetylene.

ANIMATED PHOTOGRAPHY IN PUBLIC STREETS.—The latest development of the animatograph, or cinematograph, is its adaptation to the hoardings in public streets, secured for the purposes of advertisement. King's-cross was the place selected on Monday night last for the illustration of the new development, at which point neither the crowd nor the unusual lights could be supposed to add to the danger of traffic, even in a fog. The illustrations were highly attractive, and certainly occasioned no disorder.—*Daily Chronicle.*

A DISTRICT fresh to English holiday-makers, and reached as easily as the Ardennes, will be opened up in *New Walks by the Rhine*, by Percy Lindley, whose *Walks in the Ardennes* and *Walks in Holland* did so much to popularise new Belgium and Dutch touring grounds. Starting from the Rhine mouth at the Hook of Holland, *New Walks by the Rhine* will cover the picturesque wooded and rocky side valleys of Rhineland, from the Ahrthal, near Cologne, to the Neckarthal and the "Blue Alsatian Mountains" of the Vosges, and will include the districts of the Taunus, Eifel, Odenwald, Hunsruck, and the Palatinate. Living is said to be as inexpensive in some of these districts as in the Ardennes. Mr. J. F. Weedon will supply the illustrations.

ON Friday, the 14th inst., the Eastman Photographic Materials Company asked Mr. Justice Romer to declare that the registration of the word "Kodak" for cycles by the John Griffiths Cycle Corporation, Limited, was improper, and that the register might be rectified by expunging the trade mark. Mr. Moulton, Q.C., stated that the plaintiffs were known all over the world as the makers of the Kodak portable camera, and they made accessories whereby the cameras could be attached to bicycles. The John Griffiths Cycle Corporation recently formed a Company, called the Kodak Cycle Company, which had a capital at present of only 100*l.*, and there could be no doubt whatever that the word Kodak was taken from the plaintiffs. It was not registered in the same class as the plaintiffs, but the Court did not consider solely the question of class in which a previous trade mark was registered, or the goods for which it is registered. In the present case the use of the word by the defendants would lead the public to believe that the bicycles were connected with the plaintiff Company, either that they were selling them or that they were made specially by arrangement with them. For the defence, Mr. Walter stated that the Registrar's attention was called to the fact that the word Kodak was used for cameras, but that it could not be used for cycles. The Registrar ordered the application to be advertised, and, on no opposition being offered, allowed the registration. A number of affidavits were filed, among them being one by J. W. Stocks, a Director of the Kodak Cycle Company, of Queen Victoria-street, E.C. Having regard to the importance of the matter, his Lordship ordered the motion to go into the non-witness list, to come on at an early date for argument.

THE RÖNTGEN SOCIETY.—This Society met on January 11, at 11, Chandos-street, under the presidency of Professor Silvanus Thompson. A paper was read by Mr. W. Webster, F.C.S., on *Practical Work with the X Rays.* He first dealt with the question of the best apparatus to use, and pointed out the value of primary batteries. Overcharging the battery did no harm under certain conditions. He described the dynamos and chemicals that had better be used, and different methods for avoiding failures. The batteries which he showed had been working for eighteen months, which was a very fair test. The best coils were of English manufacture, and he used a twenty-inch coil, which gave a twenty-inch spark, and which, with a pneumatic attachment, worked admirably. Mr. Webster then pointed out how much had been done by Sir William Crookes and Mr. Jackson, and remarked that Professor Röntgen had merely put the finishing touch to their discoveries. He showed the tube which had been made by Mr. Jackson in 1894, and with which he had demonstrated that wood and other materials were pervious to certain rays. He had found an improvement to prevent the spark from passing round the bowl of the tube, and thus lessening the danger of perforation. By heating the tube and starting with a small spark he was able gradually to produce the effect he wished, and had thereby saved the lives of many tubes. The bulb of the tube should not be very large, as, the larger it was, the more difficult the tube was to condition, and the greater were the number of accidents. An aluminium cover for the cathode tube was an advantage, and a protector of sheet iron was useful for saving the hands from the effect of the rays. The effect of the rays varied very much with different subjects. In the case of one patient, whose head was photographed, a patch of his hair first turned grey and then came out, and he was not grateful to the rays; however, the hair had grown again afterwards of the original colour. In other cases, however, the pain in the injured or diseased part had entirely ceased after five or six minutes' exposure to the rays. Anæmic subjects were the best to photograph, while gouty subjects were particularly difficult. To produce good negatives, considerable experience in photographic development was necessary, especially in the production of cloud negatives. The lecturer also showed the working of the rays, and the audience were enabled to examine their hands and other limbs in a state of transparency. Afterwards a series of photographs were shown on the screen, giving proof of the manner in which the art had progressed in a very short time, the clearness of the pictures being much increased, while the time of exposure has been greatly diminished.

PHOTOGRAPHIC EXPORTS.

COMPILED FROM THE CUSTOMS ENTRIES.

December, 1896.

	£		£		£
Adelaide	265	Brought forward	4187	Brought forward	7532
Algoa Bay	27	Falkland Isles	14	Penang	111
Amoy	31	Flushing	422	Perth	69
Amsterdam	46	Freemantle	316	Port Elizabeth	272
Auckland	120	Ghent	126	Rangoon	87
Bangkok	287	Gothenburg	10	Revel	18
Bilbao	30	Halifax	50	Rosario	8
Bombay	1047	Hamburg	241	St. Vincent	12
Boulogne	207	Hiogo	30	Salonica	13
Brisbane	144	Hong Kong	71	Shanghai	307
Buenos Ayres	32	Kurrachee	47	Singapore	511
Calcutta	558	Lyttleton	49	Stockholm	24
Canterbury	92	Madras	255	Sydney	1799
Cape Town	727	Malta	16	Tokio	13
Christchurch	25	Mauritius	63	Townsville	7
Christiania	30	Melbourne	1417	Trinidad	56
Colombo	68	Mossel Bay	12	Wellington	176
Delagoa Bay	27	Napier	28	Yokohama	271
Durban	190	Oporto	26	Zanzibar	6
East London	234	Otago	152		
Carried forward	4187	Carried forward	7532	Total	11,292

December, 1897.

	£		£		£
Adelaide	112	Brought forward	3676	Brought forward	6273
Amsterdam	78	East London	23	Otago	21
Auckland	350	Falkland Isles	19	Perth	152
Bangkok	243	Flushing	81	Port Elizabeth	394
Berbice	10	Freemantle	272	Rangoon	51
Boca	30	Ghent	43	Rio Janeiro	15
Bombay	1146	Haiphong	22	St. Petersburg	305
Boulogne	297	Halifax	50	Shanghai	335
Brisbane	167	Hamburg	243	Singapore	33
Buenos Ayres	134	Hiogo	29	Sydney	1509
Calcutta	404	Hong Kong	126	Trinidad	12
Cape Town	302	Lisbon	30	Valencia	112
Christchurch	37	Lyttleton	75	Wellington	30
Colombo	24	Madras	80	Yokohama	626
Delagoa Bay	15	Mauritius	28	Zanzibar	12
Dunedin	65	Melbourne	1390		
Durban	257	Natal	86	Total	9880
Carried forward	3676	Carried forward	6273		

Patent News.

THE following applications for Patents were made between January 1 and January 8, 1898:—

CAMERAS.—No 11. "Improvements in Photographic Cameras." A. J. E HILL.

CINEMATOGRAPHS.—No. 72. "An Improvement in Cinematographic Apparatus." B. ACRES.

PRINTING PRESSES.—No. 95. "An Improvement in Photographic and Typographical Printing-frame Presses and Machines." C. D. HARRISON.

CAMERA REST.—No. 262. "An Improved Stand or Support for Viewing Processions and the like, applicable also for use as a Walking Stick, Umbrella Stool, Hook Crutch, Door-fastener, Pick Rest for Camera Bicycle, and the like." Complete specification. A. RUST.

FRAME STRUT.—No. 303. "Strut (or support) for Photographic Frames or other purposes." C. WALLS and H. BOYNETT.

CAMERAS.—No. 345. "Improvements in Photographic Cameras." J. B. LANE and C. H. WATSON

WRAPPERS.—No. 415. "An Improved Wrapper, particularly adapted for the Transmission of Photographs and the like through the Post." L. CANESI

ANIMATED PHOTOGRAPHY.—No. 441. "Improvements in Animated Photograph Machines." H. H. MOON.

ANIMATED PHOTOGRAPHY.—No. 442. "Improvements relating to Animated Photograph Machines." W. J. H. JONES.

PHOTO FRAMES.—No. 454. "Decorative Pallet Frames for Photos, Almanacs, Firescreens, and the like." T. GEORGE and F. RAUPACH.

ENLARGING CAMERAS.—No. 499. "Improvements in Negative-enlarging Cameras and Cameras for Printing from Negatives or Transparencies." Communicated by H. Stender and H. P. Ware. W. P. THOMPSON.

MOUNT.—No. 539. "A New or Improved Duplex Photo Mount." M. PEARLMANN.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

January.	Name of Society.	Subject.
24	Bradford Photo. Society	*Negative-making.* Chapman Jones, F.I.C., F.C.S., F.R.P.S.
24	Camera Club	*Mirage.* Major P. A. MacMahon, R.A., F.R.S.
24	Richmond	*The Capabilities of Pyro-soda Development.* B. E. Edwards.
24	Stafford Photo. Society	Prize Slides.
24	Wakefield	Exhibition of Members' Slides.
25	Birmingham Photo. Society	*Through Burns' Land and Galloway.* W. Meikle.
25	Brixton and Clapham	*Portraiture.* Harold Baker.
25	Hackney	*Light and Colour.* E. J. Wall.
26	Camera Club	Club House Dinner.
26	Coventry and Midland	*Denmark* or *Brittany.* H. Sturmey.
26	Croydon Camera Club	Platinotype Printing on Fabrics and on Paper.
26	Kingston-on-Thames	Social Evening with the President.
26	Leytonstone	*A Simple Photo-micrographic Apparatus.* E. E. Hill.
26	Photographic Club	Annual Lantern and Musical Entertainment: Ladies' Night.
26	Shropshire	Prize Slides.
26	Southport	*Enlarging with "Koresco."* J. R. Cave.
27	Camera Club	*Bird and Lizard Life in Australia.* W. Saville-Kent, F.L.S., F.Z.S.
27	Ireland	*Stray Wanderings with the Camera.* James Simpson.—*A Tour through the Co. Kerry* R. M. Inglis.
27	Liverpool Amateur	*The Invasion of Mona, or the Campaign of Easter, 1897.* E. Rimbault Dibdin.
27	London and Provincial	Open Night.
27	Manchester Amateur	Lantern-slide Testing Night.
27	Oldham	*From the Black Forest to the Tyrolese Alps.* G. Hidderley.
27	Woolwich Photo. Society	*Exposure and Development.* C. Churchill.
28	West London	*Photo-microscopy.* F. L. J. Barrow.
28	Wolverhampton	Lantern Evening: Prize Slides.

ROYAL PHOTOGRAPHIC SOCIETY.

JANUARY 18,—Photo-mechanical Meeting,—Mr. T. Bolas, F.I.C., F.C.S., in the chair.

RESTORATION OF FADED PRINTS.

The Rev. F. C. LAMBERT said he was engaged upon a series of experiments in connexion with the restoration of faded silver prints, and asked to be furnished with any valueless prints in that condition in order that he might pursue his investigations. He passed round for examination some photographs which had been cut in two and remounted, to show the effect of the restoration, one half remaining in the yellowed and faded state, while the other half had been bleached by immersion for some time in a dilute solution of mercuric chloride, and then redeveloped or darkened by treatment with hydroquinone or some other agent.

THE GUM-BICHROMATE PRINTING PROCESS.

Mr. Lambert referred to the recent revival of gum-bichromate printing, and showed some examples upon rough and smooth-faced paper, with a view to controverting the assertions which had been made to the effect that by that process it was impossible to obtain other than a smudgy result. He said it had been held that only a very soft negative was suitable for gum-bichromate printing, but he had been endeavouring to alter the nature of the bichromated film to suit the negative, and to render it possible to produce good prints even from a very hard negative.

The CHAIRMAN said that the idea that this process could only yield smudgy prints was absolutely without foundation; the specimens shown by Mr. Lambert appeared to possess a complete scale of gradations, though within narrow limits. In 1878, when he gave a course of lectures at the Society of Arts upon the bichromate processes, Mr. Foxlee lent some examples of gum bichromate, in which the half-tones were perfect.

The HON. SECRETARY said he had received a letter from M. Demachy, expressing his willingness to read a paper to the Society upon this subject at an early date, and adding that the foremost Parisian artists had taken an interest in the process, although they had never troubled themselves about other photographic methods, a fact which M. Demachy considered showed that painters were not opposed to photography *qua* photography, but only to the average photograph.

COLOUR PHOTOGRAPHY.

Mr. W. GAMBLE exhibited a dark slide, which he believed to be the first made commercially in this country for obtaining colour photographs by Professor Lippmann's process. It consisted, in effect, of an ordinary quarter-plate book-form double back, one half of which formed a tank for containing mercury, which was stored in a bottle of iron or steel held in clips outside the slide, from whence it was conveyed by an indiarubber tube to the tank, and into contact with the surface of the sensitive plate. The details of the apparatus were fully described, and it was passed round for examination.

The ASSISTANT SECRETARY remarked that he had not seen a photograph by this process in which anything like the area of a quarter-plate was effectively utilised, the edges, even in examples only half quarter-plate size, being always very imperfect; the colouring, in fact, seemed to be only true in the area of the plate immediately opposite the opening of the lens, where the rays fell practically at right angles to the sensitive plate.

Mr. SANGER SHEPHERD said that, by reason of the nature of the emulsion used, the detail was so fine that the degree of enlargement was much less restricted than with an ordinary plate of coarser grain. He had found it necessary to purify the mercury after each exposure, as markings were caused on the plate if the same mercury was used repeatedly.

The CHAIRMAN thought Dr. Neuhauss had suggested that both the mercury and the tank should be cleaned after use.

Mr. GAMBLE next referred to Dr. Joly's process, and showed in the lantern the "taking screen," of alternate lines of orange, yellowish green, and blue; the "viewing screen," of red, green, and violet lines; a stand for viewing the positives on a table; a specially constructed album for containing the positives or ordinary lantern slides; and a number of slides were projected. He stated that Dr. Joly had taken out patents for extending the principle to colour printing, either by laying down a monochrome print on white paper and printing transparent coloured lines over it, or by having the paper printed with coloured lines and printing the monochrome upon it. Proceeding to a consideration of

THE THREE-COLOUR PROCESS.

Mr. Gamble thought that, although very little advance had been made in the method, very great progress had been attained so far as results were concerned. The making of the three negatives on three differently sensitised plates seemed to him to be illogical and wrong, though this was the method suggested by all authorities except Mr. Ives. The scientific plan, obviously, was to to have a plate sensitive to the whole range of the spectrum, and to cut out by means of colour-filters the portions to be respectively impressed on the three negatives. With regard to the ruled screen for making the colour-block negatives, the matter of angle was very important; any crossing at an angle less than 45° produced objectionable patterns, and the best patterns were within a range of 10° from 30° or 60°, reckoning within. On examination of several colour-prints, he found the following crossings adopted by four leading firms, English, Continental, and American: — (A.) blue, 65°; red, 115°; yellow, horizontal; (B.) blue, 65°; red, 130°; yellow, 10°; (C.) blue, 65°; red, 130°; yellow, 10°; (D.) blue, 75°; red, 110°; yellow, horizontal. He recommended workers not to be in too much haste to order large and expensive screens and odd rulings, for finality in the matter of screens had certainly not yet been reached; it was, moreover, doubtful whether the cross-line screen was really suitable for three-colour rendering, for it was known to cut off a considerable range of gradation compared with the original. The ideal screen, in Mr. Gamble's opinion, was the chess-board pattern, several varieties of which had lately been patented by Mr. Max Levy, who claimed that with such a screen it would be possible to make a negative on a dry plate, possessing approximately the same printing qualities as the best wet-collodion negative now produced with the cross-line screen, and more of the delicate gradations of light and shade of the original.

The several points touched upon by Mr. Gamble were conversationally discussed as he raised them, and, at the conclusion of the formal meeting, some positives by Dr. Joly's process were exhibited in a table instrument under the illumination of an electric arc lamp.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 13,—Mr. G. W. Atkins in the chair.

LUNAR PHOTOGRAPHY.

Mr. E. W. Parfitt passed round some photographs of the moon, and showed a piece of apparatus he used for making his exposures in this work. It was fitted with a small eyepiece with which to focus the image sharply upon the screen, and carried in a sliding arrangement the ground glass and the sensitive plate, which latter was a third of a quarter-plate in size. Having focussed the image, the telescope is capped and the slide drawn, bringing into register one end of the plate; the exposure is then made, after which a second photograph can be made upon the other part of the plate, each plate forming two distinct negatives. Some of these photographs were shown in the lantern, an excellent enlargement from one of them being much admired.

PERMANENCE OF GELATINO-CHLORIDE PAPERS.

Mr. BARKER said it was generally believed that gelatino-chloride prints were not permanent and liable to fade, but to show that this was not necessarily the case, he had brought up a number of early examples of this process, which certainly were not to be included under that verdict. These were made with the original formula, and dated back to 1885, one very early specimen having been made in 1880. He also showed samples of three commercial papers, each of which had apparently different keeping qualities. One was from the first batch made by the Ilford Company, which was useful still, but the others were not nearly so good.

Mr. A. MACKIE, in connexion with this subject, said that some prints he had made on matt chloride paper, and toned with platinum, were much colder in colour now than when first made, although they had not faded, in the ordinary sense of the word, at all, being as brilliant as ever they were.

Mr. E. H. BAYSTON asked whether Mr. Barker had noticed that paper from the first batch made by the Ilford Company reversed in the deep shadows, that is, instead of bronzing over, they grew lighter again. He drew attention to the matter at the time, but never saw the peculiarity again.

Mr. BARKER had not absolutely met with such an occurrence, although he had heard of it. As regards the keeping qualities of this paper, they were at their worst when exposed to the air, but when kept under a weight were much improved, and the best way was to keep the two faces together and under heavy pressure.

Mr. Mackie passed round a print on paper taken from a packet of fifty cabinet pieces, and that only six months old, which it could be seen had gone badly enough.

Mr. Kellow exhibited a negative, which was an instance of the light penetrating the celluloid shutter of a changing box in which the plate was stored. An image of the tripod screw, which rested upon the shutter, was plainly impressed upon the plate.

Mr. THOMAS inquired whether the yellow prussiate of potash and sulphocyanide of ammonium were included in the list of restricted poisons? The

matter was one of considerable interest to dealers in photographic materials, and there seemed to exist some difference of opinion on the matter.

It was mentioned that the catalogue of restricted poisons included all the metallic cyanides, and a discussion ensued on the legal aspects of the sale of these chemicals.

The HON. SECRETARY read a paper, contributed by Mr. W. T. Wilkinson, of Wakefield, on the subject of

PAPER NEGATIVES [see page 41].

Mr. A. HADDON considered that this form of sensitive material would be far superior to celluloid films for travellers, as many could emphasise from experience of the shortcomings of the latter support. He did not anticipate any ill effect from the fact that paper would more readily absorb moisture, as he took it that it was not the moisture which exercised the disturbing influence, but the celluloid itself.

Mr. BARKER mentioned that Mr. Warwick Brookes used to duplicate his negatives by reproducing them upon paper. He believed his procedure was to take a positive, and from that print off in albumen paper the required number of negatives, which, untoned, were sold and used as were ordinary negatives. The method should be one to recommend itself to professionals when large numbers of prints were required.

It was stated that Mr. Valentine Blanchard adopted a similar method of making enlarged negatives on albumenised paper.

Mr. E. BANKS, in reply to an observation as to the grain of the resulting paper negatives, said that Wellington & Ward recommended a momentary exposure of the back of the paper to light as a means of obviating any such appearance.

Some discussion took place upon the best means of supporting negative paper in the ordinary dark slide, and a vote of thanks was passed to Mr. Wilkinson for his communication.

PHOTOGRAPHIC CLUB.

JANUARY 12,—Open Night,—Mr. Frank Haes in the chair.

Mr. J. R. WILLIAMS called attention to a formula for the collodio-albumen process, in which one of the items was given as a "small cake of iodine," and inquired what constituted a small cake.

No definition was forthcoming, and the general opinion of the meeting was to throw doubt on the practicability of the instructions.

Mr. E. CROFTON, wishing to try the hydroxylamine developer, which he had seen stated to be without staining properties in the slightest degree, had procured some, but found no instructions for its use. He could not succeed in making more than a one and a half per cent. solution of the stuff, and although he had not done anything in a developing way so far, he found that a few crystals left out in the open had not apparently altered at all.

A discussion took place upon the possibility of purchasing right out any of the different plate-makers' machines; and it was generally questioned whether this could be done, but that some royalty would be demanded such as in the case of a small maker, to make it a hard job for him to succeed.

MANCHESTER PHOTOGRAPHIC SOCIETY.

JANUARY 13,—The President (Mr. J. Wood) occupied the chair.

Mr. A. E. CASSON proceeded to give a demonstration on the subject of

ENLARGING BY MEANS OF INCANDESCENT GASLIGHT.

He first of all described his method of working and his apparatus, which he had kindly brought to the rooms. He said that the developer he liked best was amidol, made according to the following formula:—

Amidol	50 grains,
Sodium sulphite	650 ,,
Water	20 ounces,

with a few drops of potass. bromide solution, ten per cent., added before development. After development, the prints should be fixed in two separate fixing baths, especially if they are to be toned afterwards. Two enlargements were then made on Eastman's royal bromide paper, a new toned paper with a rough surface, well suited to some subjects. In front of the paper, and in contact with it, Mr. Casson fastened a piece of "bolting" silk, which the Eastman Company had provided, and which gave to the picture an etched appearance. The Eastman Company kindly lent a number of bromide prints and enlargements on the different kinds of paper and of various tones, which were much admired by the audience.

After Mr. Casson had developed the enlargements he had made, Mr. H. WADE, who was announced to demonstrate on

HOW TO OBTAIN WARM TONES ON BROMIDE PRINTS,

proceeded to tone them, first of all describing the two processes which he intended to use. The first one was that in which uranium nitrate was the toning agent, and he said that most of the difficulties met with in this process were due either to the neglect of precaution in the preparation of the original print, or to the use of too strong a toning bath. It was essential that all traces of hypo should be eliminated, and the print well washed before toning. The bath he used was made according to the formula of Mr. Welborne Piper, and is as follows:—

Stock Solutions.

A.

Uranium nitrate	1 part.
Acetic acid	1 ,,
Water	60 parts.

B.

Potass. ferridcyanide	1 part.
Water	60 parts.

C.

Ammon. sulphocyanide	1 part.
Water	20 parts.

Mr. Wade said that it was advisable to use a weak bath, as purer tones were obtained. The following is the strength he recommended:—

Take of A, B, C, of each	1 part.
Water	48 parts.

The other process was that published by the Eastman Company for use with their new royal bromide paper. The print may be developed with any developer, but carried a little farther than usual, as the bath reduces the image somewhat. The formula is:—

Hypo	10 ounces.
Alum	1 ounce.
Water	80 ounces.

A metal dish is the best to use for the purpose, as the solution has to be used at a temperature of about 120 degrees, as this is the temperature required to produce toning. When the colour required is obtained, the print is well washed, and by this treatment is said to be absolutely permanent. Mr. Wade then toned several prints by each of these processes, and showed what a variety of tints could be obtained.

The meeting then came to a close, all those present having heard and seen two very instructive and interesting demonstrations.

Camera Club.—The Camera Club, at its usual Thursday evening meeting last week had two subjects before it, both of which were of some interest. First came a paper by Mr. Player, read in his absence by the HON. SECRETARY (Mr. Godfrey). This consisted of some further observations of the method published some time ago of copying prints and drawings without the help of a camera, by what is known as the absorption process. As brought before public notice in the first instance, this process was merely interesting as a scientific curiosity, and the results shown were certainly far inferior to the general run of camera work. Now, however, Mr. Player has been experimenting, and has made great improvements in the method of working, and the specimens shown, many of which are still hung on the wall of the Club-room, are certainly worth attentive study. In some instances they are really excellent, and prove what accurate copies can be obtained of pen-and-ink drawings, pencil sketches, &c., without the help of camera or lens. Mr. Player's *modus operandi* is as follows: The drawing or engraving to be copied is placed face upwards on a sheet of plate glass, the glass merely acting as a support, which will ensure close and even contact. Then, in red or yellow light, a piece of smooth bromide paper is laid face down on the drawing; above that are placed two sheets of plate glass, and on the top of the upper sheet a piece of green pot-metal glass. With a triple gas light, such as is used for billiard tables, fifteen inches above the ground glass the necessary exposure is from five to ten minutes. It will be understood that the engraving and the sensitised side of the bromide paper are in contact, and that the latter is uppermost. After exposure, the bromide paper is developed in the ordinary way, and presents a negative image, which in turn will yield a positive by any process desired. The green glass plays an important but little understood part in the work, and gives far better results than glass of any other colour. It can be replaced by green gelatine, such as is used in ornamenting Christmas crackers. Gaslight seems to be the only form of illumination which Mr. Player has yet employed, and it would be interesting to know what modifications might be necessary if the electric arc were used. A short discussion followed the reading of this paper, and Dr. LINDSAY JOHNSON, in summing up, which as Chairman was his particular province, related an interesting experience which he had had a few years ago, which seemed to have a bearing upon the matter in hand. Taking a negative which showed extreme contrast of black and white, he placed it in a printing frame above a piece of ordinary writing paper, with the object of ascertaining whether the latter, after exposure to sunlight, would afford any evidence of phosphorescence. [It will be remembered that, many years ago, Becquerel devised a machine which he called a phosphoroscope, which was intended to show that most substances will retain light for a certain time after insolation. An engraving of this contrivance will be found in Ganot's *Physics*.] After a somewhat long exposure Dr. Johnson took the plain paper into his dark room, and found upon it a distinct positive image, which persisted for some time, showing that the paper had absorbed the light, and was capable of giving it out again. If we remember rightly, much the same effect has often been obtained by placing a door key on a sheet of paper in the sun, and quickly removing it to a dark room, when a spectral key is seen on the paper for some time afterwards. After a somewhat desultory discussion, the subject was dismissed, and Dr. CHARTERS WHITE was called upon by the CHAIRMAN to give his promised paper on

MICRO-CRYSTALLOGRAPHY.

The lecturer said that nothing seems to be known on this subject, and, although he had searched through the usual channels, he could find but little about it. Ordinary crystallography had, of course, quite a literature of its own, but the method which he was about to describe, by which the interesting process of minute crystallisation could be watched under the microscope, clothed in the most gorgeous raiment, by the aid of polarised light, seemed not to have attracted the attention of English writers. He would not go into theoretical matters, but would simply describe the method which he adopted to get the remarkable effects which would presently be seen upon the lantern screen. He took a drop of a more or less saturated solution of a certain salt, and placed it on a slip of microscopic glass. According to the pitch of saturation, to the temperature of the surrounding air, the amount of moisture it contained, as well as upon other conditions, is the appearance of the result obtained. His first experiments were made with hippuric acid in methylated alcohol, and he found that by alternately heating and cooling the glass upon which the solution rested, striæ were formed. At first one observes only a few spots appearing under the microscope, and these gradually increase in size, and can be modified in innumerable ways by blowing or breathing upon the glass. The atmospheric conditions seemed also to affect the ultimate form in which the crystals grouped themselves, and variations could also be induced by causing the salts to crystallise in coal gas, ammonia, and vapour of burning sulphur

&c. Hippuric acid, however, gave, whatever the treatment, crystals in which the circular form was predominant. Next he would direct attention to the beautiful crystals formed by a saturated solution of hydroquinone in acetone, which were characterised by fine tones and exquisite foliations. Peculiar modifications could be obtained by first covering the glass upon which the crystals were ultimately formed with a layer of gum arabic dried. Potassic bichromate also gave good effects when mixed with a solution of gum and dried slowly, so that the crystallisation process was protracted. With this preface the lights were turned down, and a variety of slides were shown upon the screen, the first being a silver tree, formed by putting the snipped-off point of a pin in a drop of silver nitrate solution. A very curious effect was produced by drawing a small toothcomb across and across a slide upon which hippuric acid was crystallising, the surface being cut up into squares, and each square containing a foliated pattern. Some of the slides shown elicited much applause, not only because of the beauty of the crystallisation, but also because of their merits as photo-micrographs. Dr. Charters White concluded his remarks with a practical demonstration, preparing slides and placing them in microscopes under polarised light, so that the audience, in twos and threes, could see the crystals glowing with the most beautiful colours. The lecturer confined himself to the production of beautiful designs by this method, and ventured to think that it would be found valuable to the decorative artist and the designer. He made no allusion to the possible application of this system of observing the formation of minute crystals to analytical purposes. We believe that much attention is being now directed in Germany to this phase of the subject. But the lecturer has certainly done a good service in showing photographers what beautiful effects are possible with very simple apparatus to the possesser of a microscope.

FORTHCOMING EXHIBITIONS.

1898.	
January 21, 22	Blairgowrie International. Hon. Secretaries, T. C. Gorrie, Rattray, and J. B. Maclachlan, Blairgowrie.
,, 29–Feb. 26.	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
January–February...	Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
March 5–12.....	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30	National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,, 27–May 14.....	International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PHOTOGRAPHING ON WOOD.

To the Editors.

Gentlemen,—I was rather surprised at your reply to "H. J." in the last issue of the Journal, as the process about which he is asking for information is looked upon here as almost the only practicable one, and it is undoubtedly the cheapest and the quickest, as it is quite possible to copy a drawing or photograph and transfer to wood inside of twenty minutes.

The procedure is as follows: Procure some glue of good quality, and soak for a day or two, then pour off the water and melt in a water bath; dilute the glue with an equal bulk of water, and boil for a half hour or so; now add glycerine in the proportion of one drachm to every two or three ounces of solution, this will prevent it setting hard; stir well, and add a drachm or two of ammonia, and put by to cool; also prepare a strong solution of gum arabic.

The collodion positive must be made on well-cleaned glass without any substratum.

Now, to transfer the film from the glass to the wood block, place in the centre of the block a little vegetable black (which must be very soft and free from grit), now sprinkle with a few drops of water, mix well together, and spread evenly over the surface with the fingers (brushes or pads are no use), and allow to dry. Now take a little of the glue, which must be quite cold, and about the consistency of a stiff jelly, and rub well into the block, also with the fingers; smooth off and allow to dry, when it should possess a slightly shiny surface; if it is dull, it should have another coating of glue.

Now take a piece of paper, which should be about the same strength that is used to print the Journal upon, and coat it evenly with a mixture of glue and vegetable black. Rub well into the paper, then follow with a thin coat of the gum solution, and squeegee in close contact with the previously dried collodion film with a roller squeegee, and in a few seconds the film can be stripped off the glass, the black coating of the paper making the photograph easily visible. Cut away all surplus paper of film with a pair of scissors, and, if the block is quite dry, place the transfer in a dish of clean water for a few seconds only. Meanwhile, with a flat camel's-hair brush, slightly wet the coated surface of the block, place the transfer, face down, in position, another piece of paper on top, and squeegee vigorously. Now clean the surface of the block with a soft sponge and water, and hold face down over a gas stove until the moist surface of the paper is warmed through but not dried. Now turn up one corner of the paper with a penknife, and it can be easily pulled away, leaving the film on the black. Now thoroughly clean away all traces of the gum and black with the sponge and clean water, and stand on edge to dry.

You will now get a photograph on the wood that will not chip or peel under the graver, and when the work is outlined, if the engraver thinks fit, the film can be rubbed off with an ink-eraser, leaving the work visible as white lines on a black ground, which gives a better idea of the printing value of the block than any white-ground process.—I am, yours, &c.,

Birmingham, January 17, 1898. E. A. B.

To the Editors.

Gentlemen,—In reply to "H. J.'s" inquiry *re* photographing on wood, it is quite practical to use a collodion film, which must be very thin; also what is known as rotten or powdery collodion is most suitable. A positive picture is required, with transparent half-tones, &c. In practice I have found, by diluting Mawson's negative collodion to nearly half, and then iodising as usual, give a fairly good result. A full exposure is required, with quick development (an addition of half a drop per ounce developer of nitric acid in the developer gives a white image). Fix with cyanide, and soak for a few minutes in citric acid to loosen film. In my hands citric acid gives a whiter image than hydrofluoric acid.

To prepare the wood, mix a weak solution of gelatine in water, coat the block with this, and rub well in till all the excess is wiped off. Then coat with black, and finally another coating of gelatine, which, being very thin, does not interfere with the engraver, and it prevents the film from splitting when cutting. The wood being all ready, it is only necessary to float the film off the glass on to the wood and squeegee down, the whole process not occupying more than fifteen or twenty minutes. The first coating of gelatine is to prevent the black staining the wood, as the engraver likes to see white wood where he has cut.—I am, yours, &c., A. W. Durrell.

157, *Norwood-road, S.E., January* 18, 1898.

OIL LANTERNS.

To the Editors.

Gentlemen,—I am pleased to see in the Journal to-day a very interesting letter on oil lanterns from your correspondent "Petrolus."

More than twenty years ago I often wrote on this subject in the Journal. But I got very little help. I wanted then, and still want, a thoroughly good oil lamp, to give a *bright* six-foot picture, and I often hear this want expressed by others.

Years ago I worked with moderate satisfaction a two-wick Woodbury's sciopticon, later I used Newton's four-wick Russian lamp, at the present time I have in use a four-wick lamp of Wrench's, cost 23*s*., also a Stock's lamp. All of these light a five-foot picture well, using the ordinary plain photographic slides as sold by the dealers.

Any attempt to push the size above five feet results in a dull picture. The Stock's lamp perhaps give a trifle the better light, but is very liable to smoke, even when the chimney is raised. Several of my friends complain of this, although it is otherwise a good lamp.

I am hardly prepared to accept the moral, "Use only three-wick lamps," as the best I have seen does not come up to the four-wick lamps. A good deal of misunderstanding arises in the discussion of this question, as we are not always agreed as to what constitutes a really bright picture.

There is one lamp I have not yet seen, viz., the Pamphengos, made by Hughes. I have always heard it spoken well of.

This subject is of great interest to a number of your readers, especially those living at a distance from our large towns. There must be amongst your readers gentlemen of experience in this matter. Can they be induced to render help? I am not referring to makers of lamps, they are so liable to think their "ducks are swans."

If my old friend, the Rev. F. Hardwich, had been alive, nothing would have pleased him better than to go in to thisquestion. Certainly, to the maker who can "go one better," there is "money in it."—I am, yours, &c., W. W. W.

PLAIN LANGUAGE ABOUT THE SPECTRUM: A REPLY.

To the Editors.

Gentlemen,—The criticism, in two instalments, by Mr. A. D. Pretzl (see this Journal, December 24 and 31 last) of my short article under

the above title in your ALMANAC for 1898 cannot be allowed to pass without notice, though it is probably unnecessary to deal other than briefly with your contributor's discursive remarks.

In the first place I may fairly complain that I am accused of being somebody else. "I rather fancy," says Mr. Pretzl, "that we have had some interesting communications before from this authority on the the subject of colour and photography. If I remember rightly, it was before the Croydon Camera Club . . . . that his statements were made." I am not the Mr. White who committed the serious offence here referred to.

It is evidently my critic's impression that I condemn the use of the spectroscope under all circumstances. This is not the case. But I do not consider it absolutely necessary that the worker should experiment in the preparation of colour-sensitive plates, believing that excellent plates can be purchased, and that in the use of these he will find sufficient scope for his skill, and that with them he will obtain better results in less time than a course of experimental plate-making would demand.

My innocent advice, "First mortgage your home and buy a spectroscope," written in all good-nature, is resented by Mr. Pretzl as warmly as if it were a personal insult.

It is hardly necessary to examine in detail the cost of various makers' spectroscopes. They can, of course, be obtained at from about 34*s.* to, say, 150*l.*, which I think is the highest price in Browning's catalogue. My opinion is that the direct-vision spectroscopes, absorbing, according to Mr. Pretzl's admission, much of the violet, are not the most suitable for the kind of work I had in view. The larger spectroscope, recommended by Dr. Vogel for more exact work, is not a direct-vision instrument; and M. Vidal, while believing in its superiority, does not advise its use, simply because it is costly. No spectroscope can be too good, and a cheap one cannot be the best for photo-spectroscopic work of the highest order and of the greatest possible exactitude. Let the worker surround himself as he may with such photo-spectroscopic, photometric, and other apparatus as will cost a small fortune, yet one thing will still be lacking. "There is no agreement as to what constitutes accuracy," as I have ventured to say in my article. Mr. Pretzl quite misses this point, and sneers at my "ignorance." Well, we can't all be Pretzls, you know!

I do not presume to be anything but an earnest inquirer. I ask for a reliable authority, and Mr. Pretzl steps forward and modestly points to himself. Perhaps this, again, is what he "rather fancies."

I have quoted Captain Abney as recommending in orthochromatic experimental work the use of a test consisting of the pigments vermilion, emerald green, French ultramarine, and chrome yellow. "Now, sir," says Mr. Pretzl, with the air of one administering a knock-down blow, "I have *very carefully read through* Captain Abney's work, *The Action of Light in Photography*, but *nowhere can I find* this recommendation. Will Mr. White kindly give the page on which it can be found?"

If Mr. Pretzl will turn to page 112, he cannot very well miss the following passage: "The standard pigments are not difficult to choose. If we take a vermilion, an emerald green, and a French ultramarine, together with chrome yellow, as a further test, and, having measured their brightness, can reproduce them faithfully in black-and-white by photography, we shall also be able to reproduce any other colours correctly on the same kind of plates."

So much for Mr. Pretzl's "very careful" reading. This quotation will at once not only prove that a practical test is possible, but fully bears out the reasonableness of my suggestion for its adoption.

Mr. Pretzl's complacent assumption of superiority, his reiterated references to my ignorance, would carry greater weight if his own remarks were not marred by egregious blunders. One cannot, after all, accept this gentleman at his own valuation.

Facts are stubborn things, and therefore Mr. Pretzl carefully avoids them, or can it be that he does not understand plain English? It is a fact, as I have stated, that a natural yellow will act upon a red-sensitive plate when a violet screen is used that transmits red and absolutely absorbs spectral yellow, and no manipulation can prevent this, however vigorously Mr. Pretzl may deny it. If there is, as he suggests, any confusion as regards colour and colour sensation, it exists only in his own mind.

"It is possible," says Pretzl, "to satisfy the *theoretical requirements* of deposit in the red and violet and blue and not in the yellow." Granted, so far as the spectrum is concerned, but with natural colours this is *absolutely impossible*, and, further, deposits in the red, violet, and blue are *not* "theoretical requirements" at all.

Mr. Pretzl asks, "Would you, sir, would any one, even Mr. White, supposing he wanted the analysis of a particular chemical, place the same in the hands of a crossing-sweeper utterly ignorant of chemistry?" Certainly not, and it is precisely for this reason that I venture to think for myself rather than accept the dictum of a self-constituted authority.

The explanation that a plate sensitive to the bright blue, blue, and violet of the spectrum is useless for photographing a pigment such as cadmium yellow is harmless enough, as are the other very elementary illustrations of a similar character. Mr. Pretzl imagines, I suppose, that he is here giving me some valuable information. I am told that "the spectrum on a plate is to Mr. White simply a mass of cuneiform hieroglyphics which he is unable to translate." This is news to me, and I shall require something more than Mr. Pretzl's unsupported statement before believing it.

I am willing to accept Mr. Pretzl's statement that the green screen mentioned by him will allow spectral blue to pass, but it does not necessarily follow that the screen is therefore "properly made." If Mr. Pretzl will take the trouble to refer to page 311 of this JOURNAL (1897), he will find an article *by himself*, in which it is stated that the very screen he now describes gives "*less correct results*" with commercial orthochromatic plates, which he now asks me to use, than another screen and a different plate. How a screen that gives less correct results than another can be said to be properly made is perhaps clear enough to Mr. Pretzl's superior intelligence, but a mere ordinary mortal, like myself, cannot easily believe two contradictory statements.

It is worth while noting, too, that in the same article we find the following sentence: "To test whether the rendering of the colours is correct a colour chart must be used." This seems to answer many of the objections raised in Mr. Pretzl's recent articles. Of course, I am aware that he was then reviewing and quoting from Hübl's work on three-colour photography.

Again (still quoting Mr. Pretzl), Hübl recommends for the yellow-printing negative "an ordinary plate, without any further sensitising, without the use of a screen. It is wrong to use a violet filter." "The sensitiveness of the plate should lie between F and G, and fade off towards E and towards red." If Hübl is correct, then Mr. Pretzl is entirely wrong in his recent statement as to what is required theoretically. My own objection to the use of a violet screen with a red-sensitive plate is quite in accordance with Hübl's recommendation.

Mr. Pretzl must pardon me for not dealing at greater length with his inflated criticisms. One word more, however.

In the example Mr. Pretzl gives by way of a lessen it is unfortunate that so simple a subject suffers from so bungling an explanation. The yellow ink (in the three samples mentioned) is too orange not because red is present, but because green is absent. One would have thought that even Mr. Pretzl would have been able to grasp a simple fact of this kind; but we find him deliberately stating that the overlapping of the yellow into the red means that "the yellow was too red." *It means nothing of the kind*, and, further than this, an overlapping is *absolutely necessary*. Yet it is with such stuff as this that Mr. Pretzl presumes to "give Mr. White a practical lesson."

The quotation from Montaigne, "I would have every one write what he knows, and as much as he knows, but no more," is certainly to the point here. Mr. Pretzl considers that this advice is "well worth careful study." Why not study it, then?—I am, yours, &c.

London, January, 17, 1898. WALTER WHITE.

ANIMATED PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—In reference to the interesting communication of Mr. A. D. Pretzl respecting animated photography, it does not appear to clear up the important question as to who first used the movable film and camera with one movement which made this animated photography, in its popular form, possible.—I am, yours, &c., J. WHITE.

24, *Gorst-road, Wandsworth Common. January* 14, 1898.

IS PHOTOGRAPHY AN ART?

To the EDITORS.

GENTLEMEN,—Our friend of the *Contemporary Review* appears to have suffered much at the hands of the amateur in general.

What a very great misfortune that such an able professional writer should make so much mistatement, generally owing, no doubt, to his not being well informed regarding the history of photography. If he only knew how much professional photographers owe to the untiring energy of the amateur—even from the very advent of photography—he would hardly have written in such an abusive spirit.

It is owing to the unmistakable personality which does exist in a photograph, that makes the difference between photographs and the records of the phonograph, and which has caused so much controversy in the past, and is still disturbing the equilibrium even of our friend of the *Contemporary Review*.—I am, yours, &c.,

January 15, 1898. ONE OF THE COMMON FOOLS.

LECTURES AT THE BOLT-COURT SCHOOL.

To the EDITORS.

GENTLEMEN,—I have pleasure in informing you that the Board has arranged for the two following courses of lectures on photo-process work to be delivered at this school: *The Half-tone Process*, Mr. F. E. Ives (four lectures, commencing Monday, February 21); *The Chemistry*

and Physics of Photo-process Work, Mr. T. Bolas (four lectures, commencing Monday, February 28),

These lectures are open only to those who are engaged in some branch of commercial photography, and admission is by ticket only, which may be obtained, by enclosing stamped addressed envelope, from the Board's Secretary, or from the undersigned.—I am, yours, &c.,

CHARLES W. GAMBLE.

The London County Council Technical Education Board, Bolt-court. Technical School, 6 Bolt-court, Fleet-street, E.C., January 17, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

Lambert Weston & Son, 23, Sandgate-road, Folkestone.—*Two photographs of Miss Dowra.*

L. P. CLERC.—Many thanks for your communication.

B. L. E.—Messrs. Taber & Co., Dover-street, Piccadilly.

A. G.—An excellent suggestion. We will bear it in mind.

PROFESSIONAL.—For all round purposes, one of the new anastigmats.

J. KIRKWOOD.—We are greatly obliged; but we think the subject has been amply referred to.

A. GREGSON.—Thanks: a paragraph drawing attention to the matter was recently inserted under News and Notes.

TONING.—AMATEUR (S. W.). Cold is probably the cause of the slow toning action of the bath. Warm it up to 65° Fahr., and try the effect.

RETLAW.—No, you have no remedy. Specimens are understood to be forwarded at the sender's own risk. They may yet be returned to you.

DISCOLOURED PAPER.—H. WALPOLE. As the paper is so discoloured, it should not be used, as it will be quite impossible to obtain good prints upon it. It would be a waste of gold to try to do so.

APPRENTICE.—M. Unless the firm is a good one, of high standing, we should not consider the offer a very liberal one, more particularly as the youth has already had six months' experience in a photographic establishment.

MINIATURE FRAMES.—A BRYANT asks: "Could you inform me where miniature frames or rims can be purchased?"—They may be obtained from any of the large dealers in photographic materials, such as Marion & Co.

MOUNTING LARGE CARBON PICTURES.—T. BAINES. Almost any mountant may be used for carbon prints. Gelatine and starch are those generally employed. The latter will be found the most convenient to use if the prints are of large size.

ORTOL.—J. W. says: "In last week's JOURNAL, Dr. Hauff's 'Ortol' developer, in section B, reads: soda, 100 parts; sulphite soda, 125 parts; but does not say what kind of soda the first-named is. I shall be very glad to know."—In reply: Carbonate of soda is meant.

MATERIAL FOR CHANGING BAG.—CHANGING BAG says: "Your kind answer to the following query will greatly oblige. What is the usual cloth material that changing bags are made of to be safe for fairly rapid plates?"—Tolerably stout macintosh cloth is as good as anything. It is perfectly safe.

CERAMIC PHOTOGRAPHY.—E. BURCHARDT writes: "Will you kindly inform me if there is any process by which an amateur could get his negatives printed on the plates of a dinner service? Would it be very expensive? Who would do it?"—Yes, and no doubt Messrs. Morgan & Kidd, Richmond, will do the work for you. Write to them.

TRANSPARENT PAPER.—M. DILLON writes: "Some few years ago a transparent paper for photographic purposes was produced, and, I think, patented by the Willesden Paper Company. Can you tell us anything about it?"—We believe such a paper was patented by a Mr. Williams, but we are not aware it was put upon the market; for what reason we are unable to say.

PHOTOGRAPHING ON WOOD.—W. T. W. writes: "Re reply to H. T. in Answers to Correspondents in last issue of JOURNAL. You will find full particulars of the method he asks for on page 606-7, BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1893, this being the method used for nineteen out of twenty blocks, the firing after the spirit preventing chipping of film."

PATENT.—R. CONYER. The complete specification of the patent can be obtained at the publication department of the Patent Office, Chancery-lane, by giving the number of it and the year, for eight pence. The abstracts we give do not embrace the claims.

STUDIO SITE.—STUDIO puts the following queries: "1. Is it, in your opinion, possible to turn out good work in a studio running north to south, front of house being south? 2. Would you recommend glass both sides? 3. What blinds would be best to use?"—In reply: 1. Yes; certainly. 2. It will be convenient to have glass on both sides. 3. Dark blue or light green will be most suitable.

SALE OF APPARATUS.—E. C. J. We cannot be responsible for advertisements that appear in the JOURNAL. We do not think you did wisely in sending the cash without having some kind of reference, particularly as only initials were given in the advertisement. We should advise you to send all particulars to the superintendent of police for the district to which the money was sent, and that without delay.

A PROFESSIONAL AMATEUR.—A. Z. Although your brother is engaged in another business, and only takes photographs in his spare time and sells them to the local stationers, and occasionally sells a few negatives to publishing houses, he has no title to be termed an amateur photographer. He is a professional in every sense of the term. He certainly has no right to exhibit as an amateur in competitions.

CUTTING PRICES.—R. W. W. encloses a price-list of a photographer who has lately started business in his neighbourhood, and complains that the prices offered to clubs, &c., are "disgraceful."—The prices are certainly very low, but they are not so low as those of some houses in London and in many of the large provincial towns. It is regrettable that prices are so "cut," but that, of course, follows on competition when that is based on prices and not on quality of work.

STUDIO AND LIGHTING.—A. B. asks: "1. In building a studio, is there any advantage in placing the ridge far out of the centre? 2. Where is the fault in lighting when there are heavy shadows under the jaw-bone on the lighted side?"—1. Much depends upon the dimensions and the aspect of the studio. Further, some workers prefer one form and some the other. 2. As a rule, too much direct top light. Use less top light, and soften the shadow by means of a reflector.

BURNT-IN ENAMELS.—COBALT writes: "I have been reading up all I can find on the subject of enamel photography, and, of all the processes, it seems to me that either the substitution or the powder process is the best for an amateur's purposes with a Fletcher's muffle furnace, which I have. Which would you advise? I may say I have had no experience with the wet-collodion process, which is the essential part of the substitution method, though I am told that is the best."—Both processes yield excellent results; but with the powder process a greater variety of colours are obtainable than with the other, it is also much easier for a beginner to work. The majority of the best enamels are now produced by the powder process.

PLATINOTYPE.—PLATINUM says: "I should be greatly obliged if you could inform me (through Answers to Correspondents column) concerning the peculiar black and white markings on the enclosed platinotype prints. I have had some trouble with several batches of paper lately with the same result. I may say that the paper is kept in calcium tubes supplied by the Platinotype Company, and every care is taken in handling the paper on the surface to avoid finger marks. I first thought it was the scum off the developer, so I made up some fresh (Company's salts), but they still made their appearance. I may add that the developer is made up according to instructions on the tins, the dishes are always cleaned out before any operations, and the hypo acid is kept away from the developer. I should feel greatly obliged if you could help me out of this little trouble."—The trouble is clearly due to want of care in working. Some of the spots appear to be caused by splashes of some foreign substance, and others by air bubbles. Finger marks are the cause of some of the stains. More care generally in the manipulations will avoid the troubles.

"SOME months ago a certain sensation was created by the story of a woman, who was described as being able to see through a stone wall," says the *Daily Telegraph*, "and as being also endowed with the extraordinary faculty of reading at a distance of a quarter of a mile manuscript enclosed in a thick and sealed envelope. 'Prodigious' was the exclamation which proceeded from many a mouth when this startling narrative was related, and people began to speculate on the chances of this lady's phenomenal qualities being utilised in the inspection of luggage, in the discovery of secret documents, and in other mysterious ways. The account of this professedly marvellous performance was duly set forth in your columns, with, as was very natural under these peculiar circumstances, more than the prudent reservation which this queer case demanded. Now, it is rather distressing to have to add that an experiment which has just been made, this time in the presence of a scientific committee appointed for the express purpose, has ended in utter disaster, as the worthy woman has totally and entirely failed to acquit herself in the wonderful style, on the strength of which she had acquired what turned out to have been a short-lived fame. She was first of all requested to read at a certain distance a manuscript enclosed in a particularly prepared box, and she quite broke down in the attempt. Then she was asked to explain the contents of a sealed paper, which was held near her as long as she desired it, and the result was precisely the same. In point of fact, the lady in question proved utterly incapable of doing more than any ordinarily constituted person could have accomplished, that is to say, there was on this occasion no marvellous performance at all."

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1969. Vol. XLV.—JANUARY 28, 1898.

Contents.

	PAGE
Ex Cathedrâ	49
Fuzzy *versus* Sharp Pictures Commercially Considered	50
Leaderettes:— Recovery of Silver from Fixing Baths — A Great Astronomical Work—Professor Dewar on the Halogens	51
The Multiple Stop in Process Work.—II. By W. B. Bolton	52
Foreign News and Notes:— The Development of P.O.P.—Ink Drawings from Silver Prints — Colour Photography — X-ray Photographs — Dark-room Lanterns — Direct Instantaneous Positives in Two Colours Lady Amateurs—The Vienna Camera Club	53
Photography and Mr. Joseph Pennell. By Temple Lambe, M.A.	54
Sulphocyanide of Gold and Ammonium. By L. Belitzski	55
The Eclipse of the Sun	56
Our Editorial Table:— The Perfected Skate-blade Trimmer — The "Luxia" Papers — *Animated Photography: The A B C of the Cinematograph* — Chedell's Bromide Printing Apparatus	57
News and Notes	58
Patent News	58
Meetings of Societies:— Royal Photographic Society — London and Provincial Photographic Association—Photographic Club — Camera Club — Croydon Camera Club — Hackney Photographic Society — Kingston-on-Thames and District Photographic Society—North Middlesex Photographic Society—Bath Literary and Philosophical Association and Bath Photographic Society—Bradford Photographic Society — Plymouth Photographic Society — Dundee and East of Scotland Photographic Association—Edinburgh Photographic Society	58
Forthcoming Exhibitions	62
Correspondence:— Acetone in the Developer—"Cosmos" and M. de la Sizeranne—The Royal Photographic Society's Council Election — Mr. Maskell and "Dogberry"—Plain Language about the Spectrum — The Blairgowrie Exhibition — Answering Advertisements	62
Answers to Correspondents	63

EX CATHEDRÂ.

We should have been disappointed had the Council election of the Royal Photographic Society failed to be characterised by an incident or two of a more or less striking nature. This feature has not been absent from the election for several years past. We print in our Correspondence columns two letters which are typical of several others that we have received, protesting against the wholesale and systematic canvassing for votes on the part of a gentleman who is a candidate for a seat on the Council. A lithographed circular asking for support appears to have been very widely distributed. Canvassing for votes has not hitherto, to our knowledge, been resorted to by those nominated for the Council, and we shall assume that in the present instance the candidate in question was unaware that, as far as the Royal Photographic Society's Council is concerned, this method of securing election has not usually been practised. Of course, a candidate is strictly within his right in canvassing; but, having had the honour of a seat on the Council for five years, we think we may go the length of saying that the whole of our colleagues would join us in deprecating the adoption of the canvassing system, and would also agree that it would introduce into the Society a disturbing element not at all calculated to enhance its dignity or promote its usefulness.

* * *

A new Indian photographic journal has made its appearance. The Editor is Mr. George Ewing, an able amateur, with whose writings the readers of this Journal and its Almanac must be familiar. There is great cultivation and vigour in the style which Mr. Ewing adopts in writing on photography, and his introductory remarks in his new venture are characteristically trenchant when he comes to deplore what he evidently regards as the unsatisfactory state of photographic journalism in India. *St. Veronica*, as the new journal is called, is published by the Law Publishing Press, 57, Bow Bazaar-street, Calcutta. We perceive that it has in it the makings of a first-rate photographic publication, and we wish it every success. Miethe, Pizzighelli, and Namias have contributions in the first number, which, though creditable in get-up, will, doubtless, be very speedily improved upon.

* * *

Intending exhibitors at the International Photographic Exhibition, to be held at the Crystal Palace, April 27–May 14 next, are reminded that the necessary entry forms, as well as the regulations governing the receipt and display of exhibits, are now available, and may be obtained from the Secretary, Royal Photographic Society, 12, Hanover-square, W. The regulations apply respectively to (*a*) exhibitors requiring floor space in Section IV., apparatus and material; and in Section V., photo-mechanical processes; and (*b*) exhibitors in Section III., portraiture and general technical photography; and in other sections where wall space only, and not floor space, is required.

* * *

Messrs. F. & R. Speaight, 178, Regent-street, W., were commanded to Claremont on Tuesday week to photograph the Duchess of Albany's children for the Great Roll of Ministering Children. Messrs. Speaight have already had the honour of special sittings for the Roll from the children of the Duches of York, at Sandringham, and at Osborne from those of the Princess Beatrice and the Duchess of Connaught.

* * *

The cheap enlargement scheme, having gone the round of the southern press, has, it appears, found a temporary abode

among the Scotch newspapers, and, this week, some copies of the Dundee *People's Journal*, containing the announcement, "A Portrait Gallery in Every Home," have been sent us, together with some letters written by Scotch photographers, who are angry with Sir John Leng & Co., the proprietors of the paper named, for patronising a scheme that might interfere with ordinary photographic business. We quote the essential portions of the advertisement in the *People's Journal* relating to the matter.

* * *

The advertisement runs as follows: "Photography, as our readers know, has of late years risen to the rank of an art as well as a science, the productions of the photographer often rivalling those of the artist in oil. At the same time various art processes connected with photography have reached great perfection. One of the most remarkable of these processes is that by which from small photographs, of almost any kind, large pictures can be made, suitable for framing and hanging up. It gives us much pleasure to announce that we have made arrangements with a first-class firm of photographers, whereby readers of the *People's Journal* can have photographs of themselves or their friends enlarged by one of the best of these processes. The enlarged portraits are mounted on a superb plate sunk mount, measuring 24 inches by 19 inches. They are beautifully executed, and we feel sure that all who get them will be greatly pleased with them. Applicants must pay careful attention to the following: "Send an ordinary photograph well wrapped up in cardboard to prevent injury in transmission by post. On the back write your name and address to prevent mistakes. If it is a bust you want enlarged, enclose a postal order or other remittance for 6*s.* 6*d.* In the case of a group, 2*s.* extra will be charged for two figures, and 1*s.* for every additional figure. When a full-length enlargement is required, an extra shilling must be sent."

* * *

We do not know whether the scheme here outlined is directed by the same persons who have hitherto co-operated in this manner with various newspapers, but the advertisement we have quoted above differs in style and phraseology from that which we have many times quoted before. Hitherto it has been held out as a bait to the readers of the newspapers that the enlargement offered for 6*s.* 6*d.* would cost from three to five guineas if obtained from a photographer. There is nothing of the sort in the above advertisement, which strikes us as entirely unobjectionable from all points of view save one, namely, that the low prices at which the enlargements are offered are calculated to adversely affect local professional photographers, who obviously cannot afford to compete against them. Why do not the Dundee photographers ask Sir John Leng & Co. to withdraw the scheme? We may say that something of the kind was not long ago successfully done by the photographers of a Lancashire town.

* * *

Our remarks last week with reference to the expressed design of some Croydon temperance reformers to photograph small children in the act of entering public-houses, and to publicly exhibit the results as lantern transparencies, have brought us a courteously written protest from a correspondent, who remarks: "Will you pardon my saying that I think it would be much better if you confined yourself to dealing with those matters with which you are so eminently qualified to deal, and which afford you scope for the exercise of your undoubted abilities, and not trespass upon a sphere where evidently you fail to appreciate the gravity of the issues involved? Your criticism upon the action of the 'temperance reformers' in Croydon cannot fail to give pain to such of your readers as are total abstainers and workers amongst the young, and also to that larger class still who believe that, to preserve the child from any and all contaminating influences, is the minimum claim which childhood has a right to demand. Respecting your statement that 'it is conceivable that nothing of a harmful nature is thereby wrought in them,' I may say it is not only opposed to the opinions of licensing magistrates of high distinction, but also to the views of many in 'the trade,' brewers, publicans, &c., who have voluntarily come forward to support the scheme for discouraging the sale of intoxicating liquor to children of tender years. You would not permit a discussion in your columns upon the 'temperance question,' and there are none of your readers who would complain; but, if this be so, then I think a little more care should be observed, so that no provocation be given to any of your readers to feel that an otherwise reasonable condition acted unjustly in their case."

* * *

On the other hand, another correspondent, a well-known photographer, writes us as follows: "Allow me, as a licensed victualler as well as a photographer, to thank you for your very able championship on our behalf in exposing one more of the many examples of tyranny with which our trade is harassed."

* * *

Clearly our columns are not the proper place for a discussion on the temperance question, and we are not at all disposed to agree with our first correspondent that anything we wrote a week ago was of a provocative nature. From the position we then took up we shall not recede in the least. We say that it is not only either wise or charitable, but positively cruel, for a body of reformers, however well intentioned, to use the camera for the purpose of detecting children entering and leaving licensed premises and publicly exhibiting the results. By what moral or legal right do they thus turn the camera into an instrument of espionage? So far from assisting the great and noble cause of child-protection we should be surprised if this abuse of photography did not retard it, for it could only annoy the parents, and might conceivably give the children a sense or feeling of degradation to which they were previously strange.

FUZZY *VERSUS* SHARP PICTURES COMMERCIALLY CONSIDERED.

The recent discussion between Mr. Baldock and Mr. Moss before the Croydon Camera Club, on "Sharp *versus* Fuzzy Photographs," although on extremely moderate lines, on both sides, led through some comments on one side of the question only, by one of our contemporaries, to a not unnatural protest from the advocate of sharpness—Mr. Baldock. That discussion has raised, once more, an ever-vexed point but leaves it as usual where it was. It is thought by many that pictures of the "fuzzy" order are quite a modern notion. That is a fallacy, for the thing is as old as photography itself.

In its earliest days it was a necessity, because the lense

st used would not give anything else; but, when there were nses which would give perfect definition, it was fully recognised at it was not always desirable to have it in the pictures. eference to some of the literature of that period will show at Sir Wm. Newton, one of the Vice-Presidents of the Photo-raphic Society, now the Royal, advocated, in the early fifties, e interposition between the sensitive paper and the negative, hile printing, one or more thicknesses of tissue or other paper soften excessive sharpness in cases where that would be otrusive. The late Mrs. Julia Cameron's pictures were all of e fuzzy order, and to obtain them she used, for her earlier ork, a single lens with its full, or nearly full, aperture, *i.e.*, e diaphragm removed.

It was Mrs. Cameron's work, and that of some of her llowers, which, to an extent, induced the late Mr. J. H. Dall-eyer to introduce, now more than thirty years ago, his atent portrait lens with the means of introducing at will a rtain amount of spherical aberration so as to "diffuse" the cus, and thus permit of the extreme sharpness of the lens eing modified if desired. Thousands of these lenses have een in the hands of photographers since that time. Hence will be recognised that unsharp pictures are by no means new idea. It is only the name that is new. The name fuzzy" was only introduced when fuzzyism assumed the ute form among the Salonists, and then it was applied ther in ridicule, we surmise, than anything else. Still, it expressive when applied to that class of work, but we ink that some other term, such as soft focus, which has ten been used, would be more appropriate to work that is ly slightly, or even moderately, deficient in absolute sharp-ss. The term "fuzzy" might still be retained solely for e Salon, and the work of the Linked Ring and others who ay fancy that the more fuzzy a photograph can be made to ok the more it approaches "art."

It has frequently been pointed out in these columns that cessive sharpness—that is, microscopic definition—is not ways desirable in a photograph; in large direct heads, for ample, or, in some instances, in the reproduction of intings where the texture of the canvas or the brush marks e very pronounced. Then a little softening of defini-on, as by the introduction of a small amount of spherical erration in the lens, is advantageous when used with dgment.

Apart from the ideas of workers of the Salon type, the mmercial question should be kept in view. In what light the *clientèle* of the professional photographer look upon zzyism? We have just said that photographers are in ssession of thousands of lenses with the means of modifying eir extreme definition, and it would be interesting to learn w often this is availed of in practice except for the larger zes. It would also be interesting to know what the eas of their patrons are on the question of the fuzzy style applied to portraiture or to landscape work? Photography still a business, and the £ *s. d.* side of it must not be lost ght of. If pictures of the fuzzy order would be likely to ove remunerative, then the professional should give them tention, even though at present he may be inclined to deride em.

Some professionals have shown at different exhibitions rtralts and figure studies of a mild Salonistic order, and the perience of the favour they met with on the part of the sitters ould be valuable to some of their brother photographers. hen Mr. Thomas R. Dallmeyer introduced the Dallmeyer-Bergheim lens, some leading London houses had them; but, we are told, the portraits taken with them did not meet with the general approval of the sitters and their friends, for they, as a rule, preferred the sharper kind of picture.

The chief reason for touching upon the commercial side of the question now is that, if the taste of the public is likely to run in the direction of "fuzzy art" (?), photographers, as a matter of business, should give it consideration, and perhaps make a feature of it during the coming season. We all remember the æsthetic craze a few years back, when sunflowers, peacocks' feathers, Japanese screens, &c., reigned supreme. Then some few photographers who made a speciality of catering for that cult did a profitable line of business. Would such be the case now, or in the near future, if a speciality were made of "fuzzygraph" portraiture?

Recovery of Silver from Fixing Baths.—Mr. Randolph Bolling writes to an American contemporary from the chemical laboratory of the University of Virginia, Charlottesville, Va., in regard to an alleged new method of recovering silver from fixing baths. He states that, having had occasion recently to make an analysis of photographic fixing baths, to determine the amount of silver present in combination with the sodium thiosulphate, the unoxidised silver salts on the developed plate were dissolved in a solution of thiosulphate to form a salt having the formula, $NaAgS_2O_3$. The silver was first precipitated by ammonium sulphide, and it came down as black sulphide of silver. This was then separated by filtration from the liquid, and, after being washed three times in hot water, was dried and heated on charcoal. The reaction which took place was as follows:—

$$Ag_2S + O_2 = SO_2 + AG_2.$$

The silver was then melted by a blowpipe, and finally it was weighed. Mr. Bolling obtained the following results: Silver from the fixing solution of two developed 5×7 dry plates, 0·2769 milligramme; silver from the fixing solution of two developed $3\frac{1}{4} \times 5\frac{1}{2}$ dry plates, 0·2051 milligramme.

A Great Astronomical Work.—In a quarto of nearly 600 pages, the heirs of the late Dr. Benjamin Apthorp Gould have just presented, says a transatlantic exchange, to astronomers the substantial completion of the photographic work undertaken by him twenty-five years ago at the Argentine National Observatory in Cordoba. Although Dr. Gould did not live to see the completion of this task of his inception, still all had been so nearly finished that, with Dr. Chandler's supervision, the whole is now brought forth in entire harmony with the original plan. On Dr. Gould's first going to the southern hemisphere, celestial photography had not yet yielded tangible results in the line of accurate stellar positions, chiefly because the now familiar dry plates were not then available. Much pioneering thus was a matter of necessity, and the misfortunes and obstacles that beset his endeavours were most astonishing, not the least of them a broken object-glass, the death of two photographers from pulmonary disease, and of a third from a stroke of lightning. The Argentine National Government has, however, supplied the necessary funds for preparation and publication, and the finished volume now published, really monumental in character, gives the accurate position of nearly 10,000 stars, with a chapter devoted to each of thirty-seven stellar clusters, mostly in the southern celestial hemisphere, and invisible from observatories generally in the United States.

Professor Dewar on the Halogens.—At the Royal Institution last Thursday Professor Dewar commenced a course of three lectures on those "sea-salt formers" which are so necessary to the practice of photography "in all its various branches," as the cobblers write up over their little shops. But the Professor dealt not with the photographic application of the halogens, but confined

himself to their history and their chemical relationship to one another. It is happy for photographers that they have only to deal with the halogens in an indirect manner, and to use them in compound form; for, by themselves, they are very nasty things to tackle, and, although the worthy Professor naturally shrank from telling a fashionable audience that the word bromine was gathered from the Greek equivalent for a "stink," he hinted pretty broadly that the halogens generally were "not violets." The lecturer dealt only with chlorine, bromine, and iodine, fluorine being for the present left out of consideration; but, of course, the greatest interest is attached to the latter element on account of its recent isolation.

Professor Dewar is naturally very proud of that bantling of his, liquid air, and he seldom gives a lecture without trotting it out, and we think that he is right in doing so, for liquid air is a curiosity of immense interest, and, moreover, it can only be seen at the Royal Institution. It affords, too, the readiest means of reducing bodies to a very low temperature. A tube of liquid chlorine or bromine quickly became solid when used as a stirring rod for a vessel of liquid air; and, when the air was poured upon a vessel of gaseous chlorine, it was very pretty to see the green colour disappear, and the gas reduced to a liquid state. Considering the technical nature of the subject, and the wet, muggy weather, the Professor had a fairly large audience.

THE MULTIPLE STOP IN PROCESS WORK.

II.

In my previous article I explained in detail the method of formation of the dot when a stop is used having several apertures instead of a single one, and it now remains to describe how it works in actual practice, and the advantages it is expected will accrue from its use. I may premise that the stop, when used in this manner or in this form, must be wholly dissociated from its ordinary function, in connexion with the lens, for improving definition, as for that purpose it would be practically useless, if not perhaps actually detrimental. The part it plays is entirely in conjunction with the screen, and it follows that the lens employed must be one that is capable of doing its duty in the way of definition with full aperture, or independently of the stop. If this be the case, then, so far as the optical working of the lens is concerned, the result will be precisely the same as if a single aperture of the same exposure value were employed; but in the case of an inferior instrument, no doubt, the collection of pencils of rays from different portions of the surface closely approaching the margin, as well as the axis, would somewhat interfere with the integrity of definition. However, process workers, as a rule, are equipped with lenses of the highest quality, and quite capable of performing the duties required.

The ideal half-tone process negative has, I suppose, yet to be produced, but, when it does make its appearance, it will, no doubt, consist of a series of dots of absolute opacity, but varying in size according to the gradations of the subject. In the highest lights they will be large enough to close up and leave only the minutest pin points of absolutely clear glass, and in the deepest shadows will themselves be but the smallest possible specks, and so on in proportion to the tones of the subject. But, as I have said, this perfect negative has yet to be obtained, and meanwhile we have to be satisfied with the nearest approach we can make to it. Do what we will, the tendency is for the high-light dots not to close up properly or to close up too much, and especially with dry plates, for the clear spaces, or what should be clear, to be veiled or partly filled up. On the other hand, the shadow dots will not make their appearance, or, if they do, are too weak to be of any use, and, if the exposure be increased, they persist in growing larger instead of gaining density.

It is the business of the skilful process manipulator to wrestle with these vagaries or eccentricities of the screens and by so modifying his methods of procedure that the high lights are just properly "joined up" and the interstices left perfectly clear and sharp, or as near to it as may be. The weak and blurred shadow dots he coaxes up by artful intensification until they are strong enough for his purpose, and then ruthlessly "cuts" away the ragged fringe from each and leaves them standing sharp and clear, a complete contrast from their original appearance. This work is all very well with a wet plate, at any rate in the hands of one who is thoroughly up to the business, for, as the image is practically on the outside surfaces of the film, it is comparatively easy to cut away at the weak edges of the dots without doing much harm to the nucleus or centre. But with dry plates—whether collodion or gelatine matters not so long as they are developed with alkaline pyro or similar developer—the image is entirely within the film, and to effectively get at the objectionable ragged edges often means to nearly as effectually remove the image altogether.

It occurred to me that, if means could be adopted by which the dots individually were formed on a smaller scale but with greater intensity, the chief difficulty would be removed, as then a sufficient exposure being given to impress the shadow dots, the joining up could be easily done with a special stop. Looking at the screen from the "pinhole lens" point of view—which, after all, appears to be the really practical one, it is self-evident that the smaller the stop used the smaller will be the image of it thrown by the screen on the plate. It is with this very obvious fact in view that the ordinary process worker divides his exposure into two parts making a portion, with a comparatively large stop, to join up the high lights, and following on, or *vice versâ*, with a smaller stop, which is supposed to impress the shadows without further spreading or increasing the size of the high-light dots. This is *supposed* to be the action, but so far as my experience goes—solely with dry plates—unless a *very much* smaller stop is used for the shadow exposure than that for the high lights, the effect it produces is more on the latter than the former. In fact, I have little hesitation in saying that the idea that impressing a smaller dot in the centre of a bigger one will not alter its size is one of those fallacies that want exposing. As a matter of fact, I very soon found that I could get a better result with a single exposure, using a moderately small stop, than by any combination of different stops, unless, indeed, the difference was so great as to render the exposure impracticable.

It was this that led me to take up the idea of using what practically amounts to a number of very minute stops simultaneously, for that is really what the multiple stop amounts to, as will have been gathered from my description of its behaviour. It seemed probable that, if just sufficient exposure were given with a large stop to join up the high lights, the shadows and rest of the picture could be brought out at leisure with this series of extremely minute apertures without any danger of interfering with the high lights already formed, and without the necessity of any protracted exposure such as would be required with a single aperture of the same dimensions, and, further, that the inestimable advantage of small, intense dots in the half-tone would result.

But here, on trial, the actual behaviour of the multiple stop did not turn out to be exactly as had been expected; at any rate, so far as the non-interference with the "joining up" is concerned. Using a combination such as I have described, consisting of nine apertures each a sixteenth of an inch in diameter, the high lights are joined up in actually a shorter exposure than if a single aperture of the same total area—*i.e.*, three sixteenths in diameter—is used. In other words, the intensity of the action of the nine small apertures causes the minute dots to spread more than the larger but comparatively weaker dots formed by the single stop.

Further than this, comparing the results produced with *similar* exposures with single and multiple apertures, respectively, of the same total area, the latter proves practically far more rapid, although only exactly the same amount of light passes. I have obtained, under these conditions, a fairly well-exposed negative with the multiple stop, when the single one has shown only the faintest dots in the high lights, and the rest entirely bare glass. It is difficult to account for this result, even if we drag in "diffraction" to account for the extra intensity of the dots formed by the minute apertures.

With dissimilar exposures the results are once more quite distinct and again in favour of the multiple stop. If such an exposure is given as will produce about the same result, so far as regards the high lights, then the gradation of the rest of the picture differs very

materially in the two cases. In the rendering by means of the multiple stop the gradation will be complete throughout, with probably a little want of strength in the extreme shadow dots, but they will be there. In the other there will be faint large dots in portions of the picture, but long before the shadows are reached nothing but clear glass.

The action of the multiple stop, in fact, appears to be altogether different from that of a single one, and it altogether explodes the idea that a small stop will not interfere with the work of a larger one. If the light be intense enough, the small stop will form a dot that will spread further and more rapidly than that produced by the same amount of light passing through a larger aperture. It is, of course, possible to make the apertures so small that the dots will not close up with any *reasonable* exposure. Thus, with a nine-aperture stop, composed of holes about one-fiftieth of an inch or half a millimetre, I produced the most curious result I have yet seen. A perfectly clear but not very strong image came up on development, but refused to take on strength. On fixing it almost disappeared, or, I may say, *quite*, until the plate was examined with the magnifier, when there was found to be a perfect image composed of such minute dots that, on looking at the glass, it appeared to be quite clear owing to the preponderance of bare glass, although the dots individually appeared to be opaque.

Now, I think, to the practical half-tone worker, these facts will appear with some force as showing what the multiple aperture stop will do, and how it differs from the single one. Whether it is capable of being worked in such a way as to take the place of the ordinary stop in every-day practice remains to be seen, but I have strong hopes for it.

W. B. Bolton.

FOREIGN NEWS AND NOTES.

The Development of P.O.P.—Dr. R. E. Liesegang makes another contribution, in the *Photographische Correspondenz*, to his studies on this subject. Twenty-five parts of a concentrated aqueous solution of gallic acid are mixed with fifty parts of a ten per cent. solution of gelatine. A glass plate is thinly coated with the solution and the film allowed to set. A faintly printed picture, on gelatino-chloride paper, is brought into immediate contact with the film. The print develops normally, attains sufficient depth in two to four minutes, and after removal may be fixed in the usual manner. The process offers no practical advantages, but exhibits one remarkable peculiarity. Upon removal of the developed print from the film, the latter exhibits a negative image. Its colour is blue-black, and, after a short time, becomes rather more pronounced. This negative image is produced by diffusion of nitrate of silver from the printing-out paper to the film, where it is reduced by the gallic acid. The migration, however, proceeds from the unexposed portions only. It may be concluded that there is less silver nitrate present in the exposed parts, in consequence of photo-chemical reduction. But it may be that diffusion is hindered by the quickly formed delicate film of metallic silver, in the presence of gallic acid. Perhaps the image is a joint effect of both causes. There is a third possibility, that the silver nitrate in the exposed portions also diffuses, but that the nascent silver returns to the print. This experiment disposes of a previous theory, that the silver nitrate in the unexposed parts is utilised as an intensifier of the image, when the prints are physically developed. The experiment may be made with other developers, but, if pyrogallic acid is used, there should be a considerable addition of glycerine to prevent precipitation of the gelatine.

Ink Drawings from Silver Prints.—Dr. Eder draws attention to the method, so often recommended, of bleaching the silver image with bichloride of mercury, after the drawing has been made over the print with Indian ink. The results obtained in this manner at the Vienna Technical School are distinctly inferior to those obtained in other ways. For instance, Farmer's reducer and a solution of cyanide of potassium were both far better. Dr. Eder gives the following directions: A fixed, untoned print upon paper sized with arrowroot, or resin, should be used, and the drawing must be made with a pen and Indian ink. When dry, immerse the print in a bath composed of 100 parts of hyposulphite of soda solution (about 1 in 8), and 10 to 15 parts of ferricyanide of potassium solution (1 in 10). The latter should not be added until the bath is required. The photograph bleaches rapidly and completely, and the drawing should then be washed and dried. A four per cent. solution of cyanide of potassium, to which a little tincture of iodine has been added, is equally efficient. In both cases the silver image is completely dissolved, whereas bichloride of mercury only bleaches the image without removing the silver.

Colour Photography.—Dr. H. W. Vogel, writes, in the *Photographische Mittheilungen*, that the problem of photography in natural colours may now be considered as solved. There are two processes, the direct and the indirect. With reference to the direct process by Lippmann, the colours are only approximately true to nature, and, in support of this statement, Dr. Vogel cites Becquerel, Krone, Valenta, Wiener, and Schütt. He also draws attention to three photographs in colour made by Dr. Neuhaus by Lippmann's process — two are of the spectrum and one of a stuffed parrott. One spectrum is upon an albumen plate, and, when viewed nearly perpendicularly, the colours pass from deep red to yellowish-green, green, light blue, dark blue, and violet, but the latter is traversed by disturbing bands of red, green, and grey. The other spectrum, upon a gelatine plate, viewed perpendicularly, exhibits pale red (orange), followed by dark green, pale yellowish-green, then a small field of blue and a long field of grey-violet, broken by reddish and bluish fields, to which greenish are added in the ultra-violet. The photograph of the parrot, viewed almost perpendicularly, renders the throat yellow with a red band, the back of the neck and breast green, and feathers on the feet yellowish. The support (wood?) is yellow. The change of colours is very remarkable when these photographs are viewed obliquely. The yellow throat of the parrot and the support are then green, likewise the pale red of the gelatine spectrum. The pale green of the latter becomes greyish white, and the blue deepens to violet. Similar variations may be seen on the albumen plate, but in a lesser degree. The deep red is paler; the green and blue retain their original colours, with, at most, a trace of grey. It may thus be seen how much the direct method still differs from the true colours of nature, yet it may be possible to attain a greater approximation by the use of extremely thin films. Dr. Neuhaus has also submitted another spectrum photograph, exhibiting the complementary colours by transmitted light. This was done "by making the silver deposit almost invisible."

X-ray Photographs.—Dr. B. Larus has an article in the *Photographisches Wochenblatt* on the development of X-ray photographs, and recommends metol and hydroquinone, not in combination, but in succession. The plate is first immersed in a hydroquinone potash developer until the outline of the image is somewhat vigorous, whilst detail in the shadows is still wanting. The hydroquinone developer is then poured off, and one of Andresen's metol potash substituted. The fine details rapidly appear, and the negative soon acquires full vigour. The negatives developed in this way are plucky, full of detail, and especially suitable for showing variations in structure. As the development is rapid, there is freedom from fog and the negatives are quick printers. A one-solution developer combining the two is less satisfactory. Dr. B. Larus also remarks that the X rays are scarcely absorbed by bromide of silver. An exposure was made through a dozen thin plates, and the bottom plate gave a negative that was but very slightly inferior to the top. A normal exposure was given, and the twelve plates were developed simultaneously.

Dark-room Lanterns.—The *Photo Gazette* recommends dipping candles in the following solution to prevent guttering:—

Magnesium sulphate	15 grains.
Dextrine	5 „
Water	500 „

Direct Instantaneous Positives in Two Colours.—A short time ago a paper by M. Graby was published in *Helios*, describing a process which, though not very successful, is deserving of notice. M. Graby endeavoured to substitute the mercuric mirror in the Lippmann process by emulsifying silver in the film, thus providing each grain of bromide of silver with its own mirror. He hoped to obtain a negative image showing complementary colours by transmitted light. An emulsion was made as follows: 1st. One grain of silver was reduced with sulphate of iron. This gives an emulsion of red orange colour in the fluid state, and M. Graby thought it might be orthochromatic, but it was not. 2nd. One

grain of alkaline bromide of silver. 3rd. One grain of sulphite of soda, or preferably emulsified sulphate of lead. With this emulsion, instead of a negative with the complementary colours by transmitted light, a positive was at once obtained with two seconds exposure, showing by transmitted light blue violet in the shadows, yellow, approximating white, in the high lights, and red in the weak half-tones. Unfortunately the colours are inverted. The blue rays produce yellow, the red have no effect upon the plate which remains blue, and the same is the case with green and black. The yellow rays have some effect, and give a red image. In photographing a picture with a gold frame, the bright gilding is rendered in bright yellow, approximating in a measure the colour of gold. If the proportion of bromide of silver is increased, as compared with the amount of reduced silver, a negative is obtained by transmitted light. This is orange in the transparent portions, and greenish-yellow in the opacities. Although the process does not give an image in natural colours, it is very useful for making glass positives in blue, violet, red, and yellow without toning. They are developed with pyrogallic acid, and fixed in the usual manner.

Lady Amateurs.—*L'Objectif* gives some interesting particulars concerning lady amateurs in France. Baroness Ad. de Rothschild gives her attention to copying pictures, landscape and interior work. Her studio, dark rooms, &c., are elaborately fitted and adapted to various processes. The dowager Duchesse d'Uzès has a preference for sporting subjects, and thinks age a necessary qualification for photography. "Plates are most sensitive when the heart is least affected." Madame Binder-Mestro affects drapery and ornaments, and has a splendid collection of photographs of officers, reserved as curiosities for the eyes of eligible young lady friends. Countess de la Bourmaise and Countess du Bourg de Royas are enthusiastic instantaneous photographers. Madame. Gillon gives special attention to lantern slides. Madame Sterns devotes herself to portraying children, and is an adept. Stereoscopic photography is the delight of Mme. Jollivet. Portraiture finds its votaries in the Duchesses d'Albe and de Mortemart and the Countess de Montozon. Many other French ladies are enthusiastic photographers.

The Vienna Camera Club.—A "sharp-focus" party seems to have been formed, according to an anonymous letter addressed to the editor of the *Wiener Photographische Blätter*. For the present they meet privately, but their object is to counteract the doctrines of the "fuzzy" school. The gum-bichromate process is humorously described by a member in the following terms: "Imagine a large, beautiful, expensive sheet of paper, which has been painted with a pasty solution of coloured gum, and exposed to light under a smeary piece of glass. After the application of water with brush and syringe, the blotches are pronounced a work of art. I am shocked to find these failures please a number of earnest, influential people."

The gum-bichromate process in colours is described as follows: "Imagine the young hopeful, who has just been given a box of colours at Christmas, innocently amusing himself, like a child of seven or eight, by colouring everything, regardless of outline. Imagine these productions of suitable size, framed and glazed, and you will then have a typical print by the gum-bichromate process in colours." Further criticisms are promised.

PHOTOGRAPHY AND MR. JOSEPH PENNELL.

Mr. Pennell is always amusing, and often instructive, and his latest pronouncement on the artistic capabilities of photography is an example of his success in both of these directions. It is many a long day since a message containing so much truth, such outspoken and competent criticism, proceeded from one whom his bitterest enemies must admit to be an artist in the fullest sense of that much-misused word, and the burden of his remarks should be laid to heart by all who have the advancement of photography as their real object. It is to be noted that no small part of Mr. Pennell's *Contemporary Review* article is taken up with the discussion of the claims put forward by certain photographers themselves, and a comparison is drawn in this matter of self-assertion between the behaviour of such photographers and that of the artist, the one eagerly seeking to be dubbed "artist" in season and out, and the other content to be the thing itself, and caring little what label the public may affix either to him or to his work. "The fact," says Mr. Pennell, "that they are artists has been recognised since the earliest ages, and any form of expression they may evolve is gladly accepted if it is artistic; the greater the artist, the more diffident he feels about his position in the world of art."

The title "artist" is usually applied, without qualification, to painters, and to painters only. It is often used when speaking of sculptors, musicians, black-and-white workers, and painter-etchers; but, while no one would dispute the title of the practisers of these arts to be styled artists, the term without qualification would be a misleading one, except in the case of those connected with the arts, *e.g.*, etching and sculpture, more closely allied to painting. To describe a man as "an artist," with no modifying terms whatever, would convey to nine hundred and ninety-nine persons out of a thousand the impression that he was a "painter." We may assume that the thousandth individual is a devoted student of photographic polemics, and would conclude that he was a respectable individual, with a dilettante interest in pictures, who amused himself occasionally in taking photographs. As the English language is employed as a means of communicating ideas amongst all English-speaking people, it is manifestly improper to take an old and generally understood word and apply to it a narrow and altogether new meaning, quite apart from the position of photography as an "art." It would be better, more candid, and much less misleading, to manufacture a new word for the individual who "practises" an entirely new "mode of artistic expression;" either, in the Lewis Carroll style, by christening him a "phartogrister," or, simpler, a "photist" or an "artographer." Any of these terms would be preferable on mere grounds of policy and of philology. It may be a paternal pride, or it may be a just sense of its merit, but I cannot help thinking that the first-named conveys a far more accurate impression of the photographer-artist than either of those terms taken separately; something higher than an artist, but lower than the photographer, something combining the fidelity to detail and accurate drawing of the painter with the imagination, the consciousness, the living personality of the camera (mahogany, taper bellows, rising and cross fronts, swing back both ways, folding into x x y, &c.). On these grounds alone, without going for one moment into the vexed question of photography and art, it must be seen that, whatever the photographer may be, it is impolitic and misleading for him to describe himself as an "artist" without adding thereto any qualifying expression whatever.

Mr. Pennell says that "artists have not insisted on their right to be called artists on every appropriate and inappropriate occasion." This may be beside the mark; photographers perhaps hope that, by dubbing themselves artists with sufficient iteration and reiteration, the public may eventually have so hazy an idea of the meaning of the term as to apply it to both indiscriminately. I fear this hope is doomed to disappointment. Long before photographers made the effort, a very worthy class of men took up the vain attempt to become known as artists. "Artists in hair" are spoken of in the thirties, but still the public, stupid ever, draws an invidious distinction between Truefitt and Turner, and we fear the impecunious barber who obtained credit on the ground that he was an artist (assuming that any one would give more credit to an artist than to a barber) would be regarded as acting under false pretences.

It is to the accomplished littérateur, who is responsible for the "forewords" to the catalogue of one of our exhibitions, that the best definition of the class I have proposed to call "phartogristers" is due. "Photographers should themselves be capable of fixing the standard of merit of their own pictorial works." There is no doubt that, concealed in this paragraph, lies an infallible test as to whether or not any given individual is a photographer or a would-be photographer-artist.

> "Pierre was the bravest man in France.
> He said so, and he ought to know,"

and in Pierre of the poet we have the prototype of the camera worker, who is a much better judge of his own work than any mere student of art or critic who has made pictures and "pictorial representation" the study of his lifetime.

Apart from the mere question of the advisability or not of modifying the perfectly well-understood and accepted meaning of the word artist so as to include photographers—whether or not it is proposed to exclude painters I am not quite certain, but to judge by certain writings I have lately read in which the photographer is constantly spoken of "as the artist" and the painter is described as a "painter," I cannot help thinking it is—apart, I say, from this question, we still have the issue before us whether or not a photographer as such is the thing at present known by the name artist. Here again we have the poet's Pierre before us. It is a singular fact that amongst the many articles, books, and papers on photography, on the fine arts, and on art generally, I cannot recall, and I very much doubt if a single instance can be found, in which any one but a photographer has spontaneously referred to a photographer as an artist. On the other hand, of course myriads of examples in which

ainters are referred to as artists exist. I qualify my statement with ie word "*spontaneously*" because I am, of course, aware of certain uch-quoted newspaper paragraphs which have been only too obviously inspired." If I am wrong in this matter, I shall be glad to have the ror pointed out. I only bring it forward as a fact, and am as anxious see the status of photography raised as any "artist" of the lot, though I deprecate some of the means employed. Let us have examples of the spontaneous recognition of photography as a fine art and photographers as artists by authorities outside the narrow little camera orld, and I should welcome it as much as any other reader of THE RITISH JOURNAL OF PHOTOGRAPHY. Until then the sad truth is forced ome upon us that the only people who admit it, and they themselves re far from unanimous upon the subject, are photographers themselves; they say so, and they ought to know."

Once more let us urge that the way to get photography recognised as art, and to induce the outside world to look upon photographers as rtists, is to produce the proof in the shape of pictures. Here, I would epeat, is the only clear road to such an end, and here we must all recogise are many pilgrims on the way. The growth of exhibitions, the attenon paid to the pictorial side of photography as it is called, will do ore—nay, will do infinitely more, since the other does nothing—to chieve this end, if it be possible, than all the clamorous demands, ritten or verbal, which some photographers put forward without easing. The exhibitors, the workers, are those who really advance ie cause they have in view; the clamant few who shout that they are rtists, who deprecate the judging of photographers by any but photoraphers, can only raise up a counter feeling against themselves and their art."

I was asked the other day to be candid, and say, in so many words, hether I regard photography as a fine art or not, and the reply, I must nfess, was in the negative. In the future, with increased facilities for ie release of the photographer from "mechanical trammels," pictures ay be produced in which photography has played some part; but what oes this release really mean? In plain English, it is simply the facility hich certain methods and processes give for modifying the photographic sult by the adoption of the painter's method. There is nothing new in ie idea; many years ago it was said of M. Lambert that he could retouch a ortrait negative on to a sheet of plain glass, but some modern processes ffer greater facilities, in some cases, by allowing the work to be done on ie print. Taking the perfect photograph as a correct representation in onochrome of the scene before the camera, every departure from that ssens the photographic character of the result, and a print which has ad its highest lights toned down or brightened, or its shadows strengthed either by hand work and paint on the print or on the negative, or y brushing or squirting at a bichromate gum film, or by playing about ith glycerine on a platinotype print, is so much the less a photograph, much the more a painting. And all paintings are not necessarily orks of art.

How photography can ever be a fine art itself I fail to see, since ere is no real room for the personal element whatever. True, at esent it is not difficult to pick out the leading workers' prints in an hibition without using the catalogue; but how much of this is due to ie success with which the photographer conveys to the spectator his pression of the scene depicted, and how much to the fact that certain orkers always choose certain subjects, adopt some particular method or ne in printing, some special style of mounting and framing, or even to ie adoption by some of a definite height for the sky line in their prints? o give a particular example. No one can see the collection of ossetti's work, now on view in London, without getting a glimpse, or en more than a glimpse, of the man, and of his life. What we know the artist confirms, in general lines, the impression obtained from s work, and every picture he produced proclaimed the spirit of the man ho uttered it. Fancy a photographer expressing his emotions through s work! Imagine him printing in a wild and stormy sky to a landscape ecause it was taken when his whole spirit was depressed by the results diarrhœa or a violent cold in the head! Conceive him imparting to enlarged snap-shot a gay, lightsome, frolicking air because his uncle s left him 50,000*l.*, or his wife has presented him with an heir! But ie idea is too grotesque to pursue further, and photographers and their aims must be judged by their works, and by their works alone.

TEMPLE LAMBE, M.A.

SULPHOCYANIDE OF GOLD AND AMMONIUM.

[Deutschen Photographen Zeitung.]

ALTHOUGH the sulphocyanide of gold and ammonium has been used for many years for toning silver prints, such as collodio-chloride, we find, beyond numerous formulæ, little as to the theoretically correct way of mixing it.

As the formulæ given did not satisfy me, and as I was unable to find in chemical books, and even in a monograph on the cyanogen compounds, the necessary information—for these touched but lightly on the compounds of gold and cyanogen—I was compelled to institute some experiments, which have cleared up some points without being exhaustive, and it must now be left to chemists to finish.

In order to better understand the subject, it is advisable to consider what happens when we tone albumen prints with gold chloride and some alkaline salt, such as the phosphate, borate, acetate, or carbonate of soda, &c. The original yellow solution of chloride of gold is rendered colourless by these salts, and this takes place quicker in light than in the dark. There are two-thirds of the chlorine taken away from the chloride of gold, and aurous chloride, AuCl, is formed.

If gold chloride, $AuCl_3$, that is the atom of gold combined with three atoms of chlorine, comes into contact with silver, and as only one atom of silver and one atom of chlorine are required to form silver chloride, it is obvious that three atoms of silver are required to precipitate the atom of gold:—

$$AuCl_3 + 3Ag = Au + 3AgCl.$$

Gold chloride. Silver. Gold. Silver chloride.

The atomic weight of gold is 197, and that of silver 108. According to the above formula, therefore, will $3 \times 108 = 324$ parts by weight of silver be replaced by only 197 parts by weight of gold.

If we use, however, instead of the yellow chloride of gold solution ($AuCl_3$) for toning, the colourless solution of aurous chloride (AuCl) formed by the admixture of the gold with the above salts, there is only one atom of silver required to precipitate one atom of gold.

$$AuCl + Ag = Au + AgCl$$

Aurous chloride. Silver. Gold. Silver chloride.

expressed in numbers, 108 parts of silver only are required to reduce 197 parts of gold. It will thus be seen that a much richer tone is obtained when aurous chloride is used, as the same quantity of the dark silver chloride in the print precipitates three times as much gold as from the auric chloride solution, and therefore it is said that the prints are strongly attacked or eaten away.

An exactly similar case occurs with the sulphocyanide bath.

Before I enter upon the composition of the sulphocyanide bath, it would be as well to say a little more about sulphocyanogen, but I must mention cyanogen. Cyanogen consists of one atom of carbon to one atom of nitrogen (CN) in the proportion 12 + 14 parts by weight. The sum of these two atomic weights, 26, is called the molecular weight of cyanogen, a word derived from κύανος, Greek for blue, because it forms Berlin blue with iron. If cyanogen combines with one atom of sulphur, the atomic weight of which is 32, we have 58 the molecular weight of sulphocyanogen, CNS, or, as Berzelius, the famous Swedish chemist, called it, rhodan, from rhodon, the rose, because, when dissolved in water, it forms a beautiful red liquid with iron.

Both compounds, cyanogen and sulphocyanogen, behave like simple substances, like elements, as they combine with other elements, and also metals, just like chlorine, bromine, and iodine.

Compounds like cyanogen and sulphocyanogen are called radicles. The former has been isolated, and is a colourless, very poisonous gas, which combines with water to form the still more poisonous hydrocyanic or prussic acid. Sulphocyanogen has not been isolated, and it is only known in its compounds, and is therefore called a hypothetical radicle.

Whilst the soluble cyanides belong to the most poisonous bodies, the soluble sulphocyanides are less poisonous or not dangerous.

As we have learnt that there are two chlorine compounds, the auric, $AuCl_3$, and the aurous, AuCl, so there also two analogous compounds of gold and sulphocyanide, the auric sulphocyanide, $Au(CNS)_3$, and the aurous sulphocyanide, AuCNS. The compounds are formed by double decomposition of gold chloride with a soluble sulphocyanide, in the case in point ammonium sulphocyanide.

$$AuCl_3 + 3NH_4CNS = Au(CNS)_3 + 3NH_4Cl$$

Gold chloride. Ammonium sulphocyanide. Gold sulphocyanide. Ammonium chloride.

In order to carry out the decomposition, assuming perfectly pure chemicals were used, there would be required

one molecule pure brown and dry gold chloride = 304·5

and three molecules ammonium sulphocyanide, $3 \times 76 = 228$

If these salts, dissolved in a certain quantity of water, are mixed

together, a greenish-grey mass precipitates, which becomes brighter and does not dissolve on addition of more ammonium, even when boiled, which is a proof that, prepared in this way, it changes, for, as we shall see later, the precipitate of gold entirely dissolves on heating if, at the beginning, more sulphocyanide was added, and only one more molecule is necessary, thus $4 \times 76 = 304$. This is obviously nearly as much as the pure dry gold chloride.

If the latter quantity of ammonium sulphocyanide, that is, one molecule more than the three molecules necessary to precipitate the gold be used, an easily soluble double salt of sulphocyanide of gold and ammonium can be formed, and the precipitate is not a greenish-grey, but a beautiful yellowish-brown precipitate of auric sulphocyanide, which is only slightly soluble in excess of ammonium sulphocyanide. On heating, the colour of this precipitate alters; it first becomes darker, and then, at 50° C., a beautiful red liquid is formed, which, on further heating, becomes gradually brighter, till, at 75° C., it is colourless. The aurous sulphocyanide formed, which, in opposition to the auric sulphocyanide, is easily soluble in ammonium sulphocyanide, has dissolved in the excess of the latter salt, and formed aurous-ammonium sulphocyanide. If the quantity of the ammonium sulphocyanide is not sufficiently in excess, a gold precipitate remains, which, even when considerable excess of sulphocyanide is used, or even on boiling, does not dissolve. It is necessary, therefore, in order that the whole may be successful, to use double the amount of sulphocyanide as calculated, that is, double as much as the gold.

Bühler prescribes three times, and Lainer eight to ten times, more sulphocyanide than, according to the calculation, is necessary in the hitherto used formula, where acetate of soda is used to reduce the auric to the aurous chloride, as much as forty times the quantity of sulphocyanide has been given. It has, however, been proved that this large excess only acts prejudicially on the tone and keeping properties of the bath.

In the preparation of the sulphocyanide bath the above-cited authors recommend that both the gold chloride and the sulphocyanide should be dissolved in a definite quantity of water, and each solution he heated almost to boiling point, and then the gold solution poured in small quantities into the hot sulphocyanide solution; and, after the addition of any small quantity the solution must be heated till any red colour has disappeared. In such a case as the previously described one, there is first formed auric sulphocyanide, which is not stable at a higher temperature, but is reduced to aurous sulphocyanide, which immediately combines with the excess of ammonium sulphocyanide to form the wished for aurous ammonium sulphocyanide.

This is exactly analogous to what happens when dry auric chloride is heated to 150°, for it is then converted into aurous chloride, and two atoms of chlorine escape.

In the conversion of the auric into the aurous sulphocyanide two molecules of sulphocyanogen escape, which makes itself felt as an unpleasant smelling gas, which causes the mouth, nose, and eyes to smart, and this is more noticeable the longer the boiling after the gradual addition of the chloride of gold. When the solutions are mixed in the cold and then heated, this is less noticeable, and the resulting solution is equally as efficacious.

Before giving a practical formula, which has been tested in practice for more than a year, we are, from the theoretical point of view, compelled to ask, What becomes of the two separated molecules of sulphocyanogen?

Because of the strong smell of the fumes given off on boiling, of the strong acid reaction which the gold solution has, I presume that sulphocyanic acid is formed, and I am further confirmed in this view by the following experiments: I heated the mixed solution in a glass retort, instead of an open dish, and passed the vapours formed on boiling through a glass tube into a vessel filled with dilute ferric chloride. The gases absorbed by the ferric chloride solution showed round the mouth of the tube the characteristic red reaction of the soluble sulphocyanogen compounds with the ferric salts.

That the red colouration in the iron solution is due to sulphocyanic acid appears to me to be without doubt; still it has to be proved that the separated sulphocyanogen is converted into its hydrogen compound, for whence comes the hydrogen? If this is taken from the water, what becomes of the oxygen? Or does perhaps, with this process, the sulphocyanogen separate as the hitherto not isolated sulphocyanogen gas? These are questions for the technical chemists, who hitherto, as will be seen from the text-books, have neglected experiments with sulphocyanide of gold.

As we have seen above, with absolutely chemically pure acid-free and dry chloride of gold and chemically pure ammonium sulphocyanide, equal parts are sufficient; but, as excess of ammonium sulphocyanide, even as much as double or treble the calculated quantity, is not harmful, the following practical formula results; but we must still say a few words about the necessary chemicals.

The brown dry chloride of gold should be used. This should, if absolutely pure, free from acid, and without any water, contain, according to the formula $AuCl_3$, 0·649 metallic gold in one gramme; but it is rarely that commercial chloride of gold is found with such a high proportion of gold, but, if the salt is dark brown, and not damp, one may be satisfied if it contain 0·5 gramme metallic gold.

Potassio-chloride of gold and sodio-chloride should be tested. One gramme of pure potassio-chloride of gold should contain 0·475 gramme of gold, and one gramme of pure cystallised sodio-chloride of gold should contain 0·494 gramme of gold. The former is more readily obtained rich in gold than the sodium salt, which is frequently mixed with salt, and Lainer has found two commercial samples which only contained 0·205 and 0·177 gramme of gold.

In order to test the salt, and this is not difficult if one has a fine gold balance and a set of fine weights, exactly one gramme of the chloride should be dissolved in 100 c. c. of distilled water, and to it should be added solution of sulphate of iron acidulated with pure sulphuric acid till a precipitate is no longer formed. The precipitate should be allowed to settle, and a few drops of the iron solution added to the clear liquid to ensure that all the gold is precipitated. The clear supernatant liquid should be carefully poured off, and the precipitate mixed with some sulphuric acid in order to dissolve any basic iron salt that might have been precipitated, allowed to stand for some time, and then diluted with water, and then filtered through a small pure filter, and the filter washed with water till the washings are no longer acid. The filter with the gold is now burnt in a porcelain dish, and on cooling the gold may be accurately weighed to a milligramme.

Ammonium sulphocyanide occurs commercially very pure, and, as according to my formula very little is required, the chemically pure can be bought. A test of Schering's make showed 98·1 per cent.

Dissolve 1 grain of dry brown chloride of gold in 90 c. c. of distilled water. In a porcelain dish dissolve also 2 grammes of pure ammonium sulphocyanide in 90 c. c. of distilled water. Add the gold to the sulphocyanide, and stir quickly, and heat the mixture over a spirit lamp, and stir. At 50° C. the solution becomes a bright transparent red, and at 75° it becomes colourless; then heat till it boils. Allow to cool, filter, and wash the filter till the filtrate measures 200 c.c. When cool it turns yellow again, probably through the re-formation of some auric sulphocyanide; but this is immaterial. This solution will keep for several weeks, and it is as well to keep it in the dark.

If potassio-chloride or sodio-chloride of gold is to be used, one should take, according to the actual proportion of gold, from 1·5 to 2 grammes of the salt.

For use the solution should be diluted with from twelve to fifteen times the quantity of water.

If it will not act, it may be strengthened by addition of more of the concentrated stock solution. It is better, however, to place the used solution in a large bottle, aud shake it up with some zinc filings in order to recover the gold.

This toning bath produces very rich tones from brown to blue, but never double toning. So far as my experience has gone, the tone is permanent.

The addition of strontium or other chlorides has not improved it, at least with collodion paper, according to my experience; it is possible, however, that with other papers its use may be beneficial.

L. Belitzski.

THE ECLIPSE OF THE SUN.

Last week's eclipse of the sun appears to have been observed under favourable conditions at all the stations, and some valuable results are expected to have been secured by the aid of photography. Telegraphing from Calcutta, Reuter says: "It is too early yet to fully state the results of the observations made, but they are known to be most valuable. Totality at Buxar lasted 1 min. 30 sec. Large parties of Europeans proceeded to Buxar, five special trains being required to convey them to the spot. A telegram from Dumroon states that the photographic observations made by the survey party there were entirely successful. Seven good pictures of the corona were obtained during totality."

The observations made at Talni by Mr. E. W. Maunder and Mr. C. Thwaites were very successful. The sky was beautifully clear. The light during the middle of totality was equal to full moon. The following is a statement of the results obtained by the observers: The general shape of the sun's corona was like that seen in the eclipses of 1886

and 1896. The corona extended over two diameters from the sun, and its greatest extent was along the sun's equator. Photographs of the corona were obtained by Mrs. Maunder on a scale of 4-5 in. to the sun's diameter, and also on a scale of 1-10 in. to get coronal extensions. The spectrum of the chromosphere and prominences were successfully observed with an opera glass, fitted with a direct vision prism in one of the eyepieces. Three photographs of the corona were obtained by Mr. Thwaites on a scale of 7-10 in. to the sun's diameter. Mr. Thwaites also secured photographs of the corona on a scale of 1-10 in. to the sun's diameter. Good spectrum photographs were obtained by Mr. Evershed. The spectrum of the "flash" was photographed by the same observer with a prismatic camera, and with a 6-in. telescope.

Observations of the eclipse were also made by a party from the College of Science, Poona, under the direction of Professor K. D. Naegamvala, and by a party from the Lick Observatory, Mount Hamilton, U.S.A., under the direction of Professor W. W. Campbell. Their report is the same as that of Mr. Maunder's party.

They report that the sky was extremely clear, and that their observations were very successful. They found the light during the middle of totality to be greater than that of full moon. The general shape of the corona was similar to that observed in 1886 and 1896. It extended to a distance of nearly two diameters from the sun, and its greatest extension was along the sun's equator.

So far as Bombay is concerned, the result of the eclipse has not quite realised general expectations. As the eclipse reached its zenith, the temperature fell rapidly, and the atmosphere became perceptibly chilly. Quite an earthy smell pervaded the air. One naturally expected to see stars peep out and twinkle in semi-darkness. But the scene was too bright for that, and rather resembled a landscape under a wintry English sun.

At the moment of totality the conditions were favourable at Sir Norman Lockyer's camp at Viziadrug, and the same was the case at Professor Campbell's camp at Jeur. The sun was gradually blotted out, and a marvellous corona of pale silver blue appeared. The duration of totality was two minutes.

Mr. F. W. Dyson, of the Royal Observatory, Greenwich, writes to the daily press: "A cipher telegram has been received from Professor Turner stating that he, the Astronomer-Royal, Captain Hills, and Mr. Newall have had clear weather, and have carried out quite successfully their respective programmes of observation. The photographs have not been developed, so that it is impossible as yet to say how good the results are. The Astronomer-Royal aimed at getting photographs on a large scale to show the detail of the inner corona. Professor Turner proposed to obtain photographs on a small scale to show the extreme extension, and others to determine the amount of polarisation of the corona. Captain Hills attempted to photograph the flash spectrum, and he and Mr. Newall made spectroscopic observations of the corona. The corona extended one radius of the moon in the direction of the sun's axis, both north and south, and three radii in the equatorial direction."

The Rev. J. M. Bacon, F.R.A.S., who has charge of the observing station near Benares, telegraphs that, with the instrument which Mr. Nevil Maskelyne designed specially for his use, he has made a successful exposure for the first "animated photograph" ever taken of any celestial phenomenon. The film will be sent to London forthwith for development, and it is hoped that it may yield results that will be both interesting and valuable from a scientific point of view.

Major-General Sir J. F. D. Donnelly, K.C.B., Director of the Science and Art Department, South Kensington, writes: "I received this morning a telegram from Sir J. Norman Lockyer, dated Majapur, 7.45 a.m., stating: 'Weather excellent and all instruments satisfactorily employed with very good results, except the integrating spectroscope. The temperature fell about 3° C. during the eclipse. It was not a dark eclipse, and very few stars were seen.' I may add that the instruments referred to were (1) a 6-in. prismatic camera—in Mr. Fowler's charge—equipped with two prisms of 45° in place of the one prism with which the results of 1893 were obtained, the dispersion being thus nearly doubled; (2) a 9-in. prismatic camera, in charge of Dr. Lockyer. It has never been used before at an eclipse, and gives a slightly greater dispersion than the 6-in. with only one prism; (3) the grating spectroscope, used by Sir Norman himself for making visual spectrum observations of the corona; (4) two kinematographs, provided and used by the Marquis of Graham, one to photograph the appearance of the approaching shadow and the other the phases of the eclipse; (5) a coronagraph, to be used by the volunteers from Her Majesty's ship *Melpomene;* (6) lastly, the integrating spectroscope, the one instrument from which no results appear to have been obtained. It is the first occasion on which such an instrument has been experimented with at an eclipse."

Our Editorial Table.

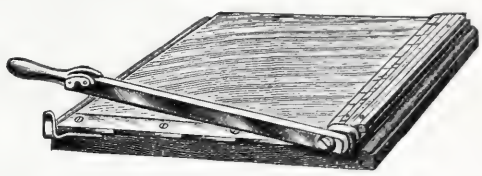
Messrs. Newman & Guardia, Limited, of 90–92 Shaftesbury-avenue, W.C., send us a useful little almanac in the shape of a desk blotting-pad. They announce that they have the agency for the Zeiss stereoscopic binocular, &c., and also enclose a reprint of an article from the *Journal* of the Photographic Society of India, referring in favourable terms to the N. and G. cameras.

For the convenience of their clients, Messrs. Morgan & Kidd, of Richmond, are issuing a book of order forms and an abridged catalogue combined. The headed columns provided on the order forms enable the customer forwarding negatives or prints for enlargement to enter all necessary particulars and instructions relating to what is required to be done. There are counterfoils for remarks. The use of this order book should facilitate the transaction of business on both sides; the abridged catalogue contains the prices of the various kinds of work undertaken by Messrs. Morgan & Kidd.

The Perfected Skate-blade Trimmer.

R. & J. Beck, 68, Cornhill, E.C.

Messrs. Beck have recently made some improvements in this handy little bit of apparatus. In the new instrument a strong metal handle, riveted to the blade so that it cannot break off, has replaced the original one of wood. The hollow-grinding of the blade is done with special



tools. A print trimmer, it is pointed out, which has not a hollow-ground blade, will be found in practice unsatisfactory. Great care is also taken that the hinge bolt and clamping nut are carefully adjusted so that it will not become loose. The addition of a strong guide ensures the blade cutting to the end of the stroke.

The "Luxia" Papers.

(Berger & Co., South Hill-park, London, N.W.)

It says much for the firm hold which the gelatino-chloride of silver printing process has obtained upon photographers that there should be room, at this comparatively late stage, for new makes of the paper. Such, however, appears to be the case. The "Luxia," gelatine paper comes from a source experienced in the production of albumen printing paper, and therefore it may be fairly assumed that Messrs. Berger have correctly gauged the requirements of photographers as regards gelatine. Prepared on selected "Rives" paper only, the "Luxia," both matt and glossy, appears to be very carefully manufactured, the samples sent us yielding us prints of good quality, toning quickly to agreeable colours, and presenting in the finished results examples vying with the most desirable specimens of the process. The paper is also issued with a white enamel surface. All three papers are amenable to ordinary treatment in the way of washing and toning, the instructions for which are commendably brief and pointed.

Animated Photography: The A B C of the Cinematograph. Price 1*s*.

[By C. M. Hepworth. London: Hazell, Watson, & Viney, Creed-lane, E.C.]

Mr. Hepworth was just the one to undertake the writing of this book, for not only is he an expert in practical projection work, but he has given a very great amount of study to apparatus for cinematography, and, we believe, has his name associated with one or two inventions in connexion therewith. The book, into which a great deal of sound work has been put, is possibly above the heads of the "amateur"—to whom it is addressed—but it should be found extremely useful by those commercially interested in cinematography. The optical and mechanical systems, the kinds of mechanism and movements pressed into service in cinematographic machines, the shutter, illuminants, the production of the film positives, and other subjects, are fully dealt with by Mr. Hepworth, who is to be felicitated on a good and useful book, heartily to be recommended to those directly interested in the newest development of photography. But—"cinefilms!" what a horrible bit of word scaffolding, Mr. Hepworth.

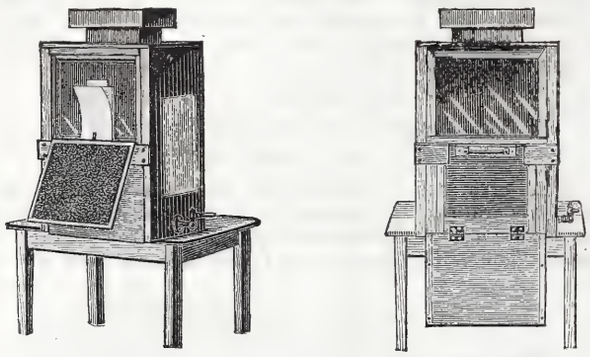
Chedell's Bromide Printing Apparatus.

Agent: C. A. Rudowsky, 3, Guildhall Chambers, E.C.

This is a simple bit of apparatus for making bromide prints in contact, the principles of which will be easily understood from the following description of the method of using it: Screw the apparatus on the stand, so that the slide does not catch against it when pressing down. Open the lid and fasten the negatives with strips of gummed paper on the corners of the glass, so that it is flush with the lower edge. If vignettes are wanted, fasten the vignetting mask (which must be larger than the

plate) between the glass and the negative, then place the whole into the frame, so that the glass with the negative goes behind the spring. Place the negative so that the spring catches it just in the middle of its lower edge. Now light the lamp, and in two or three minutes the plate glass will become warm and clear, and you can commence exposing.

All other light must be excluded, as the red light on both sides of the apparatus is sufficient. On the left hand of the apparatus place the cut paper, and on the right side the dishes for developing and fixing. To expose, take with the left hand a piece of bromide paper, place it on the



negative behind the spring holding the plate; with the right hand press the handle of the lid against the apparatus, at the same time quickly press downwards for exposure. Time of exposure, according to negative, light, and whether vignette or not, two to five seconds; by using incandescent light, two seconds. After exposure, pull the slide quickly upwards, open the lid, remove print, and develop. When the correct time is found, one can keep on filling, exposing, and developing; but, if the developing is only to be done after all the prints are exposed, protect the prints from the red light meantime.

News and Notes.

WE stated last week that Mr. A. Langfier's new address was 494, High-road, *Brondesbury*. It should have been "High-road, *Chiswick*."

PHOTOGRAPHIC CLUB.—Wednesday evening, February 2, 1898, at eight o'clock. Trade Night. Manufacturers and dealers wishing to introduce their novelties should address the Hon. Secretary.

MR. A. H. BENNETT has resigned the position of Hon. Secretary to the Derby Photographic Society, and is succeeded by Mr. E. Fearn, 76, Richmond-road, Derby, to whom all communications should in future be addressed.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—This Society will hold its Annual Dinner on Saturday, February 5, at 6.30 p.m., at the Montpelier Tavern, Choumert-road, Peckham, S.E. All communications respecting same should be addressed to the Hon. Secretary, Mr. A. E. Allen, 27, Princes-square, Kennington, S.E.

A FIRE broke out early on the morning of the 20th inst. at 54, Mare-street, Hackney, on the premises of Mr. T. Fisher, photographer. A timber-built erection, used as studio and stores, became alight from one end to the other, and was completely razed to the ground. The cause of the fire has not yet been ascertained.

MESSRS. FUERST BROTHERS, 17, Philpot-lane, London, E.C., write: "It may be of interest to your readers to know that we have reduced the price of the Lumière cinematograph camera (which is capable of photographing, copying, projecting, and reversing animated pictures) to 40*l*. This price should induce its general adoption by the trade."

THE SERVANTS AND THE PHOTOGRAPHER.—Two domestic servants, named Youall and Stewart, sued a Mrs. Smith, of Balham, at the Wandsworth County Court, to recover one month's wages in lieu of notice. It appeared that, when plaintiffs were engaged, they were told that no followers would be allowed. Towards the end of the year they had their photographs taken, and it was arranged with the photographer that when he had finished the photographs he should take them round to the kitchen. As it was a wet night when the photographer called, he was asked into the kitchen whilst they looked at the photographs, and whilst they were doing so the mistress entered the kitchen, and they were told to leave the house at once, their wages being paid up to that day. Judgment was given for the defendant, to the evident surprise of plaintiffs.

Patent News.

THE following applications for Patents were made between January 10 and January 15, 1898:—

KINETOSCOPIC PROJECTION.—No. 681. "Improvements in and relating to Projecting Apparatus and Cameras for Kinetoscopic Pictures." Complete specification. W. C. HUGHES.

SLIDE-CARRIER.—No. 717. "A New and Improved Slide-carrier for Magic Lanterns and similar Apparatus." P. J. JACKSON.

KINEMATOGRAPHY.—No. 721. "Reversed Motion in Kinematograph Pictures." J. TROTTER.

PHOTOGRAPHY IN COLOURS.—No. 838. "Improvements in or relating to the Process of Photography in Colours." Communicated by L. P. Dugardin. R. HADDAN.

CINEMATOGRAPHE.—No. 990. "Portable Cinematographe." J. PESCHEK.

HAND CAMERAS.—No. 1189. "Improvements relating to Magazine Hand Cameras." A. C. JACKSON.

DARK SLIDE.—No. 1097. "Reliable Spring-fastener and Light-protector combined for Photographic Dark Slide." W. MANNING.

PHOTOGRAPH-HOLDER.—No. 1104. "Appliance for Holding Photographs or other Articles." G. C. CUNNING.

FLASH POWDER.—No. 1126. "Flash Powder for the Taking of Photographs by Artificial Light." Complete specification. A. WEISS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

January.	Name of Society.	Subject.
31	Camera Club	Smoking Concert
31	Croydon Camera Club	Meeting of Refreshment Committee.
31	North Middlesex	Informal Meeting
31	Richmond	Demonstration: *The Gum-bichromate Process.* C. Sheed.
February.		
1	Aintree	Ladies' Social
1	Brixton and Clapham	*Developers and Development.* Ethelbert Henry.
1	Gospel Oak	Home-made Apparatus and Photographic Chat.
1	Hackney	Sale and Exchange Evening. W. L. Barker.
2	Croydon Camera Club	Council Meeting.
2	Edinburgh Photo. Society	*The Comparative Advantages of Enlargements and Direct Photographs.* Enlargements: William Hume. Direct Photographs: James Hay.
2	Kingston-on-Thames	Beginners' Night: Lantern-slide Demonstration.
2	Leytonstone	*The Yellowstone Park.* Captain J. M. Knight, F.G.S.
2	Photographic Club	Trade Night: Novelties, &c.
2	Southport	*Portraiture.* Harold Baker.
3	Birmingham Photo. Society	Third Annual *Conversazione.*
3	Bolton Mutual Photo. Society	*Sunny Memories.* J. W. Wade.
3	Camera Club	*Physiology of Thought and Memory.* P. W. Ames, F.S.A.
3	Leeds Photo. Society	Annual Lantern Show of Members' Work.
3	Leigh	*Five Days in the Lake District.* W. Hampson
3	Liverpool Amateur	*Photo-micrography.* F. W. Sawby.
3	London and Provincial	Photographic Chat. E. Banks.
3	Manchester Amateur	*Practical Photographic Dodges.* C. M. Hepworth
3	Woodford	*Elementary Optics.* R. Child Bayley.
4	Plymouth	Demonstration: *Enlarging and Reducing by Hume's Cantilever Enlarging Lantern.* R. Rugg Monk.
4	Wakefield	*A Mountaineering Experience.* Alex. Keighley.

ROYAL PHOTOGRAPHIC SOCIETY.

JANUARY 25,—Technical Meeting,—Mr. A. Haddon in the chair.

DENSITY MEASUREMENTS.

Mr. CHAPMAN JONES exhibited and described the completed form of his apparatus for measuring the densities of photographic plates, a provisional model of which was shown at a meeting of the Society in December 1895, and referred to in these columns. The instrument had been made by Messrs. Baird and Tatlock, and chiefly differed from that originally designed for experimental purposes in the following respects: the baseboard had been cut away so as to get rid of the reflection from it, and from the white scale upon it, which in the original had introduced disturbing influences, and necessitated the use of a strip of black velvet; the width of the apparatus had been increased, obviating the risk of damaging one of the mirrors by heat; and the sliding carrier would now take a plate larger than quarter-plate size. The scale of the instrument was marked on one side in opacity logarithms, the other side being left blank, in order that the user might put upon it any scale which he preferred. The principal points were that only one light was employed, the readings were obtained by one simple movement, and the avoidance of the possibility of the scattering and consequent partial loss of any of the light that had passed the plate being tested. Mr. Chapman Jones described the working of the apparatus, when he first introduced it, as follows: "One light only is required, and it shines directly upon one side of the test plate, and, by means of these mirrors and a velvet-lined tube with diaphragms, a beam is brought round to the other side of the plate. The test plate is Captain Abney's arrangement of a translucent and opaque white surface in juxtaposition, the one being illuminated by transmitted light, and the other by light impinging upon it from the front. When both are equally bright, the test plate is at the zero point, then the photographic plate

o be measured is brought immediately behind the translucent portion, and the rrangement is moved until the equality of brightness is restored. The scale hows the density of the interposed deposit."

PHOTOGRAPHY FOR ORNITHOLOGISTS.

Mr. R. B. LODGE read a paper entitled *Photography of Bird Life in Spanish nd Dutch Marshes*, which was illustrated by a large number of lantern slides rom photographs of birds and birds' nests of very great beauty, taken in ost cases under circumstances of exceptional difficulty, and requiring, not nly the exercise of considerable patience and perseverance, but also the ndurance of no slight physical inconvenience and danger. The lecturer egan by remarking that photography was a very big subject, a great deal oo big for any one man to tackle in every branch, and therefore the best lan was to take up and stick to a particular department in which one appened to be specially interested, and he had therefore taken to the tudy of natural-history photography, having formerly been, unfortunately, wood-engraver, a profession which had died a somewhat unnatural death t the hands of its rival, photography. The difficulties of this branch of ork arose not only from the small size of the objects, which rendered necessary to get within a few yards' distance of them, but also from he fact that birds and birds' nests could generally only be photographed dark corners and amongst dark-coloured foliage, and that the olours of the birds themselves were frequently bad from a photographic oint of view, yellow and reddish-browns predominating. Mr. Lodge described is adventures upon Dutch meers, in which he sometimes stood waiting for ours, waist-deep in water, for a heron or tern to settle upon its nest and be hotographed; and his attempts to make exposures from a punt, when the utch boatman always wanted to light his pipe at a critical moment, scaring way a bird whose advent had been awaited with a degree of patience which ob was certainly never called upon to exercise, and which he probably had ot at his disposal even if he had required it. It must have been a little annoy-g, to say the least of it, to find that, after waiting on the alert for four ours in three or four feet of water, the plates had become fogged owing to eir prolonged exposure in the camera with the shutter of the dark slide awn, having stood all that time ready to release the shutter at the instant bird alighted upon a particular spot. The results of ornithological expedi-ons in Holland and Spain were very fully detailed and illustrated, and the cture concluded with an exhibition of slides depicting bird life on the Farne lands, where puffins, guillemotes, kittewakes, gulls, terns, eider duck, and rmorants are to be found in enormous numbers, and so tame that they n be approached very closely.

Messrs. HOWARD SANDERS, CROWLEY, KEARTON, BIDWELL, and PENROSE luded to the difficulties which they had experienced in the pursuit of their servations of the peculiarities of bird life, and Mr. MARRIAGE suggested at negatives taken with an ordinary rapid rectilinear lens might, upon bsequent enlargement, yield better results than those taken with a tele-otographic lens as used by Mr. Lodge.

Mr. LODGE, in reply, said his exposures averaged about one-eighth of a cond. For a bird on a nest he could sometimes give as long as three or four conds, but a bird "on the hop," especially a small bird, required a very ort exposure. He first used a whole-plate camera, weighing "about a ton," d was constantly modifying his apparatus, being now engaged in completing quarter-plate camera, with which he proposed to try a single lens of sixteen ches focus. He did not think an enlargement from an ordinary negative uld be of much use for this work, birds being usually so small that the age was usually so minute that enlarging would not yield a satisfactory ult, it would not stretch enough to be useful. He hoped to be able to ploy, with his new camera, a tele photographic lens with a camera ex-sion of from seven inches to twenty-four inches, a single sixteen-inch lens, a rectilinear lens of ten-inch focus. He had not used isochromatic plates, hough he would much prefer to do so, because they they were not fast ough for his purpose.

Mr. SPILLER proposed a hearty vote of thanks to Mr. Lodge, which was ried by acclamation.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NUARY 20,—Mr. Robert Beckett in the chair.

The CHAIRMAN remarked that at a meeting he had recently attended a ques-n arose as to which was the best way to diffuse the light issuing from the ndenser, by placing a piece of ground glass with its ground surface towards light or away from it, and, in repeating the question, he described how same arose. An enlargement was being made, but it was found that the andescent gas burner threw its image upon the easel, to obviate which the gestion was made that a piece of ground glass should be inserted between light and the condensing lens.

Mr. E. GEO. HARVEY had met with the same difficulty. He was making an arged negative from a somewhat thin positive, and was troubled with an ge of the lamp flame, slight, but quite sufficient to mar the result. ntually he used ground glass, trying both sides in turn, and found that, nything, the best diffusion was secured with the ground surface towards lamp. It made a difference of almost double in the exposure.

Mr. E. H. BAYSTON had the same difficulty with a three-wick lamp, getting ven illumination on the screen, to obviate which he substituted a pane of und glass (which particular side towards the flame he could not say) for ordinary clear glass in the front of the lamp.

Mr. A. HADDON could see no reason to suppose that the ground surface ards the light was superior to the other way, or *vice versâ*.

Mr. BAYSTON, in answer to a question, said that, of course, by putting the und-glass diffuser in contact with the negative, it was only natural to ect that the resulting image would exhibit an enlarged copy of the grain of glass.

Mr. EDWIN BANKS was frequently called upon to use such a device, but er employed ground glass on account of the consequent loss of light. In own practice he coated his condenser on its end nearest to the light with a little fine matt varnish. By so doing he got a more even effect of illumination and no grain, and, what was very important, the exposure was not materially lengthened.

Mr. HADDON observed that ground-glass globes were known to stop about forty per cent. of the light.

The HON. SECRETARY admitted the difficulty of getting rid of the image of the flame, but, with an adjustable reflector, it was possible to so break up the flame that this was, to a large extent, corrected. For the best effect it was necessary that the focus of the condenser should be such as to suit the particular lens employed.

Mr. H. RAPSON inquired for the best way to illuminate the negative for copying by artificial light without a condenser. He referred to both enlarging and reducing.

Mr. HARVEY had worked with tolerable success with magnesium burned behind a ground-glass screen, keeping the ribbon on the move during exposure.

Mr. RAPSON was inquiring, because what seemed to him to be theoretically a correct method had turned out less satisfactory than was to be expected. The method was to have a practically flat source of illumination, eleven incandescent burners arranged in a row; at an angle of 45° with this was a flat, white screen, while at the same angle with this was the negative to be reproduced. He found great difficulty in getting proper illumination by this means.

Mr. BANKS said that a very efficient screen for diffusing light was to be made by dissolving gelatine in skim milk, and coating on a sheet of glass. The mixture would dry with a semi-opaque appearance, and, while a perfect diffusing agent, stopped no light. It was practically opal, without its light-stopping power.

An exhibition of lantern slides followed, subjects being contributed by Mr. Kellow, Mr. Hodges, and the Hon. Secretary.

PHOTOGRAPHIC CLUB.

JANUARY 19,—Mr. J. E. Hodd in the chair.

In Mr. John H. Gear's absence, the HON. SECRETARY read the Affiliation lecture on

BROMIDE ENLARGING.

The author discusses the subject of enlarging direct on to paper both by daylight and artificial illumination. Having described the most suitable kind of negative for the purpose, the paper details the various means for securing evenly distributed lighting of the same, as well as the special forms of apparatus required. In giving instructions for the arrangement of artificial sources of illumination, the author treats of the electric arc, the incandescent gas, and oil-lamp systems, paying due attention to the question of reflectors, diffusers, and condensing lenses, and, with the aid of diagrams, makes clear the functions and the distribution of the several pieces of apparatus to be employed. Exposure receives its due share of attention, with hints as to the relative exposures required for varying sizes of enlarged image; after which different methods of developing, with formulæ, are discussed. The lecture was attentively followed, and the instructions were clearly put in a concise and interesting form.

The CHAIRMAN put considerable stress upon the importance of the incandescent gas burner to the amateur enlarger, who, more often than not, had perforce to use artificial light, and personally he had found this an ideal illuminant. He could not but think that the best way to adopt in enlarging was to make an enlarged negative, from which prints in any process could be made, and for this purpose he found the incandescent gas burner, in conjunction with a condenser and long-bellows camera of the cheap *multum-in-parvo* type, all that was needed, up to 12 × 10. He found the best process for the intermediate transparency was the Novitas stripping film paper, and did not believe this was used to the extent which it deserved. The method was of advantage in the printing-in of clouds and other dodging, and was very expeditious. As regards the statement that the focus of the lens used should be one and a half times the base of the negative, although it was true that they were taught to use a long-focus lens, yet in actual practice it was more convenient to use one of shorter focus, provided it be a good instrument, and he himself was using a five-inch Goerz, which enlarged to any size perfectly.

Mr. W. THOMAS pointed out that the lecture was purposely confined to bromide enlarging, so that the fact that the author had not fully covered the whole field was intentionally so. Primarily, these lectures were intended for those societies the members of which were just beginning to realise the difficulties of photography, and were so written that they should be easily understood by the youngest worker. He recalled a demonstration of the use of reflected artificial light without the intervention of condensers by Mr. Fry, and the good results obtained by this arrangement. By means of the reflected light from two sources, the limelight being the form used, a life-size bust from a strong quarter-plate negative was secured with a minute's exposure, and the enlargement was certainly good.

Some discussion took place upon the value of ground glass, oiled paper, and other diffusers in conjunction with the condenser, and

Mr. EDWIN BANKS said the surface of the negative had a great effect on the result when working with a condenser, any unevenness or damage to the film coming out on the enlargement with great distinctness. In the case of a retouched portrait negative, every trace of the abrasion of the film came out strongly on the enlarged print, and, for the purpose of obviating this, a piece of ground glass was very suitable.

Mr. J. H. BALDOCK spoke in favour of the ground glass in conjunction with condenser and limelight, and said the lengthened exposure was immaterial. As regards the lens, he did not agree that the lens used in taking the negative was always suitable for the actual enlarging when using a condenser. It was sometimes difficult to get the lens to take up the cone of rays from the condenser unless this was an expensive one, and he experienced this when using a lens of five and a half inches' focus for enlarging, which was that used in taking the photograph. A lens of longer focus (about nine inches), however, was found to get over this, and gave a perfect disc on the easel. He thought

the lecturer unjustly ran down snap-shot negatives. His best results were by this means, and they were often much more suitable for enlarging than those of stand cameras. He favoured the permanganate test for hypo to that of starch used by the lecturer, and said a weak solution made a very simple and easy testing method.

Mr. PARFITT remarked on the latitude of focus in enlarging, and the difficulty of finding the exact focus of the image. It was possible to rack an inch and find no difference in the definition.

Mr. BRIDGE advised the use of a ruled plate previously fixed and dried, and to focus on that.

A long discussion ensued on the qualities of bromide prints, their permanence and after-treatment, and a vote of thanks was accorded to the Affiliation Committee and to Mr. Gear.

Camera Club.—Thursday last week at this Club was devoted to an account of Mr. E. T. GARWOOD'S experiences in the interior of Spitzbergen, where he went in 1895 in company with Sir Martin Conway. The latter was bent upon map-making, whilst Mr. Garwood himself was more interested in tracing the geological features of the country; and, fortunately, for stay-at-home people, he carried with him a camera, with which the excellent series of views which illustrated his remarks were taken. It seems to be the business of the modern explorer to upset all the notions with regard to geography which we have, most of us, gathered at school. Spitzbergen was supposed to be a land covered with an almost impenetrable ice cap, a place where mother earth was never seen, but supposed to be hidden somewhere below if any one had the hardihood to pick through yards of solid ice to find her. This is quite erroneous, for, although there is plenty of ice and snow, the rocks and soil in many places are plainly apparent—at least in the summer-time—and the temperature in the sun often reaches a high point. In the winter-time it must be confessed that Spitzbergen is not what a house agent would describe as a "residential neighbourhood." As a matter of fact, no one resides there, or can reside there. It is a no-man's land, totally without inhabitants. The Russians, some years ago, had a thought of establishing a colony there, and they offered a number of convicts, who had been condemned to death, a home there on the condition that there they stopped. Of course, this was a tempting straw to drowning men, and the convicts were duly landed on the island; but, before the Russian ship started on its homeward voyage, they came in a body to the captain and begged to be taken back to Russia and be hanged. This was not very flattering to Spitzbergen as a country; at the same time we must remember that these men were not of the type which we associate with missionaries and pioneers. The west coast of the island is convenient of access because it is washed by the warm water of the Gulf Stream; and at one point a steamer makes its appearance at weekly intervals in the summer months, and a certain number of tourists find their way to Spitzbergen by this route. Why they go there, and how they occupy their time when they get there, are problems difficult to solve. Certainly there are some wild fowl to be shot, and occasionally, but very rarely, a reindeer will cross the path of the sportsman. Although the interior of the island is not covered with ice, there are glaciers to be crossed, rapid rivers to be forded—rivers caused by the melting of the snow on the mountains—and peaks to be climbed. The lecturer and Sir Martin Conway took with them only two men, supposed to be both Norwegian sailors. One was good enough, and answered to the description; but the other was a rough peasant, and a fraud, who, when they had been only a few days on their inland journey, feigned illness, and wanted to go home to his mother. The real fact was, that the work of hauling a sledge he considered too hard to be comfortable, and he wanted to get back home to enjoy a little leisure. The four wanderers dragged two sledges between them, and the work was hard. Mr. Garwood told his audience that he had never worked so hard in his life. Before he took to sledge-drawing, he had never believed in the Pythagorean doctrine of the transmigration of souls. Now, however, he was quite convinced that the soul of a pig occupied his sledge, for, when you tried to pull it in one direction, it always made a point of shooting off in another. They slept in curious little tents, the supports of which were formed of their long Norwegian snow shoes, but the difficulty of making the tent pegs hold in the frozen ground or ice was very great. It was generally ice, and when they arose in the morning very perfect impressions of the human form divine were melted into the ice where they had lain. The island seems to be extremely subject to fogs, and for five days, travelling in Indian file and roped together, the last man could not see the first. When, however, they got upon higher ground, they often had days together of unbroken sunshine, ascertaining afterwards that on the coast the thickest fog had been reigning supreme all the time. There was at that time of year no night to speak of, but there was a great difference in the actinism of the light, a photographic exposure at midday requiring only one-seventh of the same subject taken near midnight. The chief photographic difficulties seemed to be a want of density in the negatives taken, probably due to deterioration of the plates during the long interval which elapsed between exposure and development, and plentiful measles which attacked the films used and infected some of the plates. In spite of these little accidents, Mr. Garwood secured a series of negatives of which any photographer might well feel proud, considering the conditions under which they were taken; and the lantern slides from them as they were thrown upon the screen elicited frequent bursts of applause. The lecturer said that the two first things which most struck the traveller in these out-of-the-way solitudes was the intense and awful stillness, and the wonderful effects of colour. There was a deficiency of red, but every other colour in the spectrum was represented in the sky, and the sky, of course, bossed the rest of the landscape. The rocks, too, offered much diversity of tint, and especially was this the case with three peculiar mountains which thrust their noses through the snow, and were called the three crowns, a fit name, for they consisted of huge masses of carboniferous limestone, which were gold in the sunshine, set upon cushions of Devonian formation which glowed royal purple. These peaks were climbed, and their portraits were taken from many points of view. The photographs of coast scenery were also full of charm, the precipitous and ice-clad land being repeated in the water, while icebergs large and small floated on the surface of the sea. A very beautiful effect was shown in one of the larger bergs, the sun being behind it and showing very plainly its transparent structure. There is a good deal of coal in the island, but difficult to get at on account of the ice, but former explorers have used it for their vessels. There are also valuable beds of phosphates which are at the disposal of anybody who cares to work them. The explorers were not very well off for food, and depended chiefly upon "Bovril ration cartridges"—they usually eat a blue one for supper and a red one for breakfast. They also had "emergency rations"—a kind of *multum-in-parvo* dinner about as big as a stick of chocolate, but not half as nice. However, a stick of it made our explorers feel fit for work for the next six hours. On this kind of food they did not gain much flesh, but, when they got to the coast, they fattened up on little auks, puffins, &c., the puffin being very dainty fare. The lecture, which was given without notes of any kind, was listened to with the greatest attention, and a desultory discussion followed, in which Captain Abney and others took part.

Croydon Camera Club.—Judging by the large attendance and the enthusiastic applause, the thirty-fourth public lantern display of photographs held by the Croydon Camera Club on Wednesday, January 19, at the Small Public Hall, Croydon, must be pronounced a decided success.

THE VELOGRAPH.

The proceedings opened with a telling series of animated photographs, shown by means of the velograph, handled in a very effective manner by Mr. Harrison. The films exhibited thoroughly aroused the audience's approval, which was in several instances manifested by loud and prolonged applause, notably when a scene entitled *French Boxers* was run through, on which occasion the demand for an encore was so persistent, that it became necessary to explain that technical details did not permit of the scene being repeated. Other subjects which were particularly appreciated were *Serpentello*, *Horse-jumping at Addiscombe*, *Rough Sea*, *Snowballing*, and *Stable on Fire*. The velograph is, without doubt, an instrument which is capable of displaying, in an exceedingly efficient manner, photographs in motion.

CORNWALL AND WALES.

The second part consisted of members' slides, first—and best—being the series illustrating *North Wales*, by Mr. H. E. Holland, whose long and exquisite set of technically delightful, and oftentimes artistically praiseworthy, pictures met with great appreciation. A very interesting set illustrating that peculiar phenomenon "The flowing of the Bourne," in the Caterham Valley, and at Cheam, by Councillor Noaks, followed, after which came a few slides of local artists and their work by the President, who drew special attention to Mr. John Dennis ("The Painter Postman of Croydon"). Next in order was a graphic collection illustrating the great storms which wrecked the Margate sea front and overturned *The Friend of All Nations*. The foregoing were by Mr. Allen Noaks, from negatives specially taken by Mr. Woodcock, who also was represented by a capital cat picture. Mr. W. H. Rogers contributed a number of mixed slides, many gaining warm commendation, notably *Old Folk at Home*, as also did those of Mr. H. L. S. Richardson, consisting of scenes in the east of Europe. Mr. Chadwick Taylor was also in his usual good form. Finally, Mr. L. G. Kough (the Hon. Secretary) exhibited twenty-five slides, most of which were scenes in Cornwall. Many of them were characterised by sound judgment in selection of subject, together with much technical ability. *Looe Harbour*, *Crumple Horn* (the birthplace of "Old Nick"), *A Farm house Kitchen*, may be mentioned as favourable examples of Mr. Kough's proficiency.

Hackney Photographic Society.—Mr. William Rawlings presiding.—Mr. W. L. BARKER gave a lecture and demonstration on

FINISHING BROMIDE ENLARGEMENTS IN BLACK AND WHITE.

He said that there were few enlargements that were not better for some after treatment; either there were defects to be made good, or else parts required working up. The outfit necessary was not large nor expensive. It should consist of: pumice powder, sauce velours, powdered blacklead, cotton-wool, a palette, stumps, crayons and holder, erasers, a drawing board, easel, and mahlstick. To prepare a bromide print for working on, it should be dusted with pumice powder and the latter well rubbed on the surface by means of cotton-wool in order to give the print a tooth for the pencil. With the aid of the above articles Mr. Barker demonstrated how to proceed in strengthening a bromide enlargement. The deepest blacks were produced by the sauce velours or a fine black powder; half-tones by a mixture of powdered pumice and powdered blacklead; high lights by erasing portion of the half-tone by the application of the stump or cotton-wool. For broad effects pigment was applied by means of a piece of rag wrapped round the finger. For finer work Woolf's crayon pencils were used in grades, H, H B, B, and B B, as might be required.

Kingston-on-Thames and District Photographic Society. — January 12 —Mr. W. F. J. HODGSON delivered a lecture, having for its title

YE OLDE CINGSTUNE, GOING! GOING! ——!

The lecturer, who had been three years getting together the material he made use of, showed a large fund of information about old places of interest in Kingston, and illustrated his remarks by some excellent slides. The subject was handled in a masterly manner, and Dr. Finny, in proposing a vote of thanks to the lecturer, congratulated him very warmly on his success, and supplemented Mr. Hodgson's remarks by giving an interesting account of the history attached to some of the old inns mentioned in the lecture.

North Middlesex Photographic Society.—January 10, Annual General Meeting, Mr. J. C. S. Mummery in the chair.—Messrs. S. C. Puddy and H. P. Perkins were elected members of the Society. The Treasurer read the balance-sheet, which showed a fairly satisfactory state of things. A good deal having been spent in apparatus, &c., during the year, the shortness of funds was more apparent than real. The balance brought over was 1*l.* 14*s.* 2

Mr. WALKER moved the adoption of the balance-sheet, coupled with a vote of thanks to Mr. Smith for his services. Mr. PRING seconded, and it was carried. The reports of the Outings' Committee, the Librarian, and Lantern Slide Committee were read and passed. The President then read his annual report. He reviewed the work of the past year, and said that the series of lantern-slide competitions, inaugurated in the beginning of last year, had proved a signal success, and the strength of the Society numerically was as great as it had ever been. The PRESIDENT moved that a vote of thanks be passed to Mr. Taylor, who was retiring from the secretaryship. Mr. MACINTOSH seconded. Mr. TAYLOR, in his reply, said he would ask the Society to pass a vote of thanks to Mr. W. J. Simpson, the Assistant Secretary, who had served three years, and now found it necessary to retire. Mr. STEELE seconded, and it was carried. The election of officers for the year then took place, resulting as follows:—*President:* Mr. J. C. S. Mummery.—*Vice-Presidents:* Messrs. W. B. Goodwin and A. H. Lisett.—*Council:* Messrs. J. Addison, H. W. Bennett, F.R.P.S., A. J. Golding, J. MacIntosh, J. W. Marchant, F.R.P.S., E. R. Mattocks, J. A. Meen, W. J. Simpson, C. R. Steele, H. Stuart, and W. Taylor.—*Librarian:* Mr. F. W. Cox.—*Treasurer:* Mr. Henry Smith.—*Hon. Secretary:* J. Durston, 5, Landrock-road, Hornsey, N.—*Assistant Secretary and Curator:* G. J. Haviland.

JANUARY 17, Mr. Mattocks in the chair.—The first of a series of instruction lectures was given by Mr. Gosling. These lectures have been arranged with the object of giving beginners a thoroughly practical knowledge of photography. Mr. GOSLING chose for his subject

FIRST STEPS IN PHOTOGRAPHY,

which he treated in quite an elementary manner, his object being to appeal to the novice. After going very fully into the theory of development, he gave a practical demonstration by developing three plates, one of which he considered correctly exposed, and the others under and over-exposed. Working with a nominal pyro-soda developer, he asked the audience to watch its action on the several plates, and in the end produced negatives characteristic of the different exposures. The paper and subsequent manipulations were followed very closely, some half-dozen visitors and new members taking the keenest interest, more experienced workers taking "back seats," as is usual on these evenings.

Bath Literary and Philosophical Association and Bath Photographic Society.—On Friday evening, the 7th inst., a *conversazione* was held under the joint auspices of these societies.—Mr. George F. Powell (President of the Photographic Society) presided. There was a large assemblage of members, and an excellent programme was presented. In reviewing this, the CHAIRMAN remarked that the aim had been to introduce interesting matter rather than an exhibition of the latest novelties. He was pleased to announce that Colonel Blathwayt would describe the *Use of the Tele-photographic Lens and Photography of Small Objects in the Ordinary Camera.* Mr. Austin J. King had kindly prepared a paper on *Bolton Abbey*, historically and pictorially treated. He would not anticipate these papers, as both the Colonel and Mr. King had given them opportunities of testing their powers at entertainments. At nine o'clock an interval of twenty minutes had been set apart for the company to partake of refreshment and examine the display of framed and unframed photographs, albums, transparencies, stereographs, &c. Resuming work, Mr. Rositter would give a short illustrated paper on some notable gardens in the locality, and the remainder of the time at their disposal would be occupied by a display of lantern slides sent in by members. Regarding this latter exhibit, he asked that each set be described by the author. Colonel BLATHWAYT then explained the characteristics of a tele-photographic attachment, and by way of illustrating his subject he showed on the screen a general view of Caudebec, a town in Normandy, taken with an ordinary lens, in which the church spire, a quarter of a mile off, appeared as a minor object. Placing on the attachment, another view was taken from the same point, which showed the spire as the principal object; a third showed only a part of the tower, but all the architectural details were marvellously rendered. Still more interesting was a photograph of the moon. The exposure was about half a second, and from measurements the lecturer inferred the moon must have travelled fifteen miles during this exposure; notwithstanding, the slide was sufficiently sharp to enable him to point out all the mountain ranges, trace the shape of the seas, the volcanoes, and approximate the diameter of some of the craters and other natural features. Slides of insects, photographed direct, not flattened, were also shown. Mr. AUSTIN J. KING, Past-President, read a paper on

BOLTON ABBEY; HISTORICAL AND PICTORIAL.

He commenced with an account of the conditions of living in early times previous to the foundation of abbey lands, when agriculture was pursued by patient, industrious, religious orders, but neglected by the fighting orders. As time rolled on, the tillers of the land accumulated wealth, and this was spent in the construction and adornment of sacred edifices. Having dealt with the history of Bolton Abbey, the lantern was brought into requisition, the first illustration showing two important periods of style of architecture. This was followed by others embracing all the best points of view of the ruined Abbey, and others showing the fifty-three stepping-stones across the river, the only convenient passage to the ruin. Following the river up through beautiful scenery, the rapids were referred to. One place, where the rocks are a little more than a yard across, the depth of water is over forty feet, and a limb of a tree thrown in at this point failed to rise again for a considerable distance, and then minus nearly all its bark. The lecturer showed about thirty pictures from the number he had taken, all of which were lucidly described. After tea the company spent some time in examining and criticising the photographs displayed on the walls and the tables. The principal contributors were as foliows:—Miss Bruère, mounted and unmounted prints, embracing several methods of printing, including red, sepia, brown, and black tones, bromide enlarged through the meshes of a fabric, &c., and framed specimens; Mrs. Shaw Phillipa, landscape, architectural, and home-portrait studies; Mrs. Leslie Williams, album, various subjects; Mrs. Forsyth Brown, bromide enlargements from film negatives. Other contributors were the President, framed specimens in ferro-prussiate and bromide; Mr. D. P. Williams, gum bichromate, Pouncy's process and P.O.P.; Mr. Austin J. King, several albums and large stereoscopes; Mr. E. J. Appleby, frame of transparencies and collection of snap-shot work; Colonel Sealey, one dozen 12×10 framed enlargements; Mr. E. Peacock, sundry prints and stereographs; Mr. W. Middleton Ashman (Hon. Secretary), album, views in the Channel Islands and on the Norfolk Broads, whole-plate views of St. Catherine's and Farleigh; Mr. A. F. Perren, enlargements in platinotype, Scotch scenery.

Bradford Photographic Society.—January 9, 1898.—The PRESIDENT (Mr. Alex. Keighley) delivered a lecture on the

HISTORY OF PHOTOGRAPHY.

Mr. Keighley, who is photographically well known all over the world, tackled his subject in a most efficacious and praiseworthy fashion, and strung together some most interesting details as to the birth, rise, and progress of the art in which he is interested. It is a great thing to be able to give a clear outline of photographic history without becoming monotonous or tiring. The subject is so comprehensive, and it is so difficult to properly condense, and give prominence to more important items. The lecturer, in this instance, however, managed extremely well, and that he carried his audience with him can be judged from the fact that he was followed from beginning to end with rapt attention. To give a full report of a lecture like this in the space at our disposal would be impossible. Be it said that Mr. Keighley gave full credit where credit was due, and pretty conclusively proved that the whole of the honours of the Fox Talbot epoch did not belong to Fox Talbot himself, but to an amateur, the Rev. J. B. Reade. The lecturer then went on to detail how various processes have sprung into existence one after another, and how, in almost every case, the amateur had once more the honour of being chief inventor and chief formulator of them. Mr. Keighley was specially fortunate in being able to illustrate his lecture by means of apparatus lent him by the Royal Photographic Society for the purpose, and the nowadays quaint appearance of some of the articles and the cumbersome nature of the apparatus called forth considerable comment, which would have amazed Daguerre could he have heard it. Mr. Keighley's *History of Photography* will be long remembered by those who heard it as combining the sometime bitter pill of dry-as-dust history with the French bon-bon of anecdote and illustration. If one must have (and undoubtedly one must) a thorough grounding in the art in which we are engaged, and must learn its life story from its earliest infancy, well, Mr. Keighley's method of dealing with the business makes it at once palatable and enjoyable.

JANUARY 17, Annual General Meeting, the President (Mr. Alex. Keighley) presiding.—The Secretary's report was read, and showed the Society to be in a flourishing condition, notwithstanding the fact that there was a slight deficit. The year had been an exceptionally expensive one, and it was owing in a great measure to this fact that the cash account was not as satisfactory as it might have been. The Secretary, however, looked forward hopefully to the next session, especially as there had been a considerable increase of members, and the work would cost nearly as much during the coming year. Altogether the prospects were most hopeful, and there was no reason why before long the Society should not rank as one of the first in the kingdom. During the past few months the working had been somewhat difficult, due to storms of a character which he thought better not to refer to. There had been a great deal of muddy water about, but the dredging apparatus had been used with capital effect. Now the mud and rubbish had been taken away, and a clear running stream was left, it seemed to him that now nothing remained but to go in and win. The report, which was of a very lengthy character, and was most humorously written, was listened to with much interest, and was finally unanimously passed. Mr. Alex. Keighley was elected President, with Messrs. Appleton, Halstead, Nicholson, Lund, Rendell, and Sutcliffe as Vice-Presidents; Messrs. Akam, Bateson, Clayton, Clough, Cousen, Graham, Gray, Hampshire, Hewitt, and Stevenson as Committee; Messrs. G. Swain and G. R. Thistlethwaite as Lanternists; Mr. P. E. Newstead as Recorder; Mr. F. Nicholson as Hon. Treasurer; and Mr. J. Snowden as Hon. Secretary. During the evening considerable discussion arose as to the changing of the night of meeting and the removal to more convenient rooms. Decision on these subjects was left over for consideration at a special meeting called for February 2.

Plymouth Photographic Society.—January 21, the President (Mr. E. H. Micklewood) occupied the chair.—Subject: Members' Lantern Night. This is always a popular meeting with this Society, consequently a good attendance and a large number of slides was the result. Many pictures were thrown on the screen, which demonstrated the ability of several workers in this branch of photography, notably a set of snow-clad mountain scenes in Switzerland, by Mr. F. E. Bowden, which, by general desire, was again put through the lantern before the meeting closed, it being considered that they were the finest snow pictures by a member that the Society had witnessed. Mr. E. H. Micklewood showed some good slides, one of them, a moonlight effect on the sea, being very fine, and others of great merit were also shown by Messrs. H. S. Hill, R. Rugg Monk, W. H. Mayne, and A. Moore.

Dundee and East of Scotland Photographic Association.—January 14, Mr. W. F. Hill (Vice-President) in the chair. Mr. G. W. BIRD, of the Educational Department, Burmah, delivered a most interesting lecture on that country. The lecture was profusely illustrated by a large number of lantern slides. The lecturer gave an account of the different races inhabiting the country, their customs and dress; the Buddhist religion, as practised by the Burmese race; the staple industries, and the various means of communication throughout the province. Mr. Bird, who speaks from an experience of twenty years' residence in the country, is the author of the very valuable work, entitled *Wanderings in Burmah*, which was recently favourably reviewed by the press.

Edinburgh Photographic Society.—January 12, Mr. James Patrick in the chair.—Mr. JAMES HAY read a paper on

COMPOSITION IN FIGURE STUDIES.

At the outset Mr. Hay explained that his paper was a plea for outdoor figure-

work. This was a branch of photography which was much neglected by amateurs. When photographing in a district, the worker should try to embrace in his collection some pictures characteristic of the humanity of the locality. This need not interfere with landscape work, as the light which was most suitable for figure work was unsuitable for landscape work. A grey day was a very good one for figure studies. Mr. Hay laid down three rules for the guidance of those who were going in for figure work: 1, Study simplicity; 2, avoid strong contrasts; 3, always have a principal object in the picture. Everything that did not help the picture should be left out; intense black and white should be avoided, and the principal object should tell its own story. In the matter of backgrounds the utmost simplicity should again be studied. Mr. H. J. BLANC, R.S.A., followed with a paper on

COMPOSITION IN ARCHITECTURAL STUDIES.

To do successful architectural work, Mr. Blanc said, the operator must take pleasure in his work. A tripod camera must be used: no snap-shot work would do. The building to be photographed must be carefully studied, the best point of view selected, and the work done at the time of day when the light would be at such an angle as would show the building to the full advantage. The camera should never be placed in a direct line between the sun and the object to be photographed, as the result was sure to be a weak, flat picture. At the close of the meeting, Mr. Blanc offered to contribute two guineas for a prize to amateurs for the best set of pictures taken in the streets of Edinburgh.

FORTHCOMING EXHIBITIONS.

1898.

January 29–Feb. 26. Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.

January–February... Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.

February 7–12..... Photographic Society of Ireland. V. E. Smyth, 35, Dawson-street, Dublin.

,, 24–26..... Woolwich.

March 1–5 ..... Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.

,, 5–12..... South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.

April 22–30 .... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 27–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ACETONE IN THE DEVELOPER.

To the EDITORS.

GENTLEMEN,—As no one else has yet recorded any experience with the above, which was first mentioned in the JOURNAL for November 26, I venture to give mine. Since that date I have used it in making several dozen lantern slides, and am well pleased with it. I have not had sufficient opportunity of trying it for negatives, but hope to find it as satisfactory as with lantern plates. It gives particularly bright and clear slides, with entire freedom from stain of any kind, and the colour is generally pleasing, a somewhat warm black. I use pyro, 2 gr.; metabisulphite of soda, 1 gr.; sulphite (saturated), 2 dr.; made up to 1 oz., and add acetone as required, beginning with 4 or 5 drops. I think the presence of the metabisulphite delays the development a little, and necessitates the use of a little more acetone, but otherwise it appears to make no difference.—I am, yours, &c., CLIFFORD E. F. NASH.

[Mr. Nash is good enough to send us a lantern slide, extremely clear and brilliant in quality.—EDS.]

"COSMOS" AND M. DE LA SIZERANNE.

To the EDITORS.

GENTLEMEN,—I want to thank "Cosmos" for having put between brackets the epithet "distinguished" as applied to M. de la Sizeranne, the French art critic. It shows that "Cosmos" is aware of the high reputation of this writer, both in England and in France. He has evidently read and thoroughly appreciated the *Modern English Painters*, the *Life of Ruskin*, and certain essays that have also appeared in the English reviews under the signature of M. de la Sizeranne, or he would not have emphasised in such a flattering way the epithet very justly attached by Mr. Maskell.

On the other hand, he does not appear to be so well posted on the *Revue des Deux Mondes*, and seems to mistake it for some young ladies' magazine. But, then, if "Cosmos" is not aware of the very great importance of the *Revue des Deux Mondes*, the *Revue des Deux Mondes* is equally unaware of the very great importance of "Cosmos"—so there is no harm done, after all.

The *Review of Reviews* has just published a lengthy analysis of M. de la Sizeranne's article. This is to warn "Cosmos" to beware of this particular number, for condensed *Revue des Deux Mondes* might be fatal at this time of the year, and we cannot afford to lose our promised epitaph on the headstone of the Salon's grave.—I am, yours, &c.,

Paris, January 20, 1898. ROBERT DEMACHY.

THE ROYAL PHOTOGRAPHIC SOCIETY'S COUNCIL ELECTION.

To the EDITORS.

GENTLEMEN,—Having escaped from the fogs and frets of London to enjoy a few days of sunshine by the sea, I find myself pursued to-day by an imposing and massive envelope, bearing outside the Royal Arms and inside a long letter (apparently lithographed) from an enterprising photographer, setting forth his attainments and requesting me to vote for him as a member of the Council of the Royal Photographic Society.

Is this some of the "new blood" you want to introduce, or is it merely a new dodge on the part of the "old school?"

I have not yet received a voting paper; but, if we are to have all the horrors of a County Council election, may we not at least hope that some man of "light and leading" (neither Messrs. Debenham nor Mackie, please) will undertake to mislead us as to the issue, or would it be too much to hope for the refining influence of lady canvassers to inform us as to the personal appearances and manners of the various candidates, in which case I shall be content to hurry back to London and face the fogs again, and will freely forgive that enterprising photographer who so rudely disturbed my peaceful Sabbath with that County-court-looking circular.—I am, yours, &c., FREDERICK W. HINDLEY, F.R P.S.

The Eversfield Hotel, St. Leonards-on-Sea, Hastings, January 22, 1898.

To the EDITORS.

GENTLEMEN,—From a gentleman who has been nominated to the office of member of the council of the Royal Photographic Society, I have received a circular begging the favour of my vote for him in the election, the same circular being also a trade catalogue of the publications of his firm, he being an eminent professional photographer.

I know nothing of this gentleman except his name, and, knowing that well, it is possible that I should have voted for him; but his pushing his private business and in the same breath asking for election to the Council of the Royal Photographic Society makes it impossible for me to give the assistance he asks. Perhaps I ought to commend his simplicity, but I feel it to be my duty to protest against this sort of thing and to warn the members of the Society against electing as officers of the Society any men who use their position for advertisement.—I am, yours, &c., A MEMBER OF THE ROYAL PHOTOGRAPHIC SOCIETY.

January 21, 1898.

[Several other protests against the canvassing circular referred to have also reached us.—EDS]

MR. MASKELL AND "DOGBERRY."

To the EDITORS.

GENTLEMEN,—If Mr. Dogberry will turn back to my challenge of two years ago, he will find that he obscures the terms of it in the references which he makes in your current issue.

I remark also that his assertions with regard to the possibility of obtaining pigment prints without transfer are considerably modified from those he formerly made.

But I am not much concerned. Gum printing has now attained a recognised position, which is quite satisfactory. The method is, in its simplest form, perfect. There is no primary desire to rival the qualities obtainable by the transfer methods, though many think it could do so if required. I sincerely hope that scientific improvers will cease to interest themselves in it, and leave it to those who best know what they require, and how to avail themselves of it.

The method is very simple, and quite free from chemical and other scientific considerations. It is difficult to understand why persons who have no sympathy with the arts should bother themselves about it at all, more curious still that they should continue to work themselves into a fury on a matter which, one would think, could scarcely interest them in any way.—I am, yours, &c., ALFRED MASKELL.

January 22, 1898.

PLAIN LANGUAGE ABOUT THE SPECTRUM.

To the EDITORS.

GENTLEMEN,—There is a good old chestnut to the effect that, when you have no case, abuse the opposing attorney, and Mr. Walter White does so to his heart's content; it probably pleases him, and does not hurt me.

It is satisfactory to learn that Mr. Walter White is not the other Mr. White, but my assumption was perfectly legitimate, considering that the two names, and the initials, I believe, are the same, and both make extraordinary statements about colour.

Your correspondent has certainly shifted his ground, for his contribution to the ALMANAC is as sweeping a condemnation of the spectroscope and the spectrum as it was possible to pen. In the ALMANAC he states absolutely nothing about commercial plates.

As to his "innocent advice," well, surely it is an impertinence for any sane man to write such nonsense when he knows that others are to read it.

What kind of work, other than three-colour work, had Mr. White in view, and that the direct vision spectroscope cannot be used for? Although a direct vision spectroscope does absorb the ultra-violet, and dampen the violet, yet so do all the modern lenses; and Dr. Eder and Valenta, in their researches upon the absorption of the ultra-violet by various glasses, point out that far too much stress is laid on this. Further, did you not publish, sir, some notes by Dr. Otto Buss, in which he proves that, although a screen might let through the ultra-violet, yet, if it totally absorbed the blue and violet, the ultra-violet allowed to pass would only increase the action of the yellow and green rays.

Mr. White now talks about "photo-spectroscopic work of the highest order," and totally ignores my extracts from Vogel and Eder.

As to his statement that I sneer at his ignorance, and his abuse that we cannot all be Pretzls, well, all I can say is that, thank Heaven there are not many Whites in this world; and I would strongly recommend this one, at any rate, to carefully study Hübl's book, and compare it with the writings of Ives, Weissenberger, Valenta, Krone, Niewenglowski, Vogel, and others, when he will probably be astonished to find that there is complete accord as to what is required. Mr. White shows his want of reading, which is probably tantamount to ignorance of what has been written.

As to my stepping forward as a reliable authority, this is a product of Mr. White's imagination; I never did anything of the kind.

As to the note from Abney, I am obliged for the reference, and still adhere to my opinion that this is a practical test recommended when the operator has not a spectroscope, or is not inclined to mortgage his home to buy one.

"Facts are stubborn things," and, although Mr. White may sneer at my English, I venture to complacently assume that, although not an Englishman, it is as good as his, and my understanding of English equally as good. I have ignored nothing, and say that, when your correspondent states "it is a fact that a natural yellow will act upon a red-sensitive plate when a violet screen is used that transmits red and absolutely absorbs spectral yellow, and no manipulation can prevent this," he shows his ignorance, for, by using a collodion emulsion plate, sensitised with chlorophyl and a pyoktaninn filter, red and blue act, but not a natural yellow,

Now, as to the green screen. I can imagine Mr. White chuckling at having got me in a corner; but, even at the risk of giving him a chance of saying that I am a good wriggler, I can wriggle out of this. In the review on Hübl's book, by me, to which he refers, it was impossible to do more than indicate the leading lines on which Hübl advises working, but let me supplement what I said by a further extract from Hübl. This screen gives "less correct results," because of the faulty colour sensitiveness of the commercial plates, and not on account of the screen at all. For Hübl states: "Die mit Uranin sensibilisirte Gelatinplatte ist weniger geeignet, da ihr die nothwendige Blaugrünempfindlichkeit fehlt, und noch weniger brauchbar sind die kauflichen Eosin oder Erythrosinplatten, die an Stelle des gewünschten Maximum ein tiefes Minimum zeigen;" that is, "the gelatine plate sensitised with uranine is less suitable, since it wants the necessary blue-green sensitiveness, and still less useful are the commercial eosine or erythrosine plates, which, in place of the desired maximum, show a deep minimum."

Again, as regards the use of the violet screen, Hübl states it is wrong to use a violet filter *which cuts out the blue-green rays*, and further, that an ordinary plate may be used because its want of red sensitiveness is made up for its violet sensitiveness, and he says, "Thatsachlich werden die rothen Pigmente in Folge ihres Seite 36 besprochenen spektralen Verhaltens von der gewöhnlichen Bromsilber platte relativ hell wiedergegeben, *während gelbe ganz unwirksam sind.*" The italics are mine, and if Mr. White will use a pyoktaninn filter he will be able to photograph a natural yellow and a red, and the former will be "ganz unwirksam," so that Mr. White's objection to the use of the violet screen is not in accordance with Hübl.

Finally, Mr. White constitutes himself an authority upon colour, and states that I bungle, show my ignorance, &c. Well, sir, I claim the right "to think for myself, rather than accept the dictum of a self-constituted authority," and, after six years' experience in the measurement and mixing of colours, I know Mr. White's antepenultimate paragraph is all wrong. I could show Mr. White spectrum readings of about six yellows, which show very little overlapping of the red, but more green than the one I quoted; and, further, I could experimentally prove that the admixture of green, and a very small proportion indeed to that yellow would cause it to darken or become saddened. I did not state that the yellow must not overlap, how much it should do so I think I may presume to know as well as Mr. White; and the addition of green cannot neutralise orange, in the sense that Mr. White would have your readers believe, if he is using pigments, and I presume yellow ink is a pigment.

Mr. White is evidently a firm believer in himself as a "self-constituted authority," and therefore it is a mere waste of time to advance quotations from well-recognised authorities; but, in conclusion, let me advise Mr. White to read, mark, learn, and inwardly digest Mr. E. Sanger Shepherd's paper, *A Review of Triple Printing Methods*, and Mr. F. E. Ives's notes in the 1897 December number of the *Photographic Journal*, and suggest also that he should mortgage his home and buy a spectroscope, even a single-prism table instrument, which may cost under 10*l.*, and also Rood's *Modern Chromatics*, Church on *Colour*, Abney's *Colour Measurement and Mixture*, Lovibond's *Light and Colour*, and Hübl's *Die Drei-farben-Photographie*, and study them a little and experiment, and he will probably, if he is not too stiff-necked, own that there are things to be learnt from the spectrum and the spectroscope which Mr. White and all his practical experiments cannot learn in a lifetime.—I am, yours, &c.,

A. D. PRETZL.

THE BLAIRGOWRIE EXHIBITION.

To the EDITORS.

GENTLEMEN,—The manner in which the pictures were judged at the Blairgowrie Exhibition is, in my opinion, far from satisfactory. In the first place, the judging should have been completed previous to the opening ceremony. The hall is not very large and a great number of visitors were present, and consequently the judging was hurriedly done, and all the pictures were not looked at. The same thing, I regret to state, happened at the previous Exhibition. A very peculiar incident has happened this year. A very fine frame of pictures by Mr. Fred Marsh has been awarded. This same gentleman competed at the previous Exhibition, and the same pictures, if I am not mistaken, were recommended by one of the Judges, but they got no support from the Judge who has awarded them on this occasion? Is this not singular? I congratulate Mr. Marsh, and I am now well satisfied. By the way, have not these selfsame pictures been previously awarded at the recent Exeter Exhibition, and should they not have been in the Champion Class at Blairgowrie?—I am, yours, &c.,

JUSTICE.

January 18, 1898.

ANSWERING ADVERTISEMENTS.

To the EDITORS.

GENTLEMEN,—Can you state why business houses do not insert their name and address when advertising for operators, &c.

Surely, if it be an upright, honest-dealing firm, they should not hesitate to publish the name and address. I made application, in answer to an advertisement of this description, and submitted an original testimonial, which was never returned to me.

It would be doing a great kindness, through the medium of your paper, to warn assistants in general against this danger. To have the words "a well-known firm" inserted in an advertisement is no guarantee that the said firm is a respectable one.—I am, yours, &c.,

G. M. S.

[There are, of course, many excellent reasons for the practice of advertising under initials, as there may be against it. At the same time, our correspondent has only himself to blame for the loss of his original testimonial; copies only should be sent, and are expected. —EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Percy Guttenberg, 42, Deansgate, Manchester.—*Three photographs of Miss Lily Hanbury.*

Harry Lowthian, 144 and 146, Freeman-street, Grimsby.—*Photograph of "Prince," the dog collector.*

MEVE.—Inquire of Messrs. Sharp & Hitchmough, Dale-street, Liverpool.

G. H. EUSTACE.—By all means send us particulars and illustrations of the apparatus.

A. UNDERHILL.—1. The display was given, we believe, in front of King's-cross Station. 2. Tuesday, January 18.

PUZZLED; J. N. D.; W. WATSON; F. W. URQUHART; J. W. BEAUFORT; B. M.; JOSEPH LEWIS, and others.—Received; in our next.

HARRISON & Co. (Bois-Colombes).—We advise you to address either Messrs. Hopkin & Williams, Hatton Garden, London, E.C., or Messrs. Mawson & Swan, Soho-square, London.

J. GAUTIER.—Messrs. Appleton's address is Bradford. Much information on the subject is given in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1898, to which we refer you.

W. N.—We have had no practical experience of it. The salt is described as "forming white needle-like crystals, the solution being a dark-brown colour, going colourless on dilution."

J. LLEWELYN WILLIAMS.—We do not answer questions through the post. Such a set could, doubtless, be obtained of Messrs. Newton, Fleet street. E.C.; Tyler, Waterloo-road; or Perken, Son and Rayment, Hatton-garden.

ARTIGUE PAPER.—E. A. MCLEAN says: "Could you inform where I could purchase paper for printing with the Artigue process?"—In reply: The paper may be obtained of Messrs. Adams & Co., 26, Charing Cross-road, W.C.

FINISHING ENLARGEMENTS.—S. L. asks if good work is possible in finishing enlargements with the air brush?—Yes, certainly it is; but it must be borne in mind that with it, as with every other system of working, skill is necessary to obtain successful results.

PHOTOGRAPHING UNDER WATER.—F. J. COBB says: "Could you tell me if there are any photographs taken under water? If so, who by? Is it possible to do so? Any information will oblige."—In reply: Some reader may perhaps be able to supply the desired information.

PRINTING ON SILK.—ABER writes: "Could you give me the formula for sensitising silk for silver printing? If you will give me the particulars in Answers to Correspondents, I shall be much obliged."—A method of printing on textile fabrics is given on page 231 of our last volume.

BOOK ON PHOTOGRAVURE.—PHOTOGRAVURE asks: "Which is the best work or works to be obtained for instruction in making a photogravure plate?"—In reply: Mr. Herbert Dennison's book on *Photogravure*, published by Messrs. Iliffe, Fleet-street, E.C., will probably answer our correspondent's requirements.

REGISTRATION.—REX says: "I have had a bed of mushrooms photographed from different positions. I should like to have them copyrighted. How shall I go about it? Their size is 12×10."—In reply: Send our publishers three prints of, and 1*s.* 7*d.* for, each subject, and they will effect the registration for you.

GUTTA PERCHA.—TRAY. Gutta percha would be a very inert material for the purpose, but you seem to have overlooked the fact that it will not stand heat, and we assume you wish to use the solutions hot. Why not use porcelain dishes, those known by the name of "granitine?" We should say they would answer your purpose admirably.

COPYRIGHT.—AMATEUR (Liverpool). It is not necessary that the pictures be marked "copyright." If they have been pirated, you have your remedy just the same as if they were so marked. It is simply a case of "bluff" on the part of the publisher and his solicitor. Take proceedings at once for substantial damages, and you will recover.

BICHROMATE POISONING.—G. U. M. From the symptoms you describe we should say that the trouble is due to something else, and not to the bichromate. Only using the process two or three times is scarcely likely to be the cause. It is only after long and continued use of the bichromate that any inconvenience is usually experienced, and only then by some persons.

APPRENTICESHIP.—H. B. It is quite optional on your part as to whether you serve after you reach the age of twenty-one; but, as it is only a question of a couple of months or so, we should advise you to serve out the term, particularly as there is a prospect of employment after at a good salary. It is not always good policy to stand strictly on your rights in business matters.

PAPER.—R. BURGOYNE. There is nothing at all extraordinary in the matter. There are very few papers that will not change if long exposed to light. Indeed, some are so sensitive to it that they will show a marked change in a few days, particularly the common papers chiefly composed of wood pulp. Some of the pink-tinted papers used for newspapers will have the pink tint discharged with a few hours' exposure to strong sunlight.

VARNISH.—L. A. C. writes: "I have seen it stated that unbleached shellac makes a better and more reliable varnish for negatives than the ordinary white lac. Is that so? and does not the colour very much retard the printing?"—Theoretically, the unbleached is the best; but, if the white lac be of good quality and freshly bleached, there is practically no difference. If the pale orange lac be used, the thin film of varnish will not appreciably retard the printing.

GLASS.—S. HUTCHINSON inquires where he can obtain some very thin glass. He says all the glass-cutters he has applied to have not anything nearly as thin as he requires. We surmise that the cover glass used for microscopic slides would be too thin. Messrs. Houghton & Son used to supply a very thin glass, such as was employed for the French albumen transparencies, and, no doubt, do so still. Hetley & Co., Soho-square, also supply a very thin sheet glass.

PROVISIONAL PROTECTION.—COLOUR says: "I have found a very quick method of colouring photographs, and should like to know if I can get a provisional protection for same, and what it would cost. This method not only makes the print coloured, but gives a highly burnished appearance to the surface."—In reply: You can obtain the necessary form at a post office for 8*d.* Provisional protection costs 1*l.*

BACKGROUND.—T. MILLS. If the background has been distempered so many times, and the coating is now so thick that it is cracked all over, the only remedy seems to be to clean off all the colour, and then treat as new canvas. That, however, is often a difficult job, and always a very dirty one. The simplest way would be to take off the old canvas and substitute new. Get common unbleached sheeting and strain on the frame, size the fabric, and then apply the distemper.

PHOTO-LITHOGRAPHIC INK.—ALPHA. Formulæ for transfer ink have several times been given in back volumes of the JOURNAL, when it was not an article of commerce. Now that it is, it would be much better and cheaper to purchase it than to attempt to make it, as it is a very messy job, not to say a dangerous one, if conducted in a room. By purchasing the ink—there are more than one—you will ensure having a suitable article. The inks may be obtained at Winstone's or Penrose's.

ENLARGING.—F. C. HAWKE asks: "Will you please let me know what size reflector I must use to get even illumination on half and whole-plates for daylight enlarging? I use 15×12 opal plate for half-plates, and I find that the bottom of the plate does not get so much light as the top. How can I remedy this?"—Probably too small a reflector is being used, or it is not fixed at a proper angle. Use a reflector, say, twenty inches by fourteen, placed at an angle of 45°. Smaller than that would do, but the larger size will be found more convenient in practice.

COPYING FADED PHOTOGRAPHS.—GEO. DIXON says: "I have some old photographs to copy, and they are very much faded. Can they be restored for the purpose by immersing them in a solution of bichloride of mercury? If so, what strength ought it to be, and what is the mode of procedure? A reply will much oblige."—By immersing the prints in a solution of bichloride of mercury the yellowness will be removed, and the pictures rendered better for copying, though no lost detail will be restored. The strength of the solution is not very material. The stronger it is the quicker it acts. Ten grains to the ounce of water is a good proportion, as it does not act too quickly. Remove as soon as the yellowness disappears and wash in two or three changes of water.

VARIOUS.—SENEX (Fiji). 1. As the temperature of the water is also so high, use one part of the formalin to from four to six of water. 2. Before developing. 3. Use more dilute than for plates, and before toning. It will not be required for albumen paper. 4. Tungstate of soda, 20 grains; water, 8 ounces; chloride of gold, 1 grain. 5. Phosphate of soda, 20 grains; water, 8 to 10 ounces; chloride of gold, 1 grain. 6. Each have their advantages; some suit one paper and some another. Much depends upon the paper. The different brands differ in their characters. 7. All the gelatine papers named are good. We should say that, with the high temperature you have to work in, you would find albumen paper suit you best for all-round work. As the imported sensitised albumen paper does not keep well, we should recommend you to have it unsensitised, and sensitise it yourself as you require it for use.

STAINED NEGATIVE PRINTING.—C. F. WYNNE says: "One of my negatives got stained during printing, which I believe was caused by the effects of damp P.O.P. I have tried a dilute solution of cyanide of potassium—about half an ounce in five ounces water—which I left it in over night, and found to my surprise the image was almost faint the following morning. Was the solution too strong? or is there any remedy for restoring the negative? The negative is unvarnished. 2. Is a little salt necessary in the first washing water to remove free silver from albumenised or P.O.P. prints before toning? I find the latter curls up. All solutions are quite cold. Would the salt have effect in the curling of the paper? A reply will very much oblige."—1. The solution was certainly too strong for the time that the negative was allowed to remain in it. The only remedy now is to try and intensify it by one or other of the usual methods. 2. It is better when salt is used to add it to the second or third washing waters. The salt, if used sparingly, will not cause gelatine papers to curl unless they have a tendency to do so without it.

LENSES.—J. HEWETT says: "1. I have a set of glasses (three) taken out of an old mount, somewhat out of date now; no name. Am desirous of having them put together in new brass mounts. Sizes of glasses are two and a half inches in diameter. I believe it to have been a cabinet portrait lens at some time when stops were not used. Glasses appear very bright. Would they be worth remounting? Would the cost be much, in your opinion, and where would be a likely firm to do such a small order? 2. Also could you inform me why such lenses as one I have just had occasion to use were ever put on the market for use? A portrait lens, in a fine elaborate mount, brass, even to a brass cap, covers a plate 10×8 portrait, but only sharp for a circle of about three inches, which seems to me useless, although I use a small stop, goes off woolly and far from pleasant. Yet, if I use a small rectilinear lens half-plate, I can take a cabinet head sharp as desired, what the large portrait lens 10×8 fails to do as well. Shall feel obliged if you can enlighten me on this in your Answers to Correspondents."—1. If the lenses are the elements of a portrait lens, any photographic dealer will get them put into a fresh mount for you; but whether they would be worth the cost, of course, depends upon their merits. We think it very doubtful. 2. If the 10×8 lens will only yield a three-inch circle sharp, it must be a very inferior instrument. The advantage of a portrait lens is its rapidity. With its full aperture it only requires about a fourth of the exposure of a rectilinear with its full aperture.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	65
Astro-photography: A Photographic Heresy	66
Leaderettes:— Ground Glass in Enlarging — Coloured Lantern Slides — Restoration of Faded Photographs —Cinematography	67
Is Photography among the Fine Arts? By W. B. Bolton	68
Pictorial Telegraphy. By William Gamble	69
Lighting the Landscape. By Edward Dunmore	70
Professor Dewar on Halogens	71
De Katow's Improvement in Apparatus for Copying or Transferring Photographs	72
Trimming the Edges of Photographs and Prints	73
Edinburgh Photographic Society's Annual Exhibition	73
Our Editorial Table:— *Glass-blowing and Glass-working*	74
News and Notes	75
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club — Brixton and Clapham Camera Club—Camera Club—Croydon Camera Club—Richmond Camera Club—Woolwich Photographic Society—Birmingham Photographic Society—Newcastle-on-Tyne and Northern Counties' Photographic Association—Rotherham Photographic Society	75
Forthcoming Exhibitions	78
Patent News	78
Correspondence:— Cheap Photographic Miniatures Wanted—The Last Word upon the Gum-bichromate Process—Plain Language about the Spectrum	78
Answers to Correspondents	79

EX CATHEDRA.

We have already announced that the Technical Education Board of the London County Council has made arrangements for two special courses of lectures to be delivered at the Bolt Court Technical School, 6, Bolt-court, Fleet-street, on *The Chemistry and Physics of Photo Process Work*, by Mr. T. Bolas, and *The Half-tone Process*, by Mr. F. E. Ives, and we now append the complete syllabus of those lectures, with the dates:—

February 21.—*The Mechanical and Optical Principles involved in the Half-tone Process*, by Mr. F. E. Ives.

February 28.—*Organic Colloids, Conditions under which they become Insoluble; Parallels from Outside Industries*, by Mr. T. Bolas.

March 7.—*The Negative-making Process and the Manipulation of Screen and Diaphragm in practice*, by Mr. F. E. Ives.

March 14.—*Gelatine as the Leading Colloid for Process Work; Compounds of Chromium*, by Mr. T. Bolas.

March 21.—*Intensifying and Reducing Screen Negatives; the Printing Process for Block-making*, by Mr. F. E. Ives.

March 28.—*Action of Light, Heat, Moisture, &c, on Chromated Colloids; Adventitious Chemical Action*, by Mr. T. Bolas.

April 4.—*The Etching Process; Mounting and proving the Finished Block*, by Mr. F. E. Ives.

April 18.—*Notes on a few Bichromate Methods; practical application of principles already considered*, by Mr. T. Bolas.

* * *

The lectures commence each evening at eight o'clock, and are open to those engaged in some branch of commercial photography. Admission is by ticket, which may be obtained free by enclosing stamped addressed envelope, with an application to the Board's Secretary, 116, St. Martin's-lane, W.C.; or to Mr. C. W. Gamble, 6, Bolt-court, Fleet-street, E.C. The qualification that those desirous of attending the lectures must be commercially engaged in photography is a wise and prudent one. It furthers the aim of the Board in making the educational facilities offered at the school of direct practical service, and promotes the progress of process work to the exclusion of the dilettante element. The subjects of the lectures could not, of course, be dealt with by abler authorities than Mr. Bolas and Mr. Ives.

* * *

A few evenings ago, Mr. Gamble, the Director of the School, kindly showed us through its various departments, and enabled us to see that the completest facilities are provided for the practical study of all branches of process work, with the exception of photogravure, which is not here dealt with. So many inquiries reach us from photographers and others who contemplate taking up block work that we here seize the opportunity of remarking that the Director of the Bolt Court School will gladly give particulars or advice to those making application therefor. With its recently published annual report before us we have no hesitation in characterising the Bolt Court School as an admirable institution, which is doing good work in the service of photography. On the occasion of our visit the three-colour negative-making class was at work under the direction of Mr. E. J. Wall, who is fortunate in having students extremely interested in the subject, and the command of photographic, physical, and chemical apparatus of such excellence and completeness as to excite the sincere envy of the veteran photographic experimentalist who accompanied us on our visit, and who lamented that such liberal-handed Technical Education Boards were not more numerous.

* * *

It may reasonably be expected that photography will play a large and important part at the Paris Universal Exposition of the year 1900. The following are the names of the principal

officials of the Committee having charge of the section, and it will be seen that it comprises some of the most eminent representatives of French photographic science: Président, M. E. Marey, de l'Institut; Vice-Président, M. A. Davanne, Vice-Président de la Société française de Photographie; Rapporteur, M. L. Vidal, Professeur à l'Ecole des Arts décoratifs; Secrétaire, M. M. Berthaud, Président de la Chambre syndicale de la Photographie.

* * *

According to the Vienna correspondent of a daily contemporary, Dr. Karl Auer von Welsbach, the inventor of the Auer light, has just taken out patents for a new electric incandscent light. It is claimed for this light that it effects in the case of electric lamps what has been already effected in the case of gas, an increase of lighting power and a reduction in the amount consumed. The new invention has not yet, however, been tested in regard to its durability and cost.

* * *

The most recent item of news with regard to the solar eclipse is that Professor Turner telegraphs to the Greenwich Observatory from Bombay that the observations made there were very successful indeed. The photographs taken by the Astronomer Royal, Professor Turner, Captain Hills, Mr. Newall, and Dr. Copeland have all been developed, and the results are excellent. This information is all the more welcome having regard to the fact that last week's news from Bombay hardly prepared us for successful results.

* * *

Mr. P. R. Salmon, an able photographer and writer on photographic subjects, starts this week for a tour in the East that will probably occupy him several months. He is commissioned by Messrs. Lévy, of Paris, to secure stereoscopic negatives of the principal places in Turkey, Palestine, and Egypt, and may possibly extend his journey to India. For the greater part of the past year Mr. Salmon has been making stereoscopic negatives of British scenery, monuments, and architectural interiors, and has been extremely successful in the results he has obtained. We wish Mr. Salmon a pleasant and fruitful journey.

* * *

The Committee appointed by the British Association to collect photographs of geological interest in the United Kingdom has issued its eighth report. During the past year 364 new photographs were received, making the total number of the collection 1751. The report states that much labour has been expended in getting the collection into thorough order. All mounted photographs, to the number of about 1700, are accessible for reference in the library of the Museum of Practical Geology at 28, Jermyn-street, S.W., where they can be inspected on application to the librarian. They are classified geographically, and grouped according to countries and counties in twenty-three albums. A loan collection for circulation amongst geological and photographic societies has been formed. The report contains a great deal of information on the subject of the Committee's efforts to secure photographs of geological interest.

* * *

In another part of this week's Journal we briefly review an admirable book on glass-blowing by Mr. Bolas. For the information of those interested, we are asked to announce that the author will give public demonstrations of the working of glass on the Tuesday afternoons of the present month at No. 6, Farringdon-avenue, E.C., between the hours of 2 and 5.

* * *

We are informed that applications for space at the Crystal Palace Exhibition are coming in gradually as regards the floor space, the bulk of it being let already, and freely for the wall space, notwithstanding that the prospectuses have not long been out in this section. One of the largest of the Courts, the Egyptian Court, is to contain Section 2, an invitation collection illustrating the past history and the present position of pictorial photography. For this there is a large amount of support, and more is coming in daily. Messrs. E. R. Ashton, Burchett, Brownrigg, H. W. Bennett, Bushby, Craigie, Carpenter, Cohen, Evans, Greger, Greatbach, Hodges, Lambert, Job, Lee, Paul Martin, and Thomas being amongst those who have already promised. Messrs. George Davison, Horsley Hinton, and Sutcliffe, amongst others, will be represented by an alcove specially devoted to the work of each. In this collection there will also be a selection of the works of Rejlander.

ASTRO-PHOTOGRAPHY: A PHOTOGRAPHIC HERESY.

When the immense impetus given to observational astronomy by the introduction of photographic methods comes to be considered, it cannot but strike the average student how remarkable it is that there are so many simple aspects of the subject upon which experts disagree. We all know that photographic science is progressive, as also, especially of late years, is optical science. It was but recently that we chronicled an alleged discovery by Professor Schaeberle of an error in the appreciation of the value of parabolic reflecting surfaces in astronomical telescopes of a particular form first proposed by Professor Pickering, and he showed for the first time that their defining power for objects lying outside the axes was, in telescopes of relatively short focal length, of a very imperfect character. The pronouncement we have now to discuss is more especially interesting to photographers, as it deals with a subject which is familiar to most of them. A correspondent has called our attention to an article in *Knowledge* for August last, written by F. L. O. Wadsworth, "Astro-physicist, Yerkes Observatory," controverting some conclusions arrived at by Dr Isaac Roberts. Mr. Wadsworth says, "There is one point which strangely enough, seems to have escaped the attention not only of Dr. Roberts, but of all other writers on the general subject of astronomical photography," and he cites such names as Grubb, Abney, Pickering, &c., among these ignorant ones.

Referring to the influence of the aperture of the photographic instrument upon the brightness of the field, due to what might be called sky-shine, he says it is of a character which affects a photographic plate more strongly than it does the eye. He does not refer to the fact that the most refrangible rays are those most intercepted by the material of the object-glass, though glass does permit the passage of very highly refrangible rays. We will now quote his dictum, upon which he bases a large superstructure of further calculation, and his refutation of Dr. Roberts's conclusions. (The italics are Mr Wadsworth's) :—

"Moreover, the great majority of the diffracting particles" [of the sky, Eds.] "being at a relatively great distance from the instrument, the illumination is of the same character *as would*

be produced by a uniformly luminous area of infinite extent. Now it follows at once, from the principle of the wave theory, that *the intensity* of illumination at the focal plane *of an objective due to such an illuminated area will be simply proportional to the area of the objective,* i.e., *to the square of the linear aperture, and will be entirely independent of the focal length of the instrument. Hence, for a given brightness of sky . . . . the time of exposure requisite to produce a given fogging or blackening of the plate will,* other things being equal, *vary inversely as the square of the linear aperture of the image-forming lens, no matter what the focal length of the latter may be.*"

Photographers, have, more than once of late, had cherished beliefs with regard to their work rudely shaken and destroyed, it must be admitted; but that they will acquiesce in the above assertion is decidedly open to doubt, unless, indeed, there is an esoteric meaning attached to the words which outsiders cannot arrive at.

Let us bring this abstract principle into the region of the concrete, first noting that no proof whatever of this astounding theory is offered beyond the assertion that "it follows from the wave theory." The Wadsworth theory means, for example, that if we photograph, say, a sheet of newspaper placed at a distance, the length of exposure needed to obtain a good negative will depend entirely upon the diameter of the lens, and not in any way upon its focus. If we take it with a two-inch objective of ten-inch focus, then, with a similar diameter lens of thirty-inch focus, the exposure required will be the same in each case. Or it may be put thus: Taking the Wadsworth theory as correct, it would follow that with three lenses, each of five inches diameter, but with foci of twenty-five, fifty, and one hundred inches respectively (*en passant*, it must be understood that any consideration of possible absorptive power of the glass is excluded), a half-plate-size dry plate placed in the focus of each would require the same exposure, although the portions of sky photographed, and consequently of light received, to cover the half-plates, would respectively be in area one, four, and sixteen times a given unit. Again, to put the matter in still another way, let these three lenses be placed in an observatory and directed in turn from a fixed standpoint, therein, to the sky seen through an aperture of given size in the dome. A certain amount of sky light only could pass through that aperture, yet, according to Mr. Wadsworth, whether that light were concentrated by the lenses on to a space an inch, or four inches, or sixteen inches in area, the plate would develop up to the same intensity or fogginess.

Now we consider that it suffices to translate this new theory into bald, practical work to at once show its untenability. We are not at present arguing either for or against the relative exposures alleged to be needed under the given conditions (that may or may not be correct), but we do say that the explanation must be sought elsewhere than in the extraordinary theory we have been describing.

Upon this theory Mr. Wadsworth has founded a large superstructure of explanations in regard to observed difficulties and contradictions of practice which necessarily all fall to the ground if the base of the structure be removed. The facts brought forward by him from various sources are very puzzling to account for, and the new theory fits in beautifully in explanation; yet, at the same time, we must confess to our belief in this being a pure coincidence, and, unless all instructions in practical photographic optics are to be rewritten, Mr. Wadsworth's discovery must be termed a figment.

Ground Glass in Enlarging.—At two of the London societies recently, when the subject of enlarging by artificial light was under consideration, the point was raised as to the advantage, or otherwise, of using a piece of ground glass in conjunction with the condenser for the purpose of diffusing, or equalising, the light. It was generally conceded that in some cases it was decidedly advantageous to do so, and the discussion in each instance turned upon the position it should occupy—between the light and the condenser, or between the condenser and the negative. Also which surface of the glass should be next the source of illumination. All the positions seemed to have had their advocates. No one, however, so far as the report shows, seems to have suggested placing the ground glass between the two lenses of the condenser.

We know that some enlarging firms, when using artificial light, always work with a piece of ground glass interposed between the components of the condenser. In this position the ground glass is always retained clean, and it is found in practice that the exposure is not materially increased.

Coloured Lantern Slides.—Coloured lantern slides, when projected on the screen, usually meet with the general appreciation of the non-photographic part of the audience, and that notwithstanding the colouring may be anything but well done. That shows that coloured photographs, with many, are still appreciated. We have often heard it said that, since the days of the old Polytechnic, the painting of lantern slides has become a lost art. That, however, was amply disproved at the Photographic Club, on the Ladies' Night last week, when Mr. A. Bridgeman showed a coloured series of the Vatican. The colouring of these slides was evidently done by a master hand, and was really most excellent. Indeed, it is difficult to imagine anything better. These slides clearly proved that modern lantern-slide colouring must not be judged of by the commercial coloured slides. They also prove that good colouring can be done on the photographic image, although the old slides, so often quoted, were painted on plain glass, and not on a photograph at all.

Restoration of Faded Photographs.—At a recent meeting of the Royal Photographic Society the Rev. F. C. Lambert showed the results of some experiments in the restoration of faded photographs. This is a subject that has interested photographers ever since the earliest days of the art. Mr. R. F. Barnes it was, if we mistake not, who first published in the fifties that, if faded or yellow prints were simply treated with bichloride of mercury, the yellowness would be removed and the picture restored, and that method has been resorted to by old professionals ever since, when they have been called upon to copy a yellowed print. The treatment is perfect so far as the removal of the yellowness is concerned, and the picture looks as bright and fresh as ever, though of a somewhat warmer tone than at first. Pictures so treated do not appear to undergo any further change, for we have by us some prints that were "restored" some fifteen years ago that are as bright and fresh as they were immediately after the treatment.

There is, however, a point in connexion with the prints shown the other night which is noteworthy. According to the report, one-half of the examples had been "*bleached*" in a solution of bichloride of mercury. We are not told in the report whether they were albumen, gelatine, or developed bromide pictures; but, whatever they were, it is pretty clear that they were not gold-toned prints. With them the image is not bleached by mercuric chloride, although all yellowness will be removed by the treatment. If the prints experimented upon were toned and fixed in the "combined" bath, the bleaching of the image can readily be accounted for; so it can be if they were developed bromide pictures. Both gold and platinum images are unaffected by bichloride of mercury.

Cinematography.—It is at present a little difficult to conceive the uses that animated photographs will be put to—or one might rather say the uses to which they will not be put—as time advances. The latest thing seems to be to apply the cinematograph to advertising purposes. Two or three weeks back a well-known firm of soap-makers and a condensed milk company jointly inaugurated an *al fresco* entertainment of animated photographs at King's-cross, to the great delight of the street urchins and others. These two firms have now gone a step further with the cinematograph. They are taking large halls and assembly rooms in the suburbs of London, as an advertisement in which to show animated photographs, with a miscellaneous musical entertainment thrown in. In this case a charge is made for admission—1*s.*, or 2*s.* for the reserved seats. But these charges are reduced to one-half on the production of a wrapper of either the soap or the milk. We are told by those who paid a visit to one of these shows that a pleasant evening was spent, and that the animated pictures shown were excellent.

While on the subject of the cinematograph, it may be mentioned that it was used at the late solar eclipse for the first time. In the *Standard* of Monday, last week, which contained the various telegrams from the different stations, was a letter from Mr. Nevil Maskelyne, saying that the Rev. J. M. Bacon had "made a successful exposure for the first animated photograph ever taken of any celestial phenomenon. The film will be sent here forthwith for development." This reads a little curious, inasmuch as most people cannot say, even on an ordinary subject, that the exposure has been "successful" until the image has been developed. But there, we all know that Mr. Maskelyne can do very clever things which few of us can do. Any how, we do hope that the photographs will prove successful when they are developed, as they will, no doubt, be of great scientific interest.

Here is another application of animated photography, according to a paragraph that has been "going the round." "The cinematograph registers slow as well as rapid motion, and a camera has been made to register the growth of plants." It would be interesting to learn more particulars about the matter. How long was the plant growing and whether the instrument was kept running the while? What was the length of the film, &c.? also, how long it would take to show on the screen, say, a rapid-growing plant—a sunflower, for instance, from the germination of seed to the plant's arriving at maturity, *i.e.*, in full bloom?

IS PHOTOGRAPHY AMONG THE FINE ARTS?

In the December number of the *Contemporary Review*, Mr. Joseph Pennell appears to have wrestled unsuccessfully with a conundrum of his own setting, as he only settles the question, in his own mind, at least, by answering another. It is as if he had asked himself, "Is photography a fraud?" and had laid back in his chair, thrown down his pen, and smiled a complacent smile of satisfaction after writing the answer, "No; but some so-called photographers are."

I do not know myself whether Mr. Joseph Pennell is the right man or competent to deal with the question at all. I am entirely unacquainted with that gentleman, and all I know of him has been gathered from his numerous diatribes against photography and photographers, judging from which I should say that he is utterly unable to deal with the subject in an impartial and unbiassed manner. But, looking more especially at his latest and most pretentious effort, it seems clear that, until he possesses some more decided idea as to what constitutes a fine art, or art of any kind, and what makes an artist, he would do well to refrain from touching more intricate questions.

Personally, I have little sympathy with the "school" who form the object of Mr. Pennell's latest attack, so on *that* ground at least we can shake hands; but, unlike him, I freely recognise their perfect right to strike out from the usual conventional track and map a course for themselves. And I will further concede them, when their results justify it, the title of artist, but this altogether independent of photography. I have never myself aspired to that title, nor, so far as I remember, have I ever risen to the height of exhibiting a picture, save and except some few occasions on which productions of mine have formed portions of technical exhibits. It was the "chemistry," the "optics," and the "science," that first attracted me to photography, and these I studied to the best of my power until I was able to produce results that pleased others if they did not fully satisfy me, for I do not think I ever produced a photograph that even I myself could not see was susceptible of some improvement. I have gone on all my time satisfied to be a "common or garden photographer," to use the term once applied to such as myself by a prominent member of the newer school, whether facetiously or contemptuously I know not, and I shall probably continue in the same course till the end of the chapter. If, then, I take up the case for photography, it will certainly be from no hankering after a title I do not aspire to.

To commence with, Mr. Pennell asks a question he does not mean, and to which I would reply emphatically in the negative, any more than painting, drawing, etching, or lithography, as such are fine arts. If the mere wielding of a brush, the spreading of pigment on canvas, or any other material, constitutes a man an artist, then every painter of a shop front is one, and he who puts the conventional three coats on your fourth-story windows, is emphatically better entitled to be dubbed "high artist" than the individual who introduced that term on these pages some weeks ago.

But Mr. Pennell says: "Unless a man can draw with his own unaided hand, he is not an artist, he has never been considered one, and never will be." I assume that Mr. Pennell is merely expressing his own opinion, for I am unaware that there is any law, written or otherwise, to that effect; but, at least, from his point of view, it somewhat limits the application of the term. At the same time it suggests other thoughts, first of which is that, apparently, the ability to draw—and under that category, I suppose, painting is included—constitutes a man an artist. I have always been under the impression that "art," in its truest sense, was purely creative, and I fancy, from other portions of Mr. Pennell's article, that he himself admits as much—that an artist's results were evolved from his own inner consciousness, or, as Mr. Pennell puts it, "out of his box"—his brain. But, according to this new exposition of the law, the merest copyist, provided he can draw correctly, is as much an artist as the master he imitates; and, *ergo*, to pursue the argument to the limit of its absurdity, a spurious Rembrandt is as much a work of art, and as valuable as the original, if it be but a fair copy.

In another place Mr. Pennell says, "To be worthy of the name of artist it has always been held necessary to give to art one's whole life, one's whole thought, and, *above all* (the italics are mine), *one's entire technical and mechanical skill*, only to be acquired by unending study and practice." This is such an astounding pronouncement on the part of one who is championing art as against the mere mechanical process of photography that I, like, I dare say, many others, had to read the statement two or three times to make sure I had not misunderstood it. But no, there is no mistake about it; according to Mr. Joseph Pennell the most important part of art is the technical and mechanical part! It is written, I know, for the purpose of proving (?) that a man who cannot draw cannot possibly produce artistic results by any other means; but it is an admission that fits in very badly with that other portion of his article in which he sneers at the photographer for "sticking his head in a black box, and at the crucial moment letting a machine do everything for him."

I judge from a remark I read, I think in these pages, that Mr. Joseph Pennell has been an amateur photographer as well as a painter. All art critics, from Ruskin downwards, have been—at least so it is said, failures as painters, and this last quotation may go far to explain his want of success with the camera. In the first place, it is not the correct or usual thing to put your head inside the instrument. If you are very short-sighted, you may get as close as you like to the focussing; but, if you go any further, you are apt to break something. In the next place, it is the commonest mistake made by those who know nothing of photography—and never will apparently—to suppose that the "machine will do everything." I

dare say, if the truth were known, Mr. Pennell gave up painting because the brushes would not get up and "do everything for him," though, of course, he could "draw with his own unaided hand." This, one would think, would suffice to show him that "drawing" is not the all-in-all. But does he fondly imagine that the optics, the chemistry, and the science he scoffs at require no learning, or that, even if thoroughly mastered, they are capable of mechanically supplying the place of art culture?

The real question at issue is not whether photography is an art, but whether by its means it is possible to produce artistic results, and whether to the producers of those results the name of artist is to be extended. Mr. Pennell says "No," because photography is a chemical, an optical, and a scientific process, though, as I have shown, he ranks the technical and mechanical sides in painting important "*above all*." But in what respect, may I ask, does photography differ from painting, wood-engraving, or lithography—to all of which he apparently concedes the title of "fine arts"—as a possible means of conveying artistic impressions? To me it seems the means matters not so long as the end is gained, for it is not the materials or the tools used that constitute the *art* or that make the artist, and a photograph may be just as much a work of art as a painting if only there be an artist behind the camera.

This much Mr. Pennell apparently acknowledges in another burst of inconsistency when he says, "If some day artists devote themselves seriously to making snap-shot 'pictures,' the photographic amateur will have a bad time of it." But I fancy the photographic amateur will rather have a good time of it at the artist's expense, for the latter will find that it is far more difficult to make a "picture" (inverted commas by special request) with the camera than he previously imagined. He has probably been accustomed, as Mr. Pennell says, to quote him once more, to look at the subject, "and his observation and his memory are so keen" (and *I* may add his "imagination") "that he can absorb the whole character of the scene before him, and then later reproduce it out of his box—his brain—without perhaps doing a scrap of work on the spot." Alas! yes. Would it were not so! Then would there be more truth in art, and fewer acres of spoilt canvas stacked in dealers' lumber rooms waiting for victims. *When* the artist takes to the camera, I repeat, he will find it infinitely more difficult to secure the result he wants than if possessed of the art inspiration he has the mechanical skill to record it. He will find the camera too truthful and matter-of-fact, and not nearly imaginative or untruthful enough for his requirements. This it is, more than aught else, that limits the artistic capabilities of the camera; the artist must not only be master of his tools, but he must be able either to mould his model to his will, or else to wait until it pleases the said model to meet his wishes.

Mr. Pennell evidently doesn't love the amateur, though I don't think the class is confined to photography. We find amongst painters (ay, and critics too) many who do not devote their whole lives to the "art." Amongst painters we find not only titled personages, but judges, soldiers, parsons, and goodness knows what not, and I was personally acquainted some years ago with a man who wrote critical articles of a very high character indeed on social and political topics for a provincial paper of importance, who filled in his spare time by keeping a provision shop!

But the tirade against amateurs affords Mr. Pennell the opportunity of a really funny description of what the real artist used to be, and, in fact, ought to be. I thought it was accepted that, like the poet, the true artist *nascitur non fit;* but, according to Mr. Pennell, he is very much *fit*. After washing brushes or lighting fires for a few years, he serves a fifteen years' apprenticeship at painting before starting "on his own," then only to find himself not "fit" for the job, and, to shorten a long story, he eventually dies at a good old age, sighing for one more chance to try it all again. If history is to be believed, however, they were not all "built that way." Da Vinci was not very far on in years when he was at the zenith of his fame, and the same could be said of a vast number of others. Coming to our own day, take the last two, and only recently deceased, Presidents of our own Royal Academy. They were neither of them old men, yet, though I am not precisely a young man, I cannot remember the time when their names were not familiar to me. Sir John Millais must have been a very young man when he played a prominent part in the pre-Raphaelite brotherhood, and they flourished and were cruelly caricatured in *Punch* in the early "fifties," I fancy. No, I think the rule is nowadays that an artist is seldom much good unless he "begins life early." In fact, unless it is "born in him," no amount of labour will lick it into him. And I really don't see why an artistic temperament should not form part of the birthright of a banker, a solicitor, or even a condensed beef man, as well as any one else. It is probably force of circumstances that compelled them into those positions or occupations instead of making them professional artists, and little wonder that their natural bent breaks out in amateur form.

Of Mr. Pennell's good old style of artist we have sadly too many. Scarcely a workhouse but holds one or more who tried as long as he could to persuade himself and the world that he was born an artist. The world refused to have it at any price, so at last, complying against his will, he gives in, too late, alas! to turn to anything else. You will find them, too, about public-house bar parlours, doing "lightning sketches" or pen-and-ink portraits, and many make a good thing out of pavement sketches. To the more astute the contribution of articles on art or quasi-art subjects to the daily papers or other publications forms a by no means to be despised outlet for the talents they really do possess, though, of course, none of these pursuits offer the same attractions as the name of artist.

After all, the question remains, and is likely to remain, much in the same position as it did, say, twenty years ago. It can only be answered by results, and when those results appear they will be readily recognised by those most competent to judge them.

W. B. Bolton.

PICTORIAL TELEGRAPHY.

The method invented by Amstutz, and described under the heading of *Processes New and Newer* in this Journal for November 19, is worthy of careful consideration, although it reads so much like a Yankee "fairy tale of science" at first sight. I should not have credited the possibility of such an achievement myself on the mere evidence of such a description, had I not seen some really excellent results published so long ago as May 1895 in the *Photographic Times* (New York). Here the original is shown in half-tone, and alongside it the reproduction obtained after telegraphic transmission over a single wire. When I say the result is excellent, I mean that it is comparably so, when one considers the means employed to produce it. Of course, the machine-made block has not anything like the quality of a good half-tone, but it is as good as the half-tone blocks we used to get six or seven years ago. In the same number of years hence, half-tone may have been consigned to the limbo of obsolete processes, and some such method as that of Amstutz's brought to the highest degree of perfection. Machinery is rapidly superseding every kind of manual labour, no matter how intricate or how difficult, and electricity is the potent power of the age. Let no one, therefore, sneer at such a method as that to which I am now referring, for photo-engravers will undoubtedly have to reckon with it in the years to come. There is really nothing unsound in principle in Mr. Amstutz's invention. The possibility of transmitting synchronous motion over a telegraph wire in order to render a *facsimile* of the dispatch at a distant station has several times been demonstrated during the past forty years, and Mr. Amstutz is only following on the lines of Caselli's pantelegraph, Meyer's autographic telegraph, and similar apparatus by Lenoir, Edison, and others. Those who feel interested in the subject would do well to refer to pages 616 *et seq.*, of Guillemin's *Electricity and Magnetism*, in the English translation which has been published.

It must, however, be conceded that Amstutz has developed the principle on novel lines, for, whereas previous inventors in this line only aimed at the production of a chemical or ink design on paper, he makes an engraved block from which many thousands of impressions can be taken.

There is rather a suggestion of the phonograph in the method. In brief, Amstutz proceeds as follows, so far as I can understand from the description: A gelatine photo-relief, such as made for the Woodbury-type process, is bent round a cylinder, which revolves with a stylus in contact. The stylus describes a fine spiral path, in the same way as the tool in a screw-cutting lathe (which, in fact, the machine much resembles). Supposing the stylus to be set vertically and loosely, it will be understood that it will rise and fall as it passes over the gelatine relief, exactly as does the tracer on the wax cylinder of the phonograph.

This rising and falling motion is made to vary the strength of an electric current, which is carried by the telegraph wire to a similar machine at any distant station. Instead of a gelatine relief, the receiving machine bears a plate of type metal, and instead of a blunt stylus it has a V-shaped cutting tool, which is free to press more or less into the type metal. This it does by the varying action of the electric current, making deep cuts in the whiter portions of the picture, and shallow cuts for the shadows. Being a V-shaped tool, it also varies the width of the space between the cuts in proportion to the depth it punctuates. A fine helix is cut on the metal plate, and the picture, when finished, has the effect of being composed of parallel lines. The amount of detail is regulated by the closeness and fineness of these lines, and, until it is possible to rule very finely and without streakiness, the results will have a coarse appearance compared with ordinary half-tone. The achievements in ruling diffraction gratings, half-tone screens, and lithographic tints certainly lead one to expect that this improvement will be accomplished. The rapidity of the process seems almost incredible. The block to which I have referred above, consisting of a photograph of a boy and dog, and measuring $5\frac{1}{2} \times 3\frac{1}{2}$ inches, was transmitted and engraved in three *minutes*. The same subject could not have been engraved in half-tone much under three hours.

I dare say most of my readers will have "spotted" the inherent weakness of the process, viz., the necessity of making a gelatine relief. It would almost seem a repetition of Mrs. Glasse's famous culinary advice, "First catch your hare." Any one who is familiar with the difficulties of making gelatine reliefs will smile at the idea of any rapid and certain process being expected where they come into question; but, as if to meet the one essential requirement of Mr. Amstutz's process, Herr Liesegang comes along with a process of producing gelatine reliefs on ordinary dry plates, which appears to be just the thing wanted. Herr Liesegang's process was fully described in this JOURNAL on December 3, and it seems to indicate a way of producing gelatine reliefs by a method hardly more difficult than making a bromide print. Briefly stated, the process consists in taking a print on gelatino-bromide paper, and, after developing it with hydroquinone, brushing it over with a concentrated aqueous solution of ammonium persulphate. In a short time the image bleaches. The solution is then rinsed from the surface by cold water, and, if now the wet film is rubbed with the fingers, the warmth of the hand will dissolve those parts previously reduced by the developer, while the white portions of the film not exposed to light remain unchanged. In this way a gelatine relief is obtained, and, if the film has been fairly rich, the relief, while wet, is nearly as strong as a freshly developed carbon print. Even after drying, it is just as distinctly visible.

I have suggested elsewhere that Warnerke process tissue ought to be just the thing for producing these reliefs, and, if the film is transferred to celluloid or thin copper, it would suit very well for bending round the cylinder of Amstutz's machine.

It occurs to me that the Amstutz method could be adapted, on the principle of Joly's process, to the production of colour prints at the receiving station; for, suppose at the sending station the gelatine relief is identical with the monochrome positive, made through the "taking" screen, the V-shaped cutter at the receiving station could be replaced by the three pens of liquid colours ruling on paper the stripes of colour which give the coloured effect of the original. It is here assumed that the variation of the electric current produced by the stylus of the sending instrument would exert more or less pressure on the respective pens, causing them to vary the flow of colour so as to get the different shades. I am aware that Professor Joly's process is different in principle, depending rather on the monochrome marking out, so to speak, the colours on the screen in due proportion. I assume, however, that, if the coloured lines varied in thickness according to the colour intensity, as do the lines in three-colour blocks, the same effect would be produced. Whether such a method is feasible, Professor Joly can best decide.

Should the Amstutz machine become a success, the method will have great attractions for newspaper proprietors, and the time may come when local photographers will hand in to the telegraph station a gelatine relief on celluloid from the negative of some important event, and a few minutes afterwards an engraved plate will be reeled out in the office of one of the big London dailies. Next day the picture will be in the newspaper on our breakfast table. Such a consummation may seem as far off as did Baron Reuter's idea, of collecting and publishing daily the news of the world to the editors of London newspapers when he laid his scheme before them, but it is just as likely to be realised, and we may see it before the dawn of the twentieth century, when, of course, we shall also have wireless telegraphy and wireless electric lighting *un fait accompli*.

WILLIAM GAMBLE.

LIGHTING THE LANDSCAPE.

ARTISTIC lighting is looked upon as essential to the production of a good portrait, which is a fact that admits of no dispute. A badly lighted figure infers the incompetence of the photographer in this direction, and there are few critics who refrain from censure if the lighting does not come up to a certain standard of excellence. The illumination of the subject is one, if not *the*, principal item in a good and striking portrait; bad lighting distorts and caricatures, destroying the likeness, and substitutes monstrosity; in fact, that the whole secret of a good and pleasing representation hinges on the skill in which the light is managed will be patent to most people. When the influence of the proper direction and quantity of light has so much effect on subjects included in a small area, it is marvellous that its influence on a larger area as a landscape has been so neglected in practice, whatever it has in theory. It is difficult to find a periodical or illustrated magazine of any kind, in which photographs have been used for the blocks, but sins wofully in selection of pictures that are badly—I might say, in many instances, vilely—lighted, when the subjects would, had more discrimination been exercised in choosing the time of day for taking them, be satisfactory and artistic, instead of disappointing and feeble effects intended as ornamental and explanatory of the letterpress.

It is perfectly true the conditions for working are different; a well-appointed and constructed studio gives unlimited power over the light, with the utmost facility at any time of the day; but this is no excuse for altogether neglecting the illumination of the landscape. The difference appears to be that in the studio the photographer suits the light to the subject, and out of doors he has to suit his subject to the light. There is no doubt that proper illumination is the rock upon which more outdoor workers strike than any other difficulty. The manipulations may be without reproach, the point of sight well chosen, and yet the picture when completed will utterly fail to please; there is something wanting, the nature of which is, in some instances, difficult to determine, with any amount of certainty, at a first examination; but, in the greater number of examples, the fault is only too assertive.

It goes without saying that some subjects have to be taken, if taken at all, under adverse conditions; but here I am supposing the photographer can select his own conditions, and it is entirely his own fault if the lighting is unsuitable. Given a good photographic day, with bright sunshine and white clouds, and the subject to be photographed is, for example, an architectural one, it will be found that it appears more important and artistic at one time of the day than at another from some particular standpoint. If it consists of many planes, cast shadows will separate one from the other, and give rise to artistic combinations of forms that add greatly to the value of the picture; the time of day wrongly chosen, these shadows are either non-existent or only partially seen. The different planes are not easily made out, one part merging into another, so that many points of architectural interest and beauty are either hidden or spoiled.

In designing buildings of an important character, architects always take into account the effect of cast shadows, so that at some period of the day, at any rate, the general effect shall satisfy their artistic pictorial instincts. It therefore behoves photographers to follow on the same lines to get the best pictorial effect the subject is capable of affording. The necessity of this was recently impressed upon me in looking over the illustrations in a popular periodical, the said illustrations being evidently reduced from photographs which were, in several instances, entirely spoilt by being taken when the chief light fell in an unsuitable direction, so that otherwise good and careful work was thus rendered commonplace and inartistic.

It is imperative for the *best* effects that the sun should be unclouded during some portion of the time of exposure, although this, I believe, has been often disputed, and there are many now that prefer to work in diffused light for all subjects of this kind. Diffused light has its value under certain circumstances, but only where the point of sight is more or less facing the sun; *then*, no doubt, a cloudy sky conduces to the best results; did the sun shine, it would only have the effect of still more flattening the shadows which, under these conditions, are already deficient in brilliancy. Anyone may satisfy himself on this point by alternately looking at objects situated at a little distance, with the sun in front and sun at his back; in all probability there will be quite a haze when looking towards the light, and quite clear when looking away from it. Even with diffused light out of doors, and with no sun visible, there is yet a difference of illumination between the side that is naturally the shadowed side and the opposite. The rules which apply with visible sunshine still hold good, although the

contrast is very much reduced, and cast shadows are entirely absent. The north side of a building presents some difficulties in getting it well illuminated, very early in the morning or late in the afternoon are the only periods in the day that the sun shines upon it, and then only during the summer months. These restricted times are often rendered unavailable from mist and vapour; so it frequently happens views with a northern aspect have to be taken when the lighting is unsuitable, and to make a presentable photograph on a bright, sunny day is out of the question. A cloudy day with dull light gives, as I have already said, the best results, care being taken to avoid over-exposure, as want of contrast will be the evil that has to be contended with.

However, the worst kind of lighting is, in my opinion, when it proceeds directly from behind the camera, and, shining full on the front of the subject, the shadows are not degraded as when the sun is opposite, but so reduced that the whole thing appears mappy; foreshortened objects appear like points with no suggestion of perspective, which is entirely due to the absence of the shadow that suitable lighting produces. The end of a long rod, for instance, may be bright and clearly made out, but assumes the appearance of a button with a front light, when a side light suggests the hidden remainder by the cast shadow it produces, and so it is all through the chapter; a side light suggests the unseen, when a front light confuses the visible. One would have thought that ordinary observation would have been sufficient to show the uselessness of trying to make a good picture with the light in an unsuitable direction, but the thousands of examples of badly lighted photographs show that it does not.

In some particular instances a pleasing effect may by chance be produced; but the rarity of them only proves the rule, that a good photograph must be well lighted to make a good picture. To suppose that, simply because the day is a suitable one for photography, anything that is properly exposed and developed will turn out a good photograph is a profound mistake, for oftentimes the very worst pictorial results are made in the very best light, and for no other reason than the source of light was in the wrong place for the subject. As I have endeavoured to point out, architectural work suffers *most* from bad lighting, but ordinary landscape suffers, too, in a somewhat mitigated fashion. Take any of the best pictures of the year in our exhibitions, we shall find that the lighting of the picture is the *chief* source of its beauty, no matter whether it is of an open marshy flat or a sylvan scene—the lighting is the principal cause of its effectiveness, and in some cases the sole cause. There is no doubt but that the skilful admixture of light and shade will, without any definite form, produce pleasing impressions. We, therefore, endeavour by skilful selection of subject and the artistic application of light and shadow, to convey such sensations that mere form is of itself unable to supply, either by its own beauty of line or the composition of its individual parts. As a lesson that will be bound to impress itself, photograph the same view from the same point, the only difference being the direction of the light, front, back, and side lights, and compare the resulting prints. It is better to see the *prints* than to trust to the mere examination of the negatives, which often give very deceptive impressions of their pictorial possibilities. As a rule, the landscape is seen most to advantage illuminated with a side light *rather* behind the camera; if the side light is at all in front, we get much more shadow on the front of things, an effect that sometimes gives very charming results, tipping with more brilliant light the upper edges of objects that may be made to give pleasing and effective contrasts with darker backgrounds, or against the more even tints of distance. As the source of light approaches the front, so much more do the upper edges of objects become illuminated, and the parts facing the camera darker, an effect often utilised with the most happy results. At the same time, extreme care is required in selection of the subject, or, instead of artistic effect, we get an ugly blurr and halation. It is always advisable to get the shadow of some object in front to fall over the lens, and thus prevent fogging from light reflected from the lens or lens mount, which is frequently the case when sunlight is allowed to fall uninterruptedly on to the apparatus. Backed plates should also be used. It need scarcely be said that this manner of lighting is trying in many respects in both exposure and development, and calls forth the utmost skill of the worker to get soft and brilliant results; but, given a good composition, with the requisite skill, the most effective style of lighting the landscape is secured, combining breadth of effect with undoubted picturesqueness of treatment, bound to attract the favourable notice of good judges of artistic work.

The effect of light in the opposite direction, that is, from behind the camera, is very bad for landscape when it is an open view, but not nearly so destructive of effect as when architectural subjects are being photographed. With large masses of foliage in the foreground, or in shady glens, this lighting is *sometimes* an advantage, and gives more detail in the obscure portions than side lighting; in fact, the subject may be such that the actual direction of the light matters very little, and the kind that affords the *most* general illumination is to be preferred, but for ordinary landscape work it is the worst kind of lighting that can be chosen, if it does not altogether spoil the effect—any other kind of lighting would be preferable and produce better results. Now, when so many photographs are taken with the intention of exhibiting them on the lantern screen, the effect of light and shade is of the utmost importance. Injudicious lighting at once makes itself unenviably conspicuous, and no composition, however good, will redeem it; on the other hand, the most simple subject cleverly lighted will elicit approval. Let it be borne in mind, ugly lines may be hidden and beautiful points accentuated if proper attention is given to the illumination without any other aid whatever.

It is a general opinion that landscape negatives require to be somewhat denser than portrait ones, and that a portraitist cannot equal a landscape man in his own particular line, and *vice versâ*. I am now alluding to the *quality of the negatives* made. I believe it will be found that the same quality of negative is required for one class of work as the other to produce a good print by the same process. I believe the origin of the opinion is due to the unfamiliarity of the two classes of workers to the management of the lighting in either case. In the studio one gets so accustomed to near objects, and the easy control of the light by blinds, &c., on them, that when out of doors, in the full blaze of sunshine, the conditions are so essentially different that familiar ideas of lighting are upset, without the knowledge that is only acquired by practice being available to take its place. I believe portraitists, as a rule, succeed better with interiors and similar subjects than with ordinary out-of-door work, chiefly because the kind of light and shade is more familiar to them, and the negatives made approximate more nearly to studio work. Then, again, the effect of atmosphere, which is one of the most charming characteristics of a landscape, has to be considered in development, an item altogether absent in studio work; and this, I take it, is the especial reason of workmen accustomed to one class of photography not being able to get on so well with another.

Direct sunshine is usually avoided in portraiture, diffused light being found to give softer and more pleasing effects in the generality of cases. Strong, definite shadows, such a power for good in landscape work, are necessarily out of place under these altered conditions, and he would be a bold photographer to treat his sitters to a bath of unqualified sunshine when having their portraits taken; but portraits have been taken, and taken well, too, in blazing sunshine with excellent effect, soft shadows and no harsh lights. Such pictures are, however, few and far between, and such lighting can scarcely be recommended for general use. And this is the point of chiefest difference between landscape and portraiture, one gives better and more effective pictures with sunshine, and the other without it. We are most of us familiar with the outdoor groups taken in sunshine, with the screwed-up features and black shadows, and yet the surrounding landscape may be perfect in every respect; and in one photograph we see the advantages and disadvantages of sunshine and diffused light. Had the group been taken on a grey day, there would have been no black shadows on the faces, but the landscape would have lost its brilliancy, which in such case is preferable, as the surroundings will thus take a secondary position and not divide the interest with the group, presumably the object of most importance in the picture. All landscapes, to my fancy, are better when taken in a bright light in which the shadows are distinctly shown, from the well-defined shadow of a tree trunk to the soft, diffused one of a passing cloud.

EDWARD DUNMORE.

PROFESSOR DEWAR ON HALOGENS.

AT the second lecture of this series, at the Royal Institution, the audience was not quite so large as upon the former occasion, and one felt inclined to wonder whether this was due to the reduction in temperature, for many of the members of the Institution are past the prime of life, or whether the subject was not just a little too technical for popular taste. Professor Dewar has the subject so well in hand, so at his finger tips, so to speak, that he talks most glibly of melting points, boiling points, specific gravity, atomic volume and weight, comparing these physical constants of the halogen elements with a rapidity which admits of no pause to enable any but a quick intelligence to keep pace with him. Perhaps he assumes that his audience knows a little more of these things than they really do—certainly than some of them do, for the Royal Institution has a very mixed audience, and one sees there some of the best known scientific men of the day, as well as strangers who will applaud every experiment,

be it successful or not, and this home of science is as liable to disappointments as are all other lecture theatres.

Professor Dewar began by pointing out the difficulties of showing the optical properties of the halogen elements, and he called in the aid of photography to show in what manner these bodies, in a gaseous condition, would absorb different parts of the spectrum. By burning magnesium wire behind these different vapours it was possible to obtain photographic records of the effects as seen through the spectroscope—barring the colour, of course. By this means it was shown that bromine and iodine cut off part of the violet and ultra-violet, and that chlorine cuts off all. Next was shown, in a heated flask, the lovely violet colour of iodine vapour; and it was also shown that, when this heated flask was interposed in a spectrum projection apparatus, the green and yellow portions of the spectrum were blotted out, leaving only the red and violet. A very pretty experiment consisted in solidifying the iodine in a tube by the application of liquid air, then by focussing the heat rays from the projecting lantern on to the tube, the solidified portion gradually distilled once more into vapour. The metallic lustre of iodine solidified in this way, although it was in a very thin film, was also well exhibited by reflected light.

A very beautiful experiment to show the effect of coloured light upon chlorine gas was the next item to attract the attention of the audience For this experiment an old-pattern differential thermometer, with a bulb at each end and a drop of liquid in the tube which connected them, was filled with the gas. A beam of red light from a distant electric lantern was now concentrated on one of the bulbs, but without action. A blue glass was placed against the red one in the lantern, still without effect on the chlorine; but, when the red glass was removed and the blue light only reached the bulb, the drop of liquid in the tube shifted its place, showing that gaseous chlorine is opaque to light of short wave-lengths, and that heat is absorbed.

Iodine vapour heated in a glass tube by means of a Bunsen burner glowed for some seconds after the source of heat was removed, showing that light is emitted from the vapour under such conditions. Iodine, unlike sulphur and some other substances, can be compressed by hydraulic means into a solid cube, or it can be drawn into wire. Specimens of both were shown by means of the vertical attachment to the lantern. By the same agency a very pretty experiment was performed on three crystals of iodine. To one was added a drop of alcohol, and it immediately began to dissolve and form the familiar brown solution, tincture of iodine as sold by druggists. A solution of potassic iodide added to another crystal produced the same coloured solution, but a drop of carbon bisulphide to which the remaining crystal was treated gave a brilliant violet colour. The brown colour of iodine in alcohol changes to a pale yellow when the solution is cooled in liquid air, a fact which was prettily demonstrated by means of the lantern. A consideration of the properties of fluorine, the isolation of which is one of the recent triumphs of chemistry, is promised in the final lecture of the series.

DE KATOW'S IMPROVEMENTS IN APPARATUS FOR COPYING OR TRANSFERRING PHOTOGRAPHS.

This improved copying apparatus is shown in two working positions in figs. 1 and 2 (sheet 1 of the accompanying two sheets of drawings), sheet 2 being a diagrammatic view of the whole arrangement lighted by electricity.

Upon the framework of the machine is fixed a pneumatic copying frame, consisting of the frame enclosing the glass pane, s, of the indiarubber sheet, d, the movable plate or table, o, and the negative or negatives, n. Between the indiarubber sheet, d, and the negative or negatives, n, is fed, in any suitable manner, the endless paper strip, p, while powerful spiral springs, f, fixed to the said framework, press the plate, o, against the glass pane, s. The indiarubber sheet, however, is not under pressure throughout its surface, only its edges are caused to adhere tightly, owing to their being provided with indiarubber strips, l, which are pressed against similar strips, b, placed on the glass pane, s, to correspond with the indiarubber strips, l, thus forming an airtight enclosure of the hollow space surrounded by the strips, l, in the parts where the paper strip, p, enters the apparatus.

Close to these edges, and within the tightening strips, l, indiarubber tubes, g, are provided, being connected to an air-exhausting apparatus, h (sheet 2), so that, by exhausting the air from the hollow space between the indiarubber plate and the glass pane, the negative and the paper strip can be firmly pressed against such pane, and it matters not whether one (fig. 1) or several negatives (fig. 2) are placed under the latter. As, however, before a vacuum is made, adhesion is already produced in consequence of the pressure on the strips, b and l, exerted by the springs, f, it is not necessary to make so thorough a vacuum as to expose thereby the glass plate to be broken.

This apparatus, being designed for quick, successive operations, the paper band, p, is accordingly, when properly illuminated, fed forward after each exposure, and the plate, o, is promptly moved away from the glass pane, s, while the impression, the adhesiveness, and the formation of a vacuum follow quickly on.

To be able to carry on the successive steps of the process in quick and correct order, the sinking, lifting, and tightening of the plate, o, must be effected by rotating mechanism of special construction, which opens and closes, at the proper time, the air-exhausting conduit; but, as the impression of the indiarubber sheet must follow during this rapid process, the vacuum required therefor is not made directly, but indirectly, by the air pump in such a manner that the latter acts constantly on a receiver, whence starts the air conduit, h, provided with a cock, c (sheet 2), and to which are fixed behind this cock the different indiarubber air pipes, g, which pass through the plate, o, and terminate close to the

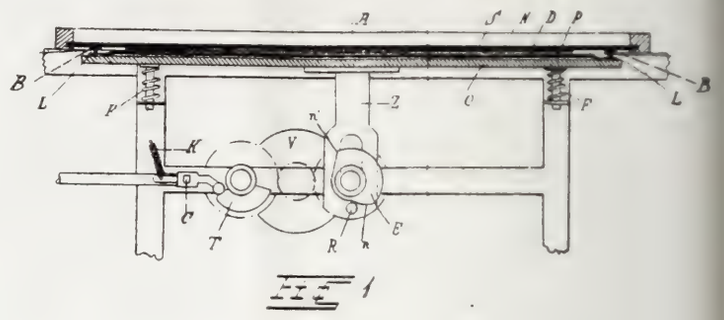


Fig. 1.

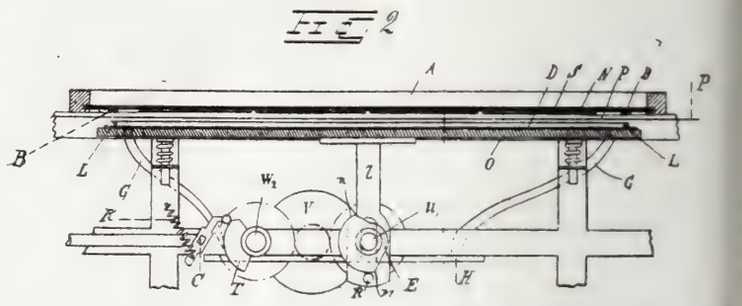
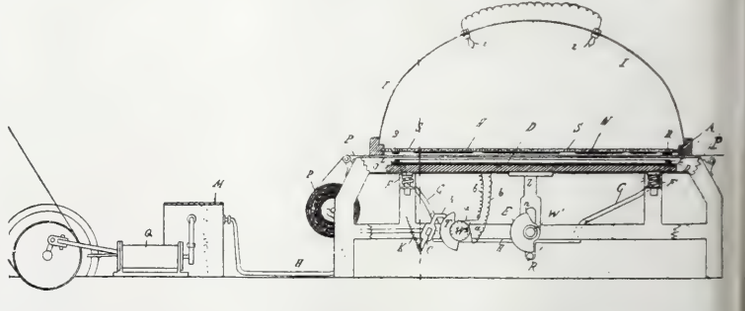


Fig. 2.

indiarubber plate, d, immediately behind the glass pane, s. The table or plate, o, is pressed by springs, and the impression is taken off by means of a cam, e, fixed to the driving shaft, w^1, which is constantly in motion. Upon this shaft is mounted a toothed wheel, which imparts, with the aid of intermediate gear, v, a rotary motion to a second shaft, w^2, carrying likewise a cam, t, which actuates, at the right moment, a double-armed lever, *h*, fixed upon the cock, c, this lever, *h*, being held in constant contact with the cam, t, by means of the spring, k. During the period of exposure the movable part of the apparatus assumes the position shown in fig. 1. The plate, o, is held under pressure by the springs, f, the shaft, w^1, and the gear actuated thereby are rotating as well as the two cams, e and t. During this rotation the cam, e, strikes with its projecting point, *n*, the roller, r, which is fixed to the sliding bar, z, surrounds the shaft, w^1, and carries the plate, o, thus depressing



the roller, r, the bar, z, and the plate, o, until the roller comes to bear against the circular part of the cam. The lowering of the table causes the cock, c, to be closed, and, as the cam, t, rotates at the same time as the cam, e, its projecting side edge moves the lever, *h*, fixed to the shell of the said cock in its closed position by overcoming the tension of the spring, k. The plate, o, with the indiarubber sheet, d, fixed thereon, is depressed, the cock, c, is closed, and the paper strip can be fed through the apparatus and under the negative or negatives in any suitable manner, so that a sufficient length of unexposed paper comes upon the indiarubber sheet, d (fig. 2). Meanwhile, the rotation of the shaft, w^1, not being interrupted, the cams, e and t, continue to rotate, and, as during such rotation the roll, r, and the end of the lever, *h*, bear on the concentric curve of the cams, e and t, the plate, o, maintained in its lowered, and the cock in its closed, position (fig. 2). As soon, however, as a new paper strip comes upon the plate, o, the roller, r, and the lever,

, having reached the extreme edge, n^1, of the cams, E and T, the former, ogether with the end of the lever, *h*, lose their support in consequence of the continuing rotation of the cams, and the springs, F, coming into action, raise the plate, O, while the spring, K, opens the cock, C. This action is so timed that the cock is opened immediately that the plate, O, s under pressure and the tightening strips, B L, have closed the edges of the indiarubber plate. At this moment a vacuum is formed in the hollow space between the indiarubber sheet and the paper strip by the receiver, which is not shown in the drawings (fig. 2). The hollow space s sufficiently freed from air at one stroke to cause the firm adhesion of the indiarubber sheet throughout its surface, and the exposure follows until the cam, E, in its uninterrupted rotary course, depresses again the roller, R, and thus, while closing the cock, *h*, lowers the plate, O.

Thus, during one revolution of the shaft, the plate, O, is depressed, while the cock in the air conduit is closed; a fresh length of paper is fed into the apparatus; the plate, O, is raised, and subjected to pressure; the cock in the air conduit is opened, and a vacuum is formed in the apparatus; and, lastly, the paper is exposed to the light for a given time, whereupon the above steps are repeated in the same order.

The illumination of the sensitised paper can be obtained from natural light, but Mr. de Katow prefers using electric lighting, and he arranges a bell jar, I (sheet 2), secured to the frame, A, and placed over the glass plate, S, this jar being provided with a suitable number of electric lamps. As the sensitised paper is fed forward, it should not be exposed to the light, and hence the electric lamps are extinguished while the table or plate, O, is depressed, being relighted when the paper is receiving an impression from the negative or negatives. For this purpose the wires, *b b*, from the electric lamp are connected to contact springs, *a a*, bearing against the shaft, w^2, or a disc mounted on the latter, and connected with the electric circuit in such a manner that at the moment when the air conduit, H, is opened in consequence of the rotation of the shaft, w^2, and the indiarubber sheet firmly presses the sensitised paper against the negative or negatives, the current is flowing, and hence the lighting takes place.

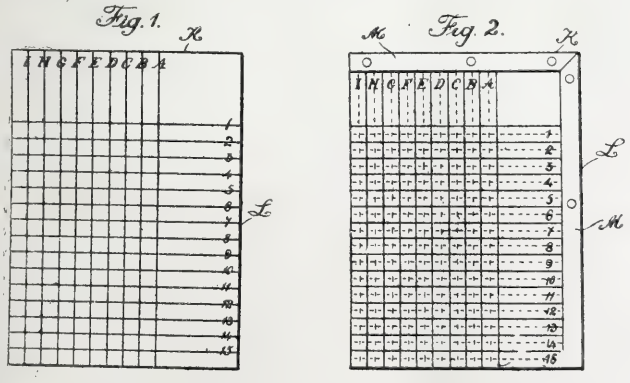
This current will continue to flow on so long as the cock, C, is open, but, so soon as it is closed, the shaft, w^2, has turned so far that the contact is broken, and hence the light is extinguished.

As the sensitised paper is fed forward, while the table, O, is lowered and the cock is closed, this feeding motion will take place in the dark, exactly as it was intended to do.

Instead of connecting the electric contrivance for the electric lamps with the gear actuating the cock, H, it may be similarly connected with the mechanism used for raising and lowering the table, O.

TRIMMING THE EDGES OF PHOTOGRAPHS AND PRINTS.

Mr. W. P. Singleton says: "I take a rectangular sheet or plate of glass, or other suitable transparent material having one or both of its surfaces ruled, impressed, engraved, cut, or otherwise marked with a number of lines. Half of these are parallel to one another and to one of the edges of the plate, whilst the remainder are parallel to one of the adjacent edges of the plate, and at right angles to the first-mentioned lines, these said lines forming a number of right angles situated one within the other. The lines are placed at any suitable distance apart, and may either be



lettered, numbered, or otherwise distinguished, in any convenient manner, or left without such distinguishing marks, according to the particular purposes for which same may be required.

"I will now further describe my invention with reference to the accompanying sheet of drawings, of which fig. 1 represents a rectangular sheet or plate of glass, or other suitable transparent material, having lines, as previously described, marked upon or cut in it in any suitable manner, the lines numbered from 1 to 15 being parallel to one another, and to the edge, K, of the plate or sheet, and the lines lettered A, B, C, D, E, F, G, H, I, being parallel to one another and to the edge, L, of the sheet or plate, and crossing the lines numbered 1 to 15 at right angles.

"Fig. 2 shows a similar sheet or plate made of a thin piece of transparent celluloid, mica, or other like material, strengthened and protected by having two of its edges bound with a metal rim, M, the said rim, M, being secured to the plate or sheet by means of rivets, or in any other suitable manner.

"In this figure the lines are arranged as in fig. 1; but, in order that they may be the more easily distinguished, every other line is dotted or broken, and only every other line running in either direction is lettered or numbered respectively.

"It is obvious that these letters and figures may be entirely or partly omitted without departing from the spirit of the invention.

"When it is required to trim a photograph or other picture, the transparent sheet is placed on said picture, having any required one of its lines made to coincide with any desired centre or base line in or on the picture, the transparency of the material used enabling the operator to arrange the intended centre of the picture exactly to his liking.

"The edges of the picture or the like can then be readily trimmed, and the size of the same reduced so that the edges thereof will be at right angles to each other.

"It is obvious that lines as described may be marked with reference to any other two adjacent sides of the rectangular transparent plate than L and K."

EDINBURGH PHOTOGRAPHIC SOCIETY'S ANNUAL EXHIBITION.

The Edinburgh Photographic Society is a veteran Society, dating back to 1861 (it was originally the Scottish Photographic Society); but, in spite of its great age, it shows a vitality that betokens vigorous manhood. There are few photographic associations that can boast a membership of 450, and our Almanac shows that it is in the first flight of veteran societies. Recently it has shown an ever-increasing vitality, and the last three years have made large additions to its membership; during the present season (that is, since October) the increase is seventy-five new members. On Saturday evening their annual Exhibition was opened in their rooms, Castle-street, Edinburgh, with a smoking concert, presided over by Mr. Hippolyte J. Blanc, R.S.A., one of the Presidents of the Society. It is proposed to hold special evenings each Saturday during the Exhibition (January 29 to February 26).

The entries for the Exhibition have been very numerous, in fact, if anything, too numerous for the room at the disposal of the Committee. This has militated somewhat against the effective hanging of the pictures, but, on the whole, the Hanging Committee have to be congratulated on their work. The room is lighted from both ends, no top light, and consequently some of the pictures, especially the small hand-camera prints, are viewed in rather an unfavourable light; but this was a matter outside their control, and only those who have had the experience know the difficulty, nay, almost impossibility, of securing on reasonable terms a suitable hall in Edinburgh for the Exhibition. It is to be hoped, therefore, that the dream of some of the more enthusiastic members that the Society should secure larger and better rooms may speedily become a reality.

The Judges were Mr. Rob McGregor, R.S.A., Edinburgh; Mr. Andrew Young, Burntisland; and Mr. W. Grant Stevenson, R.S.A., Edinburgh.

A casual look round reveals the fact that most of the awards, as has been the tendency at all recent exhibitions, have gone to low-toned pictures. We propose treating the pictures as they are hung and catalogued, irrespective of the number of the individual classes.

Class VIII.—Amateur members only, for the best direct picture.—The silver medal in this class is awarded to W. J. Croall, for *Devil's Rock* (No. 22). This picture, which is a beautiful print in platinotype, well deserves its reward. The large, outstanding mass of rock which gives the title, dominates the picture, but none of the rest of the frame is "to let;" the water is admirably rendered, and the clouds lend a completeness to the picture. The award of the bronze medal to *Light and Shade* (No. 20) an ordinary print in collodion chloride, by D. Keith Murray, is a little surprising. Technically, the print is all right, but the composition is far from satisfying. John Warrack, jun., has two studies in portraiture (Nos. 11 and 23) that show undoubted artistic ability, but they are printed very dark, and show an unpleasant hardness. Two cloud studies (Nos. 14 and 15), by J. A. Trevelyan, are interesting, but not pictorial. In *An Old Batchelor* (No. 24), and *Grace* (No. 32), by Alex Allen, the photographer has been successful in securing a good model, but the lighting of the picture requires more consideration. *Scotch Firs* (No. 21) is a good picture spoiled by the lopping off of the top of the trees. The surprise in this class is the large number of P.O.P. prints shown. We thought that process was obsolete for exhibition purposes.

Class V.—Best set of pictures, not exceeding five, being work done with camera held in the hand.—The silver medal is awarded to J. B. Johnston for four nice landscapes (No. 51); the sky in the two at the top of the frame is rather "streaky;" one shows the high lights of sky reflected in the water; the prints are suitably mounted and framed. The bronze medal goes to James Burns for a series of five harvest scenes (No. 61), printed, if anything, too dark, but admirably mounted and framed. There is a considerable number of P.O.P. prints in this class, some of them with very *outré* mounts.

Class IV.—Best direct or enlarged figure or *genre* composition.—The silver-medal picture *Martha* (No. 86) by Alex Allan is a little gem, not larger than quarter-plate. The lighting is powerful, the profile of the face being strongly lit, and the rest of the picture in shadow; a tartan shawl is wrapped round the old lady's shoulder, but this is not much more than indicated. In one of his other pictures, *Fireside Reflections*, the same figure occurs, but the treatment is not on the same level as the medalled picture. *Katie* (No. 82), by J. B. Johnston, the winner of the bronze medal, is a print of a little girl; we think it is fortunate in securing this award, as other pictures in this class strike us as superior. "Pretty" is the best description of the print. *Next-door Neighbours* (No. 79) shows two nicely posed figures, and is technically first class, but the background is irritating. *Cottage Interior* (No. 91) is about as hard as any one need wish; *Milking Time* is a pleasing picture; *Crusoe Teaching Friday* is "stagey" and artificial.

Class V.—Open to members and non-members.—A division, landscape, seascape, and architecture.—J. B. Johnston adds another laurel to his wreath by winning the silver medal with *In Largo Bay* (No. 112). This is a very pleasing composition—a boat, a figure, and a sea beach, slightly out of focus, giving an evening effect, the whole picture being very restful. The second prize is awarded to W. Smedley Aston, Birmingham, for *After Many Days*. Like the silver-medal picture, this is another seaside picture, and represents an old wreck left stranded on the sea-beach. We are inclined to prefer his *An Autumn Evening* (No. 107), the composition seems more satisfactory, although the clouds do not seem quite so suitable as the winning picture. *Loch Morevaird* (No. 98) has excited some curiosity as to what a white object in the middle of the water; it certainly hurts the picture. *Under the Lea* (No. 96) is one of the best renderings of a wind-driven landscape we have seen. *Guddling* (No. 100) is a pleasing picture. *Homewards* (No. 109) is a good country scene, slightly spoiled by the hard outline of the hills on the horizon. J. Craig Annan, Glasgow, is represented with *Skelmorlie Woods* (No. 115) a tangle of brushwood with some trees; it seems more of a study than a finished picture. This class also contains some good work from Clifford Young, George J. T. Walford, W. F. Slater, and Eustace Young, London; F. P. Moffat, Edinburgh, and others.

Class VI.—Best direct or enlarged picture, being the work of a lady member.—*Shadow, Silence, and Sadness* (No. 145), by Miss Daisy Duncan, is awarded the silver medal; it has the reflections of the light in the sky well caught in the water, but the big boulder in the foreground seems to throw into greater prominence than necessary the bareness of the left of the picture. *The Fairies Glen* (No. 154), by Mrs. Norman Macdonald (bronze medal), has an obtrusive figure of a little girl in the foreground which tends to mar the harmony of the picture. We are astonished that none of the pictures submitted by Miss Curle have caught the Judges' eye; they all show clean technique and good composition.

Class I. (continued).—Open to members and non-members, B division. Figure studies and portraiture.—This Class may be characterised as the strongest in the Exhibition; the silver medal picture, *A Symphony* (No. 184), by Wm. Crooke, Edinburgh, has been awarded the gold medal for the best picture in the Exhibition. This is a *real* picture, one that it would be a pleasure "to live with;" the background is dark, and, while the picture does not seem really out of focus, still the unimportant parts are suppressed in a manner that might be said to render the whole a photographic harmony. The bronze medal goes to R. S. Webster, Edinburgh, for *Portrait Study* (No. 180), a photograph of an old lady which, we think, we have seen before; there is an indefinable charm about it that is not entirely due to the personality of the sitter; the photographer seems, as some one has said, to have got behind the mask of the face and shown us the lady herself, her *ego*, as scientists say. *Head of an Artist* (No. 177), by Chas. Sweet, Rothesay, is a striking rendering of a strong, manly head; the white hair is wanting in texture, however. *In a Garden Fair* (No. 187), by J. Craig Annan, is unnoticed by the Judges here, although it received very favourable critiques on its appearance at the Salon last year. It retains all its old charm and "sunniness," and is a pleasing relief after so many evening, mud-flat pictures. *I've got the Penny* (No. 172), is a taking picture, although it would stand some technical improvement. This Class is so full of good things that space debars us treating them *in extenso*.

Class II.—Best direct or enlarged picture, half-plate size or under, other than figure or *genre* composition.—*Sunset on the Forth* (No. 221), by J. Knox Crawford, gains the silver medal. This, as might be expected, is one of the low-toned school, with the characteristic "Horsley Hinton" feature, light in the sky reflected on the water. The reflection is a trifle hard, and the rays from the setting sun do appear rather artificial. *Sunshine and Sea Breezes* (No. 225), by Ralph S. Commons, reminds us very much of a picture by the Rev. F. C. Lambert at one of the London Exhibitions; it is an arrangement of masses, with no detail anywhere, except, perhaps, in the sky. *At Close of Day* (No. 210), has a peculiar effect, and it wants close inspection to know that the white patch represents cottages; one would think it had been taken from a height.

Class III.—Best direct or enlarged picture about half-plate size, other than figure or *genre* composition.—W. J. Croall gains both medals in this class, the silver with *Harvest—Leading in* (No. 269), and the bronze with *Fox Terrier—Champion Barron* (No. 277). Both pictures are good; the figure "forking" is, perhaps, a little stiff, but the picture as a whole is satisfying. The picture of the fox terrier is exceptionally fine, as also are this artist's other animal studies (Nos. 260 and 265), but his *Sunset on the Forth* is very hard. We have seen a better print from this negative, probably at the Glasgow Show.

The "Not for Competition" Class has some good animal studies from Charles Reid, Wishaw, W. J. Croalls (*Sporting Dogs at Work*), a nice study of sheep and snow (*Strayed*) by George B. Cowen, Ramsey, I. O. M. and some pictures by "Matthew Surface" Bradford.

Class VII.—Best Set of six Lantern slides.—This only produced five entries. The silver medal was withheld, and the bronze awarded to R. Robinson for one of the three sets he entered (No. 304).

The following is the complete prize list:—

PRIZE LIST.

Class I.—Open to members and non-members.—A division, landscape seascape, and architecture.—Silver medal, *In Largo Bay* (No. 112) J. B. Johnston, Edinburgh. Bronze medal, *After Many Days* (No. 111) W. Smedley, Aston, Birmingham. B division: figure studies and portraiture.—Silver medal, *A Symphony* (No. 184), Wm. Crooke, Edinburgh Bronze medal, *Portrait Study* (No. 180), R. S. Webster, Edinburgh. Gold medal for best picture in the Exhibition, awarded to No. 184, Wm. Crooke Edinburgh.

Open to members.—Class II. Best direct or enlarged picture, half-plate size and under, other than figure or genre composition.—Silver medal *Sunset on the Forth* (No. 221), J. Knox Crawford. Bronze medal, *Sunshine and Sea Breezes* (No. 225), Ralph S. Common.

Class III. Best direct or enlarged picture above half-plate size, other than figure or *genre* composition.—Silver medal, *Harvest, Leading-in* (No. 269), W. J. Croall. Bronze medal, *Fox Terrier champion, Barron* (No. 277), W. J. Croall.

Class IV. Best direct or enlarged figure study or *genre* composition.—Silver medal, *Martha* (No. 86), Alex. Allan. Bronze medal, *Katie* (No. 82) J. B. Johnston.

Class V. Best set of pictures not exceeding five, being work done with camera held in hand. Silver medal, four pictures (No. 51), J. B. Johnston Bronze medal, five pictures (No. 61), Jas. Burns.

Class VI. Best direct or enlarged picture, being the work of a lad Member.—Silver medal, *Shadow, Silence, and Sadness* (No. 145), Mis Daisy Duncan. Bronze medal, *The Fairies' Glen* (No. 154), Mrs. Norma Macdonald.

Class VII. Best set of six lantern slides.—Silver medal, withheld Bronze medal, six slides (No. 304), R. Robinson.

Class VIII. Amateur members only, for best direct picture.—Silve medal, *Devil's Rock* (No. 22), W. J. Croall. Bronze medal, light an shade, D. Keith Murray.

Our Editorial Table.

GLASS-BLOWING AND GLASS-WORKING.

By THOMAS BOLAS, F.C.S., F.I.C. London: Dawbarn & Ward, 6, Farringdon-avenu

IN this little work we have a striking evidence of the versatility of geni possessed by the author. His connexion with literature and his valuab researches in the more obscure regions of chemistry and physics ha long been known. In the work before us he proves to be as expe with his hands as with his pen. It consists of a summary of a series lectures and demonstrations given under the auspices of the Techni Education Committee. The literature of glass-blowing is by no mea plentiful, and the author is to be congratulated on striking new grou The ten chapters into which the work is divided are progressive, writt in a concise, descriptive manner, and so profusely illustrated that t veriest tyro cannot help understanding them. It will be a revelation many to know how, with the simplest of contrivances, articles for t chemical laboratory or for domestic decoration may be fashioned out such an apparently refractory substance as glass. The first four chapte are exclusively confined to a description of the apparatus required, a how to construct them, and of the varieties of glass, with their suitabili for different purposes. The remaining portion deals in a practical a lucid manner with the technical art of glass-blowing. Commencing wi the simplest examples of bending and sealing glass tubes, it proceeds a gradual manner through all the requirements of the laboratory, up the making and filling thermometers, and constructing of all variet of vacuum tubes. Every example given is well illustrated throu its various stages. Not the least interesting chapter of the bo is the one devoted to the decorative and more artistic applications glass-blowing. Here, again, the author wastes no time in discussing t canons of art, but sums it up in the simple statement, that "t workman should do just what pleases him at the moment." This p tion is illustrated by a three-colour block of various-coloured bottl jugs, vases, and fancy articles, and the method of colouring, blendi and fashioning each of these beautiful objects is described. The bo ought to be in the possession of every laboratory student as well expert. There is not a waste word in it, and we can cordially reco mend it to our readers.

News and Notes.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.—Mr. J. Durston, of 5, Landrock-road, Hornsey, N., writes: "Please note that Mr. Taylor has found it necessary to retire from the Secretaryship of the above Society. As his successor, I shall be pleased to answer any inquiries from the above address."

PHOTOGRAPHIC CLUB.—Wednesday evening, February 9, 1898, at eight o'clock. Members' Open Night. Slides, &c. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

THE next meeting of the Manchester Photographic Society will be held at the Manchester Athenæum, and will be a joint one with the Manchester Amateur Photographic Society, when Mr. E. J. Wall will lecture and demonstrate on *Colour and Photography*, treating of the production of colour, its reproduction by photography, by the three-colour process and Joly's, and its rendering in monochrome.

MR. H. D. GOWER (Hon. Secretary of the Photographic Section of the Croydon Microscopical and Natural History Club) writes: "May I take the liberty of calling your attention to an error in the article *Fuzzy versus Sharp Pictures Commercially Considered* in the last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY. You mention the discussion having taken place before the Croydon Camera Club. This is not so. I think you will find that the paper was read before the '*Photographic Section*' *of the Croydon Microscopical and Natural History Club* in December last."

EXTRAORDINARY CLAIM BY A PHOTOGRAPHER.—At the last sitting of the Market Drayton County Court, before His Honour Judge Jordan, George Brace, a travelling photographer, sued W. Shepherd, of Spoonley, to recover the sum of 10*s.* 6*d.*, the price of a photograph. Mr. Garsi le, who appeared for the defence, stated that Brace, without asking permission, took a photograph of the defendant's homestead, and then demanded payment for it. The defendant refused to pay, whereupon the defendant took out the present summons. As the plaintiff did not appear in support of his claim, His Honour gave judgment for the defendant, with costs amounting to 5*s.* 6*d.* The plaintiff was also the plaintiff in another action, in which he sued a farmer under identical circumstances, and in the absence of plaintiff this was also dismissed with costs.

WHERE certain salts, such as bromide of potassium and chloride of sodium, undergo changes of colour under the action of cathodic rays, after the method of Goldstein, it has been found by Professors Elster and Geitel that they are at the same time rendered photo-electrically sensitive, inasmuch as in sunlight or broad daylight they lose any negative electric charges imparted to them more rapidly than in the dark. The same physicists, writing in Wiedemann's *Annalen* (62), now examine whether the same property is conferred on these salts when the colouration is produced by heating them in the presence of potassium or sodium vapour, after the manner described by Kreutz and Giesel. In the case of common salt, the electro-meter readings represented the loss of charge in one minute in light were as follows: For salt coloured by cathodic rays and kept in darkness a year, 214; rock salt coloured brown to blue by potassium vapour, 73; natural violet salt, 23; chloride of sodium coloured by Berlin blue, + 1; the corresponding data in the dark being 0, − 10, − 2, − 3. With potassium bromide, nearly blackened by potassium vapour, in light, 71; the same bright blue, 101; the same coloured by Berlin blue, + 1; the results in darkness being − 4, + 2, 0 −. There is thus no doubt that the same photo-electric properties are conferred on the salts by potassium vapour as by cathodic rays; and, moreover, these properties exist more or less in the natural violet and blue varieties of such minerals as rock salt and fluor spar.

FAKENHAM DISTRICT CAMERA CLUB EXHIBITION.—The Third Annual Exhibition of this Club was held on January 19, at the Corn Hall, Fakenham. The walls of the hall were well covered; the exhibits numbering about 250, in addition to 210 stereoscopic and lantern slides; these latter were placed on new in grooving, forming the sides of a special framework, which rendered inspection pleasant both by day and artificial light. The competition prints were hung together in their respective sections. The loan collection was distributed round the hall, and included fine examples of the work of some well-known picture-makers, Messrs. Horsley Hinton, W. Thomas, S. L. Bulthurst, T. Morley-Brook, E. Marriage, A. H. Hughes, C. H. Hewitt, and others, having kindly contributed. The Judges were Dr. Bensley, Mr. W. G. Thompson, M.D., and Mr. C. Wood. Section 1 (Figure Studies).—The silver medal was awarded to Mr. W. Howell for *The Old Folks at Home*, and the bronze medal to Mr. A. J. Jeffreys for *Harvesting Osiers*. The average standard was not high, although several compositions showed much cleverness. Section 2 (Landscape, &c.)—The silver medal was awarded to Mr. C. H. Oakden for *Pulls Ferry*, and Mr. W. E. Dunmore secured the bronze medal for *Choir Processional, Norwich*. There were a large number of frames in this section, and the work generally good, notably the contribution of Miss Ellman, Miss Willis, Messrs. Oakden, Dunmore, Slater, Rumbold, Ayling, and several others. Section 3 (Enlargements).—The silver medal went to Mr. J. T. Walford for *The Close of a Stormy Day*, and the bronze medal fell to Mr. G. O. Thomson for *Swazi Impi at the Malaboch War*. There were some charming things in this section, the quality, both pictorial and technical, ruling high. Mr. Walford's picture was especially beautiful, and strongly reminded one of Mr. Hinton's best work. Mr. G. O. Thomson's *Charge of a Swazi Impi* was very noticeable from its vigour, great size, and admirable treatment. Section 4 (Stereoscopic).—Mr. Oakden came in first, after a struggle with Mr. Rumbold. Both gentlemen's sets were of fine quality, Mr. Oakden's Irish scenes and Mr. Rumbold's interiors especially so. Section 5 (Lantern Slides: Figure Studies).—A small class and a weak one. Bronze medal awarded to Mr. R. Tindall. Section 6 (Lantern Slides, Landscapes, &c).—Mr. E. Marriage secured the silver medal and Mr. J. Ward the bronze. This section gave the Judges a big job, and after a long and conscientious examination, both on the screen and in hand, the awards were made as above. Mr. Marriage's sets included but one even approximately poor slide. Mr. Ward's seascapes were, as usual, good, as were the contributions of Mr. W. E. Farmer, who ran Mr. Ward close for second place. The Exhibition was enlivened by the string band, ably conducted by Mr. R. S. Utting. Amongst the special attractions were Ives's kromskop, which drew a large number of visitors to the little room, where the Secretary explained and exhibited its powers. At 8.30 p.m., in the assembly room, was shown the aerial graphoscope, an invention of Mr. Eric Bruce, by which ghost effects, &c., can be produced in bright light. About 200 slides were also projected on the screen, mostly the productions of the President (the Rev. W. Martin) and Mr. T. J. Miller, jun., the remainder being the prize slides of Messrs. Tindall, Marriage, and Ward. Messrs. Miller, Son, & Co. had a printing press at work finishing off the programmes, which were in colours and embellished with a charming little snap-shot, the production of Mr. T. J. Miller, jun., managing director of the company, which makes a speciality of colour work. Mr. Hudlass, of Southport, showed his pneumatic carrier for the optical lantern, and his "Pneu" hand camera, both very ingenious novelties. The Strand Engraving Company, the Metallic Photo-printing Syndicate, Messrs. Morgan & Co., of Aberdeen, Messrs. Vincent, of Blaikley, the Eastman Company, Otto Schölzig, and Messrs. Mawson & Swan, and R. W. Howes, of East Dereham, were represented by some most admirable work, which was quite a revelation to the country dweller. The St. Paul's Company kindly sent a fine collection of original drawings by well-known artists. Altogether the show was an excellent one, and would have done credit to a much larger society, but the public unfortunately failed to appreciate it, and attended in much smaller numbers than would have been expected.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

February.	Name of Society.	Subject.
7	Bradford Photo. Society	*Twelve Years of Photography.* Percy Lund.
7	Camera Club	*Japan.* Rev. Walter Weston.
7	Ealing	Lantern Evening: Bournemouth and Various Slides. A. E. Smith.—Various. A. Richardson.
7	Ireland	Opening of Exhibition.
7	North Middlesex	Informal Meeting.
7	Putney	*Carbon Transparencies with a View to Enlargements.* F. T. Beeson, F.R.P.S.
7	Richmond	Lantern Evening: Adjudication of Competition.
7	Stafford Photo. Society	*Cloud Photographing.* A. H. Hinton.
8	Birmingham Photo. Society	*The Production of Lantern Slides by the Aid of Exposure Meters.* G. F. Lyndon, J.P.—Members' Lantern Evening
8	Bootle	Exhibition of F. H. Worsley-Benison's Series of "Westby" Photographs.
8	Brixton and Clapham	*Flower Studies.* E. Dockree.
8	Hackney	*Hints on the Working of the Optical Lantern.* Dr. Roland Smith.
8-12	Ireland	Annual Exhibition.
8	Isle of Thanet	*Photographic Advances.* F. C. Hepworth.
8	Manchester Amateur	*The Theory and Practice of Bromide Printing.* Councillor George H. B. Wheeler.
8	Shropshire	Demonstration of Enlarging on Bromide Paper. J. L. Della Porta.
9	Coventry and Midland	1897 Slides.
9	Croydon Camera Club	Eighth Annual Meeting.—Special Exhibition of Gum Prints.
9	Kingston-on-Thames	*Some Applications of Photography, Useful and Marvellous.* George Davison.
9	Leicester and Leicestershire	*Enlarging.* J. H. Gear.—*Stereoscopic Work.* J. T. Cooper.—Prize Slides (1887).
9	Leytonstone	*Lantern Experiments.* A. Woodcock.
9	Photographic Club	Members' Open Night: Slides, &c.
9	Southport	Carbon Printing. Single Transfer Demonstration.
10	Bolton Mutual Photo. Society	*Platinotype Printing.* Peter Woods.
10	London and Provincial	*Photographic Papers for Development.* T. E. H. Bullen.
10	Oldham	Exhibition of the Thornton-Pickard Company's Specialities. Mr. Scott.
10	Woolwich Photo. Society	Lantern-slide Testing Night.
11	Croydon Microscopical	Conversational Meeting.
11	West London	*Gothic Architecture.* H. Mann and T. Coysh.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 27,—Mr. J. E. Hodd in the chair.

The Chairman passed round a half dozen examples of what films should not be. These were taken at random from a considerable number, and were alike in being covered with meaningless marks, while in those where there was a suggestion of an image it was of a thin and ghostly character. The films had travelled to India, and were presumably properly exposed. There was no reason to suspect staleness, but upon development effects such as were shown were all that could be got.

The Hon. Secretary ascribed the appearance to a supposed action after exposure, and suggested that, if the films had been taken out to India, and some, unexposed, brought back, exposed in this country, and developed, there would have been no cause for complaint. He instanced a case in which certain films went across deserts and suchlike, and during the trip some were exposed. These did not turn out particularly well on development, but some of the unexposed films which had been through the same experiences and came into his hands were perfectly clear and free from any such defect. This, and the fact that films exposed in the same regions and developed at once were, for the greater part, successful, led him to the belief that some action in the film after exposure was the cause of the defect.

Mr. A. Haddon inquired whether it was to be inferred from this that, if the gelatino-bromide emulsion had been supported upon glass or paper instead of celluloid, identically the same result would have been obtained? He thought not, and that it was due not to the action of light or atmosphere, but to something in the substance on which the sensitive compound was supported.

Mr. A. Thomas said it was only reasonable to expect that one or two films would miss exposure by dropping two together now and then, and it would be of some importance to know whether there were any exceptions to the general rule amongst those about which the Chairman spoke. If there were no exceptions, Mr. Freshwater's theory would hardly stand, as it was only likely that some of the films would miss exposure, in which case they should, in accordance with this theory, be unaffected by the action suggested. He wished to get to the fact as to whether it followed the action of light or was irrespective of it.

Mr. Edwin Banks explained that celluloid was of a very uncertain composition, some was good and some was bad, but no celluloid was very permanent, and if closely confined under pressure it gave off its nitrous acid gas, this liberation occurring underneath the gelatine film, and having the effect of destroying the image in patches. The rollable film was much superior to the ordinary specimen of cut film, which was made of practically anything.

The Chairman remarked that greater density occurred where the fault was, there being less density where the action had not taken place. As regards the pressure question, the defect was often seen in cut films, but not in rollable films.

Mr. Haddon was of opinion that the makers of celluloid did not know how to make it. If gun-cotton were properly made, it was practically indefinite in its life, and he instanced its application to military purposes where it was stored tightly but with no ill effect. The Government would not pass it if there was the least trace of acid in it, but in the films under notice there was an abundance of acid.

Messrs. George Houghton & Son's representative attended to describe the latest improvements in the Sanderson camera, and to show some of their novelties in apparatus. Referring to the first-named, he said it had been provided with a travelling frame, which, racked out, practically making the camera of triple extension. The half-plate form was measured, and, fully extended, reached some twenty-four inches. The eccentric front allowed of the lens being brought pretty well opposite any portion of the plate. A new bromide printing frame was passed round, designed to facilitate the printing of a large number of copies from a negative. It is intended to be placed against an aperture in the dark-room door, or other suitable place, and, being provided with a shutter, avoids the trouble of having to cover and uncover the paper between each operation. The operator is situated inside the dark room, and the exposure is made to a lamp outside the room by raising the wooden shutter between it and the negative. There was also on view a Maloni flash lamp, and some samples, showing the quality of lighting by means of this apparatus, were passed round. During the evening two groups of the meeting were taken with the lamp, in addition to a couple of portraits of the Secretary and Mr. Haddon.

A vote of thanks was passed to Messrs. Houghton and their representative.

PHOTOGRAPHIC CLUB.

January 26.—The large hall at Anderton's Hotel on Wednesday evening of last week was well filled with the members of the Club and their friends, being the occasion of the Annual Lantern and Musical Entertainment and Ladies' Night. Thanks to the energy of Mr. F. A. Bridge, the Hon. Secretary of the Club, an attractive programme was provided, and at eight o'clock, when Mr. Frank Haes, who presided over the gathering, opened the proceedings, probably two hundred or more were seated in the hall. Prefaced by Miss Louisa Pyne's pianoforte solo, who throughout the intervals contributed some excellent music, slides were shown by Messrs. Sydney Keith, Vivian Hyde, W. K. Stretton, and W. D. Welford, the subjects including Scottish, river, and miscellaneous views. Mr. Vivian Hyde followed with an admirable rendering of "Out on the Deep," and later, with equal success, the "Will o' the Wisp." Mr. McConnell's violin solos were deservedly well received, and Miss Ethel M. White's "Sunshine and Rain" and "Whisper and I shall hear" drew forth much applause. The humorous side was ably catered for by Mr. Coningham with his "Sneezing Serenade" and "The Story of a Musical Box," and Mr. J. W. Mason is to be congratulated on his masterful cornet solo, "Queen of my Heart;" while mention must also be made of the pretty pianoforte duets by the Misses Gaze. Mr. Noel-Cox contributed some very realistic slides of the great fire, and, amongst those shown by Mr. Bridgman, the pictures of the Vatican, delicately coloured and photographically excellent, were much admired. Mr. Evans's well-known Lincoln Cathedral views, Mr. Paul Martin's *London by Night* series, and a selection from Mr. Medland's zoological studies brought to a close a very successful evening, during which Mr. R. R. Beard projected with the aid of his cinematograph a number of interesting events, including the Jubilee procession, high diving, changing the guard, &c., and one kindly lent by Mr. Birt Acres for the occasion consisting of 3500 successive pictures—*The Blacksmith's Shop*. Under the direction of Mr. Bridge the success of the entertainment was assured, and thanks are due for the attention displayed by the stewards, and to Messrs. Beard and Bridgman, to whom fell the task of working the lantern.

Brixton and Clapham Camera Club.—January 18.—Mr. C. F. Archer addressed the members on

Success and Failure,

or different ways of treating the negative. The following is a condensed account of this paper: "My endeavour will be to entertain you with a few examples of my own work, and explain how these results were obtained. These specimens are not upheld as first class work, but brought as examples which, in many cases, have been produced from negatives which many of us would set aside as useless. Presuming you to be all more or less acquainted with the various processes at our command, any one with care and patience can achieve all I have, but without these qualifications it is useless hearing what I have to say. The instances before our attention have necessitated a large amount of time and perseverance, and I must frankly confess my failures to have been numerous. The essence of a consistent worker lies in the fact of always trying to excel himself, and not being discouraged by adverse criticism of his work. Most of us can hardly be expected to hold our own with leading workers, who have so much more scope and opportunity, putting aside time and money. We must therefore content ourselves by following in their footsteps, and gaining knowledge by a close and studied observance of their work; and, if we do our very best, I am sure we shall please ourselves and those around us. I will first call your attention to the point of vantage from which to treat our subject. I have here a print entitled *Hazy Morn*, and a much more pleasing picture of the same subject, *In Sweet September*. The camera was, in this instance, only placed about three or four feet more to the right; the time of the year was, of course, different, and the patch of sunlight was waited for. At another time of year the same subject was again treated of, as seen in *Flood Tide*—the merit of which print is in the lines of composition and the lighting, the perspective of which gives the distance. This subject with a flat sky would be worth nothing. I next show you a print from one of my early negatives, long ago condemned as useless—*A Country Road*—and also a cabinet portrait of myself on a bicycle propped up in a studio. This print in itself is absurd, as I appear to have just come through the background as a circus rider comes through a paper disc; but, by painting out the background, reducing the size of the figure to suit the landscape, and making a duplex print, a very fair result has been produced for the trouble. In this instance, I first made a transparency, and then the negative from that; my usual method, however, is to get a print to my liking, mount and finish it, and then copy it in the camera. It is undoubtedly the best way to proceed if you want to print in my favourite method, carbon. Next I show you one of my very early prints, exhibited five years ago at our Exhibition, and also a print from the same negative shown this year. I have printed in some trees from another negative on the right-hand side, and introduced a suitable sky from a third negative. The result is very different and far more pleasing. Next I produce a very commonplace sort of photograph of the *Village Inn, Esher Common*. On the left of the card is a print from the same negative, but the vertical way of the paper, and the foreground is also vignetted off. In the centre is a small print from another negative with the top part vignetted off, and on the right hand a print of a cloud. In the frame you see the finished result, which, I think you will admit, is a pleasing little picture. In multiple printing care must be exercised in seeing that the relative perspective is correct. In this instance, the sheep might have been higher than the fence or small enough for rabbits. They, however, happen to be right size and fairly well grouped. I had to block out one on the left-hand side, as he was walking out of the picture and the eye would naturally follow. "After an explanation of the method of masking part of a print while printing in sky or foreground from another negative, Mr. Archer continued." Still appreciating your patience, I show you a print of a view taken at Pulborough. I have already alluded to the "point of vantage." In this instance, while waiting for the sun to break through the clouds, I could hardly appreciate the uncalled-for jubilance of my brother artist on the bank until I noticed that the water was trickling into the top of my boots as I gradually sank deeper into the mire. But I stuck to it although a cold October day, and show you the print because it illustrates by comparison with its companion one, what widely different effects can be produced from the same negative. I have now an example bearing out my statement that we should never be discouraged by adverse criticism. This print was entered for an *Amateur Photographer* monthly competition some years ago. It was placed in the second class. You will notice the reproduction of a silver-medal print in a recent competition corresponds very nearly with mine bar the shape. I therefore, instead of having discarded my negative as one of the second-class order, made a bromide enlargement of it and trimmed it to the shape shown in the small print at the corner of the card. The enlargement took a medal last year as the best individual print in our Exhibition, and was also sold and greatly appreciated. In conclusion, I trust that you, like myself, may have some negatives lying by you at the present time only latent and waiting for future changes to bring them forth in all the glory of success, and I think I may safely add here the well-known adage that "you never know your luck."

On Tuesday, January 25, Mr. Levett read the Affiliation lecture on *Portraiture*, by Mr. Harold Baker. The lecture and slides were both to the point, and highly appreciated.

Camera Club.—On Thursday evening, the 27th ult., Mr. Saville Kent, of the Australian Government Fisheries Commission, gave a lecture on

Lizards and Birds of the Antipodes.

At least, so said the programme; but, when Mr. Kent came before his expectant audience, he explained that he had found the combined subject rather too copious for one evening, and that he must therefore apologise for confining his attention to the lizards, leaving the feathered race for another occasion. The popular idea of a lizard is something that is slimy, crawling, poisonous and generally repulsive to mankind. This was a gross and wicked libel. The lecturer had kept lizards as home pets, and therefore he knew something about their little ways. They were the most winsome and playful creatures imaginable, most beautiful in form and in colour, and were certainly never slimy. They were clothed in a handsome suit of scale armour, and, as

eing poisonous, there was only one venomous kind known, and that was a zard of New Mexico. One of these harmful beasts could be seen at the ological Gardens. Some ignorant people were under the impression that, ecause a lizard had a long tongue, which it whisked in and out of its jaws, iat tongue must of necessity be a poisonous weapon. That was all nonsense. any kinds of lizards depend upon their tongues for their livelihood, not iat they preach or lecture, but they pick up with that most active and fficient organ the little unconsidered trifles which, in the form of minute isects, form their food. Kept in captivity as pets, lizards want plenty of ght and heat, and, with ordinary care and kindness, will thrive under such onditions. There are only two lizards which are indigenous to Britain, one f which produces its young alive, the common lizard, and the same lizard hich wears a dull uniform except at the pairing season, when the male ssumes a more brilliant colouring. After this brief introduction to the lizard ribe generally, with some capital lantern slides as an earnest of what was to ome, the lizards of Australia were trotted forth, the first to be considered eing the Iguanas, or Australian Monitors. These are not to be recommended as ets, for they are rather long, measuring seven or eight feet from tip of tail to hout. Indeed, they are not infrequently mistaken, by those who know no etter, for half-grown alligators. These creatures are very fond of wild birds and ggs, and will resort to all kinds of dodges to annex such dainties. They also ave a keen relish for the contents of the domestic poultry yard. The next amily of lizards which came under review were the *Agamidæ*, and the parcular member of the family whose portrait was thrown upon the screen was he *Moloch horridus*, popularly known as the Mountain Devil. This compliientary name was, no doubt, bestowed upon it simply on account of its hideus, not to say repulsive, appearance. It is in shape like an ordinary lizard, ut it has the appearance of having been dipped in some sticky compound nd then rolled in sharp spikes and spines, which stick out from it in every irection. Yet it is a harmless creature, and so long as you do not prick ourself with its armoury of knives and daggers, it will do you no harm. efence, not defiance, is its *raison-d'être*, at least so said the lecturer. Ugly s it is, the Moloch serves a useful purpose in eating up the black evil-smelling nts which are found in Australia. It will lick up the insects one by one, and ill devour about 1500 at a meal. A curious photograph was shown of the ecturer's garden, in which half a dozen of these Molochs were feeding on a rocession of ants. One of the lizards, who had evidently had enough as he ared for, was walking off with his tail cocked up in the most dandified air. straw hat, trimmed with living Molochs, was another picture which caused reat amusement. The Jew, or bearded lizard, is a curious little creature, hose manner of frightening his enemies is to make grimaces at him, just as nall boys or monkeys will do. If you come upon one suddenly and startle im, a singular transformation occurs, for he will open his mouth wide and istend his beard, or perhaps he will elevate and depress his beard alternately ithout opening his mouth. At night he will scramble up a sapling, and, olding it tightly with his interlocked claws, will go to sleep in that position. he frilled lizard has a collar that the Grand Old Man might envy, and he has he power of suddenly erecting it until it stands out like a gigantic Elizabethan uffle, which must be very disconcerting to any animal smaller than itself. Ve have seen certain comic pictures in which a traveller has been depicted efending himself against a wild beast by suddenly opening his umbrella. his is in reality what this lizard does with his collar, and dogs who will ttack and kill far larger animals are at once vanquished by this strange erformance. Some have thought that the use of the collar is to help the nimal in jumping from high trees, the extended frill acting as a kind of parahute; but this is quite a mistake, the whole end and aim of the appendage is o strike terror into the lizard's foes. These creatures can hop, skip, and jump long on their hind legs, and the lecturer showed several instantaneous photoraphs which he had taken of them skipping across his lawn, some of the ttitudes shown being intensely comic. These pictures were taken with a hutter working at one five-hundredth of a second, and this was evidently one too quick for the active movements of the lizards, many of which had the ppearance of skaters. There is a water lizard in Australia which grows to a ngth of four feet, and which is often mistaken for a young crocodile, and everal of these can be seen at the Zoological Gardens, where they seem to lie n a semi-dormant condition, but, set free on a lawn, they will run about erect ke the lizards already mentioned. There is a stump-tailed lizard in Australia, nd it is of such construction that it is very difficult to distinguish its head om its tail. These make very good pets and Mr. Kent told his audience iat three of them had the run of his library, warmed themselves on his earth-rug like cats, and liked being nursed on a human lap. Some of these zard pets have sometimes to be fed artificially, and a most amusing photoraph was shown of three of the little animals propped up on their tails and wathed in dinner napkins ready for their meal. The Gecko is one of the few zards which has a voice, and he calls out Gek-ko, hence his name. The eckos are nocturnal in their habits, and consume beetles, moths, &c. Their et are furnished with suckers, so that they can, like flies, crawl on the walls nd ceilings in search of their prey. Some are so tame that they will ome regularly at the right time to the dinner table to be fed. They readily ied their tails, almost with a touch, and in a few weeks another tail, minus ertebral column, grows in the place of the lost member. All these different nds of lizards were illustrated by remarkably good photographs, the work of e lecturer. In conclusion were shown some pictures of the chameleon, a eature which had many remarkable attributes. With a tongue as long as self, it can shoot it out like the cork from a popgun with an elastic cord tached, and the sticky end of the extended member will infallibly secure ny unfortunate insect at which aim is taken. Each of the creature's eyes oves independently of its fellow, so that, while a fly is being appropriated n one side, the opposite eye is engaged in looking for a subject for the next ot. Thus was brought to a close a lecture which was exceedingly well ustrated, and one which covered comparatively new ground.

Croydon Camera Club.—What is a platinotype? The non-photographic rson will probably think it is a silver print (bromide) which, indeed, is equently palmed off as a platinotype. The latter is, however, not only more elegant in its tonal rendering, but possesses that attribute, which silver prints lack, of being everlasting. The ordinary uninformed amateur photographer, who dotes on his P.O.P., regards platinotype as one of those difficult and occult processes which "no fellow can understand." As a fact, it is easier to work than gelatino-chloride printing-out paper. To prove the foregoing, and to illustrate other interesting points, Mr. W. H. SMITH gave a lecture and demonstration on Wednesday, the 26th ult., which drew an attendance of thirty-eight members, who were well rewarded by listening to and watching Mr. Smith. To begin with, he told of what the coating on the paper was made, and how light affected it, and of the peculiar substitution of platinum for iron which takes place when the developer is applied. Many, no doubt, for the first time heard that platinotype paper improves by keeping, *i.e.*, black paper is better when three months old than when new. The sepia paper, although usable when sent out, is at its best when no less than nine months old. The effect upon the scale of tones by altering the temperature of the developer was strikingly shown by means of prints cut in half, developed in different baths, and subsequently mounted up rejoined. It was, however, when Mr. Smith got to work at the developing that most of the interest was aroused. Prints were developed face up or down, singly and in battalions. Some were just dipped into the developer, then laid on sheets of opal, and thus handed round, development proceeding the while. Next, huge prints, measuring 36×20, were developed by pinning to boards and brushing them over with a mixture of equal parts of the normal developer and glycerine. Vignetting effects obtained by development were also shown, and a remarkable device, whereby a canvas-like effect resulted, was demonstrated by placing a sheet of coarse muslin or buttercloth, which was slightly moistened with developer, on the face of a print, and then passing a roller squeegee over the fabric; finally, both before and after removing the fabric, parts of the prints were strengthened by touching up with a brush charged with glycerine, and developer. A number of prints on linen were next handled, being tossed into a beaker of developer, stirred up, wrung out, and thrown into the acid clearing bath, the image being apparently incapable of injury by rough handling. Finally several sepia prints were developed in the hot bath (140° Fahr.).

Richmond Camera Club.—January 24, Mr. Ardaseer in the chair.—Mr. B. EDWARDS, of Messrs. R. W. Thomas & Co., read a paper entitled

THE CAPABILITIES OF PYRO-SODA DEVELOPMENT,

which was illustrated by a large number of slides. He began by demonstrating the superiority of pyro over quinol as a developer by throwing on the screen negatives, exposed under identical conditions, developed with each agent, and transparencies made therefrom; the pyro-developed negative, though not very different in appearance from that developed with quinol, yielded an incomparably superior transparency. Soda carbonate, the lecturer contended, is preferable to ammonia for use with pyro, as being less liable to cause fog and having better keeping qualities, and he deprecated the use of soda sulphite as a preservative, as retarding development, and so tending to cause frilling. The formula recommended was:—No. 1: Pyro, 1 ounce; soda-metabisulphite, 1 ounce; water, 80 ounces. No. 2: Soda carbonate (washing soda), 6 ounces; water, 80 ounces. For use, equal parts of each, adding bromide if requisite. The lecturer claimed great latitude for pyro soda, and showed examples where exposures of one, thirty, and sixty seconds seemed to give equal results. With instantaneous exposures the developer gives detail first and then density, this control of density in subjects having great contrasts being very important. A series of eight negatives with identical exposures, but varying times of development, was shown, and the one developed for the shortest time, though much too thin for printing purposes, showed just as much detail as the most fully developed. Mr. Edwards also advocated pyro soda as a developer for lantern slides, and showed by examples the different tones obtainable.

Woolwich Photographic Society.—January 13.—A paper, entitled

PICTORIAL COMPOSITION AND ITS RELATION TO PHOTOGRAPHY,

was read by Mr. H. J. SPENCER (a member). The lecture was very copiously illustrated by lantern slides. The paper was read under great physical disability, but it was voted to be one of the best ever read before the Society, and ought, we think, to be repeated elsewhere. Notice is called to our Fourth Annual Exhibition, to take place on February 24, 25, and 26 next.

Birmingham Photographic Society.—January 18, Annual General Meeting, Sir J. B. Stone, M.P., in the chair.—There was a numerous attendance of members. In moving the adoption of the report, Sir BENJAMIN said that the Society still held its high position among the Societies of the country in regard to the useful work which was done. "I have an idea," he said, "that photography should be used to impart knowledge to a far greater extent than at present. I should like to see an optical lantern in every Board school, by the aid of which instruction might be imparted to the rising generation in a far more interesting and thorough manner than the method in use at the present day." He suggested that more systematic instructions in the various branches of photography should be taken up by the Society. Mr. PHILIPPS seconded the adoption of the report. Mr. E. C. MIDDLETON proposed a vote of thanks to Sir Benjamin for his services in the past as President, and proposed his re-election as President for the ensuing year. Dr. HALL-EDWARDS seconded this motion. The following gentlemen were elected as officers, &c., for 1898:—*President:* Sir J. B. Stone, M.P.—*Vice-Presidents:* Messrs. E. C. Middleton, G. H. Lyndon, J.P., Dr. Hall-Edwards, and Mr. T. W. Robinson.—*Council:* Messrs. Harold Baker, C. S. Baynton, W. Bateman, T. Taylor, W. T. Greatbatch, E. Underwood, and F. J. Penn.—*Hon. Librarian:* Mr. P. T. Deakin.—*Hon. Treasurer:* Mr. A. C. Gilbert.—*Hon. Secretary:* Mr. C. J. Fowler.—*Assistant Hon. Secretary:* Mr. Frederic Lewis.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—January 11, Mr. J. Hedley Robinson in the chair.—Captain SAYERS (one of the members) gave a most interesting lecture on

BURMAH AND THE BURMESE.

The lecturer was well qualified, by the time he had spent in the country, to

describe the people and their customs. Numerous lantern slides also added to the interest of what the lecturer termed a "sailor's yarn." In proposing the vote of thanks accorded to Captain Sayers, the CHAIRMAN and Mr. J. P. GIBSON drew attention to the striking similarity, from an architectural point of view, which existed between some of the pagodas, &c., and shown in Captain Sayers' slides and Norwegian church buildings.

Rotherham Photographic Society.—January 11, Mr. J. Leadbeater (Vice-President) occupied the chair.—Mr. W. ETHELBERT HENRY'S paper on

DEVELOPERS AND DEVELOPMENT

was read and discussed. Dr. F. B. Judge Baldwin (President) and Mr. H. C. Hemmingway (Hon. Secr tary) were re elected delegates to the Royal Photographic Society (Affiliation Committee). The Annual Exhibition was mentioned, the Council having fixed Thursday, Friday, and Saturday, March 24, 25, and 26, for the event. A number of photo-survey prints, chiefly of details of interesting local churches, were handed in.

FORTHCOMING EXHIBITIONS.

1898.	
February	Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
,, 4–26.....	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
,, 7–12.....	Photographic Society of Ireland. V. E. Smyth, 35, Dawson-street, Dublin.
,, 24–26.....	Woolwich.
March 1–5	Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.
,, 5–12.....	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30	National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,, 27–May 14.....	International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Patent News.

THE following applications for Patents were made between January 17 and January 22, 1898:—

STEREOSCOPE.—No. 1305. "A Viewing Appliance for Producing a Stereoscopic or Relief Effect." Sir D. L. SALOMONS, Bart.

FILMS.—No. 1436. "Improvements in Manufacturing Films for Animated Photography." H. RHEINLANDER,

MOUNTING.—No. 1469. "An Apparatus relating to the Mounting and Squeegeeing of Photographic Prints and similar articles." F. T. PARSONS.

SHUTTERS.—No. 1514. "Improvements in Photographic Shutters." A. B. MEES.

FRAME STRUTS.—No. 1593. "Improvements in Struts or Supports for the Backs of Frames applicable to Photographs and the like." W. BLAKE.

LANTERNS.—No. 1674. "Improvements in Enlarging Lanterns (Photographic)." LEVI, JONES, & Co., Limited.

FILM-CARRIER.—No. 1689. "Detachable Film-carrier for use with Cinematographic and the like Apparatus." G. HAYDON and HAYDON & URRY, Limited.

CINEMATOGRAPHIC APPARATUS.—No. 1690. "Improvements in Apparatus for Taking and Projecting Zoetropic or Cinematographic Pictures." G. HAYDON and HAYDON & URRY, Limited.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CHEAP PHOTOGRAPHIC MINIATURES WANTED.

To the EDITORS.

GENTLEMEN,—There is evidently a growing demand by the public for miniatures, something pretty and yet absolutely permanent that can be done for a guinea in a silver-gilt rim. A ceramic enamel is really what is wanted, but the price charged by the trade firms for this kind of thing kills the sale at once. They must be produced at first cost by the photographer himself. To photograph a sitter, submit proof and probably give a resitting, pack the negative and dispatch it to a trade firm, wait their time (perhaps weeks), and then pay half a guinea for an enamel one inch by three-quarters, the photographer finds then he must charge at least 25*s.* for it, considering how long he has sometimes to wait for his money and the amount of money he has already expended on specimens. And when the sitters begin to consider the cost of a rim or brooch to hold it, then they decide to have something else in place of the miniature. These things are generally wanted for birthday or Christmas presents, and are usually left over until a week or a fortnight before they are wanted. If the photographers who sit down and grumble at the state of trade were to put their energies in this direction, it might help to mend matters. Perhaps, Mr. Editor, you will favour us with a *practical* article on the subject.—I am, yours, &c., J. W. BEAUFORT.

25, *Colmore-row, Birmingham, January* 25, 1898.

THE LAST WORD UPON THE GUM-BICHROMATE PROCESS.

To the EDITORS.

GENTLEMEN,—At my time of life, looking back into the vista of the darkest days of darkest photography, this revival of an old rusty process seems like the story of the old chap with a lantern exploring the graveyard stones in quest of an honest man. The name of Mr. Pouncy sounds in my ear something like that modest aspirant who says "he possesses a jewel," Mr. Bennetto, of New Quay notoriety. I well remember that much nonsense was boomed in printing ink over Mr. Pouncy's claims as the discoverer of a permanent photographic process, but he would not part with his secret unless he got a very large sum, which he never got. The natural result was shown by the sequel; if he had a secret, it was worthless both to himself and the world, as he died, and it has come to nothing!

I remember Mr. Wharton Simpson sent me a few pieces of tracing paper, which Mr. Pouncy had sent him, that had been smudged on the back with a mixture of asphaltum and bichromate of potash. These exposed, the uncoated side towards the negative, and developed by immersing in turpentine. Of course, there was a graduated positive, but it was messy and utterly uncommercial, and as such it died. Can anything be more insultingly ridiculous than to introduce this bichromate and gum process to workers of the present day? I saw in a window of an auction room last week an old umbrella that belonged to Dan O'Connell, of repeal notoriety; it was valued at a big sum, what one might buy a dozen brand new ones for. Now, it seems to me that this unearthing of a fossil process of the past has its origin in such a piece of nonsensical foolery.

Granted that, by deft of hand and aided by modern discoveries, one out of a hundred can now and again make a presentable picture. Where on earth is the advantage beyond what is attainable by a common-sense every-day process, as that of the Swan carbon tissue?

I say, in the name of common sense and of progress, let us not lose our heads altogether. It seems to me there should be a mental ratchet wheel and pawl in our heads to prevent us going back; we lose time and money by so doing. Let it be known to all men that it is only for *successful* processes we are to be thankful, and not to those who, like the would-be inventors of perpetual motion and philosopher's stones, who have had their nostrums hid away in their shrouds in their coffins. It is admitted that none but an expert can successfully work the process; surely that fully accounts for its previous death, that is, supposing it ever lived, which I doubt very much.

In the year 1842 or 1843, at Liverpool, I spread a film of gum bichromate upon glass, dried it, and placed it in the camera, glass side next the view; this I placed in position in a top-room window, South John-street, focussing the spire of St. George's Church on a summer Saturday evening. On the following Monday morning I plunged the glass into cold water, and, on removing it, I had the satisfaction of seeing a picture of the spire and the roofs of the houses in relief.

Negatives in these days only existed on waxed paper, or else I should have followed up the experiment; as it was, I amused myself placing the glass in the sunshine, when I got a fair positive picture by looking under on white paper. I merely mention this to show that gum and bichromate of potash never belonged to anybody but Mongo Ponton. At that time I carried a bottle of bichromate of gum in my pocket to show lithographers how they could photograph on stone. I made no fuss or secret about it, as I considered that to Ponton all the honour belonged.

When Talbot's discovery became known, we ransacked every chemic within reach, thinking we could make sun pictures upon, and with everything. My most successful experiments were made upon smooth finished surfaces of yellow pine boards. I got excellent representations of leaves, ferns, and black lace, but the fixing process marred the brilliancy; except as outlines for carving purposes, they were of little value.

Long before Mr. Pouncy's appearance I made very presentable lamp black positives by the following plan: I coated a smooth hard-sized paper with bichromate and gum, exposed under a negative, then covered the exposed surface with a mixture of fine lamp-black in alcohol, which soon evaporated. I had prepared another sheet of white paper with a thin coating of gelatine, both sheets were slightly damped and placed face to face, passed through press, then plunged into cold water for half an hour. Upon withdrawing, two changes were observed; a negative

n the one sheet and a positive on the other at one operation. The gum ichromate, unaltered by light, had parted with its colour to the gelatine, while the insoluble gum retained the lamp-black; these proofs were hown to Mr. Simpson and to Mr. Robert Hunt, who expressed dmiration, urging me to proceed further; but other matters occupied ny time, and I did not follow it up.

I consider it a universal duty imposed upon every intelligent citizen f the world to help freely to advance progress without grasping and cheming for profits and honours, which he knows right well he has only ppropriated, but did not create.

The atmosphere is so highly charged with knowledge at the present ay, and one idea or invention is so much dovetailed into another, it is tterly impossible to discriminate or define the honours as regards any nvention whatever.

The conclusion I have come to anent these so-called discoveries and he rapid strides now being accomplished in every work and corner of hotography is, it is full time to blend all the discoveries into one, and heir individual authors also; it is both invidious and ungrateful to xtol one and neglect the other. It is only a matter of A B C to enable s to perpetuate the illustrious names of Talbot, Swan, Archer, Herschels, nd Robert Hunt, the real pioneers of our art, to whom we stand ndebted for all time.—I am, yours, &c., JOSEPH LEWIS.

Dublin, January 18, 1898.

To the EDITORS.

GENTLEMEN,—Your correspondent "Dogberry" makes a serious lunder, referring to the sensitising of carbon tissue from the back as a ailure, and as proving thereby the worthlessness of applying the ichromate to the paper *before* the pigmented gum; he evidently loses his ead in the labyrinth of operations, to which critics by profession are so ften liable.

The carbon tissue consists of an extra, and perhaps an unnecessary, oad of pigmented gelatine, it is appied to the paper in a *liquid* state and o *penetrates* the pores of the paper and dries there. Of course, if you pply the bichromate in solution on the back only of the dried film, the ensitive salt is unable to percolate through the film to the top surface here the picture is formed; but, if the pigmented gelatine were applied in *liquid* state upon a paper already saturated by the sensitive salt, the hole state of affairs would be completely changed. The bichromate ould combine with every atom of the gelatine, and, wherever the light cted, the colour would be secured in an insoluble film.

The whole question is one of very little importance indeed, as the gum rocess must go back to the oblivion from whence it came.—I am, yours, c., JOSEPH LEWIS.

Dublin, January 26, 1898.

PLAIN LANGUAGE ABOUT THE SPECTRUM.

To the EDITORS.

GENTLEMEN,—Surely Mr. Pretzl cannot have forgotten that it was he ho commenced this discussion, that it was he who introduced per-onalities into it. My "ignorance" having been again referred to, my impertinence in writing such nonsense" having been duly set forth, it but a misuse of words for Mr. Pretzl to accuse *me* of abusing *him*.

It is true that in the ALMANAC I said nothing about commercial plates. list of the things I did not mention would be a very long one.

Mr. Pretzl emphatically contradicts my statement that "a natural ellow will act upon a red-sensitive plate, when a violet screen is used hat transmits red and absolutely absorbs spectral yellow." What does natural yellow consist of? Let me quote from Ives: "Yellow is also sually a very impure colour, the most brilliant hues consisting of a ixture of all the spectrum colours except blue and violet. It is really rprising that so many people should continue to regard yellow as a rimary colour . . . . the most brilliant yellows may be made up of all he green, yellow, orange, and red of the spectrum. It is not even ecessary to have any of the spectrum yellow present." Will Mr. retzl admit, I wonder, that chrome yellow, for example, reflects a large mount of spectrum red? This is a fact; and it follows that, when a ıre red acts upon the sensitive plate, so also do the red rays reflected by he yellow pigment. A filter that will transmit the red, reflected by a d pigment, and absorb the red reflected by a yellow pigment, is a hysical impossibility.

The quotations from Hübl help to prove my contention. The red igment to which Hübl refers is a violet-red, the violet of which acts pon the ordinary plate. *The red does not act at all.* Hübl says that a ordinary plate may be used because "its want of red sensitiveness is ıade up for (by?) its violet sensitiveness." Exactly, if we are photo-raphing a red pigment of the purplish or carmine tint of the "*minus reen*" character required for three-colour printing purposes. There-ore, although we are photographing a more or less "red" pigment, we re not really photographing a pure red at all.

Mr. Pretzl adds that "Mr. White's objection to the use of the violet reen is not in accordance with Hübl." This altogether misstates my ontention. My objection was "to the use of a violet screen *with a red-sensitive plate*," which Mr. Pretzl must know is a very different thing, and which is, after all, entirely in accordance with Hübl.

It now appears that the green screen that Mr. Pretzl recommended gives "less correct results," not because it is in any way inaccurate, but because the colour sensitiveness of the commercial plates is at fault. Why, then, did Mr. Pretzl advise me to use these same commercial plates with this screen? Mr. Pretzl designates his own attempted explanation "a wriggle." Comment is needless.

In the case of the yellow ink, Mr. Pretzl's unfortunate example: "I could experimentally prove," says Mr. Pretzl, "that the admixture of green, and a very small proportion indeed to that yellow would cause it to darken or become saddened." He adds: "The addition of green cannot neutralise orange in the sense that Mr. White would have your readers believe if he is using pigments, and I presume yellow ink is a pigment."

If Mr. Pretzl will refer to his own remarks on this ink he will find that he described its spectroscopic examination—the overlapping of the yellow into the red, referring to the red *light* reflected by the yellow pigment. Similarly, I speak of the lack of green *light* reflected. Mr. Pretzl tortures this very evident meaning into an accusation that I recommend the addition of a green pigment to an orange pigment to produce a better yellow. It is mere folly to imply that I suggested such an absurdity.

This is not the only case, however, in which the ideas that Mr. Pretzl attributes to me are purely his own inventions. If he is not able to understand my contentions, he might at least hesitate before attempting to disprove them.

"I claim the right to think for myself," exclaims Mr. Pretzl. No one has denied his right to do so; but even "six years' experience in the measurement and mixing of colours" does not ensure him against the possibility of error; indeed, when he is palpably wrong, it rather aggravates the offence.—I am, yours, &c., WALTER WHITE.

London, January 31, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Percy Guttenberg, 42, Deansgate, Manchester.—*Three photographs of Miss Lily Hanbury.*

Fred Parsons, Grosvenor Studio, Southend.—*Photograph of the Mayor of Southend-on-Sea, John Henry Burrows, Esq.*

Charles Ward, Canal House, Bathampton, Bath.—*Photograph of tombstone to Admiral Phillip in Bathampton Church, Bath.*

F. C. Hawke, The Studio, Hallaton, near Uppingham.—*Two photographs of Mr. Thomas Isaacs, huntsman, and the pack of Mr. Fernie's hounds.*

F. H. Agnew, 45, Bridge-street, Glasgow.—*Photograph of R. C. Hamilton, the Rangers football player. Photograph of the Third Lanark R. V. football team.*

G. N. FUTCHER.—Thanks for your interesting letter.

W. FUSSEY.—We shall be pleased to examine the lens.

R. W. BARNES.—Inquire of Fallowfield, Charing Cross-road, London, W.C.

L. M.—The query was duly inserted. We have forwarded your card to the gentleman named.

C. KLARY.—The patent specification will not be published for several months yet. We will then procure it for you.

A. MALONE.—A mathematical-instrument maker would procure such a scale for you, we believe. Ours was specially prepared.

PUZZLED.—You must use a negative as directed in the instructions issued with the camera. Procure and study a book on elementary photography.

H. W. BUSBRIDGE.—It is against our rules to give the addresses of our contributors. We will, however, forward a letter if you will send it on to us.

SILVER IMAGE ON COPPER.—CAPTAIN. The only process we know that fulfils your requirements is the Daguerreotype. That, it seems to us, is the process that will suit you exactly.

COPYRIGHT.—DOUBTFUL. Although the photograph was taken, and registered, ten years ago, it is still copyright. The copyright exists during your life, and for seven years after your death.

DRY PLATES.—TOM TIT. Try the formulæ given on pp. 1037 and 1038 of the ALMANAC in place of that you have been using. They are all good. You must keep in mind that it is much more difficult, and requires far more experience, which is only gained by practice, to make a very rapid plate than a slow one. You must not expect to be very successful at first in making plates of extreme rapidity.

W. M. CROUCH.—Afraid we cannot offer any explanation. It appears curiously unbusinesslike conduct. Why not ask the lady's reference to write him? Against our rules to answer through the post.

ADDRESS WANTED.—G. G. says: "Will you be good enough to inform me through your paper the address of Messrs. Shew, the makers of the Eclipse camera?"—In reply: Messrs. Shew's address is 89, Newman-street, W.

J. N. D.—This matter does not, we believe, come within the scope of copyright rules; you would require to register the design at the Patent Office. Better address the Comptroller-General, the Patent Office, 25, Southampton-buildings, Chancery-lane, W.C.

THE CRYSTAL PALACE EXHIBITION.—A. LUNDSTRÖM says: "Will you kindly inform me to whom communications about the Photographic Exhibition at the Crystal Palace are to be directed."—In reply: The Secretary, Royal Photographic Society, 12, Hanover square, W.

BICHROMATED SOLUTION.—PERCY B. asks: "Will you kindly tell me whether a bichromate solution has any injurious action on a silver bromide image, of course after negative has been fixed and dried?"—It will give a yellow tint to the film, which will darken with exposure to light.

ADDRESS WANTED.—W. D. says: "In an article on *Micro-photographs*, January 7, you mention M. Dagron, of Paris, as a specialist in this line. Would you kindly give me his address?"—In reply: Will one of our Paris readers supply our correspondent with the desired information?

WASTES.—R. S. R. Working on so small as you do, as an amateur, and using P. O. P,, we should say that it would not be worth while to take any heed of residues, particularly considering the small price the silver realises when it is recovered. Any how, it would be of no use to save the old developing solution; there is no silver in that to recover.

SHUTTER.—J. S. A. We have received the sketch, but can give no opinion as to whether it infringes the patents of any other shutters. The only way for you to ascertain that will be by searching the patents at the Patent Office, or getting an agent to do it for you. We may say that on some points it seems to be very like some others, if not identical.

MOUNTANT.—P. R. O. F. Starch is the most generally used mountant; but good flour paste, if used as soon as made, is little, if any, inferior, so far as it is likely to influence the stability of the photographs. We have some photographs more than a quarter of a century old that as yet show no signs of deterioration. Personally we prefer a neutral gelatine as a mountant.

OFFENSIVE ALBUMEN PAPER.—R. J. says: "I have recently been sensitising my own paper, albumen, but I find the smell, nay, stench, from it most abominable. It stinks the house out. Is there any way of avoiding this abomination, as I find I get much better tones on this paper than on any I can by ready-sensitised?"—Only by getting another brand of paper. All albumen papers do not possess this offensive smell.

CARBON PRINTING.—W. B. HENDERSON asks: "Could you favour me with the formula for a *reliable* waxing solution to be applied to the opal developing suport in the *double transfer* carbon printing process?"—It is not quite clear whether you wish to transfer the print from opal glass, or whether from a flexible support on to opal glass. However, formulæ for waxing solutions for either purpose are given on p. 1041 of the ALMANAC, and they are reliable.

REPRODUCTION OF PAINTINGS.—ART. The copies of paintings issued by the Continental houses named are made on collodion plates. They aver, we believe, that it is impossible to obtain such fine result on gelatine plates, and, judging from the results, there seems to be some justification for the assertion. The details of the actual process used are, we are told, kept as a trade secret, and are only known to a limited few. Still, good results are obtainable on gelatine plates.

CARBON PRINTING.—C. J. EMERY asks: "Is there any special treatment to which carbon vignettes have to be subjected? My trouble is that the whites are not pure, as though all the pigment is not out. I tried to clean them with cotton-wool before putting them in the alum, but I could not do that without spoiling the film."—No. Probably the difficulty has been due to the tissue being "tinted," or fogged before it was printed; or, maybe, it had been slightly exposed to light after, or while printing, and thus became fogged.

DISPUTED ACCOUNT.—LEGAL says: "Recently I photographed a group, and, before finishing the order, sent one copy to see if approved of. Seventeen were ordered, and I therefore supplied sixteen additional copies, and charged for seventeen, the total number supplied. The individuals now decline to pay for the first one sent, on the ground that 'a proof is not a proper photograph.' Can I compel them to pay? A reply will oblige."—If the proof submitted was a finished and mounted picture, it should be paid for. If it was only a rough proof, it should not be charged.

CRYSTOLEUMS.—X. Y. Z. writes: "Will you kindly give me an outline of the manner of procedure in the production of crystoleum photographs? When a print is upon glass, in what way can the paper be removed so as to leave the film on the glass? At the same time I shall be pleased to have the name of any wholesale house that could do the work."—After the print is mounted in optical contact with the glass, the paper is rubbed off with fine glass paper, or a better way is to use the Novitas stripping paper. The print is then coloured on the back. We know of no wholesale house that does crystoleum work, and it is more than doubtful if there is one. Crystoleum is more an amusement for amateur painters than anything else.

RETOUCHING.—W. WATSON says: "I am engaged as retoucher at 35*s.* per week, and am expected to retouch on an average from eight to ten cabinet heads a day. My master says I ought to do fifteen easily; but, as I am not able to do more than four or five, is my master reasonable in giving me notice to leave on this account? Your reply will be much appreciated."—It is impossible to express an opinion, as all depends upon the size of the heads (cabinet heads are all sizes), the quality of the negatives, and the work they require; also the style of work, whether of high-class finish or otherwise.

BAS-RELIEF PHOTOGRAPHY.—T. H. PITCHFORTH says: "Will you kindly answer me the following? Are bas-relief photographs a patent, or only the method by which they are produced? Could I, for instance, do bas-relief photographs by a method of my own without infringing any patent?"—In reply: Provided your method is original, you are perfectly entitled to make bas-relief photographs. Bas-relief photography is about a third of a century old, if not more, and the patents that have recently been taken out in connexion with it are reasonably open to doubt on the score of validity. We cannot undertake to answer questions through the post.

STAINED ENGRAVINGS.—HIGH PEAK writes: "Having bought a few old steel-plate engravings which are "smoke" or "time" stained, also a few mezzotints which are in the same condition, I should be glad if you could give me a formula to remove it. It is not perhaps exactly in your line, but I thought perhaps you may be able to enlighten me."—There are several ways of cleaning engravings, but they are all dependent upon the bleaching action of chlorine. If the prints are of any value, our correspondent should place them in the hands of a professional print-restorer, as a novice would probably utterly ruin them. Space in this column will not permit of giving working details of the various methods.

FINISHING ENLARGEMENTS.—F. W. URQUART asks: "Can you inform me of a suitable colour for working up bromide enlargements? I have been using Indian ink, but the colour does not match well with the grey tint of the bromide print. When there is very much work to be done, it has a rather warmer tint than the print. Do you think the ink I am using would be of an inferior kind, as I have always understood that Indian ink only was used for the purpose of finishing?"—The colour must be made to match that of the bromide enlargements, and they vary in tint. The addition of a little indigo, or of crimson lake, or of the two, to the Indian ink, as occasion may require, will enable the tint to be matched exactly. Indian ink, it may be mentioned, is not always of the same tint, it varies considerably. The best is usually of quite a brown tint.

DAMAGED LENS.—CAUTION writes: "Your advice in the next issue of THE BRITISH JOURNAL OF PHOTOGRAPHY will be much appreciated. I am offered a Dallmeyer's *carte de visite* portrait lens (1B I think it is) at a very nominal price. The back combination is broken and quite useless. Is the lens any use for portraits and copying or enlarging, having the front combination only? I am unable to test the lens before buying, or I would not trouble you; but, if it can be used for copying or *carte-de-visite* work, you would confider it well worth having for a pound. Your advice will greatly oblige."—The front lens can be used for any purpose to which a single or landscape lens is applicable, but it will have to be stopped down to about *f*-16 to yield fine definition. It will then, no doubt, cover a half-plate well. In using the lens it should be made to take the place of the back combination, *i.e.*, so that the convex side is next the ground glass. Of course. the maker could fit the instrument with a new back combination, which might be worth while.

COPYRIGHT.—REGULAR SUBSCRIBER says: "I shall esteem it a favour if you will kindly reply to the following questions:—We have taken photographs of a well-known actress. She has sat at our invitation, and we have given her photographs equivalent to one dozen cabinets, and thereby secured the copyright of these photographs. We have sent some to two papers, stating our terms were 10*s.* 6*d.* each reproduction including our name and address underneath. We were notified by the editors of both papers that our photographs had been accepted. One of the papers has reproduced the photographs, but without our name and address underneath, and not mentioning our names as being the photographers, although this was part of our terms. 1. What ought we to do in the matter? Could we claim damages, and how much should we be entitled to? 2. Are we right in taking the acceptance of the photographs as being the acceptance of our terms? Also we should be glad of your advice on the following matter:—One of the photographs of this actress, we notice, was reproduced in another paper without our knowledge or permission, and it was only by accident that we discovered it. 3 Are we not entitled to compensation for the piracy of our copyright? and what do you think a reasonable amount to claim? 4. Has the editor of a paper the right to reproduce a photograph in any but the one paper for which it was sent by the photographer, in the event of such editor being the proprietor of other papers? 5. Is there any society for the protection of photographers' copyright similar to Romeike's Agency, who search the papers and send cuttings to subscribers relative to their business?"—In reply: 1. We advise you not to take any trouble in respect of the omission of your name, so long as you were paid your fee, although theoretically you have cause of complaint. 2 and 3. You appear to have a clear case against the paper. Write, making a claim for twenty guineas. If you get a half, or even a quarter, of that sum, be satisfied. 4. No. 5. Surely you have heard of the Photographic Copyright Union, which, during the last four or five years, we have some score of times recommended to our readers. The Union is the very body to take up your case.

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Contents.

	PAGE
Ex Cathedrâ	81
Sulphite of Soda and Metabisulphite of Potash	82
Leaderettes :— The Stereoscope — Lightning-flash Photographs — New Use for Carbide of Calcium—Sciographs of Precious Stones — Transformation of X Rays—Arc Light and the Eyes — Photography and Fraud — Bazaars and Fires — New R.A.'s	83
Characteristic Reactions of the Known Developing Agents. By Dr. M. Andresen	85
Ottings. By Cosmos	88
The Use of Photo-engraved Plates, Woodcuts, Types, &c., in Ceramics and Glass Painting. By P. C. Duchochois	89
The Halogens	89
Our Editorial Table :— Eastman Cartridge Film Roll-holders for Glass-plate Cameras — Fluorescent Screens for Radiography — Catalogue Received — The Tintograph	90
News and Notes	91
Patent News	91
Meetings of Societies :— Royal Photographic Society—London and Provincial Photographic Association — Photographic Club — Camera Club — Gospel Oak Photographic Society — North Middlesex Photographic Society —Richmond Camera Club—Bath Photographic Society — Birmingham Photographic Society —Bolton Mutual Photographic Society — Leigh Photographic Society — Liverpool Amateur Photographic Association — Sheffield Photographic Society — Tunbridge Wells Photographic Society—Dundee and East of Scotland Photographic Association — Edinburgh Photographic Society — Glasgow Photographic Society	92
Forthcoming Exhibitions	95
Correspondence :— Colouring Lantern Slides — Canvassing at Elections—Cinematographing the Solar Eclipse	95
Answers to Correspondents	96

EX CATHEDRÂ.

We have received particulars of the progress of matters in connexion with the North-Western Photographic Exhibition. A strong and numerous local committee has charge of the arrangements. The Exhibition will be held April 11–23 inclusive, in the City Art Gallery, Mosley-street, Manchester. It will be divided into two sections :—(A). To consist of work by societies within a radius of sixty miles of Manchester. The work sent in will be subject to selection by a committee of judges from several of the societies represented. We are informed that up to this date some thirty-one societies within the radius have declared their intention of taking part in this section. These societies represent, it is said, a membership of upwards of 3000. (B). To consist of work by prominent photographers, by invitation only. A large amount of high-class work is already promised for this section.

* * *

From the notice to members interested in Section A we make the following extracts :

"No restrictions are imposed as to size or as to the previous exhibition of the pictures. All pictures must be framed. Oval, Oxford, plush, or other fancy frames may cause rejection and should not be sent. All exhibits must be the sole work of the exhibitor, except mounting and framing. The exhibits from each society are to be sent in one lot, carriage paid, to reach the City Art Gallery, Manchester, by April 2. From these the Selection Committee will decide upon those to be exhibited. Each society's exhibit will be hung together, and distinctly marked as the work of that society. There are to be no entrance fees, no charges for wall space, no medals or awards, and the public are to have free admission, from 10 a.m. to 5 p.m. daily. A special evening has been set apart for an exhibition of lantern slides by members of the societies." The Hon. Secretary of the Organizing Committee is Mr. S. L. Coulthurst, 6, Mary-street, Harpurhey, Manchester, N.

* * *

In the last number of *Nature*, Sir David Salomons describes the following method of obtaining stereoscopic effect from a single photograph. "Many devices," he says, "have been brought out in the hope of giving a single picture a solid appearance, such, for instance, as a large convex lens. All these devices, however, failed to give the desired result. The illusion, so far as it goes, is simply a distortion of the original picture. The nearest approach to the production of the stereoscopic effect from a single picture is by photographing the illustration with its plane inclined at an angle of the optic axis of the lens, first in one direction and then again in the opposite direction, in which manner two dissimilar pictures are produced, which can be viewed with an ordinary stereoscope, and the result is by no means unsatisfactory. The process, however, is inconvenient." For a long time past Sir David has been experimenting with stereoscopy, and amongst other objects one has been to secure a stereoscopic effect with a single picture. This he has now succeeded in attaining in a comparatively simple manner. "If," he says, "a stereoscopic slide is examined, it will be found that each picture is compressed, so to speak, on the inner side, which is equivalent to saying that the central line of any one picture is shifted from the centre inwards, thus expanding one half of the picture and compressing the other half. It therefore appeared to the writer that, if by some means a single picture could be given two images, each one compressed in a suitable manner and then viewed with the ordinary stereoscopic lenses, the solid effect should be produced, and such is the case."

* * *

Sir David Salomons describes his method as follows :—"A large deep cylindrical lens is taken and cut in two along the

line where the lens is thinnest. Thus two wedges are produced, each having one side curved and the other side flat. If these two pieces are placed together, with the thick portions towards one another, and held at a short distance over any picture, the eye will perceive an image of the illustration in each lens, and the pictures will be compressed in the manner already referred to. All that is now necessary is to view these two images with ordinary stereoscopic lenses. One picture will result, as solid in appearance as if the ordinary stereoscopic slide had been employed. The apparatus will be found of considerable use for looking at small photographic portraits, landscapes, &c., as well as engravings. The result is very pretty. Naturally one class of picture must suffer under the operation; but, as these are comparatively rare, there is an extended use for the instrument, which is called the pseudoscope. The pictures unsuitable are those which represent an object when placed very near the eye, since the image produced by solid objects in each eye in such cases differs greatly; but this difference in the image is comparatively small after a distance of, say, fifteen to twenty feet." We believe that Sir David Salomons has patented the pseudoscope, so that opportunity will, doubtless, be had in due course of judging of its efficiency for imparting stereoscopic effect to single pictures.

* * *

On the subject of our recent references to the action of the Croydon Vigilants in advocating the photographing of children entering and leaving licensed premises, a friend at Croydon writes us as follows: "As to whether The British Journal of Photography was or was not the proper medium in which to refer to the action of the Croydon 'Vigilants,' and their proposed use of photography, is, I should say, a question for its Editor. I enclose cuttings from a Croydon Liberal paper, which, if you care to peruse them, will show that every one does not agree with the Vigilants. The Radical paper is even more strong, but I do not see any mention of the subject in the Conservative paper. I am also told that it is in contemplation, next Sunday evening, to throw slides, from snap-shots, on the screen, of children seen entering public-houses—if this is not a libel, it ought to be—and, if the parents of such children tried to wreck the lantern and tear down the sheet, small blame to them for so doing. It always seems to me that these self-constituted advocates of 'temperance' are themselves most 'intemperate.'" The extracts enclosed by our friend prove that the action of the Croydon Vigilants does not find unanimous local support. We should not be surprised if, one of these days, the question whether one person has a legal right to photograph another person without his permission, and publicly exhibit the photograph, did not engage the attention of the courts of law. That, after all, is the underlying matter at stake to which the action of the Croydon Vigilants directs attention.

* * *

We again find it necessary to here remind correspondents that we do not undertake to answer questions through the post. A notice to this effect appears in each issue of the Journal; but, as it has recently been disregarded by so many of our readers, we deem it advisable to take this opportunity of specially directing attention to its existence. Last week, seven or eight correspondents asked for replies by post, one on the ground that a question put to us some weeks ago had not been answered in the Journal. As a matter of fact, the answer was duly given in our pages. We are at all times glad to be of assistance to readers and others, and, such being the case, we think we have a right to expect that they, on their part, will go to the very little trouble required of making themselves acquainted with the conditions upon which our services are available.

* * *

We learn that several secretaries of photographic societies who send us reports of their meetings are surprised at their non-appearance in our pages. The reason for this is that these reports contain nothing of interest to the general reader, being merely effusively worded records of unimportant occurrences, supplying no information likely to facilitate photographic progress. Reports will always be published when they contain matter which, in our judgment, is of some general interest to photographers; but we must ask secretaries of societies and others to note that in future we shall exercise a somewhat more rigorous censorship in this respect than hitherto. In this matter we believe we shall have the support and acquiescence of the large majority of our readers.

* * *

The First Annual International Salon Exhibition of the Pittsburg Amateur Photographers' Society was held at the Carnegie Art Galleries, Pittsburg, last month. Some 700 photographs, chiefly by local workers, were contributed to the Exhibition, of which the illustrated catalogue has been sent to us. This contains reproductions of some very good photographs, leading to the supposition that the quality of the display was high. On the opening night a company of 2000 persons thronged the Art Galleries. The local papers had some very inferior reproductions of some of the exhibits, but they atoned for this ultra-enthusiastic desire to honour photography by publishing long and laudatory accounts of the Exhibition. For an "international" Exhibition there were lamentably few entries from Europe, however.

* * *

The arrangements for the catalogue of the approaching Photographic Exhibition at the Crystal Palace are now in hand. It is proposed to make of it a shilling book, running to some two hundred or more pages in all, of a larger size than those of the Pall Mall catalogues. It is to be printed throughout in the very best manner on first-class paper, so as to admit of half-tone and line blocks being used with the text wherever required, as it is intended to be something very much more than a mere list of exhibits. It will be descriptive and illustrative, will contain a large number of examples of photographic processes, three-colour prints, &c., and will, it is hoped, form a valuable work of reference in time to come as well as a handsome volume typical of the state of photography and photomechanical processes in 1898.

SULPHITE OF SODA AND METABISULPHITE OF POTASH.

It is rather surprising, considering its undoubted value as an adjunct to the developer that, although metabisulphite of potash has been before the photographic world for twelve or fifteen years now, it is not more generally employed than it is but, from what we can gather from various sources, we believe during the past year or two it has been steadily advancing in favour in preference to sulphite of soda.

There still appears to exist, however, a good deal of un-

certainty as to its real value, and we are constantly receiving from beginners as well as from older hands complaints as to troubles and inconveniences arising from its use; but these we have little hesitation in setting down to want of knowledge or of thought in connexion with the different chemical constitution of the two salts. In the early days of its introduction, from want of consideration on this point, the metabisulphite was used in much larger proportions than it is now; in fact, we remember more than one instance in which it was employed in the same proportions as the neutral sulphite, despite the fact that it contains a far larger proportion of sulphur dioxide, or sulphurous acid, a portion of which is practically in the free state. Under these circumstances, it was not surprising that complaints arose as to its retarding influence in development, and even of its altogether arresting developing action; but the real cause was in all such cases undoubtedly neglect to make allowance for the proportion of alkali in the developing solution that was neutralised by the large excess of acid in the metabisulphite. The same reasons, no doubt, prevail, though to a less extent, at the present day, for, when properly used and due allowance made for free acid, the balance of advantage is all in favour of metabisulphite as compared with the neutral sulphites either of soda or potash.

Sulphite of soda, although easily obtainable in a state of purity or definite form, is subject to rapid deterioration, absorbing oxygen, and being converted into sulphate, which not only has no preservative or other useful action on the pyro, but actually plays the part of a retarder. The metabisulphite, on the other hand, is a fairly stable salt, both in the crystalline state and in solution, unless unnecessarily exposed to the atmosphere, in which case a portion of its loosely combined sulphur dioxide is lost, and its preservative value decreased to a proportionate extent; but, under those circumstances, instead of acquiring increased retarding power, the opposite occurs, for, as it then neutralises a smaller proportion of the alkali in the developer, the latter becomes correspondingly more energetic.

In chemical composition the metabisulphite or anhydro-sulphite of potassium, as it is also called, consists of the neutral sulphite *plus* an additional atom of sulphur dioxide, its formula being K_2SO_3,SO_2 or one atom of oxide of potassium in combination with two atoms of sulphurous acid. It has, therefore, independently of its acid character, rather more than two and a quarter times the preservative value of the neutral sulphite of soda; but, when the circumstance is taken into consideration that its solution possesses highly acid properties, its actual preservative value is really far higher. In practice, it is found convenient to use it in conjunction with pyro in equal proportions, *i.e.*, one ounce of metabisulphite to each ounce of pyro, or just one fourth of the quantity usually employed of sulphite of soda. We have frequently, during the past twelve years or more that we have used the salt, had to contrast favourably its preservative powers with those of the sulphite when employed in these proportions, and we have at the present time, on our dark-room shelves, two bottles of pyro solution made at the same time, some two or three months ago, which fully bear out the character. One is a solution of pyro with neutral sulphite in the proportion of 1 : 4, the other of pyro and metabisulphite in equal proportions, both being ten per cent. solutions of pyro. The solution with sulphite which from the very first had a faint tinge of brown, has now become quite black and opaque, although it has not lost its developing power, though this must, of necessity, be to some extent depreciated; but the other remains, as it was at first, a clear, bright yellow, in spite of the fact that the bottle has been in regular use, while the other has only been opened two or three times altogether.

But where much of the present-day misunderstanding arises is in the neglect on the part of many to recognise that the sulphites exercise two distinct functions. Originally employed simply as preservatives of pyro, they probably in that conjunction act *only* as preservatives, whereas it is well known that with most of the newer reducing agents, such as amidol, metol, glycin, and the like, the sulphite exercises quite as important a part as the alkali, if not a more important, in development itself. Amidol, as is well known, forms a perfect developer in conjunction with sulphite of soda, without alkali at all, and metol, though not so energetic as the last-named, in the absence of alkali, is far more vigorous in its action with sulphite alone than with alkali without sulphite, proving, as we have said, that the sulphite exercises an important function in the development.

This being the case, in using metabisulphite in conjunction with the newer reducing agents it is all-important to consider it from the point of view of its developing power rather than of its preservative action. We have shown that with pyro the proportion of 1 : 1 suffices, so far as preservative action is concerned, to do all that is required, and in a better manner than sulphite in the proportion of 4 : 1, although, as regards the sulphurous acid it contains, the proportion of metabisulphite should be $2\frac{1}{4}$: 1; but, with amidol, for instance, if metabisulphite be substituted for neutral sulphite in the same proportions as with pyro, namely, one-fourth of the quantity, then obviously we shall have a serious deficiency in the actual quantity of sulphite employed in the developer; but, if one half of the quantity of metabisulphite be used as compared with the ordinary proportion of neutral sulphite, the due quantity of the latter salt in the actual developer will be maintained, and in these proportions we have found the former to behave in every way as well as the other, and to keep the solutions better, when used with amidol, metol, glycin, or para-amidophenol. Many of those who have failed in this particular direction may take the hint.

As regards the difficulty arising from the free acid in the metabisulphite interfering with the due proportion of alkali in the developer, this will disappear if the following figures be borne in mind or pasted up in the dark room. Each grain of the salt will neutralise one-and-a-half minims of a solution of ammonia containing ten per cent. of NH_3. As such a solution is formed practically by the mixture of one part of strong ammonia with two parts of water, every two ounces of developer, containing three grains of pyro and three grains of metabisulphite to the ounce, will require nine or ten minims extra of the ammonia solution; or, if carbonate of soda be used, for the same quantity of developer—two ounces—eight grains of additional soda will be necessary.

The Stereoscope.—Is the stereoscope in course of revival? It would almost seem so from the fact, as we mentioned last week, that the well-known house of Lévy & Co., of Paris, have sent an operator to the chief places in Turkey, Palestine, and Egypt to secure stereoscopic negatives. This, of course, shows, practically, a confidence in its revival, otherwise such great expense would not be gone to. It also shows the enterprise of the house of Lévy & Co.

Many years ago, when the stereoscope was in the zenith of its popularity, a London house (Negretti & Zambra) sent an artist to Palestine and the Holy Land to take negatives, and some of the slides from them were shown in the recent Historical Exhibition at the Crystal Palace. It is a little surprising that amateurs pay so small attention to stereoscopic photography, seeing that half a stereoscopic slide is just the lantern size, and that now transparency plates are supplied of such excellent quality. A stereoscopic hand camera need not be much more bulky than the majority of the present hand cameras, and not much heavier to carry. But no one yet seems to have made a speciality of stereoscopic hand cameras; why?

Lightning-flash Photographs.—An extremely interesting paper on this subject appears in a recent number of *La Nature*, illustrated by one of the most remarkable photographs of this kind of subject we remember to have seen. M. G. Toppe, who has been working at this kind of photography for the last ten years, was preparing for effects in an approaching storm, and found his camera including the Eiffel Tower within its field. One of the photographs he took depicts a streak of lightning actually striking the summit of the Tower, and it is represented with startling distinctness, while in another part of the picture is seen another flash not nearly so bright. The excessive brilliancy and width of the bright flash as represented is ascribed to the circumstance that, just at the time, a shower of rain began to fall. Another view, taken directly afterwards, gives an excellent picture of clouds, the flashes that illuminated them having been outside the field of view. Although the focus was the same in each negative, the outlines of the Tower in the last-named are crisp and clear, but in that taken during the shower they are of the strictest fuzzytype order. The writer of the article describing these pictures speaks of the great difficulty of the work, especially as regards focussing; but it is obvious that the only focussing needed is that for distance, the use of a suitable finder being the better course of procedure. No doubt, experience as to exposure is required, the time given in the two instances referred to having been about fifteen minutes.

New Use for Carbide of Calcium.—The favourite method of strengthening weak alcohol for photographic use is to distil it from quick-lime or from carbonate of potash; but, according to a plan of M. Yvon, presented in a paper read before the Paris Academy of Sciences, the use of carbide of calcium is preferable. This substance is entirely without action upon pure alcohol; but the presence of the slightest trace of water leads to the production of acetylene, and, governed by this action, it is comparatively easy to obtain anhydrous spirit by adding the carbide to alcohol containing ten per cent. of water. The actual condition of the alcohol as regards odour is not alluded to in the published abstract of M. Yvon's method. It may be noted that, according to Mr. J. W. Swan, in a paper recently read by him before the Institution of Electrical Engineers, the annual output of this electrically produced substance is already 20,000 tons.

Sciographs of Precious Stones.—In the same periodical we find an article by M. L. Dunbar upon photographs by X rays of various precious stones, illustrated by two reproductions of photographs produced respectively by ordinary means and by the Röntgen rays. They are very instructive, and indicate the ready means at hand to distinguish between real and imitation stones. It is found that nearly all precious stones are quite transparent to the Röntgen rays, while, as is well known, glass, or "paste" as the glass-like substance used for imitation stones is called, is absolutely opaque to them. The same relative transparency and opacity is found also in real and artificial pearls. In making these views the stones were placed on a cake of wax, and exposed first to oblique solar rays and afterwards to the rays from a Crookes tube actuated by a coil giving a spark of 0·2 metre (nearly eight inches), and placed at a distance of 0·38 metre (about fifteen inches). The exposure was one minute.

Transformation of X Rays.—This subject has been experimented upon by M. G. Sagnac, who has communicated his results to the French Physical Society. He finds that the rays incident to a metallic surface do not suffer perceptible reflection, but that they are by the superficial layer transformed into secondary rays which can produce photographic results, and render fluorescent screens luminous. These secondary rays differ from the ordinary kind in several ways: thus they are freely absorbed by aluminium and then produce tertiary rays, which are absorbed by that metal still more readily. M. Sagnac throws out the suggestion, that it is possible that these secondary and tertiary rays may be intermediate between the Lenard rays and the true Röntgen rays.

Arc Light and the Eyes.—It is stated that in the French Navy the seamen who work about the search lights are supplied with dark blue spectacles as a protection to the eyes. It has been found that the eyesight of many of the men has become seriously affected by the strong arc light used. It is further stated that dark brown eyes are far less affected by the light than are grey or blue ones. This is curious if it be correct.

The subject of the arc light and eyesight is one that should be kept in mind by photographers who employ it, whether for portraiture or for enlarging purposes, as we have known several instances of serious inconvenience arising from its incautious use. This is not likely to be the case with those who are continually using the arc light, as they are fully alive to the consequences, and guard against them. It is to those who use it for the first time in, say, experimental work, or extemporaneously in portraiture, that the caution is most needed, because the ill effects are not felt at the time, but only some hours afterwards. Some few years back two photographer friends of ours spent an entire day in experimenting with the light for photographic purposes, with the result, through want of caution, that the next day the eyesight was very seriously impaired, and it was more than a week before it regained its normal condition.

Quite recently a case came under our notice in which very unpleasant results followed. At a large fancy dress ball an arc light was extemporarily installed in an adjacent room for portraiture, the light being one of six to eight thousand candle power. The one in charge of the lamp had had but little previous experience with the arc light, though he wore a pair of "London smoke" spectacles as a protection. After working all night, during which some seventy or eighty exposures were made, he found himself practically blind, and remained so the whole of the next day, while the pain at the back of the eyes was very acute, and it was several days, notwithstanding professional treatment, before the eyes recovered their normal state. The skin of the face also became brown, as if it had been sunburnt, and afterwards peeled. The unpleasant consequences in this instance were, no doubt, in great measure, due to an unnecessary watching of the arc and the use of too thin glasses. It cannot be too strongly impressed upon those who use the arc light for the first time to wear almost black spectacles, and, even then, to look at the arc as seldom as possible, and only for the briefest period.

Photography and Fraud.—Some little time back reference was made to a young lady at Narbonne who was alleged to be endowed with a marvellous sight, by which she could read letters without opening them and even without even seeing them. A Dr. Ferroul was so impressed with the genuineness of the thing that he brought the matter before the Academy of Science and Literature at Montpellier, who appointed a committee to investigate the subject, with the result, as we said at the time, the experiment entirely failed under the test conditions. Details of the tests have since been published, and one of them, and perhaps the most conclusive, is interesting, inasmuch as it was a photographic one. The Commissioners took with them a number of cards with writing on

em, and left some with a sealed box at the house of Dr. Ferroul, short distance away. The box contained a photographic plate, one lf of which had been exposed to light. Mlle. X. failed to read e contents of the envelopes with the Commissioners, and for a time say the contents of the sealed packets at the Doctor's. But after hour or more, during which time Mlle. X.'s sister had gone to nd fro, and the lady had left the room more than once, she was le to do so more or less correctly. Then the Commissioners turned to the house of Dr. Ferroul and examined the sealed box, nd, after examination, expressed the opinion that it had been ened. The development of the plate revealed the fact that it had en, and the plate exposed to light. There was a good deal of genuity displayed in this method of proving the fraud, but it was nclusive.

Bazaars and Fires.—At the last monthly meeting of the iddlesex County Council, the licensing committee for music, ancing, and stage plays presented its annual report. One paragraph it opens thus: "In view of the terrible disaster which recently curred in Paris in connexion with a bazaar." Further on, the port goes on to say, "The County Council has not, of course, any risdiction over bazaars, except so far as they may be accompanied stage-play performances or concerts." The Committee have, owever, resolved that, when a stage play is held in connexion with bazaar, there must in every case be a licence, and that the per- rmance must be held apart from the place where the stalls for the le of goods are situated, and so arranged that there are separate xits for the stage-play audiences. For a wonder, no mention is ade of cinematograph performances, or of the use of the lime light. ounty Councils usually look askance at these.

New R.A.'s.—Death has been rife amongst Royal Academi- ans more than usual during the past year or two. Last week three acancies had to be filled up—two R.A.'s, and one A.R.A., and con- iderable curiosity existed in art circles as to whom the blue ribbons ould fall, particularly after the ballot of a fortnight before, when Ir. Lionel Smyth was unexpectedly elected. The full Academicians ave to be chosen from those who are the Associates, and the hoice, after several ballots, fell to Mr. B. W. Leader, and Mr. J. S. ucas, both painters. The most exciting part of a Royal Academy lection is that for an Associate. The candidates for that distinction ave, at some time or other, to be proposed by an Academician. ast week a list of some hundred-and-sixty names were handed ound. After several ballots and the usual formalities, the final one ell to Mr. Napier Hemy, who defeated Mr. Alfred East by two otes—twenty-six to twenty-four. An election to the Royal cademy is a widely different affair from the election of a member f any photographic society.

CHARACTERISTIC REACTIONS OF THE KNOWN DEVELOPING AGENTS.

[Translated from the Photographische Correspondenz.]

The number of the developing substances used in photography has so onsiderably increased in the last decade that a summary of the haracteristic reactions of these substances will be useful to the practical vorker. The tabular statement will render it easy for any expert to ecognise any developer which may be introduced into the market under fancy name.

It is advisable to make the investigation in a systematic manner. The ubstances must be tested in a given order of reactions, so that it will be asier and more certain to determine what developing substances may e present, and then to determine by special tests what is the actual ubstance.

The procedure is somewhat different, according to whether the sub- tance is in the solid or liquid form.

A. The Substance is a Solid.

A small quantity, about 1 gramme, should be finely powdered and dis- olved in 100 c. c. of cold water.

(*a*) The substance will not dissolve. Test for glycin and di-amido- xyphenol.

1. It dissolves on the addition of some solid sodium sulphite and carbonate of potash = glycin. Test the solubility of the original substance in water on the addition of hydrochloric acid (soluble) and of acetic acid (insoluble), and whether the solution, acidulated with dilute sulphuric acid, gives off the smell of quinone on oxidation with potassium bichromate (1 : 15).

2. The substance does not dissolve on addition of sodium sulphite and potash = di-amido-oxyphenol. The original substance should be soluble in water in the presence of acetic acid, so that no quinone is formed on oxidation.

(*b*) A clear solution is formed. In this case all the other developing agents must be tested for.

Add to the one per cent. aqueous solution five per cent. of dry sodium sulphite and ten per cent. of potassium carbonate.

1. If a fine crystalline powder separates out = para-amidophenol. This should be confirmed by the special reactions.

2. The solution remains clear, but becomes coloured; it may be amidol, eikonogen, tri-amidophenol, pyrogallol, or di-amido-resorcin.

(*a*) If the colour is blue = amidol. Test further.

(*b*) The colour is golden yellow and does not alter on standing exposed to the air = eikonogen. Test further.

(*c*) Colour greenish, especially when shaken in a half-filled bottle, and turns brown on adding a few drops of caustic soda = tri-amidophenol. Test further with ferric chloride.

(*d*) The solution is brown which increases on shaking in the air = pyrogallol or di-amido-resorcin. Add a few drops of caustic soda.

(*aa*) The brown colour remains and quickly increases = pyrogallol. Test further by special reactions.

(*bb*) The brown colour turns blue = di-amido-resorcin.

3. The solution remains clear and bright, without any colour = brenzcatechine, hydroquinone, metol, ortol, para-amidophenol (when very dilute), or para-phenyl-endiamine. Test the original substance as to the evolution of quinone by oxidation with potassium bichromate and sulphuric.

(*a*) If no quinone is formed = brenzcatechine. Test with ferric chloride and lead acetate.

(*b*) If quinone is formed by oxidation = hydroquinone, metol, ortol, para-amidophenol, para-phenyl-endiamine.

Add to the aqueous solution of the substance some dilute sulphuric acid and shake with ether.

(*aa*) If on the evaporation of the ether a residue of long needles is left = hydroquinone or ortol. Test for the same. If the hydroquinone comes from the ortol, the original substance will give, on oxidation, the Bordeaux red colour mentioned in the table.

(*bb*) There is no residue, or but little, after evaporation of the ether = metol, para-amidophenol, or para-phenyl-endiamine. Prepare a 1:20 solution of the substance, add some dilute sulphuric acid, and cool the solution by the addition of ice, and then add, with stirring, as much concentrated nitrite solution to make it smell of nitrous acid.

(*aa*) If a felted mass of fine needles, separates = metol. Test according to table.

(*bb*) If there is no separation = para-amidophenol or para-phenyl-endiamine. To some of the clear solution, containing nitrite, add some solution of *a*-naphthol-ε-disulphonic acid (known also as Andresen's acid), made alkaline with caustic alkali.

1. The azo dye formed is of a ponceau red shade = para-amidophenol.

2. The azo dye formed is of a Bordeaux red colour = para-phenyl-endiamine.

B. The Developer to be Tested is an Aqueous Solution.

As aqueous solutions of developing agents generally possess keeping properties only in the presence of sulphites, these will be found in all liquid developers. In order to test this, it is only necessary to acidulate a small quantity of the solution with dilute sulphuric, and the smell of sulphurous acid will prove the presence of sulphite.

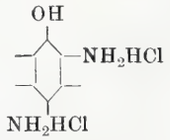
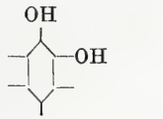
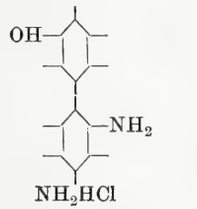
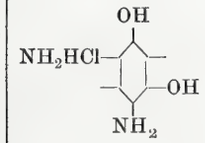
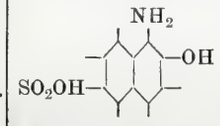
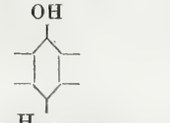
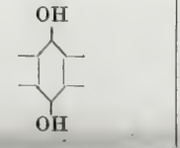
To recognise the developing agent, place a small quantity of the original solution in a little dish, and add a little concentrated caustic soda lye.

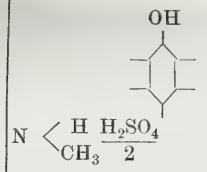
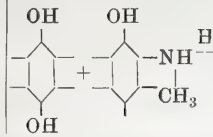
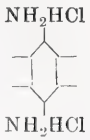
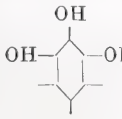
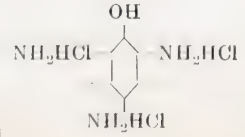
(*A*) If the solution assumes gradually an intense colour on exposure to the air.

(*a*) If the colour is an intense blue = di-amido-resorcin, a small quantity of the original solution should be acidulated with dilute sulphuric acid, and the solution boiled to drive off the sulphurous acid, a couple of drops of ferric chloride solution, and strongly diluted with water. The solution will then assume the characteristic colour given in the table.

(*b*) The solution, when in contact with the air, quickly turns brown—

REACTIONS OF DEVELOPING SUBSTANCES.

Commercial Name.	Scientific Name.	Constitution Formula.	Crystalline Form.	Melting Point of the Compound.	Solubility.	Behaviour to Acids.	Behaviour to Alkalies.	Behaviour to Oxidising Substances.	Used as a Developer in Conjunction with—	Remarks.
Amidol.	Hydrochlorate of 2·4 di-amido-phenol.		Colourless needles.	Decomposes on heating without melting.	Easily soluble in water. Sol. in alcohol and ether with difficulty.	Precipitated from aqueous solution by conc. hydrochloric acid.	Sulphite solutions on addition of potassium carbonate turn blue, with caustic potash a Bordeaux red colour.	Ferric chloride produces an intense red colour in aqueous solution. Amidol does not give quinone on oxidation.	Neutral sodium sulphite; alkalies.	—
Brenzcatechine or Pyrocatechine.	1·2 Dioxybenzol.		Broad flakes (from benzol). Prismatic needles (from water).	104°	Readily soluble in water, alcohol, and ether; soluble in cold benzol.	—	Cannot be separated from an aqueous sol. by shaking with ether in the presence of caustic alkalies. After acidulation of the sol. is taken up by the ether.	An aqueous solution gives an emerald green colour with a drop of ferric chloride; without the addition of carb. soda, turns violet red. Gives no quinone.	Alkaline carbonates.	Solution of lead acetate causes a white ppt. with aqueous solution of pyrocatechine.
Di-amido-oxydi-phenal or Diphenal.	Di-amido-oxyphenol.		From water in long felted needles.	148°	Readily soluble in alcohol, glacial acetic acid, and hot water; with difficulty in benzol; almost insoluble in cold water.	Soluble in dilute acids; for instance, acetic.	Not soluble with sulphite or alkaline carbonates, requires caustic alkalies.	Gives no quinone on oxidation.	Caustic alkalies.	The diazo compound of di-amido-oxyphenol gives, with Andresen's α-naphthol-disulphonic acid a ponceau red dye (compare para-amido-phenol).
Di-amido-resorcin.	Hydrochlorate of 4·6 Di-amido-resorcin.		Rhombic tables.	Decomposed by heat without melting.	Very soluble in water; sol. with difficulty in alcohol and ether.	Very readily ppt. by conc. HCl from aqueous sol.	Aqueous sulphite sol. give with pot. carb. a yellow brown; with caustic alkalies, a blue colour.	One drop of ferric chloride sol. gives, in dilute di-amido-resorcin sol., an intense violet colour, which after a short time disappears. No quinone formed.	Neutral, alkaline, sulphites.	—
Eikonogen.	Sodium salt of α_1-amido-β_1-naphthol-β_3-sulphonic acid.		Rhombic plates.	Loses at 110° 2½ molecules of water of crystallisation. On further heating, decomposes without melting.	Easily soluble in hot water; less soluble in cold; almost insoluble in alcohol and ether.	Acids precipitate the free acid in fine white needles from aqueous solution of eikonogen.	Alkaline solutions have a golden yellow colour.	No quinone on oxidation.	Neutral sulphites with alkaline carbonates.	—
Glycin.	p-oxyphenyl-glycin.		Mica-like plates.	Melts with decomposition.	V. s. sol. in water and alcohol, insol. in ether.	Forms with mineral acids salts sol. in water, but not with acetic acid.	Is converted by sodium sulphite, carbonate, and caustic alkalies into salts, which are readily soluble in water.	Gives chinone when oxidised with pot. bichrom and sulphuric acid, with evolution of CO_2.	Caustic alkalies and carbonates.	—
Hydroquinone.	1·4 dioxybenzol.		Needles, or long hexagonal plates.	169°	Easily sol. in alcohol, ether, and hot water, less sol. in cold, sol. in cold benzol.	—	Not separated from alkaline aqueous sol. by agitation with ether; is removed, however, after acidifying.	Is easily converted by oxidising agents into quinone. A convenient oxidising sol. is made by dissolving 1 part of conc. sulphuric acid and 1 part of pot. bichrom. in 20	Caustic alkalies and carbonates.	Quinone is recognised by its pungent smell, which is readily given off on heating to boiling aqueous solutions.

METOL.	Sulphate of the methyl, p. amidophenol.		Needles or prisms. The free base crystallises in long needles.	Decomposes without melting. The free base melts at 87° C.	V. sol. in water, s. sol. alcohol and ether. The free base v. sol. in alc., ether, and hot water, less sol. in cold.	—	Aqueous solutions of metol, which also contain a large proportion of neutral sulphites or alkaline carbonates, contain the metol in the form of the free base.	Gives quinone on oxidation. Metol is, therefore, a phenol derivative, and not a cresol derivative, as is frequently assumed.	Alkaline carbonates.	If a solution of hydrochlorate of para-amidophenol be acidulated with dilute sulphuric acid, and some nitrite sol. added, the nitroso compound of metol $\left(C_6H_4\overset{OH}{N}\overset{CH_3}{NO}\right)$ separates out in fine felted needles. Ethereal sol. of the metol base on evaporation leaves the metol in the form of an oily liquid, which sets, on standing, into long rosette-shaped crystals.
ORTOL.	Sulphate of methyl-o-amidophenol + hydroquinone (a mixture).		Sulphate of methyl of amidophenol crystallises in flat rhombic tables or prisms.	Sulphate of methyl of amidophenol decomposes on heating without melting. The free base melts at 80° with decomposition.	V. sol. in water, partial sol. in alcohol and ether (hydroquinone dissolves).	—	—	Gives, on oxidation with bichromate and sulphuric acid, a deep Bordeaux red colour, and also quinone.	Alkaline carbonates.	—
PARA-AMIDO-PHENOL.	Hydrochlorate of 1·4 amidophenol.		Prisms. The free base crystallises in plates.	Decomposed on heating without melting. The free base melts with decomposition at 184°.	V. sol. in water, s. sol. in alcohol and ether. The free base is v. sol. in hot, s. sol. in cold water, fairly sol. in alcohol, s. sol. in ether.	Precipitated from aqueous sol. by conc. hydrochloric acid.	Alkaline sulphites and carbonates ppt. the free base from concentrated aqueous solution; caustic alkalies also ppt. the free base, which is again dissolved on further addition with the formation of phenolate.	Oxidation easily produces quinone. On the addition of chloride of lime sol. to a sol. para-amidophenol mixed with hydrochloric acid, a deep violet colour is first formed, and, on further addition, yellow flocks of chloranide quinone separate.	Caustic carbonates and alkalies	If a solution of hydrochlorate of para-amidophenol be acidulated with hydrochloric or sulphuric acid, and some nitrite solution added till the smell of nitrous acid is recognised, a diazo compound is formed in the solution which, with Andresen's α naphthol disulphonic acid, gives, in caustic alkaline solutions a ponceau red dye.
PARA-PHENYL-ENDIAMINE.	Hydrochlorate of 1·4 phenyl-diamine.		Tricilinic tablets. The free base crystallises from ether in tablets. From water monoclinic crystals are obtained which are converted in the water into rhombic plates.	Decomposed without melting The free base melts at 140°.	V. sol. in water. S. sol. in alcohol. M. sol. in ether. The free base is v. sol. in alcohol and ether, less sol. in water.	Ppt. by conc. hydrochloric acid from the aqueous solution.	Separated by ether and also from alkaline caustic solutions.	Gives quinone on oxidation. Chloride of lime sol. produces, in a sol. acidulated with hydrochloric acid, quinone dichlordiamide, which separates in yellow flocks.	Caustic alkalies.	The diazo compound of para-phenyl-endiamine gives with Andresen's α-naphthol-disulphonic acid a red-violet colour (compare para amidophenol). The shade of this dye is best determined by pouring some of the sol. on filtering paper, and dropping dilute acetic acid on the place.
PYROGALLOL.	1·2·3-Tri-oxy-benzol.		Colourless shining needles.	Melts at 132·5°.	V. sol. in water, alcohol, and ether.	—	Sulpho - pyrogallol solutions become brown on addition of a few drops of caustic soda Pyro is separated by ether from sulphite sol., but not from sulphite and potash solutions.	Gives no quinone.	Alkali carbonates and ammonia.	If a dilute solution of pyro is mixed with a concentrated solution of ferrous sulphate which has become superficially oxidised, there is formed after a short time a beautiful blue colour.
TRI-AMIDO-PHENOL.	Hydrochlorate of 2·4·6 tri-amidophenol.		Needles.	Decomposed without melting.	V. sol. in water, almost insol. in alcohol and ether.	Conc. hydrochloric acid ppt. the compound from aqueous solution.	A sulphite sol. is yellowish. By addition of potash the colour becomes green, by adding caustic alkalies it becomes brown. The colours are very distinct if filtering paper be saturated with the	One drop ferric chloride sol. produces a dilute aqueous sol. a deep blue colour. No quinone formed.	Neutral alkaline sulphites.	—

pyrogallol, amidol, or tri-amidophenol. A small quantity of the original solution should be placed in a dish, and a lot of dry carbonate of potash added.

1. The solution turns blue = amidol. Test further as with diamido-resorcin, or extract some of the original sulphite solution with ether, evaporate the latter, and dissolve the residue with water. Ferric chloride gives a red colour.

2. The solution turns brown on exposure to the air = pyrogallol. In order to confirm this, acidulate a small quantity of the original solution with hydrochloric acid extract with ether, dissolve the residue after evaporation of the ether in water, and test as suggested in the table with oxidised sulphate of iron.

3. The solution turns a smutty green = tri-amidophenol. In this case the original solution is more yellow than the former. Test further with ferric chloride as suggested for di-amido-resorcin.

(*b*) Soda lye produces no marked change of colour = brenzcatechine, di-amido-oxyphenol, eikonogen, glycin, hydroquinone, metol, ortol, para-amidophenol, para-phenyl-endiamine.

Add to some of the original solution some hydrochloric acid, slowly and with constant stirring, and note if any separation takes place, and then note if the precipitate dissolves in excess of acid.

(*a*) If a white precipitate is formed = di-amido-oxyphenol, eikonogen, glycin, para-amidophenol.

1. The precipitate formed does not dissolve in excess of hydrochloric acid = eikonogen.

2. The precipitate dissolves on addition of more hydrochloric acid = di-amido-oxyphenol, glycin, and para-amidophenol.

(*a a*) The precipitate does not dissolve on addition of strong acetic acid = glycin.

(*b b*) The precipitate dissolves n excess of acetic acid = para-amido-phenol, di-amido-oxyphenol.

Acidulate a small quantity of the original solution with dilute sulphuric acid, drive off the free sulphurous acid by boiling, and add to the boiling hot solution some potassium bichromate.

(*c c*) The solution smells of quinone = para-amidophenol.

(*d d*) There is no smell of quinone = di-amido-oxyphenol.

(*B*) No precipitate is formed on the addition of hydrochloric acid to the original solution = brenzcatechine, hydroquinone, metol, ortol, or para-phenyl-endiamine.

Acidulate a small quantity of the original solution with hydrochloric acid, and shake with ether.

1. If a precipitate is left on evaporation of the ether = brenzcatechine, hydroquinone, ortol.

(*a*) The residue gives quinone = hydroquinone or ortol. Acidulate a small quantity of the original solution with sulphuric acid, boil off the free sulphurous acid, and oxidise with potassium bichromate. If the red colour mentioned in the table appears, it is ortol; in the other case, hydroquinone.

(*b*) The residue gives quinone = brenzcatechine. Test with ferric chloride and acetate of lead.

2. If there is a no marked residue on evaporation on the ether = metol or para-phenyl-endiamine. Acidulate a small quantity of the original solution with dilute sulphuric acid, boil off the free sulphurous acid, and add to the liquid cooled with ice some solution of nitrite till it smells of nitrous acid.

(*a*) If, after the addition of the nitrite, a compound separates out (nitroso-metol) = metol. This is proved by no colour being formed in a caustic alkaline solution with α-naphthol-ε-disulphonic acid.

(*b*) The solution containing nitrite gives, when poured into a caustic alkaline solution of α-napthol-ε-disulphonic acid, a red-violet colour = para-phenyl-endiamine.

In the above notes the method of analysis is given when only one developing agent is present in the secret preparation. It is rather more trouble when two or more reducing agents are present; still the data in the table will be of some assistance, and they may be tested for separately.

Dr. M. Andresen.

JOTTINGS.

Poor "photo-aquatint" process! The name is a misapplication; the process itself is as old as the hills; the modifications that have been introduced into it were anticipated long ago; the normal results it yields only excite the guarded admiration of a few stupid photo fakers calling themselves "artists" (!); the *ab*normal results are said to be as good as—common or carbon prints. The only thing that can be urged in favour of bi-gum is that it is a troublesome and roundabout method of occasionally making a good photograph. A very little while will suffice to kill it outright among sensible photographers, "who have no sympathy with the arts," to quote Mr. Maskell on January 28 (p. 62) That gentleman pleads that gum printing should be left to him and his friends. But why on earth do these persons thrust it forward in their exhibitions, their books, their reviews, their articles, if they sincerely want to keep it to themselves? Really, nobody so far as I'm aware has asked them to afflict the world with the gum monstrosities and abortions which their producers are pleased to think "art."

By the time these lines are made public the Council election of the Royal Photographic Society will be over, and "new blood" to the extent of twenty per cent. at least will have been introduced into that assembly. The six or seven new councillors, unless I have been misled, will have a pleasant surprise awaiting them. The R. P. S. Council, I am told, is quite an orderly, businesslike, and good-humoured assembly; and not by any means the cliquey, fossilised, and cantankerous body one or two foolish persons were very fond of representing it a little while ago. If the new men tell their friends the true state of affairs, they will have done a little to deserve their election to an honourable position.

The Croydon Temperance Reformers who have sought to advance the cause they have at heart, namely, the discouragement of the practice of sending children to public-houses, have in the judgment of prudent persons chosen the wrong means of achieving their end. To photograph the young people entering or leaving licensed premises, to make transparencies from the negatives and to publicly exhibit them to a meeting of people avowedly opposed to the liquor traffic, is a course of procedure that would readily commend itself to a fanatic, but not to a clear-headed man of the world with a wholesome fear of the libel laws or the strong right arm of an indignant parent. Feeling at Croydon has run somewhat high on this point, but I shall be very much surprised if counsels of wisdom do not prevail and the projected photographic exposition be abandoned. At the least, this method of converting the camera into an instrument of persecution is an interference with the liberty of the subject; gentler, more rational, more humane methods than this are surely at hand to those who make the care of their neighbours' children their cause and object.

If the example here set by one body of reformers of utilising photography to promote their particular aims be taken up and imitated by other zealots and faddists, it is not difficult to imagine that life would be rendered intolerable by the new terrors that would then be raised around us. A gentleman might scruple to be seen greeting a lady acquaintance in a public thoroughfare; while one's exit from a theatre; a new church or chapel one was quietly visiting; a pawnbroker's; a marine store dealer's; or a political club of the opposite party to that of which one was a member might be the signal for some vigilant friend or enemy to release the camera shutter for the purpose of photographically holding one up to obloquy among one's associates, acquaintances, or colleagues. The terrible possibilities of this system of espionage are bewildering. But, seriously, Parliament would not tolerate the state of things here hinted at. Indeed, it has yet to be proved whether you or I, dear reader, are legally in the right in photographing persons against their will. A test case in point might result in some curious complications between hand-camera workers and their victims.

Thanks, many thanks, to M. Demachy, who, in the Journal of January 28, is good enough to tell me what a great man is M. de la Sizeranne, the only apologist of the Salon of the first rank that has so far appeared. I am also equally grateful to him for informing me that the *Revue des Deux Mondes* is not a young ladies' magazine. Since M. Brunetiere retired from the editorship of the *Revue* it has, I believe, undergone a change of style and tone, but I am glad to

hear that it has not made a bid for boudoir patronage. If, however, it continues to manifest the retrogressive tendency evinced by its insertion of articles inquiring whether photography is a fine art, it is to be feared that old women, and not young ladies, will be the only people who will read it.

M. Demachy is good enough to warn me off condensed M. de la Sizeranne in the English *Review of Reviews*. I take the warning, not solely because one of the unaccomplished objects of my life is the composition of the Salon epitaph, but also because M. Demachy himself, in the January number of the *Bulletin du Photo-Club de Paris*, likewise dishes up some condensed M. de la Sizeranne, one taste of which does not at all dispose me to go in for a larger consumption. M. de la Sizeranne apparently says nothing particularly new or striking on his subject; nay, his reference to the gum bichromate process—"qu'il reconnait la plus guarde obéissance à la vision personnelle de l'auteur"—reads uncommonly like a French translation of some of Mr. Maskell's very funny Salon catalogue "Forewords." Yes; of such is the wisdom of M. de la Sizeranne.

Making due allowances for the changes in photographic taste and style wrought by time, M. de la Sizeranne does not appear to say anything that wasn't as well said ten, twenty, thirty years ago, over and over and over again. For all that, photography is not yet ranked by sane men as one of the fine arts; all the signs point to a greater disinclination than ever to so regard it. I admire M. Demachy's enthusiasm, but it is a very rickety and leaky mud barge indeed in which he has taken passage. Let him derive all the comfort he can from M. de la Sizeranne, whose solitary grandeur as a trumpeter for the Salon is not yet likely to be disputed from this side of the Channel. The Salon will need the epitaph I am willing to gratuitously compose for it long, long before any English writer or critic of the first class will be guilty of such a solecism as poor M. de la Sizeranne's. COSMOS.

THE USE OF PHOTO-ENGRAVED PLATES, WOODCUTS, TYPES, ETC., IN CERAMICS AND GLASS PAINTING.

[Anthony's Bulletin.]

HAVE frequently been asked to communicate a process by which to reproduce in vitrifiable colours on glass plates, faïence, porcelain, &c., the images from the engraved plates, woodcuts, types and ornaments employed for the illustration of books, &c., in their original size without the aid of photography.

One knows that these engraved plates, woodcuts, and types are negative, that is, made with the image reversed, and therefore, that the prints pulled from them give the image in its right way. Consequently, to apply them on the materials now in question, one should operate by double transfer. This was not wanted on account of the trouble involved. It was desired to operate by simple transfer.

The process I have recently worked out for this purpose, which I shall presently describe, is so simple and practical that I wonder one did not think of it before. It is as follows:—

A sheet of unsized printing paper, say 11 × 14 inches, is immersed into a mucilage prepared by allowing some quince seeds to macerate in cold water, agitating from time to time, until a syrupy liquid is obtained, when one adds a little of a solution of gum arabic, and, for keeping, a few drops of carbolic acid. About ten grains of quince seeds to the ounce of water suffice to obtain in half an hour a mucilage of the proper consistency. It may be prepared according to the following formula:—

Gum arabic, powdered	100 grains.
Water	8 ounces.

When dissolved add:—

Quince seeds	75 grains.
Glycerine	15 drops.
Carbolic acid	2 ,,

On its removal from the mucilage the paper is pinned up to dry. It may then be kept in a dry place for future use, or at once coated with a film of collodion:—

Ether, concentrated	3 ounces.
Alcohol, 95°	4 ,,
Pyroxyline	50 to 60 grains.
Castor oil	20 to 25 drops.

To coat the paper, it should be spread on a thin, flat board provided with a handle at one corner; and after folding up the edges of the paper, the lower end excepted, to about one-quarter of an inch, to prevent the collodion from running off or getting on the back of the paper, a certain quantity of collodion, sufficient to cover the whole surface, is poured steadily upon the middle of the paper at a short distance from the top, and, by slowly inclining the board backwards, allowed to cover first the upper right part of the paper, then the left, then, by raising the board, the left lower part, and lastly the right, when the excess is drained into a vial by the right corner. At the moment the board is upright in a diagonal position, striæ will be seen to form on the coating. They disappear, however, by gently rocking the board from left to right without changing its position. All this should be done without haste, but not too slowly. When the collodion has set, the paper is hung up to dry, and may then be kept indefinitely, so to say.

The collodionised paper curls up more or less in drying, which is objectionable when printing on large sheets. To prevent curling it may be prepared in the following manner:—

The paper is first cut the same size as a glass plate, which will serve as a support, and the latter edged, say, to a quarter of an inch, with a solution of alumed gelatine, which is allowed to dry. The plate and the paper are then immersed in tepid water for a moment and both, the paper in contact with the gelatinised side of the plate, are removed, contact being ensured by rubbing with some force with an indiarubber squeegee, taking care to remove air bubbles, if any, and the water from the surface of the paper, after which the mucilage is twice flowed, drained, and the whole set aside to dry spontaneously. The paper is now perfectly flat and pasted by its edges on the plate. It remains to collodionise it and to strip it off from the glass, when dry, by cutting the edges with a penknife. One should keep it flat in a portfolio for future use.

The image is printed on the collodion size. This can be done in two manners from the plates engraved in intaglio (copper plates), first, one may ink with a compound consisting of a vitrifiable colour, or a metallic powder, mixed to the proper consistency with burnt nut or linseed oil; or, second, with mordant, that is, simply with burnt nut oil, mixed with a little turpentine, and upon this latter print one dusts immediately the vitrifiable colour, or a metallic powder.

Printing in mordant from woodcuts, photo blocks and types is imperative.

The transfer may be effected at any time, For this purpose the print is immersed in cold water, where the pellicle soon detaches itself. This done, it is transferred, collodion film in contact with the material selected, by means of an adhesive substance. A plain mucilage of quince seeds will do:—

Quince seeds	20 grains.
Carbolic acid	2 drops.
Water	8 ounces.

Allow this to macerate for fifteen minutes, then filter through absorbent cotton or flannel.

The firing is done in the usual manner. First, however, it is well, when not objectionable, to dust over the material a mixture of equal parts of silicate of potash and fused borax. This is an extra precaution, protecting the collodion film, to prevent it in burning, from plating or otherwise spoiling the picture.

The *modus operandi* for transferring on glass the images to be viewed by transparency through the back of the plate may be simplified. The image is printed in mordant on damped unsized paper, or on a thin sheet of gelatine, then immediately applied on the plate with little pressure, whereby the plate is printed in mordant, upon which the vitrifiable colour, or the metallic powder, is dusted.

For ornaments not to be burned in on glass (signs, boxes, tops of tables, &c.) bronze powders or colours (not vitrifiable, of course), such as burnt umber, vermilion, &c., are dusted on the mordant, and the glass afterwards backed with an appropriate paint. Designs in several colours can thus be transferred by double printing.

As it has been implied in the beginning of this communication, the processes above described have only an indirect relation to the applications of photography to ceramics and glass painting, their object being to render available the use of photo-engraved plates, wood cuts, &c., not specially intended for that purpose, by laying on glass, porcelain, or faïence, the vitrifiable colour by means of printed transfers, as it is usually done in manufactures. I think they form a necessary addendum to the photo-ceramics and the other industrial photo-process I have already published. Moreover, the knowledge of simple, practical processes which pertain to the decorative arts will certainly be welcomed by the amateur and the professional at all times. P. C. DUCHOCHOIS.

THE HALOGENS.

THE third and concluding lecture on the subject of the halogens was delivered by Professor Dewar at the Royal Institution last week, and he was again met by an audience which were evidently interested in his remarks. By the aid of some tall glass jars, containing respectively solutions of fluoride, chloride, bromide, and iodide of potassium, he was able to show the behaviour of each when silver nitrate was added, the first showing no change, the second giving a copious white precipitate,

the third the cream colour familiar to all users of dry plates, while the iodide gave its own bright yellow reaction. He next added nitric acid to the same solutions, showing that in the fluoride there was again no effect, but that precipitation followed in the other cases, proving that the chloride, bromide, and iodide, unlike the fluoride, were insoluble both in water and nitric acid.

Next was shown the action of chloride of calcium on a solution of fluoride of potash, the dense precipitate of fluoride of calcium showing that that body was insoluble in water, but became soluble on the addition of ammonia. The result of adding an iodide to a solution of mercuric chloride, familiar enough to photographers as an old method of compounding an intensifying solution, with its scarlet precipitate and its disappearance under an excess of the iodide, was the next experiment. It was then shown how fluorine forms a gaseous body in combination with silica; hence its value in etching glass, and as a valuable agent in the analysis of rocks in which silica occurs.

In order to show the transparency to heat which some of these bodies exhibit, a very prettily arranged experiment followed. A delicate thermometer (thermopile) was in connexion with a galvanometer the spot of light from which traversed a scale at the back of the lecture table. A Bunsen burner was then brought at such a distance from the thermometer that the light spot stood at 50°, equal to 50 units of heat. When, however, a plate of glass was interposed between the source of heat and the thermometer, the light spot ran back to 5°, showing that 45 units had been cut off. The glass was then removed, and once more 50° was registered on the scale. A slab of rock salt was now placed in the path of the heat rays, when the light spot slowly went back one degree only, showing that sodium chloride was wonderfully transparent to heat. Moreover, a rock-salt prism was shown to refract this heat, while a prism of glass had no effect whatever. Fused and rolled sheets of bromide and iodide of silver—specially prepared at the mint by Professor Roberts Austen for the purpose of this experiment—were shown to be also transparent to heat, the light spot in the first case running back to 35° and in the second case to 37°. Iodide of silver was stated to be the substance which of all others suffers the least expansion from heat—not altering its volume through a considerable variation of temperature. Rock salt, it was noted, had all the necessary optical qualities to fit it for photographic lens construction, but its hygroscopic nature, besides the difficulty of getting flawless specimens, rendered it unfit for such employment.

The explosion of an equal volume of chlorine and hydrogen under the action of light is a very old experiment, but it is the kind of thing one reads of and does not often see performed. It was, therefore, interesting to observe the sharp report which such an explosion gave when the beam from an electric light, twenty feet distant, was concentrated on the glass bulb which confined the mixed gases. It was at one time thought that the two gases which seemed to be held apart by such loose affinities would slowly combine in the dark if sufficient time were given for the operation, but recent experiments in Paris had shown that the gases will keep uncombined for an indefinite period, if kept from the light.

When light acts upon chloride or bromide of silver, the upper layer becomes unstable, and is readily attacked by a reducing agent or developer. The action is, however, stopped by any great reduction of temperature, as was shown by holding a sheet of photographic paper to the beam from an electric lantern, while the centre of that paper was chilled from the back by the application of a sponge soaked in liquid air. Under this treatment the paper darkened except in the centre, where it remained perfectly white. A still more striking experiment, and one which showed that such chilled paper was insensitive even under development, was to immerse a roll of bromide paper in a vessel of liquid air so that only one half of it was covered by the liquid. This was exposed to light and then developed, with the result that one half was white and the other half black. Professor Dewar stated that he had found that very sensitive gelatine plates retained about twenty per cent. of their sensitiveness to light under the same cooling process, but he thought it was a question of degree, that is to say, if a temperature nearer the absolute zero could be attained, then all traces of light action, chemical action, &c., would disappear. He had spent much time over these problems connected with low temperatures, but much concerning them still remained unexplained.

Another old experiment, but with a most interesting new sequel, next came under review. Fluor spar, when scattered over a hot-iron plate in the dark, phosphoresces. If, however, the powdered spar has been heated and cooled some time before the experiment is made, no phosphorescence is apparent. Now, it has recently been reported that a German investigator had found that the X rays would revivify such heated and cooled spar, so that it would once more exhibit the phenomenon of phosphorescence. Professor Dewar had some powdered spar which had been heated, cooled, and treated by the X rays ten days previously. This was thrown on the iron plate, and it at once became visible in the darkened theatre.

Another interesting experiment showed that the halogen compounds were, some of them, transparent, and some opaque to the Röntgen rays. For example, fluoride of ammonia is quite transparent; the chloride less so; the bromide less still, while the iodide is perfectly opaque. Thus it will be seen that opacity increases with the atomic weight in a regular progression.

In conclusion, a number of interesting experiments were shown, but, as they have no particular photographic interest, they need not be detailed. Professor Dewar's lectures on the halogens have covered much new ground, and the only regret is that they were confined to three in number.

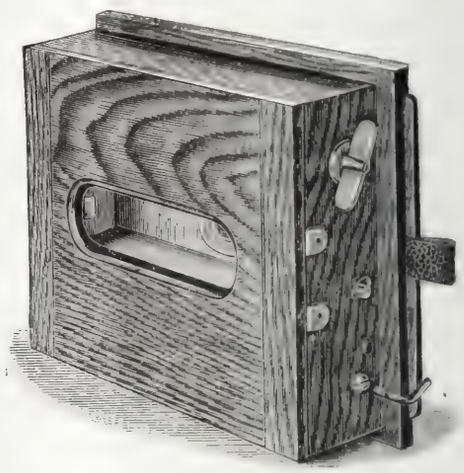
Our Editorial Table.

Eastman Cartridge Film Roll-holders for Glass-plate Cameras.

Eastman Photographic Materials Co., 43, Clerkenwell-road, E.C.

By the use of these roll-holders the daylight changing system is made available for those who have only glass-plate cameras.

It is pointed out that the power of inserting and removing spools of film without the use of a dark room is a new feature in independent roll-holders. The adaptation to the purpose has been carried out with the greatest simplicity and neatness of construction. Thus any glass-plate camera can, by the attachment of one of these roll-holders, be quickly and cheaply converted into a film cartridge instrument. The roll-holders



are sold with the frame, of such length, breadth, and thickness as to b adaptable to any glass-plate camera made for the same size of plate. I is as easy to change from a plate-holder to the roll-holder as from on plate-holder to another. By an ingenious and simple-locking device, th section of film used for each exposure can be drawn perfectly tight an flat.

The roll-holders are light and compact, and can be easily fitted t almost any existing camera without interfering with the camera or th plate-holders. The dimensions of the frames of the roll-holders, as sol previous to fitting, are:—

Size.	Length.	Width.
$3\frac{1}{4} \times 4\frac{1}{4}$ inches.	$5\frac{1}{2}$ inches.	$4\frac{1}{2}$ inches.
5 × 4 ,,	$6\frac{1}{2}$,,	$5\frac{1}{2}$,,

The weight of the $3\frac{1}{4} \times 4\frac{1}{4}$ is 9 ounces, and of the 5 × 4, 11 ounces.

Fluorescent Screens for Radiography.

J. R. Gotz, 215, Shaftesbury-avenue, W.C.

Mr. Gotz has placed on the market a fluorescent screen for radiograph work, which has been found to give the greatest satisfaction. Th fluorescent salt, platino-cyanide of barium, is of English manufactur and is coated in a special manner on stout paper, which is stretche mounted, and backed, and fitted in a light mahogany frame, th constituting a very convenient form of screen for practical work.

Catalogue Received.

W. King & Co., Southsea-road, Kingston-on-Thames. Trade price-l of enlargements, finishing and contact printing, &c.

The Tintograph.

Marion & Co., Soho-square, W.

The Tintograph is a method of colouring photographs or engravin and Messrs. Marion have been good enough to send us one of the fi dozen photographs coloured according to the process by one of th hands without previous experience. The result is a really good s pleasingly coloured photograph; and the process should be fou extremely serviceable for the purposes. The Tintograph consists of a of the necessary colours and materials, which are put up in a box,

includes one bottle liquid colour red, one bottle liquid colour blue, one bottle liquid colour green-yellow, one bottle albanine (white) three brushes, four mixing cups, and one large bottle of medium. It may be pointed out that the photographs are coloured on the front, and not on the back, by this process, very full instructions for which are issued by Messrs. Marion. The results are quite as good as the best productions of the Dansac-Chassagne process, and the instructions for working bear a not very distant resemblance to the method followed in making results by that ill-starred process of "photography in natural colours." The Tintograph, however, simply professes to be a process for colouring photographs, and as such deserves to succeed. The instructions are clear and explicit.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, February 16, at eight o'clock. "A Chat on Electricity and Optics," by Mr. A. W. Isenthal.

AN electric light from vacuum tubes, which is brilliant enough for light-house service, and another luminant, from hermetically sealed globes, which lasts indefinitely, have, it is stated, been recently invented.

ROYAL PHOTOGRAPHIC SOCIETY.—Photo-mechanical Meeting, Tuesday, February 15, at eight p.m., at 12, Hanover-square. "Process Reproductions from an Editor's Point of View," by Wallace L. Crowdy, editor of the *Artist*.

SAWDUST is to be utilised in the production of calcium carbide by a method patented by Professor Wilson, of St. Catherine's, Ontario. The refuse from the sawmills is converted into carbon, which is powdered and mixed with limestone. The mixture is said to be subjected to the action of an electric current for about ten hours, and calcium carbide is produced, which is broken and sold to consumers who desire to make acetylene gas. The cost of the process is not stated.

THE LIVERPOOL SPRING EXHIBITION.—The Spring Exhibition at the Walker Art Gallery is to be opened on Saturday. The "Whistler" room and the room beyond it are devoted to photography, and have been specially decorated for the occasion by Messrs. Waring & Gillow. The "Whistler" room contains the exhibits by members of the Liverpool Amateur Photographic Association, who are said to have risen to the occasion and produced a collection of over two hundred pictures, which surpasses any previous exhibition by the Society. There is also a fine exhibit of transparencies and stereoscopic pictures. The other room contains miscellaneous photographic work and the latest novelties in appliances.

WITH the issue of March next, *Process Work and the Printer* will have its pages considerably increased in order to make room for a great extension of scope. The following topics will be dealt with in early numbers: The illustrated magazines, British and American, the work of black-and-white artists, illustrated advertising, artistic treatment of photographs for process reproduction, illustrated catalogues and price-lists, new illustrated books, new printing machinery, practical process engraving. From this it will be seen that the magazine will contain much of interest to engravers, high-class printers, artist illustrators, publishers, journalists, photographers, and, in fact, every one interested in modern engraving, illustrating, and printing in their very numerous applications.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—Life seems very brisk in this Society just now. On Thursday last the third annual ball was held in the Grosvenor Rooms, and was well attended by members and their friends, passing off very successfully. The members are now looking forward and preparing for their Thirteenth Annual Exhibition, which is to be opened by the Lady Mayoress. The Society are fortunate in having placed at their disposal the rooms of the Royal Society of Artists in New-street, by the kindness of the Committee of the latter. These rooms are admirably adapted and lighted for the purposes of the exhibition. This year, for the first time, a representative loan collection has been inaugurated, and already some thirty of the most prominent native and Continental workers have signified their intention of giving support. In addition to lantern and cinematograph exhibitions, each evening there will be selections of vocal and instrumental music. It may interest those who compete in both open and closed classes, to know that a substantial premium has been offered by the Society for a design for a suitable plaque, to be produced by electro deposit, as an award to the successful competitors. And, further, the Society intend announcing their show to the public through the medium of a specially designed pictorial poster.

EXPERIMENTS on the action of Röntgen rays on vegetable life have hitherto led to negative results, but Signor G. Tolomei, writing in the *Atti dei Lincei*, has led to the conclusion that their action is identical with that of light. On exposing to the action of Röntgen rays branches of *Elodea canadensis* immersed in water charged with carbonic anhydride, evolution of bubbles took place, as in the presence of sunshine, or electric, or magnesium light. The same similarity was observed in the effects on the lower vegetable forms, both Röntgen rays and light causing retardation in the absorption of oxygen by *Mycoderma aceti*, and in the evolution of carbonic anhydride by Saccharomyces. Again, in their action on *Bacillus anthracis* the Röntgen rays behave in the same way as sunshine, but in a minor degree; when a gelatine film was exposed for twenty-four hours to the radiations from a Crookes' tube, with the interposition of a zinc screen having an X-shaped aperture, the letter appeared transparent on an opaque background. That the action was due to destruction of the germs, and not to the generation of any toxic quality in the agar was proved thus: When a sterilised film was partially exposed to the rays, and subsequently brought into contact with a stratum of dried spores, the spores began to germinate all over the film; but, when the stratum of spores was exposed to the rays, the screen with the letter X being interposed, and the film subsequently brought into contact with them, only those spores which had been protected from the Röntgen rays developed, and the letter X was distinctly seen. Signor Tolomei attributes the previous failure to obtain such effects to the short duration of the exposures.—*Nature*.

WE are informed that the Eastman Photographic Exhibition, which was attended by over 25,000 people when it was given at the New Gallery Regent-street, has been repeated with even more success in the National Academy of Design at New York. The Exhibition took place in this latter city, commencing on January 1, and, during the twelve days that it was open to the public more than 26,000 people passed the turnstiles. The same decorations and pictures were used, and a considerable number of fresh enlargements were added, being the work of prominent American users of the Kodak and of some distinguished photographers on the Continent of Europe. Amongst others, new pictures were shown by Messrs. Alfred Stieglitz, R. Eickemeyer, jun., Jas. L. Breese, Chas. I. Berg, John E. Dumont, W. B. Post, Henry Troth, R. B. Roosevelt, jun., and Miss Zaida Ben-Yusuf. The photographs by members of the Royal Family of Great Britain also accompanied the Exhibition, and pictures which had not previously been exhibited in the English collection were shown by Mrs. Joseph Chamberlain, Baroness de Zulen, Princess de Poix, Prince Wagram, Comtesse de Castellane, Vicomtesse de Savigny de Montcorps, the Duchess of Oldenburgh, and others. Every section of the Exhibition proved to be equally as successful as when held in England. The space available in the National Academy of Design was even greater than that used in the London Exhibition, and the spacious gallery surrounding the noble staircase, by which the rooms were approached, formed a very handsome feature. Music and floral decorations served to make the premises and the proceedings additionally attractive. The American press have given the most glowing notices of the Exhibition, remarking particularly upon the quality of the pictures in the Invitation Section, and upon the interesting character of the technical exhibits. Many of the papers, including the *New York Herald*, gave illustrations of some of the pictures. The same plan was followed in the disposition of the draperies as that which proved so great a success in London, and the arrangement of the frames was undertaken and carried out by Mr. Alfred Steiglitz, the general management of the Exhibition being in the hands of Mr. L. B. Jones.

THE USE OF VACUUM TUBE LIGHTING IN PHOTOGRAPHY.—Mr. Nikola Tesla, in the *Electrical Review* (New York), says: "A few years ago I began a series of experiments with a view of ascertaining the applicability of the light emitted by phosphorescent vacuum tubes to ordinary photography. The results soon showed that, even with a tube giving no more light than the equivalent of one-half of a candle, objects could be easily photographed with exposures of a few minutes, and the time could be reduced at will by pushing the tube to a high candle power. Photographs of persons were likewise obtained at that time, and, if I am not mistaken, these were the first likenesses produced with this kind of illumination. A rather curious feature in the photographs obtained with tubes of moderate illuminating power was that the lights and shadows came out remarkably strong, as when very short exposures are made by flashlight, but the outlines were not sharp, and practically no detail was visible. By producing tubes of much greater candle power, a notable improvement in this respect was effected, and this advance prompted me to further efforts in this direction, which finally resulted in the production of a tube of an illuminating power equal to that of hundreds, and even thousands, of ordinary vacuum tubes. What is more, I believe that I am far from having attained the limit in the amount of light producible, and believe that this method of illumination will be eventually employed for light-house purposes. This probably will be considered the oddest and most unlooked-for development of the vacuum tube. The purpose of the present communication is chiefly to give an idea in how far the object here aimed at was obtained. The photographs were taken by a tube having a radiating surface of about 200 square inches. The frequency of the oscillations, which were obtained from an Edison direct-current supply circuit, I estimated to be about 2,000,000 a second. The illuminating power of the tube approximated about 1,000 candles, and the exposures ranged from two to five seconds, the distance of the object being four feet to five feet from the tube. It might be asked why, with so high an illuminating power, the exposure should not be instantaneous. I would not undertake to answer this question satisfactorily, which was put to me recently by a scientific man. Likenesses can, of course, be obtained with instantaneous exposures, but it has been found preferable to expose longer and at a greater distance from the tube. The results so far obtained would make it appear that this kind of light will be of great value in photography, not only because of the fineness of the lines, but also because the artist will be able to exactly adjust the conditions in every experiment so as to secure the best result, which is impossible with ordinary light. He will thus be made entirely independent of daylight, and will be able to carry on his work at any hour, night or day. It might also be of value to the painter, though its use for such purposes I still consider problematical."

Patent News.

THE following applications for Patents were made between January 24 and January 29, 1898:—

STEREOSCOPIC PROJECTION.—No. 1835. "An Improved Method or System by means of which Pictures Projected upon a Screen from an Optical or Magic Lantern or Lanterns are seen in Relief or with Stereoscopic Effect." J. ANDERTON.

OPTICAL PROJECTION.—No. 2044. "Improvements in or connected with Apparatus for Optical Projection for Advertising and other Purposes." W. CLAYPOOLE.

MAGNESIUM LIGHT.—No. 2023. "An Apparatus for Using the Magnesium Light in Photography." G. LEVI-LAJEUNESSE.

ANIMATED PHOTOGRAPHY.—No. 2196. "Improvements in and relating to Apparatus for Producing Animated Pictures." HAYDON & URRY, LIMITED, and G. HAYDON.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

February.	Name of Society.	Subject.
11	Bradford Photo. Society	"Exposure Meters." W. T. Wilkinson.
14	North Middlesex	"Picturesque Essex." George Biddell.
14	Richmond	"Cloud Photographing." A. Horsley Hinton.
15	Aintree	"The Beauties of Perthshire." D. J. Neill.
15	Birmingham Photo. Society	"Photographic Halation." George Marlow.
15	Bootle	Carbon Printing Demonstration. Jos. Appleby, L.A.P.S.
15	Brixton and Clapham	"A Chat on Trimming and Mounting Prints." R. C. Whiting.
15	Darwen	"A Tour in Switzerland." George Butterworth.
15	Gospel Oak	"A Few Hints for Economical Photographers" J. E. Rayner.
15	Hackney	"Enlarging, and Photography Slides." J. H. Gear.
15	Leeds Photo. Society	"What to See in an Old Church." S. Margerson.
15	Royal Photographic Society	"Process Reproductions from an Editor's Point of View." Wallace L. Crowdy.
16	Croydon Camera Club	Practical Photographic Tips. Technical Chat opened by John Smith.
16	Kingston-on-Thames	"How to Make a Camera." Victor Robinson.
16	Leytonstone	"A Few Hints from my Note-book." A. E. Bailey.
16	Photographic Club	"A Chat on Electricity and Optics." A. W. Isenthal.
16	Polytechnic	"Optical Projection." T. E. Freshwater, F.R.M.S., &c.
16	Southport	"Negative-making." John A. Hodges.
16	Woodford	"Lantern-slide Making." Ernest Marriage.
17	Birmingham Photo. Society	Last Day for Entries, Annual Exhibition.
17	Bolton Mutual Photo. Society	"Photography with the Microscope." Fred Wilkinson, F.G.S.
17	Bradford Camera Club	"At Home Subjects." E. H. Whetstone.
17	Leigh	"Sepia Platinotype." T. Lee Syms.
17	London and Provincial	Lantern Night: Members' Slides and Lewis Medland's *Fair Life*.
17	Manchester Amateur	"Developers and Development." W. H. Henry.
17	Putney	Prize Slides.
18	Croydon Microscopical	"Portraiture." Harold Baker.
18	Plymouth	"Flash-light Work." E. H. Micklewood.
18	Wakefield	"Elementary Photographic Optics." R. Child Bayley.
18	Wolverhampton	"Development" T. H. Cox.

ROYAL PHOTOGRAPHIC SOCIETY.

FEBRUARY 8,—Annual General Meeting,—the Earl of Crawford, K.T., F.R.S. President), in the chair.

NEW MEMBERS.

Seventeen new members were elected, and eleven candidates for membership were nominated. It was announced that the Uttoxeter Photographic Society had been admitted to affiliation; and that Messrs. C. H. Oakden, W. F. Slater, and W. D. Welford had been admitted as Fellows.

THE ANNUAL REPORT.

The PRESIDENT moved the adoption of the Annual Report, which he thought would be regarded as a fairly satisfactory one. During the year 1897 there had been a net increase of membership of forty-six, the financial position was good, and the Society was distinctly growing, the total number of members on January 1, 1898, being 660.

Mr. ANDREW PRINGLE seconded the motion, which was carried unanimously without discussion.

THE BALANCE-SHEET.

Mr. C. H. OAKDEN moved the adoption of the balance-sheet, which showed that the Society possessed 500*l.* invested in Consols, and property to the amount of 354*l.*

Mr. SEBASTIAN DAVIS seconded, remarking that not only was the financial position of the Society highly satisfactory, but it was generally in a more flourishing condition now than had been the case for many years.

Mr. S. H. FRY thought the attention of the Council might be directed to the treatment of the subscriptions received from life members, which at present were regarded entirely as revenue. He pointed out that the Society had ninety-three life Fellows and members from whom no subscriptions were being received, but who were a permanent charge upon the funds to the extent of, perhaps, 15*s.* per annum each. This was not a serious matter as things were at the present time, but he suggested that, to guard against emergencies, it might be advisable to invest some portion of the life subscriptions so as to produce an income to meet any requirements that might arise.

Mr. G. SCAMELL (Hon. Treasurer) recalled the fact that a good many of the life members were old members who at a former period, when the Society was in very low water, had paid life subscriptions in order to afford means of refloating it. Further, a sum of 84*l.* had, during the past year, been expended in the purchase of furniture, books for the library, and other property, being an excess of 15*l.* over the amount received as entrance fees and life subscriptions, so that actually more had been invested for the benefit of the Society than had been received from those sources. The expenditure had been kept well within the income, the balance at the beginning of the year being 22*l.*, as against 32*l.* at the end. The Exhibition resulted in a loss of 45*l.* as compared with 99*l.* in 1896, and 104*l.* in 1895. The Affiliation scheme was progressing, and was likely to make further progress, the Society being now in touch with 5000 members of affiliated bodies throughout the country.

Mr. S. DAVIS pointed out that many life members were now contributing to the funds as Fellows, and that several had, a few years ago, subscribed to a guarantee fund, which at that time was necessary.

The balance-sheet was then adopted without dissent.

ELECTION OF OFFICERS AND COUNCIL.

Mr. R. BECKETT submitted the report of the Scrutineers, from which it appeared that the election of officers and Council had resulted as follows:—*President:* The Rt. Hon. the Earl of Crawford, K.T., F.R.S.—*Vice-President:* Captain W. de W. Abney, C.B., D.C.L., F.R.S., Messrs. T. R. Dallmeyer, H. Chapman Jones, F.I.C., F.C.S., and Sir H. Trueman Wood, M.A.—*Ordinary Members of Council:* Messrs. T. Bedding, T. Bolas, C. H. Bothamley, F. A. Bridge, J. Cadett, Alexander Cowan, W. E. Debenham, A. Haddon, J. A. Hodges, F. C. Lambert, Alexander Mackie, J. W. Marchant, Andrew Pringle, J. Spiller, J. W. Swan, H. Snowden Ward, L. Warnerke, J. Waterhouse, J. B. B. Wellington, and Horace Wilmer.—*Hon. Treasurer:* Mr. G. Scamell.

About 200 members voted.

THANKS!

Mr. S. H. FRY moved a voted of thanks to the officers and Council for their services during the past year, remarking that the Society was to be congratulated upon possessing a most excellent set of officers and an admirable and hard-working Council.

Mr. R. W. CRAIGIE seconded the motion, which was carried by acclamation.

The PRESIDENT acknowledged the compliment and referred to the onerous duty involved in the formulation of new Articles of Association, expressing regret that that question had led at the time to a certain amount of dissension, but he was pleased to think that the present election had restored to the Society one of the most distinguished men in the photographic world.

Votes of thanks were also passed to the Auditors and Scrutineers.

THE CRYSTAL PALACE EXHIBITION.

The PRESIDENT mentioned that the arrangements for the forthcoming International Photographic Exhibition at the Crystal Palace were progressing satisfactorily and that there was every prospect of a satisfactory result. The offers for the loan collection were such as to indicate a very remarkable show; but he hoped that further applications for space would shortly be made by professional photographers, as there was room for more exhibitors in that class.

THE HONORARY SECRETARY.

Mr. J. SPILLER, in a highly eulogistic speech, proposed a very hearty vote of thanks to Mr. Horace Wilmer, the retiring Hon. Secretary, who had intimated that pressure of other duties would prevent him offering himself for re-election.

Mr. J. J. VEZEY seconded, and the motion was very cordially supported by Messrs Bolas and Pringle.

The PRESIDENT expressed his deep personal obligation to Mr. Wilmer for the very kind and able assistance which he had at all times afforded him.

Mr. WILMER, in responding, said he had had great pleasure in carrying on the work of the Society, and was only prevented from continuing to do so by the impossibility of being in two places at the same time. He wished, too, to take the opportunity of testifying to the admirable manner in which the secretarial duties of the Society were discharged by the indefatigable Assistant-Secretary (Mr. Child Bayley), by whom his work had been considerably lightened, and to the value of the clerical assistance rendered by Mr. Bartlett.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 3,—Mr. T. E. H. Bullen in the chair.

VELOX PAPER.

Mr. IBBETSON, on behalf of Messrs. J. J. Griffin & Son, gave a demonstration of the new Velox paper for development. It is said to be a chloride paper, and, although the results by it resemble to some extent those of bromide paper, it behaves in rather a different manner. The peculiarity about this paper is that the operations can all be conducted in a room lighted by naked gaslight, and it is expected that, on account of its independence of the dark room, it will commend itself to the amateur worker. It follows, of course, that the paper is slower than bromide paper, but it is found that thirty-five seconds is enough for an average negative exposed at four inches from the burner. The paper is made in three or four grades: the Carbon Velox, so called from its resemblance to that process; the Glossy Velox; and a Portrait Velox, with less contrast than the others. After exposure to the negative, it is developed on a piece of glass or other support, by means of a piece of cotton-wool dipped in the developing solution. Development takes place immediately, and is complete in about twenty seconds, when the print is plunged at once into the fixing bath. There appears to be no means of forcing the picture if under-exposed; but, if signs of over-exposure appear, it is quickly placed in the hypo, and often saved in this way. The developer is a very con-

entrated one, and it is important to adhere to the prescribed proportions of the ngredients. The chief complaints seem to be due to the use of unsuitable levelopers, and to a lack of appreciation of the importance of the purity of he chemicals used, especially of the sulphite. A weak developer, or one that as become oxidised or contains an excess of bromide, gives greenish or rownish-blacks. Insufficient bromide produces dirty whites, and the ddition of a small quantity of a ten per cent. solution is recommended. The leveloper which gives the best results is a metol-quinol mixture, and can be ad in accurately weighed proportions, with the proper quantity of bromide, f the English agents.

Mr. S. HERBERT FRY was invited to develop a few prints, which he did. It eemed to him that the process, as it had been shown, possessed a serious disdvantage as far as technique was concerned, in that nobody could count on vhat he was going to get, and could take no credit to himself for getting a ood result. By having to develop in such a short space of time, the process, e thought, was robbed of its practical value. In his opinion it was a doubtful dvantage to recommend that the paper was workable in gaslight. It was vorking under conditions which did not at all favour the print, and he asked, Vhy should not the development be done by non-actinic light, as far as the aper was concerned?

Mr. E. GEORGE HARVEY considered it a great mistake to work this paper in ctinic light. He had compared prints produced in a yellow light with others ade in the presence of a naked light, and found a distinct fogging in the tter, the whites being degraded where protected by the rebate of the printing rame.

The CHAIRMAN, in his experiments, had gone to work in his own way. ranted that it was slow, he had protected it from actinic light. To get more titude in development he diluted his developing solution. It was said that he paper was not a bromide paper, but he hardly thought it was a pure loride, as it would not be affected by such light as they had in the room; if were a chloro-bromide paper, it would be affected by such light; and, if ure bromide, it would be fatal. Whatever it was, it should have every hance, he held, and not be subjected to an actinic light unnecessarily. He as able to get anything he liked on it under the conditions he observed, viz., n actinic light and a diluted developer, these ensuring the integrity of the hites, which otherwise would be veiled. Dilution did not affect the colour of he image in his hands.

Mr. FRY imagined that, by manipulating under conditions of safe light for evelopment, all restrictions enforced with regard to the concentration of the eveloper would entirely disappear. The ordinary rules regarding the obaining of colours would be in force as with any other paper, and the colour ould not be interfered with on account of the dilution of the developer. For is own and the satisfaction of the meeting, he showed that a minute's exosure to the light of the room (certainly there were fifteen jets going) was ffi ient to produce a very decided reduction on development.

Mr. IBBETSON, in reply, said the main idea was that this process was for he tyro. The novelty lay in the fact that it dispensed with the dark room, a ate of things which would be welcomed by many, although he quite underood the apparent desire of those who wished to continue its necessity. To be le to develop in an ordinary room was a great satisfaction, but it was a llacy, of course, to suppose that the paper was not sensitive to such light as ight be present. The inventor had provided for a rapid development by escribing the concentrated developer, and the fact that so short a time was quired was an argument against any serious or even noticeable fogging curring. Amidol was found to be a slower developer, and would, perhaps, more to the wish of those who were anxious to watch the growth of the age. The tones by this agent were nice, and development took about sixty conds, resembling that of bromide paper; but, of course, in such protracted velopment, yellow light would naturally have to be employed. Dilution of e developer gave less satisfactory prints, the blacks inclining to muddiness.

PHOTOGRAPHIC CLUB.

EBRUARY 2,—Mr. F. W. Dowell in the chair.

Messrs. J. J. Griffin & Sons' representative showed some results by, and monstrated, the Velox-paper printing process. Several grades are supplied, att, glossy, and a special portrait variety. It resembles a slow bromide per, with the difference that it is said to be a chloride paper. Exposure is ade to day or artificial light, and is considerably longer than for bromide per. The novelty about the process is that it can be worked by the light of ordinary gas burner, or a number of them, providing sufficient distance is served in the developing operations. Experimental exposures were made d developed at the meeting, an average negative requiring from thirty conds at a distance of three or four inches from the burner. Development very rapid, twenty seconds covering the whole period between the applicaon of the solution and the complete appearance of the image. It is then ced directly into the fixing bath without any intermediate washing, and ated afterwards in the usual way. The developer is a concentrated one, y dilution causing bad tones, and should not contain oxidised sulphite of da, nor more nor less than a specified quantity of bromide. Metol-quinol s used as the reducing agent, but any of the newer developers will serve. e prices compare equally with those of bromide papers.

Messrs. Watson & Sons exhibited a camera for panoramic work. Hitherto, was pointed out, these instruments have been very cumbersome, but the e shown is probably the smallest yet introduced. Constructed for films, it at present to be had in five-inch or three-and-a-half-inch size, and the chanism is actuated by a powerful spring in the base of the camera, workat high tension or low, as a vane is regulated by the insertion in a place vided of larger or smaller pieces of metal. Three revolutions wind up the ing, and stops are provided for stopping the instrument where required. e film is contained on spools, and is two metres long. After any given exure the film is perforated to mark off the exposed portion. The greatest ount of film exposed at any one time is three-sixteenths of an inch. There no suggestion of vibration while the camera is revolving, and this is contributed to by the firmness with which the tripod engages the camera, a wheel-racket device ensuring perfect rigidity between these parts. The larger size sells for 20*l.*, but anything beyond this can be made, and only increases the instrument, noticeably in the vertical direction, the film being wound horizontally on spools.

Mr. David Allan showed a "spectroscopical" chimney-glass, or safe light, and a new calcium tube, doing away with the need of an elastic band, and fastening in the same way as the lime tin. The glass of the chimney is also made in sheet form, and has been, as its name implies, spectroscopically tested and declared safe.

Mr. Clifton showed the American Primus camera with Stigmatic lens. The camera is particularly adapted for this form of convertible lens, giving great extension. Ordinarily the front of the enclosing box is opened out, and the camera racked forward. When still more extension is required, the back opens and allows the camera to be also racked in that direction. It is provided with rising and cross front, finder, Bausch & Lomb shutter, and double swing back, *i.e.*, both vertically and horizontally at one time. The finder reverses on a hinge, when the position of the camera is altered so as to give vertical or horizontal pictures.

Mr. J. E. HODD showed three enlarged 10×8 negatives, the original quarter-plates, and the Novitas transparencies employed. He advocated the use of this stripping film for the transparency, and said his work was done with an incandescent gas burner, a six-inch condenser, and a *multum-in-parvo* enlarging camera. The absence of granularity in the enlargements he attributed to the full exposure which he habitually gave. He went into details for the benefit of those who had not used the paper, and gave a *résumé* of his own practice.

Camera Club.—On Thursday last week, when the usual audience at the Camera Club dropped in by two's and three's and took their seats in front of the lantern screen, there were certain whispered comments on the title of the lecture presently to be delivered by Mr. P. W. AMES, F.S.A., namely:

THE PHYSIOLOGY OF THOUGHT AND MEMORY.

"What on earth has that got to do with photography?" asked one scoffer. "Just what *I* wanted to know," said another. Then they puffed away at their pipes and cigars at such a rate that the electric ventilator had to be set going full speed before the room was cleared of the smoke which they created. Still the question remained unsolved, What in common has photography to do with "thought and memory?" "Well, you see, when you take a photograph, your *thought* is that it will turn out something good—and it doesn't; and your *memory* often makes you forget how much accelerator you have put in your developer, and you muddle the whole thing." Another member ventured to hope that the promised discourse would do his memory some good, for, although, if the room were full of orchids, he could without hesitation name each one, he was always forgetting his umbrella. Other speculations followed, which were interrupted by the Chairman's hammer, and all settled down to listen to the lecturer's remarks. We were told at the outset that the subject was in reality peculiarly appropriate to the Camera Club, for the student of the brain was under great obligations to photography which enabled such perfect pictures of microscopic sections of the brain to be made. Formerly the biologist was dependent upon mere drawings, and, as all knew, drawings of microscopic objects were untrustworthy, because the artist, in spite of the most conscientious wish to give a literal translation of what he saw, was unconsciously swayed by influences which were out of his power to resist. In grateful acknowledgment of the service rendered to him by photography, the physiologist now offered something to the Camera Club in exchange. From the earliest times the study of the phenomena connected with thought and brain action had been a matter of great interest, and for a long period the metaphysician had it all his own way, and analysed our sensations according to his own ideas. Then arose the biologist, and declared that all attempts to analyse the workings of the human mind were futile and vain, and that, if we would unravel such mysteries, we must examine the brain itself, study its physical structure, and then we should possibly be able to find out how the mind works. Biology comprehends both the anatomy and physiology of the nervous system. The matter of the brain can be hardened by chemical means, it can be cut into sections in all directions, and in this way the whole plan of the fibres of the brain has been discovered after an immense amount of research. Mr. Ames then showed a number of diagrams and photographs of the brain, spinal cord, &c., and explained in a most masterly manner, and altogether without notes or references of any kind, what was known with regard to this most intricate subject, first showing what a fascination the problems connected with it always have had, and always will have, to educated people; then pointing out how the metaphysician of old sought to solve such problems, with the result that nothing came of his work but "words, words." The biologist, attacking the mystery from another standpoint, compares brain action with mental action, and also is able to show, by experiments with animals, that one part of the brain governs certain nervous centres connected with taste, another with smell, another with hearing, and so on. The lecture was listened to with the most wrapt attention, and our only regret is that its want of direct photographic interest precludes us from giving it but a short report.

Gospel Oak Photographic Society.—February 1, the Vice-President in the chair.—The members of the Society evidently take great pride in their handiwork, and have apparently a liking for apparatus and accessories of their own manufacture. An excellent response was made by the members to the invitation of the Secretary, asking them to exhibit and demonstrate their ability in the home manufacture of apparatus, and of an excellent show, the following are the most interesting items:—Large wooden dish for developing, fixing, &c., and a lantern-slide printing frame for printing from any part of a negative up to half-plate, by Mr. Brown. Mr. PICARD showed a very large (about 24×20) bellows that he had made. He said it was generally considered a difficult thing for an amateur to make a camera bellows, but when done in the way he had adopted, and which he described, it was really a simple matter,

though one requiring a certain amount of patience. He also showed a half-plate instantograph camera, which he converted for use as a hand camera, fitting it with a roll-holder, focussing scale, and adapters for taking lenses of various sizes. The shutter had also been made to fit all the lenses. Mr. WILSON demonstrated the working of his magazine hand camera. This, with the exception of the lenses and shutter, was entirely his own make. The changing mechanism, though not a new idea, worked smoothly, and appeared to be quite certain in its action. An aluminium-mounted camera to take a half-plate roll-holder, the work of Mr. Bamber, had a very handsome appearance. Its chief merit was its extreme lightness, its weight, without lens of roll-holder, being only twenty ounces. It could be used either in the hand or on a stand. Mr. Gorton exhibited a flash lamp of his own construction, and showed a figure study taken with it, which appeared to be full of detail. He claimed that the height of the flash with his lamp was upwards of three feet. A vignetting frame by Mr. Harrison had many points to commend it. It could be used on either a quarter or half-plate printing frame, the cards or masks could be made any shape desired, and by means of gauges at the bottom it could be removed from the frame for the purpose of examining the progress of printing, with the certainty that it would be p aced in exactly the same position again. The ASSISTANT HON. SECRETARY asked whether any member had tried aluminium powder for flashlight work in the place of the magnesium ordinarily used. The VICE-PRESIDENT stated that it had been tried some time ago at one of the meetings of the Society, but did not give nearly so good a light as magnesium. He thought it would be more brilliant if mixed with chlorate of potash, but the addition of this introduced an element of danger.

North Middlesex Photographic Society.—January 24, Mr. Beadle in the chair.—Messrs. D. Nesham, W. D. Faller, J. L. Cartwright, and F. Clitherow were nominated for membership. The PRESIDENT announced that the annual dinner would take place on, March 12, at the Holborn Restaurant. Mr. DAWSON, of the Woolwich Society, then gave a lecture on

THE PREPARATION OF CHEMICAL SOLUTIONS.

He considered a knowledge of chemistry an essential part of photography, and fully described his method of preparing the different formulæ, advocating simplicity in their preparation; he thought this was best attained by making up the different ingredients in ten per cent. solutions. Starting with pyro and ammonia, which, in his opinion, was still the best all-round developer, he recommended metabisulphite in preference to any other as a preservative for the pyro. He then passed on to pyro soda, hydroquinone, and the newer developers, amidol and metol. Continuing with the consideration of toning solutions, he concluded with a few remarks on lantern slides and platinum development.

JANUARY 31, informal meeting, Mr. McIntosh in the chair.—Mr. J. Lane was nominated for membership. Mr. Wilson brought a quantity of paper negatives and some prints taken about the year 1853. Great interest was taken in their examination, and admiration expressed at the excellent quality of the work after the CHAIRMAN had explained the difficulties under which photographers worked in those days.

FEBRUARY 7, Lantern Night.—The monthly competition for slides by members took place. Between thirty and forty slides were sent in, which resulted in keen competition. Those by Messrs. Durston and Crane were placed respectively first and second. The Committee then selected slides by Messrs. Burnard, H. Stuart, Pring, Lisett, and Bishop for the Society's box.

Richmond Camera Club.—January 31.—There was a very good muster to witness a demonstration of the gum-bichromate process, which was announced to be given by Mr. Sheed of the West Surrey Photographic Society, but which was undertaken at very short notice by Mr. E. POINTON, of the same Society, Mr. Sheed being prevented at the last moment from fulfilling his engagement. Mr. Pointon gave a complete and successful exposition and demonstration of the process, explaining every step and developing several prints. He also handed round some finished prints, which gave a good idea of the capabilities of the process. It should be added that several members of the West Surrey Society were present, making the gathering a peculiarly pleasant one.

Bath Photographic Society.—There was a large attendance of members and friends on January 26 to hear Mr. GEORGE F. POWELL'S illustrated lecture, entitled

A TRIP TO PARIS.

He prefaced his remarks by saying that he, in company with Mr. Frederick York, of lantern-slide repute, arranged to take a short holiday together in Paris. He was fortunate in this respect, because Mr. York was well acquainted with the French capital, and, knowing exactly where to go for the most important pictures, much time was thus saved for actual photography. Of course they both carried cameras, and he might say they somehow obtained certain pictures, which would be shown on the screen, the necessary permission to take which had not been obtained. Several of the slides were from Mr. York's negatives. The lecturer then showed about eighty pictures of the other side of the Channel, mostly of Paris. He gave some interesting details of each subject. Commencing with views of the imposing railway station of St. Lazare and the fine streets and buildings near, Mr. Powell continued with fine sharp photographs of the Louvre Hôtel-de-Ville, Luxembourg Palace, the Grand Opera House, views on the Champs Elysées, Arc de Triomphe, many of the busy Boulevards, views on and across the Seine, including the large floating, swimming, and washing baths moored to the bridge. Successful photographs of the interior and exterior of Nôtre Dame and the Madeleine were shown, as well as Napoleon the First's tomb, and the intricate iron work in the construction of the Eiffel Tower, also many incidents occurring in street life about the Bourse, Pantheon, &c. The lecturer then passed on to Versailles, exhibiting photographs of the grand entrance to the palace, as well as one or two interior views, the display closing with a selection of views taken at Rouen.

Birmingham Photographic Society.—February 1.—Mr. E. C. MIDDLETON read a paper upon

PHOTOGRAPHIC ADVANCES OF THE LAST FEW YEARS,

by T. C. Hepworth, F.C.S. The paper was illustrated by a series of lantern slides by the writer, and mentioned, firstly, the wet-plate process, and treated at great length the subject of process work generally. Mr. Middleton, however, thought the paper was not up to date, as, during the last few years many modifications in process work had been made which were not mentioned in the paper. The Woodburytype was next mentioned as a most perfect process for the rendering of pictures, and a good specimen of a Woodburytype lantern slide was shown. A slide illustrating the photography of a flying bullet was shown. Astronomical photography was spoken of, and the method adopted of distinguishing stars from imperfections in plate or manipulation. The photographic recording of the movement of animals, cinematography, and X-ray photography were also treated of at some length. Upon the subject of X rays, Dr. HALL-EDWARDS said that it was a mistake to suppose any substance was opaque to the X rays, as it was only a matter of length of exposure for them to penetrate anything. Mr. E. C. Middleton was warmly thanked for the manner in which he explained the recent modifications which had taken place during the last year or so in process work.

Bolton Mutual Photographic Society.—January 27.—Demonstration of two photographic specialities by Mr. Woods (Hon. Secretary of the Society), viz., the new American printing paper, Velox, and dry-collodion lantern plates. Mr. Woods made a slide on the dry-collodion plates, which are made from Dr. Hill-Norris's formulæ by the Birmingham Collodion Plate Company, Yardley, which was printed, developed, fixed, washed, and dried ready for the lantern in ten minutes. The slide was afterwards toned a rich sepia, and instructions were given for producing a great range of colour from red, brown, &c., on to purple, all of which are permanent. A print was also made on Velox paper made by the Nepera Chemical Company, U.S., the easiness of working the same being much appreciated. Samples were distributed for members to experiment with.

Leigh Photographic Society.—January 27, Mr. Miles F. Burrows (the President) in the chair.—Dr. JOS. JONES gave a paper on

PHOTOGRAPHING UNDER DIFFICULTIES,

being an account of his experiences with photography while acting as surgeon on a voyage to the Amazon; being troubled very much with the plates frilling and ship beetles it was a wonder the Doctor had any results to show. Mr SYMS recommended the Doctor to use a few drops of formalin in the developer another time to stop frilling.

Liverpool Amateur Photographic Association.—The monthly meeting was held on Thursday, in the Club-rooms, Eberle-street, the President (Mr W. Prior Christian) in the chair. Miss M. H. Stead, Miss H. M. Henderson Messrs. Stanley Cann, J. H. Sutherland, C. F. Inston, and T. H. Jones were elected members. The medals awarded in the recent annual competition were presented to the successful competitors. Mr. E. RIMBAULT DIBDIN delivered a lecture, entitled

THE INVASION OF MONA, OR THE CAMPAIGN OF EASTER, 1897,

which was the outcome of an excursion to the island of a number of the members, most of whom had contributed slides to illustrate the lecture. The headquarters of the party were at Peel, excursions being made thence to all parts of the island. Mr. Dibdin chronicled their doings with much humour. The lecturer was accorded a warm reception by a large audience, and a most enjoyable evening was spent.

Sheffield Photographic Society.—February 1, the President (Mr. G. Tomlinson) occupied the chair.—The presentation of the medals won by the members in the recent annual competitions took place. For prints, Mr. C. Blackwell was awarded the silver medal, and Mr. J. H. Lygo the bronze. For lantern slides, the silver medal was gained by Mr. J. H. Lygo, and the bronze by Mr. H. J. Clague. One of the Affiliated Societies' lectures on

NEGATIVE-MAKING,

by Mr. Chapman Jones, F.I.C., F.C.S., was then read by Mr. D. C. Brook and illustrated by lantern slides. The lecture dealt with the subject from the choice of a lens and camera up to the development of a plate, a marked point of the latter being the compounding of the developer when using pyrogallic acid, so as to prevent oxidisation, which is prone to stain the negative when prolonged development has to be resorted to.

Tunbridge Wells Photographic Society.—February 3, Eleventh Annual Meeting, Mr. E. R. Ashton in the chair.—The HON. SECRETARY then read the report, which began by the congratulations of the Committee on the success which had attended the acquisition of the room, and they felt that those members who had used it must have found the benefit of being able to study works and papers on their own particular art without being disturbed. The attendance at the meetings had been quite up to the average, and much interest had been taken in the lectures and papers that had been read. The Hon. Treasurer presented the accounts, which were considered satisfactory, considering a large sum had been used for furnishing the room, and these, together with the report, were adopted, on the proposition of the Chairman. The Hon. SECRETARY proposed the re-election of Mr. F. G. Smart as President, which he said, gave him much pleasure to do, knowing how much he had had the interest of the Association at heart from its infancy. The following officers were also re-elected:—*Vice-Presidents:* Rev. A. T. Scott, Messrs. E. R. Ashton and C. Leeson Prince, M.R.C.S., F.R.A.S., F.R.Met.S.—*Committee:* Messrs. A. W. Pierson, J. W. Morgan, and G. W. Howard, F.C.S., to which was also added Mr. J. H. Spencer.—*Hon. Auditor:* Mr. E. Catchpole.—*Hon. Treasurer:* Mr. B. Whilrow.—*Hon. Secretary:* Mr. Joseph Chamberlain. Mr. HOWARD moved that a hearty vote of thanks be given to the Hon. Secretary for his past services, and the large amount of time and trouble he had taken in the affairs of the Association, which was carried unanimously.

Dundee and East of Scotland Photographic Association.—February 3, Professor Steggall in the chair.—The SECRETARY read the Affiliation lecture,

PICTORIAL PHOTOGRAPHY,

by Mr. A. Horsley Hinton. Afterwards a lively discussion took place, and the conclusions of some of the members were not altogether in accord with those of Mr. Hinton. The following question was put to the meeting, "Has it been found necessary to give a longer exposure to backed plates than to unbacked?" The opinion expressed by the majority of those who took part in the discussion was decidedly in favour of the necessity of giving backed plates a longer exposure, all things being equal, such as stop, light, &c.

Edinburgh Photographic Society.—February 2, Mr. James Patrick in the chair.—The subject was

THE COMPARATIVE ADVANTAGES OF ENLARGEMENTS AND DIRECT PHOTOGRAPHS.

Mr. W. HUME read a paper on

ENLARGEMENTS.

He claimed for enlargements that they could be made as good as the original photographs. If they were inferior, it was not because they were enlargements. The process of enlarging made the production of large pictures less costly. There was a great deal more latitude with regard to size than in photography direct, and any subject could be produced in a large size. Mr. JAMES HAY read a paper on

DIRECT PHOTOGRAPHS,

in which he urged that direct photography should be employed wherever possible. The quality of a direct photograph was better than that of an enlargement. It was easier to study the composition on the larger ground glass, and the focus could be brought to bear on the principal object. The objections as to weight need not stand seriously in the way, because the subject could be selected and notes taken as to the most suitable time, &c., for photographing before the large camera was brought into use. A discussion followed, and it was found that most of the members were in favour of the production of large pictures by enlarging.

Glasgow Photographic Society.—February 3,—There was a large attendance of members present. The Secretary's and Treasurer's reports were presented to the meeting in printed form, and were held as read. The financial report shows the Society to be in a very healthy condition, there being a balance in hand of 25*l*. The PRESIDENT (Mr. Stuart) demonstrated the development of platinotype prints by the various modes described by the Platinotype Company in the pamphlet issued by them. Much interest was manifested in the different modes of treatment. Mr. Stuart showed fully the handling of the collodio-chloride paper, showing his entire mode of working, which has been very successful; in fact, so much so that he stated he had now abandoned all other silver papers for the collodio-chloride paper. The advantages of this paper are many, viz., its keeping qualities before and after printing; its facility for toning and drying rapidly; and for printing in about half the time of all others. Mr. J. Lizars, optician, Buchanan-street sent a very handsome quarter plate camera of the improved Challenge type, which received considerable attention from the members, and was really a very handy, beautiful piece of finished cabinet work. It was very much admired by the members. There accompanied it a film-holder for cartridge films, so that they can be loaded and unloaded in daylight, which can be adapted to any camera; also a very light aluminium stand. It was extraordinarily light and very rigid. Mr. STUART intimated to the meeting that they had held their first Committee meeting for the Photographic Convention of the United Kingdom on Wednesday last, February 2, in the Religious Institution Rooms. It was a complete success, a very large attendance of the leading amateurs and professionals being present. Altogether the Convention bids fair to be a great success. Mr. Stuart then called upon the Society to send two representatives to the next meeting of the Commitee, which was to be held in the Religious Institution Rooms on Wednesday last.

FORTHCOMING EXHIBITIONS.

1898.

February		Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
,,	11, 12	Photographic Society of Ireland. V. E. Smyth, 35, Dawson-street, Dublin.
,,	11–26.....	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
,,	24–26.....	Woolwich.
March 1–5		Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.
,,	5–12.....	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30		National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,,	27–May 14.....	International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

FOR DRILLING GLASS.—An optician recommends the following method: Dip a drill borer heated to white heat first into quicksilver, whereby it is excellently hardened, and sharpen by grinding on a whetstone. If the drill thus prepared is moistened with a saturated solution of camphor and oil of turpentine and the borehole is kept rather moist, glass may be drilled like wood.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

COLOURING LANTERN SLIDES.

To the EDITORS.

GENTLEMEN,—Your remarks *re* "Coloured Lantern Slides" in last week's issue, though most apt and true on the whole, were, I think, a little too sweeping with regard to "commercial coloured slides." Considering the *price* that is offered for some commercial work, it is no wonder that such work as can be "turned out" at it should meet with your condemnation, or that persons of taste should "prefer plain slides." Some seem to imagine that colouring slides is the merest mechanical work possible, instead of being, as it is, work requiring the greatest skill to do *properly*. But that it can be so done I trust the specimens I show you with this will demonstrate.—I am, yours, &c., PROFESSIONAL.

February 5, 1898.

[The slides shown us by our correspondent were coloured in an extremely effective and artistic manner. We were surprised to see such excellent productions at so low a price, 2*s.* each.—EDS.]

CANVASSING AT ELECTIONS.

To the EDITORS.

GENTLEMEN,—I fully sympathise with Mr. Hindley in his desire to "have a little sunshine by the sea;" he should come here and he will have his heart's content. I am having some English clouds coming over for my Corsican pictures. I am sorry the "imposing and massive envelope" was not of more importance, say, from the Lord Chamberlain nominating Mr. Hindley as a member of the Royal Tradesmen's Association, or better still, an announcement of an honour to be conferred. Leaving joking aside, I do not agree with his remarks (or yours Ex Cathedrâ), about canvassing at elections. It cannot be said I am a partisan, as I do not know the candidate in question; far better to have everything square and above board than have "a hole-and-corner meeting" to arrange who are to be elected. It is within my knowledge of a case of this kind, not only did the ringleader have a meeting at his office, but had the impudence to call personally on some of the members of the club to request them to attend and blackball one of their number; one of them had never attended a meeting of the club, and another only once, and that at the formation of the rules. I will not reiterate the answer he got, but it was exceeding complimentary to yours truly,

A. L. HENDERSON,

An old Member of the Royal Photographic Society, retired.

Grand Hotel, Ajaccio, Corsica, February 2, 1898.

P.S.—Intending visitors to Corsica may leave Charing Cross on Sunday morning at 10 a.m., *viâ* Paris, Marseilles; at the latter place they can have eight hours to spare, catch the Monday's steamer at 5 p.m, and reach Ajaccio the following morning, Tuesday, about 8 a.m.

CINEMATOGRAPHING THE SOLAR ECLIPSE.

To the EDITORS.

GENTLEMEN,—In your issue of Friday last you make some genially worded comments upon my rashness in saying that during the recent eclipse the Rev. J. M. Bacon had made a successful exposure with an instrument of mine. Well, the statement does sound rather curious. But you explain my ability to make so definite an assertion by saying that I can do things which few others can do. I fear you intend that as a very Pickwickian modification of photographic accuracy. I am grateful for the compliment; but I don't deserve it. I was not born to this greatness. I have not achieved it. It has been thrust upon me; and I am overwhelmed by it.

Joking apart, however, I really have good reason to feel confident; although, as you say, "most people cannot say, even on an ordinary subject, that the exposure has been successful until the image has been developed." But it is because this is not an ordinary subject that I am able to prophesy before I know. Obviously, if all the factors which combine to make a correct exposure can be determined beforehand, and mutually adjusted in due relation, only accident can prevent a successful result.

Such has been the case in this instance. The factors involved are all constant within very small limits. The personal equation is practically eliminated. The total sum of all possible errors is infinitely less than the fairly wide margin within which exposure is substantially correct. Therefore, when I hear that no accident has happened, that the sky was

cloudless, that the corona was of rather unusual brightness, and that the instrument worked perfectly, I can confidently predict that the film has received impressions capable of yielding satisfactory negatives upon development. Even though the test of development should never be applied, nothing can alter the fact that the exposure has been successful.

I heartily join with you in hoping that the final result will prove satisfactory. From a spectacular point of view the subject is, probably, one upon which it is not worth while wasting a film. As an exhibition picture, I fancy, it can have little value. But I am sure we all hope we may gain something that will be of scientific interest.—I am, yours, &c.,

Egyptian Hall, January 7, 1898. NEVIL MASKELYNE.

[We hope so, too. If Mr. Maskelyne and Mr. Bacon do not achieve final success, it will surely not be because they do not deserve it.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

John Stuart, 120, Buchanan-street, Glasgow.—*Photograph of the late Jas. Wilson, Esq.*

Isaac Slater, Mostyn-street, Llandudno.—*Photograph of the late Rev. John Evans (Eglwysbach).*

J. G. MARTYN.—We will write him.

J. H. BALDOCK.—Received. Very many thanks.

SUBSCRIBER.—Yes, if the specimens were your property.

BRUGES.—1. Both firms are of high reputation. 2. Yes.

S. C. MOTE.—From David Allan, 157, Whitfield-street, Fitzroy-square, N.W.

B. M.—Three parts of a two per cent. solution of pyrocatechin to twenty parts of a ten per cent. solution of potassium carbonate.

G. H. EUSTACE.—It seems a very good arrangement. Better submit it to some dealer. When the specification is published, we may reproduce.

A. GRAY.—Sorry we can give no further reference; the paragraph appeared in one of our foreign contemporaries. We do not answer questions through the post.

THE LUX PLATES.—SPEED says: "Would you oblige by letting me know the agent for Lux plates? I believe them to be German make."—In reply: Perhaps some reader can supply the desired information.

REV. L. MACDONA.—Your query was inserted in the JOURNAL of December 31, 1897. We replied to you last week, page 79, to your initials, and we forwarded your card to the gentleman named. What more can we do?

THE GUM-BICHROMATE PROCESS.—G. H. J. BURROWS asks: "Could you tell me where I can obtain Mr. Maskell's book on the Gum-bichromate Process, also price of same?"—In reply: Of Messrs. Hazell, Watson, & Viney, 1, Creed-lane. Price 1*s.*

BOOK ON FINISHING.—F. FUSON says: "Could you tell me where I could get a work on finishing enlargements in black and white? I have already learned the rudiments."—In reply: Messrs. Percy Lund & Co., Bradford, publish such a book by Mr. Bool.

MOUNTING.—CARTE. We do not recommend any antiseptic to be added to the starch paste "to make it keep." We always advise the use of freshly made starch, that is, made the same day as it is used. Starch is cheap, and the trouble of making the paste is, well, nothing. Again, it is more adhesive when freshly made than it is after being kept, whatever antiseptic may be used.

OPERATOR.—A. X. Y. We are not surprised at your experience with operators. How can you expect to get a good one for the price you have been paying and the hours you expect them to work? Why, a bricklayer's labourer earns more per hour than you pay. If you pay a reasonable salary—say, double—you may then expect to have a trustworthy man, *if* not a really first-class operator.

CRACKED CONDENSER.—A. LIDDLE. We do not see that the maker of the lantern should be held responsible for the breakage. All condensers are liable to crack if they are heated too suddenly, and there must be great heat from the lamp you are using. The fact that the lenses are loose in their cells shows that they were properly mounted to avoid their splitting, not that the damage was due to that.

THE DUSTING-ON-PROCESS.—BICHROME says: "I want to make a picture on paper by the dusting-on process. 1. Is it necessary to have a very vigorous transparency? 2. How is it possible to discharge the yellowish-brown stain of potass bichromate from the film after having been exposed to light and rendered insoluble?"—In reply: 1. A picture of moderate vigour. 2. Immerse in a solution of caustic potash 1 : 50.

HOTOGRAPHIC COMPANIES, LIMITED.—DOUBTFUL. It is quite without our province to give advice as to commercial matters, whether they be to do with photography or any kindred trades.

BOOK ON LIGHTING.—T. J. EVANS asks "whose method you think is best for getting artistic effects in lighting the subject; I mean Rembrandt and other effects, apart from the ordinary lighting? I should like to get a book on same if you will please give me your best advice."—In reply: There is an admirable book on Lighting, by Inglis, published by the Chicago Photo-Beacon Company, Chicago. Your dealer would, doubtless, procure it for you.

ENLARGING.—BROMIDE says: "I have found that in using the incandescent gas for enlarging purposes the texture of the 'mantle' is visible upon the screen; is there any way of preventing this?"—If our correspondent had read the last two numbers of his JOURNAL, he would have had no need to put this query. We refer him to the reports of the Photographic Club and that of the London and Provincial, on page 59, and a leaderette on page 67.

MOUNTANT.—E. C. P. asks: "What is the best thing to put in starch paste in order to keep it good some time? or could you give us a recipe for making a good photographic mountant, and oblige?"—We have, over and over again, replied to this and similar queries. Any of the well-known antiseptics will prevent the starch from becoming sour; but we have always advised the starch to be made fresh each day if it is to be used for mounting photographs, the trouble is so little. There is no better mountant for silver prints than either starch or a neutral gelatine.

LANTERN.—PATER writes: "I want to get a lantern to amuse my youngsters with, but I cannot afford to go to much expense in the matter. I want to use an oil lamp, but I find that even with that and a lot of the painted (cheap) slides the thing will be more costly than my means will run to. Can you give me a hint?"—We should recommend a lantern of moderate price, but with a four-inch condenser—the standard size; then with that the ordinary lantern slides can be used. These can be hired for the evening for a very small sum. With a smaller lantern the usual slides cannot be used with effect.

LANTERN PROJECTION.—EX-PHOTOGRAPHER says: "I want to project advertisements on a screen by means of a limelight lantern. I can't have the screen on the opposite side of the sheet, so should have to show through the sheet, the lantern being in a room the window of which is only four feet six inches wide. I could put the screen out about one foot six inches from the window. Will you say what size picture I could get with the shortest-focus lens? Of course, if I could not get a fairly large picture, the letters could not be seen from the street, I being on the second floor. I have several advertisers willing to take the thing up, so any advice you could give me I should be very grateful for."—In reply: See our ALMANAC for 1898, page 1078, in which a table of distances is given.

PORTRAIT LENS.—Interested writes: "The following rule is given in text-books: The difference between the two combinations of a portrait lens is of a ratio of three to five inches. Is it material which has the longer focus? If so, which? or can I, by substituting either a longer or shorter-focus combination either front or back, get from a given lens of twelve-inch focus one of nine and fifteen-inch focus respectively? I want these lengths for occasional use on a lantern front; or could it be altered in any other way?"—The simplest way to alter the focus of a portrait lens is to interpose, at the position of the stop, a shallow double-concave lens to lengthen it, or a slight double-convex to shorten it. These lenses may be simple ones, such as spectacle glasses, and, if of only shallow curves, they will not materially interfere with the correctness of the instrument.

SOLUBILITY OF AURANTIA.—AURANTIA writes: "Permit me to ask a question: 1. Where can the aniline dye known as aurantia be bought in crystal form (not powder)? 2. How can this dye be made to dissolve in matt varnish? I have the dye in powder, but find that in this form it is soluble only in plain collodion and in alcohol, but not in benzole or ether. Perhaps you can advise me how to utilise the powder if there is any difficulty in obtaining this dye in larger crystals, in which latter form I am hopeful it may be found more manageable; am I right in supposing this?"—In reply: 1. Probably Messrs. Hopkin & Williams, Cross-street, Hatton Garden, can supply the dye in crystals. 2. Whether in crystal or powder, aurantia is aurantia, and its solubility is the same in either form, except that in the powder it will the more easily dissolve in suitable menstrua. It is soluble in alcohol and in ether, or a mixture of the two, but not, we think, in benzole, one of the constituents of most of the commercial matt varnishes.

COMMISSION.—ANDREW HUNTER says: "When I was away on my holidays last summer, I took several good local views, and a stationer who saw them offered to sell them on commission; at the time I asked him the amount of commission he would expect, but he only said, 'We will not quarrel over that.' Later on I sent him on a supply, and lately he sent about half, saying he would get his commission when the rest were cleared out. Now, I have no idea the amount that is usually paid for commission on such; so, if you could give me some idea, as I would not like to offer him too little, and, at the same time, I would not like to give him too much. He sells them at 6*d.* each for unmounted half-plate P.O.P. prints and 1*s.* for half-plate opalines. Helping me with above will greatly oblige.—Yours was a most unbusinesslike arrangement, on both sides. From twenty-five to fifty per cent. we should say, certainly not less than the former or more than the latter. About thirty per cent. is about the average profit to the retailer on pictures of this character.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1972. Vol. XLV.—FEBRUARY 18, 1898.

Contents.

PAGE

Ex Cathedrâ 97
Enlarging Negatives in Practice 99
Leaderettes:—
Stereoscopic Relief from a Single Print—A Novel Stereoscopic Effect—A Scientific Imposture Detected by Photography—Röntgen Rays on Vegetable Life 100
By the Way. By Dogberry 100
On Dust and Dusting Boxes. By R. Child Bayley 101
Foreign News and Notes:—
Intensifying Platinotypes—Unknown Exposures—Metol Glycin Developer—A Test for Bromine 102
The Latent Image and its Development. By F. Hurter, Ph.D., and V. C. Driffield 103
The Crystal Palace Exhibition ... 105
Exhibition of the Liverpool Amateur Photographic Association 105
The Warwick Dry-plate Company 107
Our Editorial Table:—
Die Kunst in der Photographie—The Barnet Plates (Backed)—Dr. H. W. Vogel's *Handbuch der Photographie*—Lutte and Arndt's Flashlight Powder—Diogen: A New Developer—The Actinograph 107
Recently Elected Officers of Societies 108
News and Notes 108
Patent News 108
Meetings of Societies:—
Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Croydon Camera Club—Croydon Microscopical and Natural History Club (Photographic Section)—North Middlesex Photographic Society—Putney Photographic Society—Richmond Camera Club—Birmingham Photographic Society 109
Forthcoming Exhibitions 111
Correspondence:—
Cinematography and Astronomical Phenomena—Specimens of Dry Plates Wanted 111
Answers to Correspondents 112

EX CATHEDRA.

On September 24, last (p. 609), when referring to the forthcoming International Photographic Exhibition at the Crystal Palace, we remarked upon the probability of His Royal Highness the Prince of Wales being prevailed upon to perform the opening ceremony. We are now happy to announce that by the good offices of Lord Crawford, the President of the Society, His Royal Highness has kindly consented to open the Exhibition on Monday, April 25—two days earlier than the date originally assigned for the opening. The presence of His Royal Highness the Prince of Wales at this ceremony will be regarded by all photographers as a great honour to photography, and will go far towards assuring the success of the Exhibition. It is another mark of the interest taken by the members of the reigning House in photography, which owes much to the English Royal Family. The Prince of Wales, we may remark, is one of the patrons of the Royal Photographic Society.

* * *

A note on cinematographing the solar eclipse appeared in this Journal three weeks ago, stating that the Rev. J. M. Bacon had made a successful exposure for the first animated photograph ever taken of any celestial phenomenon. From the reports sent home from Sir J. Norman Lockyer, in India, it will be seen that two cinematographs have been used at his station as well; one with a view to photographing the interesting celestial phenomenon itself and the other to try to get views of the landscape as the shadows fell upon the earth. It may be considered premature to discuss how far either of these may prove valuable, but a large series of photographs of the appearance of the sun's disc or corona before, during, and after totality, cannot fail, one would think, to be of some value, and it is just possible that as interesting results may follow from the attempt to record the shadows. Moreover, as the experiments cannot be considered complete until the films have been developed and scientific men seen the results, we need not pause to discuss the question.

* * *

Dr. John Macintyre, of Glasgow, has been good enough to inform us that the instruments in question have been arranged and controlled by the Marquis of Graham, who, during last summer, quite independently conceived the idea, and, as he was to accompany Sir J. Norman Lockyer to Viziadurg, the necessary arrangements were made. With regard to photographing the shadows, Dr. Macintyre points out that nothing beyond a good photographic lens, which could take in a large part of the landscape, was required, the film being simply exposed in the ordinary way. The other idea, namely, photographing the celestial phenomenon, required a great deal more attention and preparation. In the first place, a celeostat, specially designed for the purpose, had to be made. Mr. Fowler, of the same expedition, took a great interest in this part of the work, and Mr. Hilger, acting with him, produced an excellent mirror with mechanical arrangements so that the image of the sun could be kept in the same position as long as necessary. Mr. Hilger was also instructed to supply a lens specially mounted and fixed to the cinematograph.

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A special Thornton-Pickard shutter was arranged so that the speed could be varied, and the mechanism of the camera was arranged so that a photograph could be taken as seldom or as frequently as required. These things were necessary because it was suggested that photographs might be taken a considerable time before and after the eclipse at the rate of one

per minute or a number per second; so, in this way, the operator had the power of taking as many or as few photographs as he pleased during the proceedings, and the exposure varied, according as the light failed approaching or during totality. This was particularly required in any attempt to photograph the corona.

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Not the least important part of the work was the preparation of the films, and any one who has worked with these in a hot climate can understand why care should have been necessary. A great interest in this part of the work was taken by the Eastman Photographic Material Company, and special films were made to suit the different requirements of the case. Previous to the eclipse, trials of these films were made, and parts of them have been sent home. From the portions developed, the films have been all that could have been desired. Telegrams have been received from Sir J. Norman Lockyer and Lord Graham from Vizladurg, the latter stating that the phenomena were well observed, and that the machines worked well. What the ultimate result may be, no one can say until the films have been developed, and there are many difficulties in such an undertaking. Now that we know that attempts have been made at more than one station, it is to be hoped that something of permanent value will be the result. We have to add our acknowledgments to Dr. Macintyre for his kindness in enabling us to publish the foregoing interesting details with regard to the cinematography of the solar eclipse.

* * *

We have been furnished with a copy of the balance-sheet of the Glasgow International Photographic Exhibition held last September and October. The net profit of the Exhibition amounts to 434*l.* 0*s.* 6*d.*, slightly below the original estimate, but still a very handsome and satisfactory sum. The total receipts for admissions, sales of tickets and catalogues, entrance fees, and so forth, amounted to 1753*l.* 3*s.* 7*d.* As they may be of interest to other Exhibition executives, we append particulars of the expenses incurred:—

By	Rent of galleries of the Royal Institute of Fine Arts	£100	0	0
„	Cleaning, attendants' wages, gas and electric lighting	121	7	8
„	Advertising in journals, daily and weekly papers, bill-posting, travelling barrows and boardmen	330	0	3
„	General printing and stationery	170	3	1
„	Entertainments Outlay:—			
	Lecturers' fees and Judges' expenses ...	156	18	8
	Lanternists' charges and moto-photoscope expenses...	165	15	2
	Music	80	0	0
„	Receiving, hanging, and returning exhibits, and draping galleries	117	2	3
„	Medals	45	10	4
„	Postages and telegrams	27	18	8
„	Miscellaneous and incidental expenses ...	4	7	0

* * *

In again congratulating our Glasgow friends on the splendid financial and and artistic success of their Exhibition, let us direct attention to one or two of the above items. Observe that the executive did not hesitate to go the great length of spending 500*l.* in advertising and printing, and 400*l.* on entertainments—two examples of enterprise in connexion with photographic exhibition management without parallel in our knowledge. How is it, we may ask, that London, with all its advantages and resources, seems incapable of achieving a result at all comparable to that of the Glasgow Exhibition? Is lack of interest, enterprise, or business ability, at the bottom of the failure?

* * *

In connexion with Mr. Charles Cruft's Dog Show, held last week at the Agricultural Hall, Islington, there was an Exhibition of canine photography, to which many well-known photographers who have given special attention to this branch of work sent contributions, Mr. Thomas Fall, Mr. Herbert Mitchell, Mr. Pugh, Messrs. Hedges, Mr. F. Spalding, Mr. Henry Stevens, and Mr. Dresser being represented by many admirable examples of their powers. Good as the display was, we felt that it was capable of considerable improvement and extension, inasmuch as it did not include photographs of one half the breeds of dogs on view in the large hall. We are sure that dog-lovers would appreciate a complete exhibition of dog photographs, and there can be no reason why, in future years, such a collection could not be organized.

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A little reflection should bring home to our readers the conviction that not only does canine photography admit of considerably more cultivation for exhibition purposes than it at present receives, but that very great scope exists for camera work in allied or at any rate parallel directions. Supplementary to a horse show, what could be more interesting than a collection of equine photographs of various kinds? So, too, with poultry; cat; canary; pigeon; rabbit, and other shows—photographic portraits of the exhibits and prize-winners, if properly executed, would undoubtedly possess much interest for "fanciers," and might supply opportunities for the organization of special exhibitions of this kind of work. We commend the idea to those of our readers who are on the look-out for fresh channels for their photographic energies. One of these days, too, a photographic Exhibition devoted entirely to pictures of animals, birds, &c., might prove a great public attraction, and a very interesting and instructive photographic display of itself.

* * *

The meeting of the Photographic Club on Wednesday, February 23, will be what is known as a Travellers' Night, and will be devoted to a lantern lecture on "Glasgow, the Clyde, its Estuary, and Some of the Nearer Highlands." This locality will be visited by the Photographic Convention of the United Kingdom next July, and we advise all those who intend being present at that gathering to make a point of putting in an appearance at the Photographic Club on February 23, so that they may have a foretaste of what is in store for them.

* * *

With reference to the Convention meeting we may remind our readers that it will be held this year in the week commencing Monday, July 4. A guarantee fund has already been locally subscribed. Mr. W. Goodwin, who so ably and successfully filled the office of Secretary to the Glasgow International Photographic Exhibition, to which we elsewhere refer, has been appointed local Honorary Secretary

of the Convention. Nobody more suitable for the position could have been chosen. A preliminary meeting of the Glasgow Executive has already been held, and everything promises well for a thoroughly successful gathering of the Convention. We trust that a large party from London and the South will be present at the Convention next July, to give a hearty support to that loyal upholder of the Convention ever since its institution, Mr. John Stuart, the President-elect.

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Mr. W. J. Belton, the well-known photographer of Aberdeen, has commenced a three months' tour of the principal northern towns for the purpose of demonstrating the properties of the Dallmeyer Tele-photographic and Stigmatic lenses; Velox paper; and the Sanderson Universal Swing-front Camera.

ENLARGING NEGATIVES IN PRACTICE.

Though this subject is a hackneyed one, there is much to say upon it that is novel, and, judging by results seen too often, there is much to learn, notwithstanding the amount of information made public by experienced men. In view of the immense number of small cameras scattered in the hands of amateurs throughout the length and breadth of the land, it is surprising how few enlarged prints are to be seen beyond the ordinary bromide picture. Now, without saying or intending anything of a disparaging tone about bromide work, it is obvious that the range of effects obtainable by its means must be of a very limited character compared with the possibilities when an enlarged negative is the means of obtaining a photograph of the desired size. The once-favourite platinotype is elbowed out by the superior claims of a developed print when ease of production alone forms a governing factor in deciding what process of enlargement to adopt; and, when a single print only is needed, there can be no doubt that it is difficult, if even it were desirable, to oust bromide from its coign of vantage. But when a number of prints are wanted, and especially when double printing is in requisition, the ease of production is so greatly facilitated by the use of a negative that it becomes almost a necessity. Similarly for exhibition work, when we remember how many prints are usually spoiled before one is produced to satisfy a fastidious taste, is a negative desirable.

Still, as we have said, the instances are rare where negative-making is adopted for the purpose. We believe we are right in saying that the main factor in determining the disuse of these means is the difficulty of getting a good negative, and, of course it must be admitted that this art, till experience is gained, is not inconsiderable.

We will take it for granted that the optical and camera arrangements are familiar, and that where the difficulty lies is in the manipulatory details of the production of transparency and ultimate negative.

We will first take the transparency-making; for, once a suitable transparency is produced, the rest is plain sailing enough. And it is just here where ninety-nine out of a hundred fail. It is quite true that among the best lantern-slide transparencies ever produced the work of the amateur stands prominent; hence, it will be argued, he should be just the one to be able to make the transparency for the first stage in enlarging. But such a view is the reverse of correct. It is the very experience of lantern-slide work that stands in the way, for we must at once say that a first-class lantern slide is a most inferior negative producer. Typical negatives, and prints in all processes, and bromides are to be seen by the thousand; but where can the would-be enlarger meet with a transparency of the right type to teach him what to work up to? We will do our best to explain. Such a transparency must have more exposure given to it than would be given to a lantern side. It must not be "plucky;" it must not be flat. It must possess the utmost detail that is visible in the negative, all the softness possible, the lights must not be white, there must be scarcely a particle of clear glass. It should be very soft, very delicate, utterly useless for lantern work, and, above all, must not be too dense. If we wrote a page, we could not advantageously add much to these simple rules; but, of course, far better than any written instructions would be the examination of a few good transparencies by an expert.

With a knowledge, so far, as to what to aim at, the next question that arises is what process must be adopted to make the transparency? It may be produced by contact printing, or an enlarged transparency may be made in the camera and a contact printed negative from that Seeing that those who may be supposed to benefit by what we are writing are assumed to be unfamiliar with the details, it will obviously be best to begin by contact printing, as the cost of spoilt plates will thereby be reduced to a minimum.

The process to employ? We may say that to those familiar with carbon printing most beautiful results with least trouble can be obtained by its means, bearing in mind the type of transparency to aim at producing. It must be printed far deeper than for ordinary work, and, as there is then with ordinary tissue a tendency to blister, it will be a good plan to first collodionise the glass before squeegeeing the tissue upon it. Special transparency tissue is made, but it is not necessary for this particular purpose in view. If, however, carbon is unfamiliar, and a development process is decided upon, a lantern plate is excellent, but it is needful to be careful that it is not made hard. Slow and quick plates are obtainable; the latter are to be preferred, as the quality suitable is most readily judged and less experience is necessary. Where lantern plates are not at hand, an ordinary dry plate (not a quick plate) will give all the quality necessary. Professional enlargers mainly use wet collodion, but we leave that out of question for amateur work. With regard to development it is desirable to keep the solution under, rather than over, what might be termed normal strength, and, further, to use less alkali than would be employed for every-day negative-making. It would be safest to keep the pyro or other developing agent at a little below the usual strength, and the alkali at half the ordinary proportion. By these means the possibilities of getting a transparency of the right type are brought to a maximum, always bearing in mind the correct type to aim at. It may here be said that the greater the amount of enlargement the less density is it necessary to have. Passing on now to the negative itself, there is little need to say anything, for, if the correct intermediate picture be obtained, the negative-making is carried on exactly as usual; it is only when this transparency is at fault that difficulties arise, the mere fact that they do present themselves to a fairly skilful hand is sure proof of the transparency being at fault. We should be pleased if we could think that any remarks of ours would lead to the further pursuit of a very fascinating branch of photography, and we urge those of our readers who have hitherto devoted themselves to bromide to give a fair trial to the process of enlarging negatives; they will never regret following our advice.

Stereoscopic Relief from a Single Print.—This has been the dream of the unskilled for many years, and countless have been the methods proposed and immediately proved to be worthless. But Sir David Salomons claims to have solved all difficulties and to have devised a method which with only one picture before us shall enable us to obtain stereoscopic effect. Sir David's scientific ardour is so well known that anything he brings forward is entitled to be treated with respect, though he proposed what from an ordinary observer would be looked upon as a paradox. In the JOURNAL last week will be found a letter from him published in *Nature* describing his invention. We would call especial attention to the second paragraph, wherein it is stated that "a *true* stereoscopic combination would not result, but one which would approximate more or less closely to the truth," though a paragraph nearer the end says, "One picture will result, as solid in appearance as if the ordinary stereo slide had been used." Sir David's instructions are not very explicit, as, for example, when writing of a cylindrical lens, judging from the context, we should assume him to refer to one of *plano-concave* form. With regard to the *à priori* possibility of relief from one picture, it is to be remembered that the sense of solidity is compounded of several co-ordinated effects, and must be rather the result of experience than an intuitive perception. If, then, we can, from one picture, obtain more than one if less than all these effects, so may the perception of relief be possible.

A Novel Stereoscopic Effect.—Another stereoscopic illusion has been described by Professor Charles Schlichter, of Wisconsin, founded on an extension of the system of producing "harmonic curves," those beautiful and intricate series of curved lines, produced by affixing a writing stylus to a pendulum, whose varying motions are compounded by reducing the different periods to a curve or series of curves of great beauty, drawn upon a plane surface. Professor Schlichter has imported three dimensions, instead of two, into the representations of these pendulum excursions, in which, in lieu of a writing stylus, a tiny electric lamp is attached to the pendulum bob. The pendulum is set in motion in front of a stereoscopic camera attached to a pendulum swinging in a vertical plane about a horizontal axis through the optical centres of the lenses. When the plate is developed and printed from, the various curves photographed start into relief as though they were taken from beautiful arrangements of entwined curved wires. There is not much doubt that for a while these curved stereograms would have a great popularity if produced at a reasonable price.

A Scientific Imposture detected by Photography.—Most of our readers will have been interested in the account published a few weeks ago of the marvellous powers of a lady clairvoyante, who was stated to possess "Röntgen-ray eyes," from her alleged power to see objects, some hundred yards away, through brick walls, and to be able, for example, to read the contents of a sealed letter securely packed in a box. So cleverly was the whole affair managed that a learned society deputed a committee to investigate the details of the occurrence. A number of sealed letters were provided and taken to the lady's neighbourhood, one being sealed in a box in the study of the medical man who first published an account of this wonderful Röntgen-ray woman. At first she met with no success; but after a time she, after meanwhile having several times left the room where the committee sat, was able to give particulars of this one letter at the doctor's house, over three hundred yards away. When the committee returned to the doctor's house to regain the letter, they decided that, during their absence, the letter had been opened. As this might, however, merely be matter of opinion, a further test was made. Along with the letters was placed one half of a plate slightly exposed on some other subject. Both halves were then developed. The check half came up all right, but the clairvoyante's half was fogged, showing that it must have been exposed to light in the absence of the committee. The inference is too obvious to need detailing.

Röntgen Rays on Vegetable Life.—Up to a recent date it had been thought that, from experiments made, Röntgen rays had no action whatever on vegetable life; but some recent experiments by Signor G. Tolomei prove that upon the lower forms of vegetable life they have a very powerful action. He prepared an Agar culture plate of the Anthrax bacillus, and exposed it to the rays under a screen with an X-shaped aperture. The result showed that all the bacilli upon which the rays fell were killed, the plate showing a distinct print of the screen aperture. This is not a medical journal, yet we may be permitted to hope that here we have distinct promise of salutary power in the Röntgen radiations.

BY THE WAY.

I THOUGHT I had said my "last word" on the subject of gum-bichromate, but two letters have appeared in the Correspondence-columns which need a word or two of reply. Mr. Alfred Maskell appears to think that I have "obscured the terms" of his challenge of two years ago, by which I presume he means that I have forgotten or attempted to misrepresent them. I have done neither.

As far as I remember, the conditions were that *two* negatives were to be chosen, one by him and the other by myself or Mr. Chapman Jones, or any one else who would take up the glove, and prints were to be made by the carbon and gum-bichromate processes, and, I think, exhibited, with the necessary explanations, at the next Exhibition in Pall Mall, the inference being that the decision as to which results were the best was apparently left to each individual himself, as no provision was made for any authoritative judgment, either by a scientific, an artistic, or a Salonesque jury. In this Mr. Maskell was perhaps wise, for, judged on a scientific basis, there would be "only one in it," while the question of artistic results has nothing to do with the matter, and if the verdict were left to a gum-bichromate enthusiast or a Salonite, it would be a foregone conclusion without being a decision. By enlarging the bounds of the competition to *two dozen* negatives, I intended to imply that, however wide the choice might be, it would be practically impossible for Mr. Maskell to select a negative which, however well he might be able to deal with it, the ordinary carbon process by transfer would not render a better account of. That is the point that Mr. Maskell cannot, or will not, grasp, that a *perfect* process must of necessity yield a better result than one that is avowedly an imperfect one.

He further alleges that I have altered my views, or considerably modified my assertions, with regard to the capabilities of the gum-bichromate process. I say, nothing of the sort. I was perfectly familiar with the possibilities as well as the failings of the carbon process without transfer five-and-thirty years ago, and was never attracted by it either for practical or "art" results. But as soon as the specification of Swan's process was published I began to experiment with what was an undoubtedly practical method, making my own tissue, and obtaining tolerably satisfactory results under the circumstances. When this matter cropped up two years ago, Mr. Maskell, by inference, claimed that the non-transfer process gave as perfect results as could be obtained by transfer; at any rate, he alleged that the text-books had been altogether wrong in teaching that development from the reverse side was a necessity in order to obtain perfect gradation, and that, I take it, amounts to the same thing. I said, as I say now, the text-books are right, for, whatever may be done by even the *improved* gum method, it cannot possibly give the same range of gradation, the same delicacy of detail, that is obtainable by any of the transfer methods. In speaking of detail I do not allude to the "harrowing detail" of "every eyelash," to quote M. Demachy; there the non-transfer methods are undoubtedly at home, but that is not gradation. When either Mr. Maskell or M. Demachy can reproduce so simple a subject as Warnerke's actinometer scale perfectly from end to end by their method, then it will be quite time enough to commence issuing challenges, and not till then.

But the position taken by Mr. Maskell in the third paragraph of his letter shows that that is far from his intention. There is no desire to rival the qualities obtainable by the transfer methods, and yet, though he is admittedly satisfied with a lower standard of result, he is angry because others will not acknowledge his adopted process as equal, if not superior, to the one he does not attempt to rival. Surely inconsistency could not further go, unless, indeed, it is in claiming that the process is "perfect in its simplicity," and that scientific improvers "are only spoiling it by bringing it nearer to the position of a 'perfect' process."

Then the following week Mr. Joseph Lewis chides me for making a "serious blunder," and attributes it to my "losing my head in the labyrinth of operations to which critics by profession are so often liable." It would seem that I am in a parlous state, but I would hasten to assure Mr. Lewis that I am not a critic by profession, and therefore, perhaps, not liable to the threatened dangers. Why critics should be more subject to operations than other individuals I don't know. The natives of certain portions of Britain are said to be more frequently in need of surgical attentions of this kind in order to render their happiness complete when there is any joking abroad; but critics, even if of Scottish extraction, are scarcely likely to come within range of this danger. Any how, personally I feel tolerably safe and comfortable, have not "lost my head," or "made a serious blunder."

If Mr. Joseph Lewis's diagnosis of my case is intended as an elegant euphemism for having "got mixed," I must ask him to look at home and to read my remarks a little more carefully. I did not refer to sensitising carbon tissue from the back as proving the worthlessness of applying the bichromate to the paper before the pigmented gum," but the very reverse. I said that, in the case of carbon tissue, sensitising from the back was wrong in theory, because it tends to make the contact surface of the gelatine with the paper support more sensitive than the reverse side, which forms the picture, and so tends to general insolubility and to cause the picture to adhere permanently to what should be its temporary support. In the case of gum bichromate, on the contrary, I said the application of the sensitising solution before the pigment renders the under side, or that in contact with the paper, of the layer of colour the more sensitive, and so, at the same time, tended to cause it to adhere more firmly, while the front surface more readily permits the unhardened gum to wash away. So that, whatever Mr. Lewis's own opinions on the point may be, for I cannot quite gather them from his letter, I did not make the blunder he alleges.

His remarks upon carbon tissue are, to say the least, rather curious, for he says "the pigmented gelatine is applied in the liquid state"—necessarily, I should say—"and so penetrates the pores of the paper and dries there." I have developed many hundreds of carbon prints in my time, and have used many makes and many colours of tissue, but I have never yet come across a sample that answers to Mr. Lewis's description. I have before me, as I write, with my notes for this communication pencilled on it, a piece of paper which differs in no respect, so far as regards colour, from the sheet I am now writing on, though it is thicker, and perhaps has a rather softer substance. Although it is perfectly white, except for the pencil marks, it exhibited an entirely different appearance until a few hours ago I stripped it from a carbon print in process of development, and after the print was done I threw the temporary support into the warm water, and left it until all the pigmented gelatine had dissolved from the surface, when there remained not a trace "in the pores of the paper," or the slightest evidence the pores had ever been so occupied.

Then he goes on to say that, if the sensitising solution is applied to the back of the dried tissue, it cannot "percolate through the film" to the surface when the picture is formed, but that, if the pigmented gelatine were applied in the liquid state to paper already saturated with bichromate, the "whole state of affairs would be completely changed." I am afraid that in the course of the years Mr. Lewis has been mixed up with pigmented gelatine he has failed to learn all that is to be learnt about the latter subject, and that, though he corrects me on the subject of sensitising from the back he has never tried it. As a matter of fact easily demonstrated, although the bichromate when applied to the back may not "percolate" through the film, it is absorbed by the latter, and does reach the front surface where the picture is formed, and this with a very short floating. The difference between floating the back of the tissue and applying the liquid pigment to paper impregnated with bichromate would be practically *nil*, the exact condition being dependent upon the quantity of salt present in either case.

I referred last month to the alleged stereoscopic pictures by Chimenti, found in the Museum at Lille. If those of my readers who may be interested in the matter will refer to THE BRITISH JOURNAL OF PHOTOGRAPHY for April 1864, *et seq.*, they will find these pictures thoroughly discussed, and the balance of evidence appears to be against the stereoscopic theory. DOGBERRY.

ON DUST AND DUSTING BOXES.

I DO not propose to weary the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY with a disquisition upon the particles of dust which, floating in the atmosphere, show so great a tendency to deposit themselves upon sensitive films and such other bodies as are likely to be harmed by their presence. The evil is one which troubled photographers twenty or thirty years ago far more than it does at present, and the pages of photographic periodicals then gave quite as much attention to it and to its cure as the subject was worth. "Dirt"—so Lord Palmerston is usually credited with saying—"dirt is only matter in the wrong place." There is a very striking example of the truth of this aphorism in the manipulations of the photo-engraver. He polishes his copper plate, and obtains a more or less elaborate swinging box, only that he may deposit upon the former a smooth and even coating of dust.

Process workers soon find that, simple and easy as it is to get a coating of dust upon any object where it is not wanted, when it comes actually to desiring to do so, there are certain steps to be taken and precautions to be observed of a nature not easily explicable at the first glance. For example, to secure an even coating, the box must be much larger in area than the plate to be coated, and the plate itself must be supported, not on pin points but on a flat surface. Different workers, again, so I am told, find extraordinary differences in the time required, both between agitating the box and the insertion of the plate, and in that during which the plate remains in the box, although others state they have not noticed this.

The subject of the deposition of fine particles is one which has received a certain amount of attention at the hands of physicists, but which is by no means thoroughly understood at present. The dust-free or dark plane observed by Tyndall as lying immediately above hot objects, when in a dusty atmosphere, was for a long while regarded as due to the destruction of the dust itself by the heat of the objects. It was next found that this plane was visible even when the temperature of the body employed was only that of boiling water.

Lord Rayleigh, to whom science owes so much, directed his attention to the phenomenon, and in a communication to the Royal Society made in 1882, after quoting Professors Tyndall and Frankland (the latter's theory being that the dust consisted largely of water and other volatile substances, vaporised by the heat) describes certain experiments of his own upon the subject. Taken by itself, there is little of practical interest to the photo-engraver in Lord Rayleigh's paper, but, read in the light of the subsequent experiments of Lodge and Clark, it becomes interesting.

He describes how he repeated Tyndall's experiments, employing for the purpose "a box (of about the size of a cigar box), three of the vertical sides of which were composed of plates of glass. A beam of sunlight reflected into the darkened room from a heliostat was rendered convergent by a large lens of somewhat long focus, and made to pass in its concentrated condition through the box. The third glass side allowed the observer to see what was going on inside. It could be removed when desired so as to facilitate the introduction of smoke." Those who wish to follow up for themselves these observations can do so readily with a cigar box or similar object. The lid, bottom, and front side should have openings as large as is consistent with the box holding together, cut in them, and the interior being well smoothed and blackened; the openings are covered with clean glass plates, which may be attached with lantern-slide binding strips or otherwise. An aperture in the back enables a small object to be introduced into the box.

The advantage of this form of apparatus is that it can readily be cleaned inside, as the smoke or artificial dust soon dirties the glass. To employ it, the box is stood upon one end, the front facing the observer, and the convergent beam of light from a lantern, with its objective removed, is allowed to pass straight through the glass forming the bottom and lid. Tobacco smoke answers very well, or a smouldering piece of brown paper, or of paper dipped in a solution of saltpetre and dried may be put inside for a minute or so and removed when the box is seen to be full of smoke. It must now be left undisturbed until the smoke is seen to be free from any very marked movements. If a warm body such as a knitting needle or knife blade be introduced from the back, the dark plane of dust-free air can be easily recognised in the beam from the lantern, and it will be seen to ascend.

Lord Rayleigh showed (and it can easily be done with this apparatus) that, if the body introduced be cooled instead of heated, then the dark plane appeared underneath and extended in a downward instead of in an upward direction. To confirm this it is only necessary to cool the knife blade by immersing it in a mixture of crushed ice and salt, wiping it dry before inserting it in the box; another way he employed was by passing ice water through a glass tube and noting the formation of the dark plane on that. Lord Rayleigh suggested that the phenomenon might be due to the centrifugal action caused by the curving of the atmospheric currents round the solid object, but this theory was not borne out by subsequent experiments of others.

In an interesting communication to *Nature* shortly after the publication of the work of Rayleigh (*Nat.*, xxviii. 297), Professor Oliver Lodge narrates how Mr. J. W. Clark and himself investigated the subject. Starting with an electrical hypothesis, which, however, soon failed to fall in with their experiments, they made the singular observation, that it is only the deficiency of illumination which prevents us from seeing these dust-free regions in the neighbourhood of every solid body, and that "*solid bodies have sharply defined dust-free coats or films of uniform thickness always surrounding them*" (the italics are Professor Lodge's own). "These coats can be continually taken off them, and as continually renewed, by any current of air. The slightest elevation of temperature of the solid causes its dark coat to stream upwards, the slightest depression of temperature below that of the atmosphere causes the coat to stream downwards; but the coat is there all the time, independent of convection currents, though I believe it gets thicker as the body gets warmer."

Some of the experiments described in this paper deal with the behaviour of dust to electrified bodies, and the suggestion thrown out, that dust offers a convenient medium for the study of many electrical and allied phenomena, is one which has, to some extent, been since followed up. This part of the subject is not so directly interesting to the photo-engraver, since, in tinfoil-lined dusting boxes we have almost an ideal closed conductor within which the potential must at all times be uniform, and consequently the last place where we should seek for electrical disturbances.

That dust is deposited at a greater rate on cold than on warm bodies is well known. It was emphasised in a paper read before the Royal Society of Edinburgh by Mr. John Aitken in 1884, in which the formation of these dust-free coats was gone into at some length. This in itself should be sufficient to account for the differences of time noticed by different workers with the bitumen dusting box. Another cause, though probably not one so influential, is to be found in the fact that the degree of moisture on the surface of the body affects the deposition of dust upon it. A warm, moist surface repels dust much more than a warm, dry one; contact with the moisture-laden breath of the operator is, doubtless, quite sufficient to effect a considerable alteration in the amount of dust deposited in a given time upon the plate.

The subject received further treatment at the hands of Professors Lodge and Clark in a paper read before the Physical Society, on February 9, 1884, in which the observed phenomena are attributed to two main causes: (1) molecular bombardment and (2) gravitative settling. It is customary, I believe, to regard the action which takes place in coating a copper plate with powdered bitumen in a dusting box as being simply due to the action of gravitation. No doubt, the deposition of the dust at all is due to this, but the action must be modified by other causes. The presence of a film of condensed air upon the surface of the plate, the upward or downward currents of air due to the difference of temperature between the plate and the interior of the box, and the possible presence of moisture upon the surface of the copper must all tend to modify the result which would be obtained by the simple action of gravitation alone. On these points I am now making certain experiments, the results of which I hope to be able to make public before very long. The subject is one of interest to all who use the dusting box, although, possibly, not of very great importance. I understand that experienced photo-engravers find little difficulty in securing perfectly definite results when they know the condition of the box; still, the causes which go to control the rapidity and evenness of the distribution of the dust upon the copper plate would be none the worse for being known, and, when known, beginners, at any rate, might find some of their difficulties or uncertainties explained and possibly removed.

R. Child Bayley.

FOREIGN NEWS AND NOTES.

Intensifying Platinotypes.—Rapp suggests that the best way of intensifying platinotypes is by the indirect method, that is first, intensification by a physical process with silver, and then the conversion of the silver into platinum by a subsequent toning. A saturated solution of gallic acid and a ten per cent. solution of silver nitrate should be prepared, and immediately before use the following should be mixed up:—

Gallic acid, saturated solution	50 parts.
Silver nitrate (ten per cent. solution)	2 „
Glacial acetic acid	10 drops.
Water	50 parts.

In this the print, which should be previously soaked in water, should be left with constant rocking until sufficiently intensified, and then washed three times in water acidulated with acetic acid and then toned in

Potassium chloro-platinite	1 part,
Phosphoric acid	15 parts,
Water	600 „

and in this bath the print should be left till any tinge of red in the print is converted into black, and it should then be well washed in water and dried.

Unknown Exposures.—Hübl strongly recommends the following procedure for the development of unknown exposures. A stock solution of—

Sodium sulphite	25 parts.
Hot water	40 „
Glycin	10 „
Potassium carbonate	50 „

A thin cream is obtained. The plates should be placed in an upright grooved tank filled with—

Water	1000 parts.
Concentrated deveveloper, as above	12 „
Potassium bromide (ten per cent.)	2 „

If the first traces of the image appear in from fifteen to thirty minutes, the plate has been correctly exposed, and may be simply left in the above till finished. If, however, the image appears in less than ten minutes, it has been much over-exposed, and it should be transferred to a bath of—

Water	100 parts.
Concentrated developer	4 „
Potassium bromide (ten per cent.)	4 „

If no trace of the image appears in thirty minutes, great under-exposure must be suspected, and the plate should be placed in the following bath, heated to 25° C. The temperature of the above solutions should not exceed 10° C.:—

Water	100 parts.
Concentrated developer	2 „
Caustic soda (ten per cent. solution)	2 „

Our experience with Hübl's concentrated developer is that it will not keep a month, but becomes black and loses its energy.

Metol Glycin Developer.—M. Remy strongly supports the combination of these two reducing agents, and gives the following formula:—

Glycin	5 parts.
Metol	0·5 „
Sodium sulphite	125 „
Potassium carbonate	125 „
Water	1000 „

A Test for Bromine.—M. H. Bauligny states that the following is an extremely simple and delicate test for bromine in a saline solution: Add some permanganate of potash and sulphate of copper, and expose a piece of paper saturated with fluoresceine under the mixture, when if any bromine is given off the paper will turn from yellow to rose. This, it is stated, will detect a milligramme of bromine.

THE LATENT IMAGE AND ITS DEVELOPMENT.

[Paper Read before the Royal Photographic Society.]

(*a.*) The Latent Image.

I.—Introductory and Retrospective.

In a paper read before the Liverpool section of the Society of Chemical Industry in May 1890, entitled, "Photo-chemical Investigations and a new method of determination of the sensitiveness of photographic plates," we endeavoured to show the connexion existing between the intensity of the light acting upon a photographic plate, the time during which it acted, and the amount of metallic silver deposited per unit area of the plate after development. We further showed how the experimental knowledge thus obtained might be practically applied to determine the sensitiveness of any given plate, and how that exposure in the camera might be ascertained which would result in a technically perfect negative, that is, one combining with minimum density the greatest approach to truthful representation.

In order to arrive at these results, it was necessary to investigate, to some extent, the influence of variations in development, and to assure ourselves that a developer existed which could be relied upon to yield constant results.

We gave it as our experimental experience that a developer might be so constituted as (1) to develop metallic silver from bromide of silver which had never been exposed to light; (2) to so retard development that the latent image impressed upon the plate should not become visible within the limits of the ordinary time of development; and (3) that a developer might be so "well balanced" that, within a given considerable period, it would not affect unexposed bromide of silver, while readily, in course of time, developing the latent image of such light impressions as were capable of development.

The outcome of this inquiry was the adoption of ferrous oxalate for the purpose we had in view, on the ground that this developer was the least liable to attack unexposed bromide of silver; that its action least varied with its composition, and that it was least affected by variations in the amount of bromide used in conjunction with it.

We found that generally, on prolonged development, the latent image tended towards a maximum density, and we gave the law connecting the various densities with the length of time of development as

$$D_t = D\,(1 - a^t)$$

where D_t is the density after t minutes' development, D the maximum density possible, and a a constant which, for the plates we then used, had the numerical value 0·9015.

With "well-balanced" developers we studied the relation between the amount of silver reduced and the exposure which produced the deposit, and we found that the relation was complicated and could not be readily expressed in its entirety by any simple formula.

Represented graphically, however, choosing, as abscissæ, logarithms of exposures, and as ordinates, the amount of silver deposited per unit area of the plate (densities), the effect of prolonged exposure showed itself as a curve of double flexure, which we named the "characteristic curve" of the plate. We then showed, from considerations of the laws of absorption of light, now generally accepted, that truthful representation can only be expected if the exposures are such that they fall within the straight portion of the characteristic curve.

The sensitiveness of the plate we found to depend upon the general position of the characteristic curve with reference to the scale of exposures. For practical purposes it was necessary to find a simple method of deciding and numerically expressing the position of the characteristic curve on the scale of exposures, so as to provide a numerical expression for the speed of the plate. Several methods suggested themselves. One was to take the value of the longest exposure which the plate could bear without producing any deposit on development. This method was found to be practically useless, as slight alterations in the constitution of the developer seriously affect this point. Next in importance was the position of maximum density, but experiments made to ascertain this point led to the discovery of the curve of reversal, and showed that the position of the point of maximum density was even more difficult to decide than the zero point. The best point of all to adopt would probably have been the point of double flexure, but the difficulty of deciding this also rendered it impracticable.

Thus we abandoned all methods of deciding the speed of the plate from the position of any one single peculiar point of the characteristic curve, and we adopted the method now in general use, viz., that of deciding the position of the characteristic curve on the scale of exposures by means of the point of intersection of the straight portion of the curve with the axis of abscissæ, *i.e.*, the exposure scale. This proceeding seemed to be further justified by our experimental results, which indicated that, for those exposures which resulted in densities belonging to the straight portion of the curve, the density ratios did not materially alter with length of time of development.

The results thus obtained gave values for the sensitiveness of plates which might differ within twenty per cent. to thirty per cent. from each other, but such differences are of no practical importance whatever, for, whether an exposure be given of 10 seconds or one of 13 seconds, its influence upon the general qualities of the resulting negative would be inappreciable.

Our general conclusion was that the density of the latent image is a function of the sensitiveness of the plate and of the exposure only; that, so long as developers are employed which are capable of developing, within a reasonable time, the whole of the latent image without attacking unexposed bromide of silver, the relation between the resulting gradations cannot be altered by development; and that the density ratios, at any rate in the straight portion of the characteristic curve, are practically unalterable.

Since the publication of our research, our general method of experimenting, of measuring and recording results, and of expressing the speed of the plate, has been adopted by eminent firms of plate-makers both in this country and abroad. Photographers in general have, however, taken exception to our use of the term "density," and our conclusions as to the constancy of density ratios have been rejected as not founded upon fact.

We must point out, however, as we have done before, that the photographic public altogether failed to realise the object we had in view when we carried out our investigation. Our object was to discover a method of speed determination, and it was not, as the public seemed to infer, to deal finally and exhaustively with the subject of development. This subject was purely incidental, and was merely investigated as far as was necessary for the real object of our inquiry.

The facts which we then recorded were, nevertheless, as carefully ascertained as are those we shall presently quote; but, owing to the greater accuracy and ease with which we are now able to impress a series of exposures upon a series of plates at a single operation, and, owing to the greater accuracy and rapidity with which the photometric measurements of the resulting densities can now be made, our more recent experiments generally embrace a wider range of gradation than our previous experiments did.

Our work still points to the conclusion that what we have termed the "density of the latent image" (that is, the quantity of silver bromide rendered amenable to development) is a function of the exposure (intensity of light × time), and of the sensitiveness of the plate. Our work, at the same time, indicates that if all possible variations in concentration and in composition of developing solutions are to be taken into consideration, the density ratios of the visible image cannot be said to be constant; and our demand that the developer shall be so "well balanced" that it shall not attack unexposed silver bromide, while capable of developing the latent image within a reasonable time, limits the choice of developer, and, with it, the applicability of the law of constant density ratios.

We see, however, more and more clearly, that the law of constant density ratios is, so to speak, the fundamental principle of photography; and that deviations from it find a ready explanation in the peculiar properties of gelatine and the diffusive and other properties of the chemicals used.

The principle of constant density ratios enables us to precalculate photographic phenomena, and, by the knowledge acquired in the course of the present investigation, we hope to show how to precalculate, to some extent at least, deviations from this fundamental principle, which are due to the behaviour of gelatine, and to the laws of diffusion, &c.

II.—Thermo-chemistry of Development.

The process of development consists in the decomposition of bromide of silver into metallic silver and bromine, the latter combining with one of the constituents of the developer itself.

The decomposition of bromide of silver (or other halogen compound) demands the supply of a certain amount of energy, and the question arises whether this necessary energy can be entirely supplied by the chemical changes taking place in the developer, or whether any material part of it must be supplied by the action of the light.

The chemical change which takes place in the developer consists in the formation of an alkaline bromide and of an oxidation product. Development by alkaline pyrogallol, for instance, may be represented by the following equation:—

$$2AgBr + 2NH_4HO + Pyro = Ag_2 + 2NH_4Br + H_2O + \underset{\text{Oxidation product.}}{(Pyro + O)}$$

The energy required for the decomposition of the silver haloids, and that produced by the formation of the corresponding alkaline haloids is given in the following table:—

TABLE I.

Energy developed per gramme molecule of compounds in calories.
1 cal. = 1000 grammes water × 1° C.

	Cl.	Br.	I.	OH.
Ag	29·0	20·7 – 23·7	14 3	—
K	101 2	90 4	74·7	117·1
Na	96·6	86·4	70·1	112·5
NH_4	72·8	62·9	47·1	90·0
H	—	—	—	69·0

From this table it will be seen that the formation of potassium bromide will produce 90·4 calories, and, conversely, that the dissociation of the same compound demands a supply of 90·4 calories.

With the values given in this table, the energy equation for any development may be calculated as follows :—

Taking the equation given above as an example, we calculate the heat of formation for both sides of the equation, leaving out of the question the heat produced by the oxidation of the pyrogallol, thus :—

$$2AgBr + 2NH_4HO + Pyro =$$
$$\underbrace{2 \times 23{\cdot}7 + 2 \times 90 + ?}$$

227·4 cal. to be supplied.

$$Ag2 + 2NH_4Br + H_2O + (Pyro + O)$$
$$\underbrace{— \quad 2 \times 62{\cdot}9 + 69{\cdot}0 + ?}$$

194·8 cal. produced.

The difference between the energy required for the decomposition on one side, and the energy produced by the formation on the other side, amounts to 227·4—194·8 = 32·6 cal. for 2 Ag or 16·3 cal. for Ag, and represents the amount of energy which must be furnished either by the formation of the oxidation product or by the light.

In a similar manner the following values have been calculated :—

TABLE II.

Calories required for the reduction of 108 grammes of metallic silver.

Reduction of	Hydrates.			Carbonates.		
	K.	Na.	NH_3	K.	Na.	NH_3
AgCl ...	10·3	10·4	11·7	13·9	14·0	13·5
AgBr ...	15 9	15·3	16·3	19·5	18·9	18·1
AgI ...	22 2	22·4	22·7	25·8	25·8	24·5

From this table we learn that the decomposition of silver chloride requires the least, and that of silver iodide the most energy for alkaline development, but that there is no material difference in the amount of energy required whichever alkali be employed. There is, however, a material difference of about 3 cals. between the carbonates and the hydrates.

Since the particular reducing agent employed, pyrogallol, for instance, would produce nearly the same constant amount of heat when yielding the same oxidation product, whichever alkali be employed, the result of this thermo-chemical consideration is that, with any given reducing agent, such as pyrogallol, the amount of energy to be furnished by the light is also nearly constant, and the speed of the plate will not be materially affected by the particular alkali employed.

Unfortunately, the oxidation products of most of the organic developers are not well known, nor is the heat determined which they develop on oxidation in alkaline solutions. If, however, the heat developed is to be sufficient to supply all the energy required, the absorption of one atom of oxygen by the developer must produce from 30 cal. to 32 cal. in order to reduce two molecules of silver bromide; or, from 44 cal. to 45 cal. in order to reduce two molecules of silver iodide to metallic silver in alkaline solutions.

The few oxidation phenomena which have been studied lead us to believe that, for one atom of oxygen absorbed, the amount of heat (30 cal.) would be easily supplied by the oxidation of pyrogallol; but nothing certain is known about it. It may be pointed out, however, that the oxidation of an iron protosalt into its persalt in aqueous solution by bromine produces 48·9 cal. for Br_2, or suffices to supply the whole heat necessary for the decomposition of 2AgBr (47·4 cal.). Hence, if ferrous oxalate, which is admittedly a less energetic developer than alkaline pyrogallol, can supply the whole energy required for the reduction of the silver, it is highly probable that the oxidation of pyrogallol will more than provide the energy wanting.

These considerations lead us to the conclusion that the light need not supply any material amount of energy. This conclusion is further supported by the fact that bromide of silver, which has never been exposed to light at all, is yet capable of development; fairly easily by the alkaline, less readily by the iron developer.

III.—Constitution and Properties of the Latent Image.

The application of thermo-chemical data to the theory of development having shown that the whole of the energy required for the decomposition of silver bromide may possibly be, and probably is, derived from the changes which the developer undergoes during development, it would appear to be possible to dismiss the old theory of the constitution of the latent image long held by many authors.

The idea that some portion of the silver bromide is decomposed by the light into a sub-bromide and free bromine, is not necessary for the explanation of the phenomenon of development. It is quite sufficient to assume that the light causes some change in the molecular structure of silver bromide; that it changes, for instance, a complex molecule Ag_nBr_n into simple ones. We may assume that the light does some work of disgregation, as Clausius would say; not involving a complete change in chemical composition, such as the formation of a sub-bromide, but work such as is done during the change in the crystalline structure of sulphur or of calcium carbonate; work which requires a much smaller amount of energy than the complete separation of atoms of bromine from the molecule of silver bromine would involve.

There is absolutely no experimental proof that the change which silver bromide undergoes when exposed to light of such small intensity, and for such small periods of time, as suffice for the production of photographic negatives, produces any visible effect or any measurable chemical transformation. All that can be proved is that exposed silver bromide is more rapidly attacked by the developer than unexposed silver bromide; but the character of the change (whatever its nature) and its progress in course of time are identical for the exposed and for the unexposed silver bromide.

When silver bromide is treated with a solution of potassium iodide, chemical decomposition takes place, the bromine and the iodine are exchanged, and we then have silver iodide. This reaction takes place also in the case of silver bromide in the sensitive film. If silver bromide which has been exposed to light (*i.e.*, impressed with a latent image) consisted of sub-bromide, this sub-bromide would either remain as such, when treated with potassium iodide, or it would yield a sub-iodide. In either case it ought to yield, upon development, a visible image; but the treatment of a latent image with potassium iodide completely destroys the image, and we must therefore conclude that the latent image consists of bromide of silver, possibly in an allotropic modification.

If a film containing exposed silver bromide be treated with potassium bromide, no effect whatever is produced; the latent image can be developed in its full vigour after the potassium bromide has been washed out.

Again, if a sensitive gelatino-bromide plate be treated with a dilute solution of bromine in water, the film loses its sensitiveness to light; that is, the plate becomes exceedingly slow. If the sensitive plate had a latent image impressed upon it by suitable exposure to light before it was treated with bromine, this latent image would no longer be capable of development; the difference in rapidity of attack by the developer on the exposed and unexposed silver bromide would have vanished.

This peculiar behaviour of the film, under the influence of free bromine, shows that, if the action of the light upon the sensitive film were continued so long as to bring about actual decomposition, and so produce a certain amount of free bromine, the bromine thus liberated would efface the latent image, and render the film almost insensitive. This is exactly what happens when the exposure is continued so long as to produce the phenomen of reversal.

That any ordinary camera exposure is inadequate to produce a material decomposition of the silver bromide on the plate can be shown by other experiments and considerations. A standard candle consumes 120 grains or 7·77 grammes of spermaceti per hour, or about 0·002 gramme per second. The energy evolved by the combustion of 0·002 gramme spermaceti (1 gramme = 10,000 units of heat) is 21 gramme units (small calories). If the whole of this energy were produced in the form of chemically active light and evenly distributed over a sphere of one metre radius = 125,663 square cm., the amount of energy per 100 square cm. of surface would be $\frac{21 \times 100}{125{,}663} = 0{\cdot}016$ gramme units of heat.

While it is possible on a sensitive plate to produce a deposit of 26·5 milligrammes of metallic silver per 120 square cm. area by an exposure of ten C.M.S., the amount of energy received by this area, assuming the whole energy yielded by the candle to be taken into consideration, as in the above calculation, is $10 \times 0{\cdot}016$ units in ten seconds.

Now the decomposition of silver bromide, equivalent to 108 milligrammes of silver, requires energy amounting to 23 gramme units, and the energy necessary for 26·5 milligrammes of silver is 5·6 units, so that the candle, even if the whole of its energy of combustion were active in

decomposing silver bromide, could only decompose 2·9 per cent. of the amount which experiment shows can be actually rendered amenable to development.

As a matter of fact, however, only a small fraction of the energy of the candle is transformed into radiant energy; and, again, a very small fraction of the radiant energy constitutes ethereal waves of sufficiently short wave-length to affect silver bromide.

It is thus rendered quite evident that the candle can only furnish an infinitesimal part of the energy necessary to produce 26 5 milligrammes of metallic silver per 100 square cm. with an exposure of 10 cm., and that the whole of this energy is, in all probability, provided by the developer.

We have, moreover, furnished the proof, as far as this can be done, that the composition of the latent image is, as nearly as possible, AgBr; and, in a paper, published in February 1891, we showed that no bromine is liberated in the course of development. As this paper may not be readily accessible, we will briefly repeat our experience therein recorded.

A gelatino-bromide plate (6½ inches by 4¾ inches) was exposed to the light of two standard candles, one on either side of the plate at a distance of half a metre, for 33 minutes. The plate was then well washed with pure distilled water to remove any bromine which might either have become free as such, or which might, by action on the gelatine, have formed hydrobromic acid.

The result was that no soluble bromine could be detected in the wash water.

The plate was then developed with ammoniacal pyrogallol for 30 minutes and washed. The developing solution and the wash water were together oxidised with nitric acid, and the bromide precipitated, washed, filtered, and weighed as metallic silver. The weight found was 197·7 milligrammes.

The plate was then fixed in pure thiosulphate, well washed, and the film stripped. The amount of metallic silver contained in the film was determined and found to be 194·4 milligrammes.

The amount of bromine found in the developer was thus slightly more than the equivalent of the metallic silver found in the developed plate. Hence we must conclude that the chemical composition of the latent image is AgBr; and this conclusion is further strengthened by the fact that almost the whole of the bromide of silver on the plate had been brought into a readily developable form.

The behaviour of exposed silver bromide to a solution of potassium iodide only furnishes qualitative results.

The behaviour of exposed silver bromide to a solution of potassium bromide is shown by the following experiment. A plate which had received a series of graduated exposures was cut into two parts. One part was soaked for twenty minutes in a solution of potassium bromide, and then washed for forty minutes. The other part was soaked in water for sixty minutes. Both parts were then developed and gave the following result.

EXPERIMENT I.

EXPOSURE C.M.S.	DENSITY. PLATE D_2.	
	Soaked in KBr.	Soaked in Water.
·625	·065	·060
1·25	·360	·385
2·5	·870	·910
5	1·305	1·365
10	1·740	1·820
20	2·190	2·230
40	2·515	2·510

That, in course of time, the rate of action of the developer upon unexposed silver bromide is the same as upon exposed, is shown by the following comparative results:—

TABLE III.

	Plate.	Time of Development.		
		2 min.	4 min.	8 min.
Unexposed	D_2	·745	1·165	1·765
,, ...	D_6	·760	1 370	2·140
,, ...	D_2	·790	1 290	1 890
Exposed 2·5 C.M.S.	G	·660	1·055	1·600
,, 10 ,, ...	H_2	·505	1·260	1·965
,, 20 ,, ...	D_7	·650	1·270	1·945

In the case of the unexposed plates, the developer contained no bromide, while bromide was used in the case of the exposed plates. It will be seen, however, that the growth of density with time is nearly the same in both cases.

When unexposed and exposed silver bromide are developed together, this equal rate of growth is not so easily detected since the action of the developer upon the unexposed silver bromide is then comparatively small, but the ratio does approximate to equality, as is shown by the following experiments, in which the exposed and the unexposed plates were developed together.

TABLE IV.

PLATE D_2 developed.	2 min.	4 min.	Ratio.
Unexposed...	·175	·300	1·71
Exposed. 1·25 C.M.S. ...	·370	·615	1·66
,, 2·5 ,, ...	·725	1·100	1·51
,, 5 ,, ...	1·040	1·520	1·46

These experiments show that the difference between unexposed and exposed silver bromide is of the same character as the difference between two successive exposures; it is a difference of degree only, and not of kind.

F. HURTER, Ph. D.
V. C. DRIFFIELD.

(*To be continued.*)

THE CRYSTAL PALACE EXHIBITION.

[WE have been officially handed a copy of the annexed letter from Lord Crawford, the President, to Mr. H. Wilmer, Hon. Sec. of the Royal Photographic Society, in reference to the opening of the forthcoming Crystal Palace Exhibition.—EDS.]

"DEAR MR. WILMER,—I write to you officially to let you know that I have to-day received intimation from H.R.H. the Prince of Wales that he consents to open the International Photographic Exhibition provided that we can arrange for the opening on the 25th, instead of the 27th, on which day he has other engagements.

"I have communicated with the Palace authorities, and find that they are willing.

"I have therefore written to His Royal Highness, thanking him for his gracious assent to my request, and naming the 25th as the day fixed upon.—Yours sincerely, "CRAWFORD,

"*February* 14, 1898. "*President* R.P.S."

EXHIBITION OF THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

ON Saturday last the Lord and Lady Mayoress of Liverpool opened the Spring Exhibition of Arts and Crafts at the Walker Art Gallery, one room of the magnificent suite being entirely devoted to the works of this Society. The whole Exhibition is one that any city might be proud of, and the amateur photographers of the city may also feel a just pride in their contribution, to its attractions. The effect upon entering the photographic room is distinctly pleasing. Instead of the usual wall-mosaic "four square" to all, that so often characterises the exhibition of a large number of works in a small space, Mr. Dyall, taking advantage of the library system of projecting screens, has adapted it to picture-hanging with conspicuous success. The *coup-d'œil* is pretty and telling. The system of groups and centres has been adopted, but the pictures have been so collected into sets guided by treatment, colour, and subject, that the first canon of picture-hanging, such association of subjects as make them mutually helpful, has been followed. A tasteful frieze has been specially painted round the apartment, and the walls and screens where the pictures are hung have a groundwork of brown—a little too positive in tone, perhaps—and festooned above with thick olive green drapery.

In a general way the visitor will best gather an impression of the pictures by taking them in numerical order, a plan we will ourselves chiefly follow. Frames Nos. 795, 796, and 797 contain an interesting collection of subjects, depicting the sportsman at work, *Grou e Driving*, *Setters at Work*, *Sea Trout Fishing*, by Mr. H. J. C. Anderson. No. 803, *Some Woodland Bits near Bettws*, by Mr. Walter Pollard, are two well-treated photographs of trees, printed in sepia colour. No. 804, by Frances M. Bell, is a very pretty composition of a difficult subject, a child with her favourite pussie. Mr. Thomas D. Sutton's *Stepping Stones* is a good print of a favourite spot with the Liverpool amateurs. Two seascapes, Nos. 805 and 806, by Mr. E. T. Cockerham and Dr. J. W. Ellis respectively, are excellent photographs, showing different treatment of sea and sky, the quiet repose of the latter being accentuated by the delicacy of treatment of the subject. The sky of the former is very good, but in feeling perhaps scarcely harmonising with the rest of the picture. In No. 813 another seascape, by Mr. F. W. Barritt, we have an excellent composition, including a group of children in the foreground, but the twilight effect shown by the illumination on the figures is not carried on through the whole. No 809, *A Forest Glade*, by Mr. E. Simnett, we recently alluded to with words of praise, as we did with Mr. Sutton's (No. 814)

"*Where Peaceful Rivers Soft and Slow*." Mr. Paul Lange's two enlargements (Nos. 819 and 820) are well worthy of study, the latter showing a boat travelling along the Chirk Canal, in which the light smoke wreaths from the boat chimney materially aid the general chiaroscuro; the former is mainly interesting as being a capital study of a wave line as seen from the vessel producing it. Dr. Ellis's *The Lucid Usk*, No. 817, in sepia carbon, is an effective picture of gorge and distant hills, with river calmly flowing through from the foreground. Charles F. Dupree's medalled study, No. 826, *Contemplation*, gives us the same pleasure as when we saw it at the Exhibition for competition in the autumn. Dr. Llewellyn Morgan's, No. 827, *Crypt of Canterbury Cathedral*, is a delicate sepia carbon print. The Artigue prints, Nos. 835 and 841, by James A. Sinclair, are two splendid studies, crisp and powerful, of Dalmatian peasants in homely costume. The former is reproduced as an illustration to the catalogue. No. 840, *Venice*, by Paul Lange, is a large size reproduction from a unique hand-camera negative, an interesting and picturesque view taken from a gondola, this being from a standpoint, if the phrase is permissible, never before chosen. Close by, the same indefatigable and ubiquitous worker has in No. 842 another photograph of great merit, a picture in every sense of the word (also illustrating the catalogue) of a group of travellers on pony back dashing through a stream of water, which is shown (and without any "faking") splashing around in a most natural manner. This photograph, we are told, was taken while the artist was, perforce, himself on horseback. Mr. T. E. C. Wilson's *Departing Day*, No. 829, was also one of the medalled competition pictures in autumn that attracted our attention and claimed our praise. His *Winding Stream*, No. 847, is also shown. Frances E. Ball's four flower and fruit studies, Nos. 837, 43, 44, and 69, as mentioned before, are exceedingly chaste and picturesque arrangements. Mr. Bushby's beautiful (No. 836) *Oxen Ploughing* is a picture with a history; our readers may remember the gold medal episode. *Bocche di Cattara* is an excellent photograph, and is one of several in which advantage has been taken of the use of boulting cloth to break up the print into minute decussations, a plan which is coming into vogue, and, in proper place, capable of considerably altering the effect. Dr. Ellis's (No. 852) *A Glimpse of the Silver Lining* is a fine study of cloud and sea, the two, however, merging into one another at a point, to our right, in a way that does not suggest reality. It shows a capital rendering of the slanting rays of light often seen radiating from a break in the clouds. Mr. G. Thompson's (No. 858), an outdoor portrait of a late well-known member of the Society, is a skilful portrait. A. Grillon's *Dieppe* gives us a fine view of a huge breaking wave. E. Rimbault Dibdin has in Nos. 855 and 941 two good portraits of John Finnie, R.E. While referring to portraits, we may now mention Joseph Appleby's four fine female portrait studies, which are fitly placed in group centres, and will attract much attention. Thomas B. Sutton's *Checkmated*, No. 861, and the companion picture are two interesting and excellent pictures, showing the insolent indifference displayed by a cat calmly resting on a window-sill just about one inch beyond the reach of two angry terriers. Mr. Frank H. Elsby's No. 881, *Evening Shadows*, loses nothing in attractiveness upon second view; nor do Mr. Morgan's Nos. 871 and 880, *A Reedy Pond* and *Sundown*—the latter very greatly attracted us. Mr. Paul Lange is seen again to advantage in No. 867, three sepia-coloured prints in one frame, the central one representing a group of cows, being an especially good picture of cattle. Frances E. Glazebrook has, in Nos. 875 and 877, two photogravure pictures of, apparently, a vineyard labourer, with a quaint-shaped basket, thoroughly human in feeling and sentiment; and again in Nos. 903 and 905, *The Bread Seller* and *Saturday's Scrub*, two bright and crisp figure pictures. Mr. Simnett's medalled picture, No. 890, is a real picture made from simple materials. In Nos. 889 and 885, Mr. F. Anyon has two fruit studies, but so gorgeously framed that the excellent photographs seem a mere detail in each. The whole of the pictures on this screen are an exception to the general rule—they are very dimly illuminated; otherwise Mr. Dibdin's *In Doubt*, No. 891, and Mr. Bushby's No. 888, *Hermit of the Waters*, would command attention and merit great praise, but in the latter that heron and his shadow is very conspicuous. Dr. Morgan, whose subjects are very varied in character has in No. 887, *Cutting the Hay*, a rural scene of great beauty. The compilers of the catalogue have done well in selecting the Hon. Secretary Mr. Schierwater's *Peaceful Village* as an illustration. It is a beautiful picture of village life. Mr. G. Thompson in No. 899, *Threshing* has a perfect gem, the play of light upon the scene is very charming. No. 909, signed *Le Puy*, we afterwards discovered to be by the same photographer, the supposed signature being part of the title of the photograph. The subject is a group of lace-makers, plying their pins and bobbin *en plein air*; for composition, not a figure could be altered to improve it; and, for delicacy of technique, it is more like a monotone copy of a Dutch master than a photograph. Dr. Ellis has, in No. 908, *Near Peel*, a beautiful riverine picture, with low foreground of rush and grass. In No. 912 we have four charming studies of primroses by George Moore, and, again, some pretty pictures of the same class in No. 915 by Miss Laura Harvey, who also has given us primroses, not quite "as large as life." Nos. 913 and 914, two frames by J. Sirrett Brown, enclose some very effective pictures of varied character from architectural views and interiors to brawling brooks and their devious ways; many of these would have been improved by the introduction of a figure. In No. 915, by Miss Laura Harvey, we aga recognise the picture which last autumn, in the competition confined ladies only, obtained the President's medal; they are charming, and o almost feels that it is only from a lady's fingers that we could hope see such dexterous ornamental treatment of simple materials.

One end of this bay is covered by a series of Röntgen-ray sciograph Nos. 917 to 928, by Mr. G. Thurston Holland. A most varied series subjects is included, the most remarkable perhaps being No. 923, t *Chest of a Boy, showing Ribs, Backbone, Heart, &c.*, and No. 921, *A Ha penny embedded in Throat of a Child*. Nos. 930 and 948, *Flow Studies*, by Mr. F. Anyon, are two very broad and effectively treat studies of flowers of the narcissus type, possibly taken by the aid isochromatic plates, for the large trumpet and perianth come out p fectly light and pale, and not with the dull, dark tone that light-yell colours in flowers usually present. No. 933, *A Sunlit Day*, by W. Prior Christian, is a picturesque combination of hillside with tr and road, an exceedingly well-chosen view, but a trifle heavy in shad an effect almost impossible in photography to avoid with the strong s light depicted. No. 937, *A Market Scene, Nantes*, by Mr Joseph Earp an unstudied and lifelike representation of a crowd of people round a mar stall. Mr. Joseph Appleby's No. 940, *Obstructionists*, is a fine study c drove of sheep resting on a high road, while seen in the middle distanc a vehicle whose driver evidently can see no æsthetic side to the grou obstructionists. Nos. 936 and 942, by Mr. D. Cunningham, giv realistic idea of life aboard one of those floating towns, a large lin Viewed from a distance, these two large photographs have a broad solid effect. No. 947, *Summer's Balm*, by Dr Ellis, is a notable stu in dark-greenish blue, of a moonlight effect on sky and sea, with a solit vessel to give a feeling of life to the scene. Among the pictures selec to illustrate the catalogue is No. 943, by Mr. Joseph Earp, *Ferry Boat the Seine*, a bold and striking view of a broad river, across which has j arrived, into the foreground, a ferry boat handled by a rugged-featu woman; the exact moment for securing a well-composed arrangement been happily seized. Frame No. 939, Mr. Paul Lange, holds three ph gravures, respectively entitled *Morning, Noon, and Night*, chosen from th forming the illustrations to his work on Norway. The atmospheric ef of the approaching sunrise is well shown in the one, as is that of dec ing day in the other, amid the hills and lakes of Norway. No. 956, *Brook*, by Thos. Napier, is a picturesque view of stream and trees, a g picture which yet would have been better if it had been curtailed a li on our left side. E. Gostenhaufer's *Four Views*, No. 964, are four c fully executed prints in sepia of prettily chosen views. Frost effects shown unusually well in Miss C. R. Langton's No. 966, and A. C. Batl *Four Landscapes*, No. 967, giving views of lakeside and of bracken with bole of tree are bright and airy views chosen and treated with arti insight. No. 968, Frances M. Bell's three views, should not be misse only for the one charming view giving us sheep under the shadow large tree, beyond which we see a field bathed in light. William Taylor has in No. 970 four views, the outermost of which are little g James Parkinson has in No. 909 three Isle of Man views which remember striking us most favourably when reviewing the autumn c petition pictures. The *Silver Swan*, No. 975, is an exceedingly p portrait of a swan with partially uplifted ruffled wings, but it is spo by its surrounding of mount elaborately decorated in relief and s frame. In Mr. Isaacson's No. 977, *Ludlow and Neighbourhood*, advan has been taken of the possibilities of a lovely neighbourhood, and ph graphs, of faultless execution, are given. The screens on which pictures are displayed are apt to take us out of our sequenc numbers, hence we find ourselves returning to No. 786, F Elsby's *Pleasant Pastures*, which we see again with pleasure. Francis E. Glazebrook's *Evening Hour*, No. 985, showing us an old busy knitting while resting in a corridor, has a quality which mus be judged by its size. Mr. F. Anyon's No. 788, *Early Morning in Do Bay*, is a very powerful picture—sky, and moon, and broken beach, tower in middle distance, but with a slight tendency to confusion of of sky and water on one side of the view. Mr. J. Bushby's *Trace Cathe* an interior, No. 787, gives us a picturesque rendering of a spot of architectural beauty. Mr. J. Appleby's No. 784, *Moonlight*, is anoth the studies of sky and water for which the Liverpool workers are fan and here, again, their reputation is ably sustained. No. 783, by Charles E. Mumford, gives us an ecclesiastical interior of great beauty great technical excellence. The subject is one in which halation usually be most prominent, but here is not a trace even in the stained window. The portrait of a girl, *The Dreamer*, No. 789, by Mr. F. Ap is of large size and graceful execution, but it displays an amount of wo up, whether on print or negative, that in exhibition work is less com seen now than once was the case. The screen on which these later pi are placed is unfortunate in regard to light. The post of honour, per is on the screen facing this latter, and here No. 1000 gives us a vi Dr. Napier of Peel Castle, which has been evidently a favourite wit members of the Association, and Dr. Napier is to be congratulated up rendering, the luminous sky of declining day giving an almost weird to the silhouette of the building. Herzegovinian gipsies, No. 999, Bushby, is a picturesquely and naturally grouped arrangement, an picture, a copy of which would be coveted by many of those wh it; No. 1005 is the waterfall view that was at the autumn co

on. Here Mr. Bushby has not done himself justice, though the int is a good example of the Artigue process. In No. 1004, *A unny Day by the Tame*, we have a telling picture of a well-chosen view a tree-fringed river, the one difficulty having been the broad stretch of assy bank, which has been bravely, but, not quite successfully, broken by the introduction of a female figure. *The Herzegovinia Defile*, No. 1001, J. Bushby, again arrested our attention by the unusual sense of large- ss its valley and hillsides produced. J. E. Wilson's No. 996 is a fine presentation of sea and cloud enlivened by the introduction of two ssels. In No. 997, *Staircase Villa de Ceste*, is a noble interior by William arvey. F. E. C. Wilson's No. 996, view of sea and dull cloud, is another cellent example of the Liverpudlian's favourite class of subject; No. 03, by C. F. Inston, is a pretty opal print of small size, whether a rnt-in picture or not we could not say, it was not protected by glass. Finally we arrive at the lantern slides, exceedingly well arranged in a nd of tunnel of dark material, with hidden reflectors behind the slides.

THE WARWICK DRY-PLATE COMPANY.

HE Warwick Dry-plate Company is the name of a new dry-plate house, th manufacturing premises at Warwick. The works, which have been course of preparation for a period of nine months, are now in going der, and the Company are in a position to execute orders. The arwick plates, which are issued at popular prices, are made in one eed only, and that "a uniform one of 25 Warnerke, which is about 100 Hurter & Driffield, and is equivalent to 100 on Watkins' meter, or 78 on ynne's meter." This speed, it is expected by the Company, will be und in practice to be suitable for general use, being fast enough for ick hand-camera work, giving good results with short exposures in the dio, and yet allowing considerable latitude in timing, while a special ocess of manufacture ensures brilliancy and freedom from fog. For ecial purposes the Warwick plates are to be supplied backed. We wish e new Company every success.

Our Editorial Table.

Die Kunst in der Photographie.

Julius Becker, Berlin.

This number completes the first volume, and we must congratulate the publisher upon the high standard maintained throughout. The selection of photographs contained in the present issue is from the English school, and comprises work by Craig Annan, E. R. Ashton, R. W. Craigie, W. Cooke, Karl Greger, F. Hollyer, A. Horsley Hinton, Rev. F. C. Lambert, and F. M. Sutcliffe. It is, of course, impossible to adequately represent the photography of this country in a single part of this work, but the pictures Herr Franz Goerke has selected are typical and great care has been bestowed on their reproduction. The text comprises an article by Mr. A. Horsley Hinton on the English School of Photography, and a thoughtful paper by Herr Richard Stettiner on Portraiture.

The Barnet Plates (Backed).

Elliott & Son, Barnet, N.

Messrs. Elliott are, we think, extremely wise in issuing their plates backed, as the demand that has been created for such plates is, in our opinion, not likely to abate. The advantages of backed over unbacked plates are so easily demonstrated and so generally admitted, that further discussion on the matter is surely not necessary. The sample of Barnet ordinary plates with backing that Messrs. Elliott sent us for trial were coated on the glass sides with a smooth, even, and homogeneous backing mixture. Even though the developer we used was appreciably below 60°, the backing was freely dissolved by the solution, the working powers of which did not appear to be thereby interfered with. A little moistened cotton-wool applied to the glass side of the negative readily removed the whole of the backing, and then, after washing, we were enabled to place in our fixing bath a clear *cliché* that did not perceptibly darken our hypo solution. Messrs. Elliott's backed plates appear to answer their purpose admirably, and will, doubtless, be in great request.

Dr. H. W. Vogel's Handbuch der Photographie.

Gustav Schmidt, Berlin.

Our readers will be pleased to learn that Dr. H. W. Vogel is restored to health, and has published the fourth edition of the third volume of his Handbuch. The volume is entitled *Die Photographische Praxis*, and deals with the construction of studios, dark rooms, apparatus, and the production of negatives by the collodion and gelatine processes. Apart from its usefulness as a reliable guide in the branches of practical photography to which it refers, the volume is of special interest to those interested in orthochromatic photography. The author deals with the colour sensitising of collodion and gelatine emulsions, which branch of photography is peculiarly his own. Modern developers are also considered, and the work throughout has been brought up to date.

Lutte and Arndt's Flashlight Powder.

Agent: C. A. Rudowsky, 3, Guildhall-chambers, E. C.

This new flashlight powder which Mr. Rudowsky is introducing is stated to have many advantages, among them being that it is non-explosive by concussion, gives off very little smoke, and may be ignited without the aid of a lamp. One method of use is outlined as follows: Put a quantity on a tin or cardboard in a line, not all in one heap, place upright in the middle a piece of the saltpetre paper which is enclosed in each tin and light the paper. On emergency in small rooms this method of working, as we know by practical experience, is occasionally very useful.

Diogen: A New Developer.

A. & M. Zimmermann, St. Mary-at-Hill, E.C.

Diogen, the newest reducing agent, is sent out in the form of a light impalpable powder. As recommended, we made up our trial solution according to the following formula which accompanied the sample sent us:—

Concentrated Solution.

Water	1 ounce, 6 drachms.
Sodium sulphite crystallised	5 drachms.
Diogen	77 grains.
Potassium carbonate	380 grains.

Solution for Use.

Concentrated diogen	4 drachms.
Water	2 ounces, 1 drachm.

Our exposures were made in a comparatively poor light, and were under-timed. The developer, therefore, had every chance of showing its possession of energetic working powers, and it came out of the ordeal extremely well. Diogen, so far as we have been enabled to judge from our trials, compares favourably with the best of its competitors in respect of the all-important qualities of a photographic developer for gelatine negatives. By the way, we wish we could prevail upon Messrs. Zimmermann and other houses to compute their formulæ on the grains per ounce principle. It would be a boon and a convenience to thousands of workers in this country.

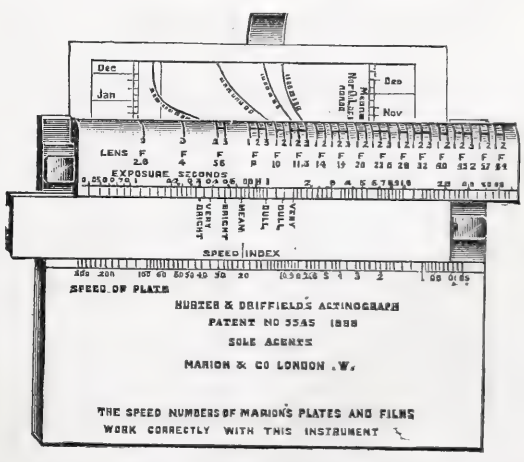
The Actinograph.

Marion & Co., Soho-square, W.

A new form of Messrs. Hurter & Driffield's Actinograph has been introduced by Messrs. Marion. It has the advantage of greater portability than the first form of the instrument, and allows of the use of interchangeable light scales for all latitudes. The light scale is now in the form of a card, having on its back a table of factors, which slides in grooves at the back of the boxwood plaque upon which the data necessary for calculating the exposure are engraved. The main features of the actinograph are thus described: It consists of four scales which correspond respectively with the light, the lens, the exposure, and the speed of the plates.

The light is indicated by means of curves for every day of the year, and for every hour of the day when it is photographically active.

The amount of light, apart from atmospheric influence, is, at any



given hour on any given day, fixed—being merely a function of the sun's altitude. The "H. & D." unit of light is the one-hundredth part of the brightest possible diffused daylight when the altitude of the sun is 90°. This they call one actinograph degree.

The *Lens Scale* shows the ratios of aperture to focal length in general use.

The *Exposure Scale* indicates exposures ranging from one-twentieth of a second to one minute.

The Speed Scale.—The speed of the plates as marked on this scale has no relation to the arbitrary speeds generally spoken of,

but is based upon scientific principles and upon clearly defined units. Messrs. Hurter & Driffield define the speed of a plate as that exposure, expressed in seconds, which, with one actinograph degree of light, will produce a theoretically perfect negative of an ordinary landscape, the light reaching the plate being equal to that reflected by the objects.

Sliding between the speed and exposure scales is a smaller slide. Upon the upper edge of this slide are five points, pointing simultaneously to five different times of exposure. The five points are marked with the words "very bright," "bright," "mean," "dull," and "very dull," and the exposure must be selected opposite that point which most nearly corresponds with the atmospheric conditions at the time of exposure.

Messrs. Marion announce that the Actinographs are kept in stock for the following latitudes:—

0° Equator.—Guiana, Victoria Nyanza, Sumatra, Borneo.

10° North.—Guatemala, Venezuela, Trinidad, Sierra Leone, Ceylon, Southern India.

20° North.—Sandwich Islands, Mexico, Jamaica, Cuba, West Indies, Bombay, Burmah, Canton, South China.

30° North.—State of California, New Orleans, Florida, Bermuda, Canary Isles, Morocco, Algiers, Egypt, North India, Persia.

40° North.—Western States of U.S.A., Chicago, Philadelphia, Portugal, Spain, Italy, Turkey, North China.

47·30° North.—Canada, Newfoundland, France, Switzerland, South Germany, Austria, South Russia.

52·30° North.—North Canada, Great Britain, Belgium, Holland, North Germany.

57·30° North.—North Britain, Denmark, Sweden, North Russia.

62·30° North.—Iceland, Norway, Finland, North Sweden, North Russia.

10° South.—Peru, Brazil, Zanzibar, Java.

20° South.—Bolivia, South Africa, Madagascar.

30° South.—Valparaiso, Buenos Ayres, Cape Colony, Western Australia, New South Wales.

40° South.—New Zealand, Tasmania, Victoria.

In its improved form the Actinograph is decidedly handy to use, and it should be in great request now that attention is being frequently directed to Messrs. Hurter & Driffield's work.

RECENTLY ELECTED OFFICERS OF SOCIETIES.

(*Received too late for the* ALMANAC.)

MONTREAL CAMERA CLUB.—Established 1892; Incorporated 1894. Meetings held at the Club Rooms, 4, Phillips-square, Montreal. *President:* Mr. Frank R. Redpath.—*Vice-President:* Mr. Charles Lester.—*Committee:* Messrs. George McDougall, J. Hamilton Ferns, Albert Holden, Charles J. Fleet, Charles P. Cleghorn, and Alfred W. Cole.—*Secretary and Treasurer:* Mr. A. Clarence Lyman, 157, St. James's-street, Montreal.

OPENSHAW, FAIRFIELD, GORTON AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1897. Meetings held weekly at 528, Ashton Old-road, Openshaw. *President:* Mr. S. Suthers.—*Vice-Presidents:* Messrs. Cluff and Oliver. *Committee:* Messrs. Bowker, Casey, Gunby, Sibert, Townsend, Wagstaffe, Millage, Newton, and Robertson.—*Hon. Treasurer:* Mr. Joseph Robisher.—*Hon. Secretaries:* Mr. Joseph Tilley, 528, Ashton Old-road, Openshaw, and Mr. A. E. Robisher, 60, Vine-street, Higher Openshaw.

News and Notes.

ROYAL PHOTOGRAPHIC SOCIETY.—Technical Meeting, Tuesday, February 22, at 12, Hanover-square, at 8 p.m. "Photographic Manipulation in Radiography." By A. W. Isenthal.

THE AUSTIN-EDWARDS MONTHLY FILM-NEGATIVE COMPETITION.—The prize camera for current month has been awarded to Mr. C. S. Stone, The Woodridings, Pinner, for his negative, *An Old Porch.*

ON Monday evening next, February 21, at the Bolt-court Technical School, 6, Bolt-court, Fleet-street, E.C., the first of the series of lectures by Mr. Ives on "The Mechanical and Optical Principles involved in the Half-tone Process" will be delivered. Colonel J. Waterhouse will take the chair at eight o'clock.

MR. LIONEL KOUGH, of 122, Birchanger-road, South Norwood, writes: "I shall be obliged if you will kindly give publicity to the fact that I have resigned the office of Honorary Secretary to the Croydon Camera Club, and that my successor is Mr. W. H. Rogers, of 106, Holmesdale-road, South Norwood, to whom all communications relating to Club matters should in future be addressed."

THE Third Annual Smoking Concert of the *employés* of Jonathan Fallowfield was held on Friday evening, February 11, at the Swallow Assembly Rooms, Swallow-street, Piccadilly. Mr. Fred. W. Hindley presided, Mr. H. J. White being vice-chairman. The hall was crowded with ladies and gentlemen, for whose entertainment a long and very diverting programme of songs and recitations, a ventriloquial sketch, and other items had been provided. Mr. C. E. Johnson made an excellent accompanyist, and Mr. F. J. Goode, as usual, efficiently discharged the duties of Hon. Secretary. A thoroughly enjoyable evening was passed, and hearty votes of thanks were accorded to the chairman for presiding, and to the artists who had contributed to the programme,

THE Exhibition of the South London Photographic Society will be opened on Saturday, March 5, at 7 p.m., by Sir Henry Trueman Wood, M.A. The awards will be distributed on the following Saturday, March 12, at 3.30 p.m., by Lady Maple. We are requested to remind exhibitors that entries close on Tuesday, February 22.

MR. WILLIAM CURRY, photographer, of Morecambe, died on Saturday, from an apoplectic seizure, at the age of sixty-eight. He was a native of Bolton, and served his time as a mechanic, but subsequently turned his attention to the photographic business, which he had carried on with great success for a number of years. He had photographed many notabilities, including Mr. Gladstone in the act of felling a tree. He was a prominent man in local politics.

PHOTOGRAPHIC CLUB.—Wednesday evening, February 23, at eight o'clock, Travellers' Night. "Glasgow, the Clyde, Estuary, and some of the nearer Highlands," a series of slides illustrating the locality to be visited by this year's Convention. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

BOLTON MUTUAL PHOTOGRAPHIC SOCIETY.—Arrangements have been made to hold an Exhibition for two days, viz., February 23 and 24 next, for which purpose rooms have been engaged at the Co-operative Hall, Bridge-street, Bolton. The Exhibition will consist of three sections: (*a*) Members' Work, (*b*) Invited Works, (*c*) Apparatus and Materials. All exhibits must be delivered, carriage paid, at the Hall not later than noon, November 23, addressed, Mr. Peter Woods, c/o Hall-keeper, Co-operative Hall, Bridge-street, Bolton.

"EVENING TIMES" CAMERA CLUB EXHIBITION, GLASGOW.—The Exhibition of the *Evening Times* Camera Club was opened in their rooms, 46, Gordon-street, Glasgow, on the 14th inst. The Judges (Messrs. W. M. Warneuke, W. Ralston, and L. R. Crosskey) made the awards as under:—Section A (Any Subject, members).—Silver medal, A. Cochrane; bronze medal, A. H. Duncan; extra bronze medal, Robert Burnie; highly commended, W. Louis Primrose; commended, J. M. Ewing. Section B (Club Outing work).—Silver medal, A. H. Duncan; bronze medal, James Douglas; commended, J. and H. F. Christie. Section C (Lantern slides).—Silver medal, William Ritchie; bronze medal, W. Louis Primrose; commended, James Douglas. Section D (Any Subject, open).—Silver medal, Robert Burnie; bronze medal, Charles Sweet; extra bronze medal, A. Cochrane; commended, A. Cochrane. As the list of awards will show, two extra bronze medals were placed at the Judges' disposal, one in Section A and one in Section D, the trial of abolition of classes being a most successful experiment. Profiting by the experience gained at the recent International Exhibition, there are a large number of pictures in sepia and brown tints, and, if we except one or two workers, light coloured mounts are a thing of the past. In the Open Section, the silver medal is awarded to *Tombs of the Kings*, No. 102, by Robert Burnie, an Egyptian scene; the bronze medal is awarded to No. 109, *The Scotsman*, by Charles Sweet, a large picture of an elderly gentleman reading the newspaper of that name; extra bronze medal, *Sunset on the Esk*, No. 113, A. Cochrane, a picture in carbon of the Impressionist school, showing considerable hand-work, the effect is decidedly good; No. 101, *Master Robin Maclean*, by the same worker, is commended; an upright panel picture of a boy, *Silence*, No. 98, is the best picture shown by Charles McDonald; and No. 108, *Coming Storm*, E. L. Brown, is a bold seascape in sepia platinotype. The silver medal in Section A is awarded to *The Farmer's Daughter*, No. 5[illegible] A. Cochrane, a low-toned sepia picture of a figure in the harvest field; the bronze medal is awarded to *A Moorland Solitude*, No. 16, A. H. Duncan, a picture of a Highland moor. This worker is awarded the silver medal in Section B for *Near Loch Libo*, No. 78, and the bronze medal is awarded to *Tranquil Waters*, No. 81, James Douglas.

Patent News.

THE following applications for Patents were made between January 31 and February 5, 1898:—

SHUTTERS.—No. 2434. "Improvements in Photographic Shutters and Mechanisms for Regulating or Varying the Speed thereof." P. E. JOURDAIN.

ANIMATOGRAPHS.—No. 2439. "Improvements in Adapting Animatographs (or Moving Pictures) for Advertisement Purposes." R. E. GILL.

DAYLIGHT LANTERN SCREEN.—No. 2448. "A Daylight Screen for the Optic Lantern by which Lantern Slides may be Exhibited in the Daylight." F. SLATER.

PHOTOGRAPHIC ROLLER.—No. 2465. "Photographic Diagonal Roller." J. SCOTT and G. D. REID.

SHUTTERS.—No. 2543. "Improvements in Shutters for Photographic Cameras." J. SINCLAIR.

PHOTO-PLASTIC RELIEFS.—No. 2570. "A Process for the Direct Transformation of a Photographic Calcographic or Pellicular Autographic Plate into Photo-plastic Reliefs." J. B. J. SEKUTOWICZ.

SLIDE CLIP.—No. 2677. "Lock Clip for Photographic Double Dark Slides or Carriers." E. A. BASEBE.

STEREO VIEW-HOLDER.—No. 2850. "Holder for Stereoscopic Views." WOOD.

LANTERN FRAME.—No. 2906. "A Portable Structure for Shadow Pantomimes, Magic-lantern Performances, and the like." Communicated by Sté. Marty-Delacroix & Cie., styled "Les Ministrels Parisiens." A. BOULT.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

nary.	Name of Society.	Subject.
.....	Bradford Photo. Society	Lecture and Demonstration of Double-coated Plates. J. T. Sandell.
.....	Croydon Camera Club	Extra Lantern Night.
.....	Ealing	*Carbon Printing.* G. Fryer.
.....	North Middlesex	*Modifying the Developer.* George Gosling.
.....	Richmond	*A Few Methods of Improving Negatives.* L. Taylor.
.....	Stafford Photo. Society.....	Demonstration. F. Fowke.
.....	Birmingham Photo. Society .	Social Evening.
.....	Bradford Camera Club	Annual Social.
.....	Brixton and Clapham	Demonstration of the Capabilities of and Method of Working Velox Papers. Messrs. Griffin.
.....	Hackney	Annual Dinner.
.....	Isle of Thanet	Annual Lantern-slide Competition and Exhibition.
.....	Royal Photographic Society ..	*Photographic Manipulation in Radiography.* A. W. Isenthal.
.....	Shropshire	Invitation Exhibition of Members' Slides.
.....	Coventry and Midland	*The River Severn.* C. J. Fowler.
.....	Kingston-on-Thames	*Lantern-slide Making by Contact and Reduction.* S. L. Coulthurst.
.....	Leytonstone	Ladies' Lantern Evening: *Popular Authors and their Work.*
.....	Photographic Club	Travellers' Night: *Glasgow, the Clyde Estuary, and some of the Nearer Highlands.*
.....	Polytechnic	Slides. F. Parker.
.....	Southport	*Retouching.* Part I. George Cross.
.....	Bradford Camera Club	*Rambles in Norway.* J. I. Learoyd.
.....	Ireland	*The Hop Grounds in Kent.* J. A. C. Ruthven—*On the Borders of Italy.* Fred. Eason.
.....	London and Provincial.....	Open Night.
.....	Oldham	*Stratford, its Associations and Surroundings.* J. Brooks and J. Chadwick.
....	Woolwich Photo. Society	Annual Exhibition.
.....	Croydon Microscopical	Conversational Meeting.
.....	West London	Annual Exhibition.

ROYAL PHOTOGRAPHIC SOCIETY.

UARY 15.—Photo-mechanical Meeting.—Colonel Waterhouse, I.S.C., in air.

The Crystal Palace Exhibition.

The Hon. Secretary read a letter from the Earl of Crawford, President of ociety, stating that H.R.H. the Prince of Wales had graciously con- t to open the forthcoming International Photographic Exhibition at the al Palace on Monday, April 25. As this date is two days earlier than riginally announced as the opening day, exhibitors are requested to note e latest date for the reception of exhibits in each section will be two arlier than that stated in the prospectus.

An Editor's Views on Process Work.

Wallace L. Crowdy, editor of the *Artist*, read a paper on "Process duction from an Editor's Point of View," which he prefaced by a theo- preamble dealing with art generally and with some direct bearing upon raphy. After some years of doubt and uncertainty, he said he had at the conclusion that, even if photography, by reason of the nical limitations governing the act of production, could not be as an art, there was no good reason why a photographer should not artist. It might be said in reply to the suggestion that photo- rs were rowing in the same boat with artists, "Yes, but with what dif- sculls;" but the former must show that their *skulls* were not merely fur- with the modicum of brains which the wielder of paint condescended to hem. If one went to the National Gallery on any students' day, and saw ies that were made of Moroni's *Tailor* or Greuze's *Widow*, and then ed them with good photographic reproductions of the same works, ould realise that a good photograph is better than a bad picture. ul for good, however, as is a fine photograph, it can seldom translate and must always be concerned chiefly with *things*, and herein lay the fference between photography and art. The lecturer said he had heard, y good authority, that a certain eminent photographic practitioner, surrounded by some of the most beautiful natural scenery of the home s, never travelled in search of subjects for his camera unless accom- by a lady model and a sun bonnet. In every landscape study by this apher the sun bonnet was to be seen, and it spelt ruin to his reputation. usiast once told an eminent painter-etcher that there were only two tists, Velasquez and himself, and the retort was, "Yes; but why drag in ez?" and similarly said Mr. Crowdy, "Why drag in the sun bonnet?" not quarrel with the photographer referred to, either for travelling lady model or with her sun bonnet, but he did quarrel with the man eleavoured to bring everything in nature down to this level. Next there l a recital of Mr. Watts' definition of art and its aims, and some say- Ruskin, succeeded in their turn by another reference to the "perambu- n bonnet." The sentiment of nature was outraged by the sun bonnet, photographer, instead of adding to the beauty of his picture by the of such an extraneous aid, merely emphasised the fact that he was ating, rather than representing, nature. In his desire to furnish the r with something "nicely arranged," the photographer too frequently art and *things*, whilst the editor wanted only art without the *things*. illustrated by a slide from a print sent by a photographer who had been asked to furnish a photograph of a chair in an exhibition at Venice, and who had sent a picture of the chair almost entirely covered by a piece of white lace, and surrounded by many "accessories." Turning to the consideration of photography in its relation to process reproduction, Mr. Crowdy dealt first with the importance of the arrangement of the subject when such was left to the process worker, and to the danger involved in attempting to arrange things "artistically," and then with the necessity, in rural scenes, of selecting a satisfactory point of view, and of considering the best aspect of lighting, the composition, the question of perspective, the use of short, medium, or long-focus lenses, and the question of whether the foreground or near middle-distance should be sharp. A good sharp silver print was the best for all ordinary processes of reproduction; beautiful as platinum prints are in themselves, the lecturer had seldom obtained good blocks from them. Without a good photograph the process worker could do very little; in fact, no amount of hand engraving on a zinc block could ever give such a satisfactory result as a good half-tone reproduction from a good original; he had watched and wept over the development of the employment of hand engraving upon zinc or copper blocks, for, although the graver might be used with effect at times, the times must indeed be out of joint if it is constantly needed. He was aware of the existence, particularly in the United States, of successful examples of blocks with a woodcut finish, but he thought he could prove that in almost every instance those blocks were bad to commence with, and were only made less bad by the woodcut finish. The meaning of "half-tone" seemed in these cases to be lost sight of, for the moment the graver was set upon a copper or zinc block it cut away the half-tones, leaving solid white lines or spaces; the reproducer who set himself to improve the imperfections of a half-tone engraving might do a good deal to a bad block, but could only do it badly with a good block; he might cast out one devil, but would gather unto himself seven others worse than the first. With the roulette, on the other hand, a great deal might be done to improve a block, for it is a toning machine, and therefore much better adapted than the graver for employment upon half-tone engravings. Concluding, the lecturer emphasised the following points: "Woodcut finish" can seldom improve a good block; "black and white" is not so important as tone and atmosphere; a silver print is preferable to all other forms of prints; the blocks have to be printed upon machines; the original is more than half the battle; makers of photographs for reproduction must consider the proper lighting, focus, and arrangement of the subject; and punctuality is all-essential, especially when dealing with the poor, persecuted art editor.

Mr. W. Gamble said process workers were striving after artistic or technical perfection, but he did not think they would attain that end by hand engraving on the blocks; he believed that the camera, together with the skill of the photographer and of the etcher, ought to render everything that it was possible to render. The process worker experienced much difficulty by reason of the unsuitability of the originals that were handed to him—gum-bichromate prints for instance, which were neither photographs nor works of art. The use of the roulette was not sufficiently understood in this country; Parisian workers were much ahead of us in this respect, although in other process matters English operators were not behind them. The use of "art" paper was a great obstacle to the attainment of the best results, but at present this most objectionable material was a necessity and not a matter of choice.

Mr. W. Thomas said he had found that the best reproductions of his own pictures were invariably made from transparencies, rather than from silver or platinum prints.

Mr. Beeson, as one engaged in the preparation of photographs for reproduction, agreed that the best results were obtained from transparencies, but said that process photographers did not like them on account of extra trouble involved, their arrangements being made for copying paper originals by reflected light.

The Rev. F. C. Lambert was rather surprised that Mr. Crowdy condemned the use of platinum prints for reproductive purposes, his own experience having pointed to the opposite conclusion. He thought it was desirable that process printers should receive some art education, and that they would then be able to treat a particular subject in the manner it required, instead of depending upon "rule of thumb."

Mr. Sanger Shepherd spoke in condemnation of the "woodcut finish;" and

Mr. Crowdy, replying, said he had intentionally omitted reference to photogravure and intaglio methods, which involved an entirely different phase of artistic expression, inasmuch as the printing was not by machinery but by a man who was himself an important factor in the ultimate result. He thought large photogravure reproductions were the most dreadful things in existence, and that purchasers of them had certainly "put their money on the wrong horse." The whole of the photogravure illustrations in Dr. Nansen's recent work, amounting to 36,000 impressions, were printed in Paris by machinery in three weeks, and he understood that two machines of the kind employed for that work were either in use in London or in course of erection. There were at the present moment over six million persons studying art in this country, and he thought this was about enough.

A hearty vote of thanks was passed to the lecturer.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

February 10,—Mr. Philip Everitt in the chair.

Several results having been shown upon the Velox paper, further discussion ensued upon the process.

Mr. S. Herbert Fry, in continuation of previous remarks upon the development of the paper, said he had been inclined to think that, if the paper were developed in a light to which it was insensitive, the importance as to rapid development which the vendor urged would not be necessary. However, by actual experiment, he found that, developed with a weak solution in non-actinic light, there did arise a staining action, owing to the prolonged development. On that point, then, the instructions were perhaps correct, and that to get bright lights it was necessary to develop with a strong solution

and to juggle quickly into the hypo bath. There did not appear to be any possible chance for the exercise of skill in the treatment of the paper. If it were under-exposed, nothing would drag the picture up, it must have a certain sufficient exposure, and then it comes up in a few seconds. In conclusion, there would appear to be no advantage in not following the course laid down and developing quickly.

Mr. Fry showed some prints ranging from black to brown done upon this paper, and gave the particulars of exposure and treatment by which they were made.

The CHAIRMAN said he had received from Dr. Rudolph, of the firm of Zeiss in Jena, three prints from negatives done with the new Planar lens, as specimens of what he had been able to do with it. The examples represented three types of work, and, in his opinion, were certainly very fine. The first was an instantaneous picture of a galloping horse, the exposure being estimated at about one five-hundredth of a second, or even less, and was taken on a 10×8 centimetre plate, at *f*-4, with a focal-plane shutter. Attention was drawn to the sharpness of a strap thrown up by the action of the galloping animal. The second example was typical of the real purpose of the lens. It was a photo micrograph of a spider taken with the Planar Series Ia 2, focus 35 mm., stopped down to *f*-13·5, with a magnification of 31 diameters, the camera extension being about 44 inches. The third example was a slightly reduced copy of a picture (four-fifths of the size of the original) taken with the Planar Series Ia 18, focus 610 mm. = 24 inches, stopped down to *f* 12. The critical definition of all three was remarkable, and there did not appear to be the slightest falling off at the edges in the two latter, which were of considerable size.

Mr. T. E. H. BULLEN took for the subject of his remarks the treatment of lantern plates. As a plate-maker, he had all sorts of queries as to the causes of success and failure, and so proposed to show a number of slides from one negative, giving the formula used and exposure for each slide, with details as to the particular direction in which each different form differed from the others. His remarks taking the form of a running commentary upon each slide as it appeared, and consisting largely of figures and formulæ, it is impossible to do more than refer to a few points. It was a common thing to receive complaints that the user got cold tones on warm plates, and a great number of failures arose from the treatment of these plates with too short an exposure and too concentrated a developer. Another cause of failure lay in the tendency to use an excess of bromide.

In the discussion which followed, the choice of the negative for illustrative purposes made by Mr. Bullen was voted not the best, although, on the other hand, it was remarked that it was a bad negative which would not yield a passable slide. The influence of the particular gelatine used for lantern-slide emulsions received some attention in regard to the question of transparency, the tendency to an overburdening of deposit in the case of warm tones with carbonate, unless the exposure be perfectly adapted to the developer, also being touched upon. The question of the proportion of bromide in the developer was the subject of some remark, especially regarding any staining influence it possessed. It was suggested that, by retarding development, there was a greater risk introduced of the film being stained by the longer contact with the oxidising developer.

PHOTOGRAPHIC CLUB.

FEBRUARY 9,—Mr. E. W. Parfitt in the chair.

Mr W. Thomas showed a lantern-slide box designed by Mr. Bourke, the President of the Leeds Camera Club. The feature of the box is that the lid and the back fold up when the box is opened, and stow away beneath the box itself, leaving the top and one side open, which facilitates the handling of the slides. The slides are retained in the box by the corners by means of upright partitions, but these do not interfere with the free removal of the slides in use.

Some results by the Velox paper were passed round, and a few remarks made upon the process.

Mr. FOXLEE drew attention to an old mechanical print in splendid preservation contained in the January, 1860, issue of the *Photographic Journal*. It was the production of Mr. Joubert, and was by a process which Mr. Foxlee could not recognise. He had examined it for grain, but that present was the grain of the paper itself. Mr. Joubert was an engraver, and the inventor of the powder process of ceramic photography, as also the steel facing of copper plates, by means of which they were made practically everlasting.

Some speculation as to whether it was a photogravure process was made, but definite information was not forthcoming.

Messrs. Thomas, Haes, and Parfitt showed several slides, including examples of landscape, architectural, interior, and lunar photography.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE Fifth General Meeting for the forty-third session of the above Society was held on Thursday evening, February 10, at the Manchester Athenæum, Mr. E. J. WALL (London) giving a lecture and demonstration entitled

COLOUR AND PHOTOGRAPHY.

The President (Mr. J. Wood) occupied the chair.

The members of the Manchester Amateur Photographic Society having expressed a wish to be present at this lecture, it was decided to hold a joint meeting for the occasion. There was a large attendance of members of both societies and their friends.

After giving a few introductory remarks respecting the selection of his subject, Mr. WALL said that, in order to see colour, it was necessary to have light. A beam of white light was thrown upon a small screen, and a prism inserted in front of the projecting lens, the result being an immediate breaking up of the white light into a band of colours. The same effect was also produced by means of a "diffraction grating," a piece of glass ruled with 2000 lines to the inch. By placing cards, on which were gummed a numb of coloured papers, in front of the screen, these colours were altered, but, whe a piece of black velvet is placed in the same position, no colour whatev remains, it being all absorbed. When the light passing through a red gla is allowed to cross the light passing through a green glass, that portion seen almost black, but, if one image be superimposed over the other, i.e., by mea of two lanterns, white light is produced. Whilst the yellow of the spectru is the most noticeable to the human eye, violet and blue are seen best by th photographic plate.

Mr. Wall gave a very full description and explanation of isochromat photography, and also described the method by which he made his own colo screens. Ives's, Lippmann's, Joly's, and the Chassegne processes were ea explained, as also was three-colour printing, and examples were shown in ea case, many of which were much admired by the audience.

Mr J. WOOD called upon Mr. J. W. WADE to propose a vote of thanks Mr. Wall, which was seconded by Mr. H. M. WHITEFIELD; and Mr. WAL after acknowledging the vote of thanks, remarked upon the splendid way which the lanternist (Mr. F. W. Parrott) manipulated the various lanterns.

Croydon Camera Club.—February 9, Eighth Annual Meeting, at the Clu rooms, 106, George-street, a considerable proportion of the members bei present.—The report of the Club's proceedings showed that a number important lectures and demonstrations had been given, several public lante shows (one held for the Croydon Hospital producing the sum of 6*l.* 14*s.* 6 for the hospital funds), and at the end of the year a materially increas balance at the bank and a net gain of seventeen members. The electio resulted as follows:—On the proposition of Mr. JOHN SMITH, seconded Councillor J. NOAKS, Mr. Hector Maclean, F.R.P.S., was unanimou re-elected President of the Club. *Vice-Presidents:* His Worship the May the Right Hon. C. T. Ritchie, M.P., Sir Frederick Edridge, J.P., and J James Glaisher, F.R.S.—*Council:* Messrs. Burn, S. Carley,* Hirst, Isa G. W. Jenkins, Kough,* Councillor J. Noaks, Packham, J. Smith, Chadwi Taylor,* S. H. Wratten, and Watson. Those with an asterisk are new added.—*Hon. Treasurer:* Mr. H. E. Holland.—*Hon. Secretary:* Mr. W. Rogers, 106, Holmesdale-road, South Norwood. On the resignation of office by Mr. L. G. Kough (the late Secretary), Mr. MACLEAN proposed, a Mr. JAMES PACKHAM seconded, the Club's best thanks be awarded hi Amongst other matters brought forward, the meeting, on the motion of W. FENTON FROST, seconded by Mr. JOHN SMITH, adopted a resolut protesting against the Club being associated with Vigilantism, and, on motion of Mr. BRICE, a letter on the subject was approved to be sent to local press.

EXHIBITION OF GUM PRINTS.

The photographic flavour was given to the proceedings by a fine assemblage gum prints which had been collected. They were hung with much taste effect by Messrs. J. Packham and W. H. Rogers. The chief feature was large collection of works by Robert Demachy, consisting of some twe signed prints. Apart from Mr. Demachy's prints, the remainder of exhibits are all by photographers who are, or have been, members of the Cl Mr. Charles Moss's works are so well known, and the examples shown lately seen here, that we need not dwell upon them. The surprise of collection is afforded by Mr. W. H. Rogers, who, although only initiate few weeks in the mystery of gum printing, has produced several large striking effects, which, ranging from figure to landscape, are full of picto import, and certainly obtained much approval from those assembled. James Packham showed the collection he has already favoured the Club w Many of his examples improve upon acquaintance.

Croydon Microscopical and Natural History Club (Photogra Section).—A very pleasant evening was spent with Mr. W. H. Dodd, M.A. Friday last, when he discoursed on the many beauties to be found in the scen of Scotland, which he illustrated by means of 150 slides made from ne at taken by himself during his holiday in the "Land of Cakes." All the sl were good, and many of them extremely beautiful, both technically and torially, as was proved by the appreciation evinced on the part of the aud One excursion, with its illustrative slides, was on the West Coast of Scot and included views in the Island of Arran and of Millport in the Camb The second, and perhaps the most picturesque, certainly the best-know the two, started from Aberdeen, the granite town, followed the Brae Road, past Ballater, Balmoral, and Braemar, on to Killicrankie, some views of river scenery, and other points of interest, including, of cour couple of Balmoral, were shown. Another trip included the celebr Trossachs and Loch Katrine, with Ben Ledi, 2900 feet, on the one side, Ben Lomond, 3192 feet, on the other side. Here, of course, was abun material of lake, river, mountain, and glen for the camera, and Mr. availed himself to the utmost of the opportunities thus afforded. In s those who are anxious to escape from the noise and bustle of town life, to seek recreation among the beauties of nature, at a not prohibitive dist cannot certainly do better than follow one or other of these delightful ro and, if only favoured by the weather, cannot fail to return to the busine life vastly improved, both in mind and body, from their pleasant, if too outing.

North Middlesex Photographic Society.—February 14, the Presider chair.—Messrs. Nesham, Fuller, Cartwright, Clitherow, and Lane were el members of the Society. This was a Ladies' Night, and Mr. GEORGE BIDD of the Brixton Society, gave a lantern lecture, his subject being

PICTURESQUE ESSEX.

Mr. Biddell proved that he had thoroughly studied this very intere county; he showed slides of a variety of subjects, but they were princi of antiquarian and archæological interest. Of course the old churches fi prominently, those of Coggeshall, Rochford, and Benfleet being much adm The old oak porch of the latter the lecturer considered one of the best

d in England. Some interesting bits of Maldon, Dedham, and Ongar wed that pictures in abundance can be obtained at those places. Slides en at Grays during the severe frost of 1895 were admired.

utney Photographic Society.—February 7, Dr. W. J. Sheppard in the ir.—Mr. F. T. Beeson, F.R.P.S., gave a lecture and demonstration on

Carbon Transparencies with a View to Enlargements.

said there were two methods of obtaining an enlarged negative: first, by cing an enlarged positive on an ordinary slow dry plate, and from this, by tact, a carbon negative; and, secondly, by making a positive by contact carbon and from this an enlarged negative in the camera on an ordinary v plate. Personally, he preferred the first method for enlargements of lerate size, say to 15 × 12, as the carbon negative lent itself better to inten- ation than a negative on an ordinary plate. In preparing transparencies, pecial tissue, called by that name, should be used; it contains a larger ntity of pigment than the ordinary. The exposure should always be ample, ut three times as long as for a print. The first step in the manipulation is prepare the glass support. This must be cleaned very thoroughly before g coated with gelatine, and the coating should be done on the hollow side he glass; it is a fact that all glass (except patent plate, which is not gene- y used for this purpose) is not quite flat, and the convex or concave side y be easily distinguished. The gelatine coating is made up of Nelson's 1 (soft), one ounce to twenty ounces of water; this is best made fresh, keeps some time. When the gelatine is dissolved, add of powdered romate of potash sufficient to give the solution a medium sherry colour. rm the clean glass plate in hot water, then flow the gelatine solution over venly, drain, and allow to dry; then, to make the gelatine insoluble, ex- to good daylight for at least ten minutes, much longer will not hurt. coated plates will keep, and a number may be done at a time, so as to be y for use as required. After the sensitised tissue has been exposed, it is rable, but not necessary, to coat it with collodion; this is chiefly to avoid of reticulation and frilling; the transfer collodion of the Autotype Com- y is suitable. The edges of the sheet of tissue should be turned up all nd, so as to form a shallow dish, the collodion poured on evenly, the rfluous drained off at one corner back into the bottle, the coating allowed horoughly set, then immerse in water until all trace of greasiness dis- ears. The next step is to immerse the exposed tissue, collodionised or as the case may be, in cold water, taking the greatest care to avoid water aining a lot of air; the safest plan is to use water which has been oughly boiled and allowed to cool. When well soaked, squeegee the e face down on to the coated side of the glass, squeegee it well on to the s, then place between blotting-paper to dry and for the tissue to attach f to the insoluble gelatine on the glass plate; allow to remain for about nty minutes, then immerse in hot water, about 100° F., for the inning" or removal of the paper backing from the tissue by stripping, development by washing off the pigment and gelatine which has not been e insoluble by the action of the light. If exposure has been ample, develop- t cannot be carried too far. Local development may be done by means stream of hot water squeezed from a sponge or by pouring hot water on ugh a suitable spout. It is desirable to pass the transparency or negative an alum bath, and, when dry, the latter should be varnished, this being olutely necessary when the negative is intended for use in connexion with kind of silver printing paper. The transparencies, whether positive or tive, may be intensified by permanganate of potash, which gives them a what browner tone; in a negative the printing effect of this is greater than d be supposed from appearance, and care should consequently be taken to carry intensification too far. Reduction is done by citric acid. Mr. on handed round specimens of positive carbon transparencies printed in act with the negative intended for use in making enlarged negatives on ary plates in the camera; these, he pointed out, should be developed, so prevent a considerably flatter appearance than would be right for a rn slide. He also showed carbon negatives from positives made by gement in the camera on ordinary plates. The various processes were demonstrated by the lecturer, who, by his skilful manipulation and explanation, clearly proved himself a master of his subject.

chmond Camera Club.—February 7, at which Mr. Cembrano presided.—meeting was devoted to the decision of a lantern-slide competition. e were two classes: Class I. (for three best landscape slides from com- or's own negatives), and Class II. (for best slides from three test ne- specially selected for their difficulty by Mr. Cembrano from his own). Class I. had been adjudicated beforehand by Colonel Gale, Mr. rington being placed first and Mr. Davis second. Class II. was judged e meeting by Mr. Cembrano, two lanterns being used. The competition omewhat keen, but eventually Mr. Davis was placed first, and Messrs. seer and Gibson were bracketed second, Mr. Child carrying off a con- on prize.

rmingham Photographic Society.—February 8.—Mr. G. A. Lyndon a paper upon

The Production of Lantern Slides by the Aid of Exposure Meters.

commencing to make lantern slides by reduction, Mr. Lyndon said, d no doubt many have asked the question, "How long shall I expose?" question that every beginner will ask himself, and "Where and how is find the answer?" I have known many experienced amateur photo- ers and lantern-slide makers unable to gauge the light sufficiently to e them to make the correct exposure straight away, and they often have ke several exposures before a correct one is obtained. Of course there reat deal in development, and, however correct the exposure may be, s the slide is correctly developed, it is not worth much. In order to mine the exposure necessary for lantern slides made by reduction by ght, Mr. Lyndon first treated the density of his negative by means of ye's print meter. Having made a note of the record obtained, he then the correct exposure (by experiments) necessary to obtain a lantern of brown tone. This was done by the aid of Wynne's exposure meter following way. A negative is put out to print in P.O.P., and, when printed to the proper depth, will register, say, 10 on Wynne's print meter which was put out at the same time as the print. When making the lantern slide, it was found that the exposure necessary by the exposure meter was just sufficient to darken the lighter tint to the exact depth of the guide on the meter. A series of experiments gave the following scale:—

Print Meter Number.	Exposure Meter, First Tint.
10	1
11	1¼
12	1½
13 and 14	2
15 and 16	3
A	4
B	5
C and D	6
E	7
F	8
G	9
H	10

A number of slides were shown upon the screen made by Mr. Lyndon, which showed that the method of determining the exposure was very satisfactory, the slides being of a very pleasing colour, and showing a full gradation of tone from shadow to high light. After a lengthy discussion, in which Messrs. Middleton, Hall-Edwards, Harold Baker, and Fowler took part, Mr. Lyndon was thanked for his very instructive paper.

1898. FORTHCOMING EXHIBITIONS.

February	Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
,, 18–26	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
,, 24–26	Woolwich.
March 1–5	Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.
,, 5–12	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30	National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,, 27–May 14	International Photographic Exhibition (Crystal Palace). R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CINEMATOGRAPHY AND ASTRONOMICAL PHENOMENA.

To the Editors.

Gentlemen,—I see a good deal is made of the successful use of a cinematographic apparatus for photographing an astronomical phenomenon for the first time. It is proverbial that old things are forgotten and by nobody more than photographers, and all credit is given to them as new things under high-sounding names. Will you let me, therefore, in allow me to refer you to a paper by my old friend, Dr. Warren De la Rue, the *Monthly Notices of the Royal Astronomical Society* (vol. xxxiv., p. 347), describing a piece of apparatus for carrying out M. Janssen's method of observing the transit of Venus, which apparatus was actually used by several parties in 1874. I cannot give a reference at this moment to the original paper by M. Janssen, to whom the original idea is due; but you will see that, as far as the construction and use of an apparatus for taking a succession of pictures of an astronomical phenomenon in rapid change, Mr. Maskelyne has been preceded; indeed, I do not think that he claimed to have originated the idea, though he has ably availed himself of the advantages modern discoveries have given him.

Of course, M. Janssen's pictures were not meant to be used for show purposes, but purely for the advancement of knowledge by accurate measurement; they did not gain the end, but that was no fault of the apparatus.—I am, yours, &c., J. F. Tennant, *Lieut.-General R.E.*

11, *Clifton gardens, Maida Hill, W., February* 11, 1898.

P.S.—I send for your acceptance a copy of the Roorkee Report.

[The Roorkee Report which General Tennant kindly sent us treats of the preparations for, and observations of, the transit of Venus seen at Roorkee and Lahore on December 8, 1874. General Tennant himself was in charge, and there are references in the report to a method of securing consecutive automatic exposures.—Eds.]

SPECIMENS OF DRY PLATES WANTED.

To the Editors.

Gentlemen,—For some time past I have been working in leisure time on the deterioration of gelatine plates from a biological point of view,

and have got considerably interested in the results. My object in writing to you is to enlist your aid in procuring specimens of films that have been subjected to extremes of temperature in tropical climates. I especially desire such films as show on development large insensitive patches. If any photographer who has returned from a foreign tour in tropical latitudes finds his films in the above condition, and will send me one or two specimens, preferably undeveloped, I will gladly defray cost of post.

Of course, a gelatine plate or film in a moist climate is practically an ideal culture tube for micro-fungi, and I am inclined to believe that these omnipresent organisms are responsible for a good deal of the deterioration observable in plates and films stored in humid localities. At least, I have clearly found such to be the case in some plates I have been working on.

Your assistance in obtaining the above material will be greatly esteemed.—I am, yours, &c., GEORGE T. HARRIS.

172, *Brecknock-road, Tufnell Park, February* 9, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

JOSEPH SMITH; J. HORSFALL; N. C. HARBUTT.—In our next.

E. MOWLL.—We have written him.

A. H. DUNCAN (Glasgow).—We reciprocate.

X. Y. Z.—Communicate with the local superintendent of police, stating the facts as mentioned to us.

FAL.—The alum is recommended presumably for hardening the film. Personally, we do not advise its use.

EMULSION.—The milkiness was probably due to soluble chlorides in the water. Wash finally in distilled water and it should disappear.

FAIRFAX.—Please refer us to the particular page of the ALMANAC on which the apparatus is mentioned. We have failed to trace it.

R. H. MILLER (Gospel Oak).—We do not answer questions through the post. Send us a stamped letter, and we will address it to the writer.

H. W. FROST (Boston).—We do not answer questions through the post. The address of Wood's Washer Company is 73, Lord-street, Liverpool.

HELIS.—No, the process is practically patent-free. Dennison's book on *Photogravure*, published by Iliffe & Son, St. Bride-street, E.C., is the best for your purpose.

WALTER CAMPBELL.—It is against our rules either to reply by post or give such a recommendation as you ask for. Better consult our advertisement columns.

B. B.—Yes; negatives are required to produce positive prints. In the powder process, however, a positive impression is produced from a transparency. This is the one exception to the rule.

PAPER.—W. OSBORNE. We are not sure whether that particular make of paper is to be had in rolls, but any of the principal artists' colourmen will tell you. "Cartoon" paper may be obtained in rolls, and that would, most likely, answer quite as well.

B. L. E.—Yes, they are patented. These and other processes are described in our Almanac for 1898. Practically speaking, any one can work the process, so long as the "patents" that have been taken out are not infringed. But we doubt the validity of those patents.

VARNISH.—GUM. Sandarac is entirely soluble in alcohol, except, of course, mechanical impurities. Not so with shellac; only a portion of that is soluble, hence the turbidity. The undissolved portion must be allowed to subside and the clear part decanted. Or the solution may be filtered, but that will take some time, longer with some samples of lac than with others.

COLLOTYPE.—R. CUMINS. In your initial experiments an expensive press is not at all necessary; any typographic press—say an Albion press, which may often be met with second-hand for a very small sum—will suffice. An ordinary letter-copying press will also answer for small sizes if the paper to be printed upon is backed up with a tolerably thick sheet of soft vulcanised indiarubber or fine printer's blanketing.

OPALINES.—OPALINE writes: "I have for some time been making opalines on gold bevel edge glasses, but have been very much troubled with the photographs leaving the glass, from the edges. I have tried going round the edge of the glass with gelatine and allowing it to dry before mounting, but without much improvement."—In all probability the glass was not absolutely clean. Try more perfect cleaning. Say with Tripoli and alcohol.

RESIDUES.—T. ROBERTS asks: "Could you kindly inform me, in your next issue of the JOURNAL, the best method of extracting gold from old toning baths, or if there is a book published on the matter?"—Add a solution of protosulphate of iron to the solution, and the gold will be precipitated. It may then be collected and sent to the refiner. No book is published on the subject, but much has appeared upon it in the JOURNAL.

GUM BICHROMATE.—C. WELLS. If the pigment does not dissolve off after several hours' soaking, and not then when warm water and a brush is used, the coating, for some reason or other, has become insoluble. Possibly through over-exposure, or, more probably, from the paper being kept too long, or the gum solution being acid.

PRINT.—W. WARDALE says: "Enclosed is a print; kindly give an explanation as to what paper it is, and what bath it was toned with, and the preparation of same."—The print is in such a mutilated and dirty, crumpled condition, that it is impossible to say on what paper it is or how it was toned. It seems, however, to be a gelatine paper.

PORTRAIT LENS.—C. F. EVERITT says: "I beg to again avail myself of your kindness through the Correspondence column of the JOURNAL. Your advice to 'Portrait Lens' is, in your last issue, 'The simplest way to shorten the focus of your lens is to interpose at the stop a slight double convex spectacle lens.' Could this be used for copying and occasional portraiture if done with a twelve-inch portrait lens of good make, and would it need mathematically centering by an optician? Thanking you in anticipation."—Yes. The better the centering the better the performance of the lens will be.

VARNISH.—C. H. H. (Gateshead-on-Tyne) says: "Some years ago I made from a receipt in, I believe, one of the B. J. ALMANACS, a very satisfactory leather varnish, which I used for bellows and leather-covered boxes, lens caps, &c. I have looked, but in vain, during the last few days, through the Year-books I have by me, but cannot find the formula. Can you give it me in next week's issue, as I want to make up another bottleful? Thanking you in anticipation."—We do not remember the article in question, but such a varnish may be purchased of any of the dealers in bookbinders' materials, and, no doubt, it would be cheaper and better to purchase it than to make it in small quantities.

COPYRIGHT.—R. C. writes: "Eight or nine years ago I took a photograph of an old church that has since been pulled down. I registered the copyright at the time, but have paid nothing since to keep it in force. Recently a local paper has given a reproduction of this photograph, and is about to publish a larger copy of it as a separate picture. Can you tell me if there is any means by which I can restore my copyright without any great expense?"—Your copyright has not lapsed. It endures during your life, and for seven years after your death. When a copyright is once registered, no after-payments are necessary to keep it in force. Copyright and patent rights are totally different things and you are evidently confusing the two. The latter have to be kept alive after the first four years by further payment, not the former.

SUN IN STUDIO.—LESS LIGHT writes: "My studio is due south, and eight months of the year I am troubled with too much sun. At present it is glazed with plain glass stippled with whiting and starch, but this soon gets discoloured and scratched. Could you recommend any special glass that would effectually keep the sun out? if I remember rightly you did in the JOURNAL about twelve months ago recommend a special glass suitable; also, would it be best to have calico (white) blind between the dark green ones and glass?"—The best way would be to glaze the studio with ground glass—or to have thin muslin blind between the dark ones and the glass. If the sun is very troublesome, we would, perhaps, be advisable to have both the ground glass and the muslin blinds.

LIGHT; INTENSIFICATION.—G. M. ILIFF writes: "1. I notice in an article in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC by W. H. Walmsley, p. 792, in comparing light in photo-micrography, he gives the incandescent gaslight as ten times the effect of paraffin. I find an ordinary micro lamp, with a five-eighths-inch burner, using the edge of flame, quite as effective as the Welsbach, besides giving better definition as being more convenient in use (no mantle to give its image on the negative). If flat of flame is used, light, of course, is not nearly so good. 2. In THE BRITISH JOURNAL OF PHOTOGRAPHY (December 17, 1897, page 807), an article appears on 'Silver Intensification of Gelatine Negatives or Lantern Plates.' Is there not a mistake as to strength of silver solution (¼ ounce of silver nitrate to 3 ounces of water)? Even as suggested, diluted (mixed solution) to three times original volume with water, it leaves 6 grains silver nitrate to each ounce of mixed solution. I find with dry-collodion plates ½ grain of silver nitrate to the ounce strong enough to build up from a very weak image."—1. Mr. Walmsley recommends the acetylene light in preference to either. 2. The formula given is for gelatine plates, and not for dry-collodion plates; these require quite different treatment.

MARIOTYPE.—HUNTLEY writes: "In your issue No 1960, November 26, 1897, p. 755, in a leading article, 'An Overlooked Property of Bichromated Gelatine,' half way down column, you write: 'The first process, matrix type by pressure,' briefly is this: A sheet of paper, coated with gelatine *et seq.*' I should feel extremely obliged if you will specify (1) the best kind of paper; (2) give the formula for preparing the gelatine; (3) how to apply the gelatine to the best advantage, or if commercially prepared gelatine-coated paper suitable for the process is procurable and where? (4) Further down you mention 'an alum-bichromate solution' as being applied to the paper. Query, which is the best alum to use, or would chrome alum do? I must apologise for being so troublesome with these questions; can only plead as an excuse my wish to get accurate and reliable information, as I want to practise the process if I can get into the right way."—In reply: 1. Any good quality paper, such as the Saxe or Rives paper. 2. Simply dissolve the gelatine in water in such proportion as will give a surface when dry about equal on albumenised paper. 3. Place the warm solution in a dish and float the paper upon it. We are not quite sure if paper, coated with pure gelatine, is supplied commercially. The Autotype Company would, doubtless, make it to order. 4. Either potash or ammonia alum will

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1973. Vol. XLV.—FEBRUARY 25, 1898.

Contents.

PAGE

ATHEDRÂ 113
STEREOSCOPE AND ITS RESUS-ATION: A CAMERA WANTED ... 115
ERETTES:—
omposition of Auric Chloride Dilute Solution—The Queen d Photography—The Forthming International Exhibition Paris—Weather Forecasting—ewgate Prison 115
GN NEWS AND NOTES:—
eloped Chloride Prints—apanese Paper—Acetone and ldehyde—Paste—Photo-micro-raphy—Protecting Drawings... 116
THEORY OF THE LATENT GE. By E. Banks 117
Y DEMONSTRATIONS AND TURES.—I. By Hector Mac-F.R.P.S., F.G.S. 118
URSE OF FIELD WORK. By hew Surface 119
ATENT IMAGE AND ITS DEVE-ENT. By F. Hurter, Ph.D., . C. Driffield 120
NOTES ON LENSES AND OCHROMATISM 122
ARWICK DRY-PLATE COM-'S COMPETITION 123

PAGE

OUR EDITORIAL TABLE:—
The Aerograph 123
NEWS AND NOTES 123
PATENT NEWS 124
MEETINGS OF SOCIETIES:—
Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—North Middlesex Photographic Society—Bradford Photographic Society—Moseley and District Photographic Society—Newcastle-on-Tyne and Northern Counties Photographic Association—Oxford Camera Club—Plymouth Photographic Society—Sheerness Camera Club—Wirral Photographic and Scientific Association 124
FORTHCOMING EXHIBITIONS 126
CORRESPONDENCE:—
Simultaneous Developing and Fixing—Keeping Properties of Gelatine Pellicle—Cinematography and Astronomical Phenomena—The Brussels Exhibition—"The Other Side"—Photographers' Price-lists 126
ANSWERS TO CORRESPONDENTS 128

EX CATHEDRÂ.

THE Dansac-Chassagne process of "photography in natural ors" (save the mark!) was launched upon a startled rld under eminent auspices, exactly a year ago, and after t length of time it has finally found its proper place and e even in the United States, the climate of which is uarly congenial to the cultivation of spurious natural-or photography, as the Reverend Mr. Hill conclusively ved about half a century ago. For the benefit of the dis-guished men of science, the *soi-disant* "experts" who ridly wrote about the "process," the editors of certain newspapers and others who helped to blow the Dansac-gne bubble, we draw attention to the fact that Messrs. hny, of New York, are announcing that the Radiotint ic for colouring photographs are now ready for sale and vy.

* * *

"THIS process," they say, "is applicable to prints on en and on gelatine papers and to positive transparencies gelatine films. For the former any good print may be used, t and toned in the ordinary manner. It may be either mounted or unmounted. For positives on glass a vigorous transparency is required. *Any good commercial plate seems to answer the purpose*, and any developer may be employed which will give clear shadows. The film should be hardened with formalin. *The process is not an automatic one;* it is therefore necessary to know the colours of the original. *A very little practice will enable the operator to gain facility in the application of the colours.*"

* * *

IF the italicised passages in the foregoing paragraph are read by the light of the "selective colour absorption" theory of a year ago, he would be a solemn person indeed who could refrain from laughing heartily. Messrs. Anthony go on to say: "The Radiotint liquids are four in number—colourless, blue, green, and red. The colourless liquid is used to prepare the prints to receive the coloured liquids and as a dilutant for them. Practically any shade can be obtained by the use of the coloured liquid, singly or in combination with each other, in varying proportions. The colours are permanent and of great delicacy, and, as they are transparent, all of the beauties of the original photograph are preserved. Lessons in the application of the Radiotint colours will be given at our New York office to purchasers, and samples of the work can be seen there. Full directions for use accompany each box of liquids." Finally, for five dollars, you get sufficient liquid to colour fifty cabinet photographs! And this is the process that has "solved the problem of photography in natural colours!" Oh, Dansac! oh, Chassagne! What nonsense has been uttered in your names!

* * *

WE may add in this connexion that Radiotint is now available for commercial purposes in this country, the necessary materials being obtainable from several firms of photographic dealers. As we wrote of it upon its first introduction, it is a method of colouring photographs that produces very good results in skilful hands; and, obviously, the more skilful the operator the better. Coloured photographs, we observe, have a great attraction for the general public, and consequently there is no reason why Radiotint or any similar method should not have considerable vogue among professional photographers.

* * *

To the older readers of this JOURNAL, as well as to photographers generally, the February number of the *Journal of the*

Franklin Institute should be of great interest, for it contains a brief memoir of the late Matthew Carey Lea, together with an admirably executed portrait of him in half-tone. Last year, when Carey Lea died, our own pages contained an appreciative account of his photographic labours, which in interest and importance, have perhaps not been excelled by any other worker. The memoir under notice rightly says of Carey Lea that "his contributions to this branch of science (photography) were numerous and some of them of such capital importance that they secured for him a world-wide recognition as one of the half-dozen pioneer investigators who had laid the scientific foundations of photography." The *Journal of the Franklin Institute* is published at the Institute, Philadelphia, and those desirous of securing a portrait of Carey Lea should purchase the February number, price fifty cents, postage, of course, extra.

* * *

A PHARMACEUTICAL contemporary is endeavouring to encourage the metric system by pharmacists in their daily business. It points out that recent legislation has made the use of the system legal in British commerce, but the mischief of a permissive system is that what is permitted is often, as a matter of convenience, ignored; and there is little doubt that the mere permission to use metric weights and measures in trade will prove futile in encouraging the general adoption of the system. The suggestion is offered, therefore, that pharmacists should neglect no opportunity of familiarising themselves, and those with whom they come in contact in the course of their business, with the more rational weights and measures that are now legal, the more especially as they appear destined, sooner or later, to supplant the older weights and measures entirely. With the view of encouraging and assisting the reform indicated, it is proposed in future to give all quantities in the pages of our contemporary in accordance with the metric system, and the change will be effected in its entirety at as early a period as may prove convenient. After the new Pharmacopœia is published, there will be no excuse for British pharmacists to plead unfamiliarity with the metric system.

* * *

A BIRMINGHAM contemporary draws attention to the fact that the new General Hospital at Birmingham, which has been designed on the most modern lines, has very early felt the necessity of adding a new section which had not been provided for in the original design. This is a radiographic department, which will be in the charge of Dr. J. F. Hall-Edwards, who has been appointed surgical photographer and radiographer to the hospital. Dr. Hall-Edwards was the first in Birmingham to successfully experiment with the Röntgen rays and their application to surgery. We congratulate Dr. Hall-Edwards on his appointment; he has done good and useful work in radiography, both practically and with his pen.

* * *

Nature informs us that Professor George M. Stratton, of the University of California, has made a novel experiment in inverted vision by wearing for eight days a mask fitted with lenses which invert the visual image, thus projecting it upon the retina in an erect instead of the normal inverted position. He soon learned to refer all objects to their correct positions, in other words, to see them right side up; but, on removing the apparatus at the expiration of eight days, everyth appeared to be upside down at first. He therefore conclu that the seeing of objects right side up is due to a men rectification of the visual image actually projected upon retina.

* * *

THE Croydon Vigilants appear to have duly held their m ing for the purpose of bringing pressure to bear on the licens authorities to forbid the sale of intoxicating liquors to child under the age of thirteen. It was a stormy and almost riot meeting, at which the "Vigilants" quite clearly cut less cre able figures than their opponents. A Croydon paper hints t great warmth of feeling had been aroused owing to announcement of the intended exhibition of photograph children entering and leaving public-houses. There were l calls for those photographs throughout the proceedings, and last, towards the close of the meeting, they were produ Our contemporary, the *Croydon Advertiser*, whose colu appear to have been recently almost monopolised by the do of Vigilantism, gives the following account of the photogra interlude at the meeting referred to:—

"Above the noisy Babel was heard loud calls for the 's shots.' Mr. Docking: You can have the snap-shots if you listen. The lights were lowered, and the lantern operator, who the gallery at the back all to himself, now rapidly exhibited slides. There were said to be about a score of Croydon 'snap-sh but few were recognised, as the features of the children and signs of the public-houses, where such came in the photogra had been purposely obliterated. Added to this, the ca screen was in a continual waving motion, and the pic succeeded each other so rapidly that identification was possible. [We (*Croydon Advertiser*) have since been priv shown the whole of the photographs exhibited, and so v are the pictures that very few Croydonians could reco them. Most of the children were in clean frocks and pina betokening that the 'shots' were 'snapped' on Sund After this the meeting dispersed quietly enough, but a crowd remained in the vicinity for a long time. A s posse of police were at hand, and spread their sheltering over prominent 'Vigilants,' who feared the attentions o crowd." Even the unedifying squabble at Croydon will produced some good if it brings home to amateur graphers the wisdom of self-restraint in the use of their cameras.

* * *

DURING the Yarmouth meeting of the Convention w several opportunities of observing the very able man which Mr. Charles L. Burdick, the inventor of the Aero manipulated that instrument in the finishing of photog and the production of portraits, &c., without a photog basis. On the morning when the Dansac-Cnassagne p was being demonstrated by the ladies from Paris, Mr. B produced a photograph in colours simply by the use Aerograph, the hand piece of which was successively c with three coloured pigments, red, blue, and green Burdick's result was in every way excellent. He ha been good enough to hand us a finished specimen of h in colouring portraits by means of the Aerograph. The the picture is a platinum print—the portrait of a lad, the colouring has been applied with a combination of c skill which has conduced to the production of a

able result. The fineness of the details in colours, and eauty and truthfulness of the total effect, especially in the tints, are very remarkable. Unquestionably, as we k elsewhere, the Aerograph in skilful hands is capable of ng the most charming results in colour as well as in and white.

HE STEREOSCOPE AND ITS RESUSCITATION: A CAMERA WANTED.

RTNIGHT ago, in a leaderette, we commented upon the prise of a French firm in sending out an artist to Pales- Egypt, and elsewhere in the East, to secure stereoscopic res, and pointed out that this firm must have pretty confidence in the revival of the stereoscope. We also ssed some surprise that amateurs should show so little st in stereoscopic photography, seeing that a stereo- hand camera need not be much larger than the majority present quarter-plate-size hand cameras.

ere seems to be a very general impression that a stereo- camera must be a bulky and heavy affair, and we all that everybody likes to have his apparatus as light and act as possible. Indeed, a correspondent writes, anent was said a fortnight ago, that he has been deterred from scopic work on account of the bulkiness and weight of pparatus, and adds, that "a stereoscopic camera must be e, at least, the size of a quarter-plate one." This, we ware, is a very prevalent idea with many photographers present day, and it, no doubt, has arisen from the fact f late years all the best makes of half-plate and $7\frac{1}{2} \times 5$ as are fitted with a removable diaphragm, to enable a scopic picture to be taken on the full-size plate when d, though, when that is done, a plate of nearly double quisite size has, of course, been used.

standard stereoscopic size is, and always has been, six ree-quarter inches by three and a quarter, and all the old scopic cameras were made to take plates of that size, at size only. The standard size of the mounts is also se dimensions, and the usual form of stereoscope will ke larger. That is also the size of the celebrated glass arencies of Ferrier-Soulier, and others. Where, then, advantage of using a large plate when the picture itself be cut down to the standard size? Even the six and quarter inches is an unnecessary length, because the of each half of the picture must not exceed about two and quarter inches. However, we should not suggest cur- the length of the plate more than a quarter of an inch, that *would* be a convenience, as then, when cut in two, uld have the standard-size lantern plate, three and a r inches square.

shorter dimension of the standard stereoscopic plate, it noted, is exactly the same as that of the quarter-plate e and a quarter inches—while it is but two and a half longer. But, if the length of the plate were reduced to a half inches, it would only be two and a quarter inches than the quarter-plate. It will now be seen that a copic camera to take the standard-size plate—and there dvantage in using a larger, as that allows ample scope ming off marginal defects—need only be about half as gain as a quarter-plate one, while its other dimension precisely the same.

e is yet another point in connexion with the size of the to be alluded to. The lenses more generally used on quarter-plate hand cameras are usually about five and a half inches equivalent focus. Now this is undesirably long for stereoscopic pictures. A lens of four and a quarter inches focus will include on the base line of three and a quarter inches the same amount of subject as is included on the base line of a quarter-plate by one of five and a half inches. But it is better for stereoscopic purposes to include a somewhat wider angle than that, and a lens of not more than four inches, or even less, is preferable. In the catalogue of a leading London house, now before us, rectilinear lenses for stereoscopic pictures are quoted as of two, two and a half, three, and four inches focus.

We have already shown that a stereoscopic camera need not exceed in length that of a quarter-plate one by more than two and a quarter inches, or two and a half with the present standard-size plate, and it will now be seen that the length, from back to front, may be curtailed by at least an inch and a half, so that a hand camera need be but a little more bulky, and not much heavier, than an ordinary quarter-plate one. By reason of its shape—being less of a cube—it will be more convenient to carry than the latter.

Armed with such a camera, the worker would be provided with the means of taking a dozen stereoscopic negatives, or two dozen lantern-size ones, and it is for the lantern that the majority of quarter-plates are used in hand cameras. The only material increase in weight would be that of the plates themselves. They will, of course, weigh about fifty per cent. more than the quarter-size ones, but that, after all, only amounts to a few ounces. Such a hand camera as has been suggested, if put upon the market, ought to command a ready sale amongst amateurs, and thus help the resuscitation of the stereoscope.

Decomposition of Auric Chloride in Dilute Solution.—Mr. E. Sonstadt writes in the *Chemical News:* "It is stated in chemical text-books that solution of auric chloride is decomposed by exposure to light with separation of gold. This reaction I have not obtained, possibly either because my solution was not exposed to light long enough, or because it contained free hydrochloric acid, as ordinary auric chloride, dried on the water bath, was used. But the same solution which failed to react with moderate exposure to light gave a precipitate of gold on heating for some hours. I then dissolved one part of the chloride in about 15,000 parts of water, which had been first distilled in the usual way, and was then coloured by addition of a small proportion of bichrome, and again distilled in a glass retort adapted by grinding to a glass receiver, every care being taken to exclude organic matter. The solution behaved on heating exactly as in the former case, gold being precipitated. In both cases a trace of hydrogen peroxide was detected in the solution after the reaction had taken place. If the reaction took place without heating, it is reasonable to suppose that the H_2O_2 produced would be much more easily recognisable. The reaction appears to be entirely analogous to that which I have shown to take place when platinic chloride is similarly heated in dilute solution (see p. 79; also *Proc. Chem. Soc.*, 1898, p. 25). In the latter case the reaction is expressed by the equation—

$$2PtCl_4 + 6H_2O = 2PtCl + 6HCl + 3H_2O_2;$$

while the corresponding equation for the auric chloride would be—

$$AuCl_3 + 2H_2O = AuCl + 2HCl + H_2O_2.$$

But as aurous chloride decomposes (as is well known, when heated with water) into gold and auric chloride, gold only is precipitated. It seems probable that the indicated reaction is a general one for the higher chlorides of metals of the platinum group."

The Queen and Photography.—Her Majesty, it is known, recently at great inconvenience to herself visited Netley Hospital

to see personally her wounded soldiers from India. Since then the Queen has desired that a photograph of each of the men should be supplied to her with, written on the back of the portraits, a short history of the case. It is scarcely necessary to say that the men were very much touched with the honour done them by their sovereign. The work will forthwith be put in hand. Photography once more proves a link between the Queen and her subjects, and a good one too, which those who have served their country will not fail to appreciate.

The Forthcoming International Exhibition in Paris.—A.D. 1900 is still two years ahead of us, and much may occur in the mean time, but our Parisian friends are preparing for their Exhibition, which they hope to make the best ever held. Last week the first meeting of the Royal Commission in England was held at Marlborough House, under the presidency of H.R.H. the Prince of Wales. This Exhibition will differ very materially from any that has previously been held. There will be eighteen groups, comprising 120 classes, and, instead of each country having a separate section to itself, the various products from them will be shown together. For example, the photographs from all parts of the world will be shown together in the Photographic Section, and not, as in previous exhibitions, in the section of the country of their origin. The same with all other products. In previous International Exhibitions English photographers have not scored much, except in landscape work, over their Continental *confrères*. On this occasion it is to be hoped they will in other branches of the art.

Weather Forecasting.—The Annual Report of the Meteorological Department was issued on Thursday last week. It must have taken a long time to complete, for it is only up to the end of March *last* year. It states that of the weather forecasts only fifty-four per cent. were a complete success, twenty-seven per cent. a partial success, thirteen per cent. a partial failure, and six per cent. a complete failure. From this it will be noticed that but little over one half of the forecasts issued were really successful, although they were for the next twenty-four hours only, and that they took effect from the time they were issued. Now, it does not require much weather wisdom in fine dry weather to prognosticate what it will be for the next few hours, nor does it when it is in a stormy and unsettled state, even if one does not possess a barometer. If one is in doubt on the matter, an old boatman, coastguard, farmer, or cabman will supply the information for his particular district quite as near as many of the forecasts issued from the Meteorological Department.

The report says that twenty-seven per cent. of the forecasts were "partial successes," and thirteen per cent. "partial failures." Many would, doubtless, like to know where the line between them is drawn, where the one ends and the other begins; also how the terms we often see in the daily forecast, "possibly," "probably," &c., are counted in the report, whether they score as complete successes, partial successes, or partial failures? So far as the Metropolitan district is concerned, it was casually remarked to us, more than once lately, that the daily forecasts seemed to be based upon the rules of contrary. With regard to the storm warnings round the coast, they seem to have been more successful than the inland ones.

In the next Estimates a grant of some fifteen or twenty thousand pounds will be asked for the Meteorological Department, and some may have different opinions as to whether full value is received for the money so far as the daily forecasts are concerned, and whether they could not be more localised; this is a matter that photographers are more directly interested in. For example, London, with its five millions of inhabitants, would like to know, approximately, whether to take out an umbrella or a walking stick; the photographer to journey a few miles out with his camera with some degree of certainty as to the weather. The daily forecasts as issued for London figure as England S. (London and Channel). With the great number of stations throughout the kingdom, the Departm one would think, could issue a more reliable forecast than it d for, say, a radius of thirty or forty miles of its centre at Westmin

Newgate Prison.—For years past it has, from time to ti been rumoured that Newgate is to be pulled down, and dur the last week or two the rumour has again become current, with seems, some substantial ground. Now, this prison is not a turesque object—prisons rarely are—but it would be a pity tha should pass away without some good photographs of it, both exte and interior, being secured, as they would be of interest to fut antiquarians, the latter especially, as the cells have contained s of the most notorious criminals of the present century, and som the precincts their bones. This is a gruesome subject, but still not without interest historically. The London prisons are appearing one by one, and it is probable that fewer photograph them are in existence than any other metropolitan buildings have been demolished. Photographs of the old Fleet Prison graphically described by Dickens, would now be very interest but we doubt if there are any, and we doubt if there are of the White Cross-street Prison, the Compter, the House of Detention perhaps even the House of Correction, or Millbank. Hith prisons have received but little attention from photographers, as have not lent themselves to the picturesque; but, now that a cult has started that sees "art" in foggy mornings, flat swamps, r days, and other dismal subjects, even old Newgate may rec "artistic treatment" at its hands.

FOREIGN NEWS AND NOTES.

Developed Chloride Prints.—The *Photographische Mit lungen* reproduces an article by Dr. H. W. Vogel, in whicl reminds photographers of the advantages of the development cess. Prints may be thus produced with comparative rapidi dull winter weather, and they are more permanent than printed and toned in the ordinary way. As evidence of practical utility of development, he instances the work of M. of Judenburg, who uses it exclusively for his landscape photogr Obernetter, the originator of the collodio-chloride printing pr made it known that, after short exposure, prints of good qu might be obtained by development. Two prints in Dr. H Vogel's possession, made by Obernetter and by Helff, twenty and ten years ago respectively, are as bright and as fresh as Dr. R. E. Liesegang is also a warm advocate of the developme prints, and we have published an important article by him o treatment of gelatino-chloride prints. Dr. H. W. Vogel give following directions for prints on celloidin paper. In winte exposure of two to five minutes, according to density of negat sufficient. Valenta's hydroquinone, or preferably pyro deve may be used, viz.:—

Water	1000 c. c.
Sulphite of soda	100 grammes
Pyro	10 „
Citric acid	11 „

If more exposure is given, the developer should be di Hanneke recommends the immersion of the prints, immediately development in a five per cent. bath of salt and water, fo minutes. After washing, tone with the following combined b

Water	450 grammes.
Hyposulphite of soda	100 „
Sulphocyanide of ammonium	13 „
Acetate of lead (12½ per cent. solution)	25 c. c.
Chloride of gold (1 per cent. solution)	35 „

The developed prints are a yellowish-brown. After immersi about ten minutes in the toning bath they are yellow, and the through shades of red-brown to purple. Dr. Vogel advises t of freshly prepared paper.

Japanese Paper.—In the *Photographische Chronik* att is drawn to the peculiar properties of the Japanese paper by the name of Usuyr & Gampi. Its fibre is very long and t the material less susceptible to injury in the wet state than

photographic paper. As it is very absorbent, it should be sized with a strong resinous solution before use. The following is recommended:—

Water	480 c. c.
Gelatine	24 grammes.
Chloride of ammonium	5 „
Alcoholic solution of gum sandarac (10 per cent.)	120 c. c.

The gelatine is dissolved in the water by heat, the ammonium chloride added, and finally the sandarac solution with considerable stirring. Sensitise with an ammonio-nitrate bath, containing 20 parts of silver to 100 parts of water, adding sufficient ammonia to dissolve the precipitate first formed by the ammonia. Print deeply till the image has sufficient strength by transmitted light, and then tone, fix, and wash in the usual manner.

Acetone and Aldehyde.—Dr. E. Vogel offers some remarks in the *Photographische Mittheilungen* on the substitution of these substances for the alkalies in developers. A fault of alkaline developers, especially those containing caustic potash or soda, is their liability to cause frilling. The developers now recommended by Lumière and Seyewetz are quite free from this defect. Dr. E. Vogel has found the pyro-acetone developer, made according to the following formula, excellent:—

Distilled water	500 c. c.
Sulphite of soda	200 grammes.
Concentrated sulphuric acid	10 drops.
Pyrogallic acid	14 grammes.

This pyro solution is similar in composition to that used in development with carbonate of soda, excepting that the amount of sulphite is doubled to avoid staining the film. For use, take 15 c. c. of pyro solution, 5 c. c. of acetone, and dilute with water to from 50 to 120 c. c. Bromide of potassium is unnecessary if the plates are free from tendency to fog. Vigorous plates develop best with a solution diluted to 120 c. c., and the image then appears slowly. The negatives are of the wet-collodion character. With less water, development is accelerated. The acetone acts similarly to carbonate of soda. In excess it gives detail and softness, but if sparingly used it tends to density. The developed plates repel water, and should be washed until they become absorbent and water flows freely over them. The alum bath is unnecessary. The developer should be of value for films, which often show a tendency to frill and strip. It is not necessary to use the purest acetone, which is expensive. Acetone, with a boiling point of 56° to 58° C., costing in Germany about 1*s.* 10*d.* per kilo., is sufficiently good. It is an excellent developer for paper if diluted, and gives a pure black tone. The aldehyde developers have, on the other hand, a resemblance to those containing caustic alkali, their action being very rapid. They require considerable additions of bromide of potassium to prevent fog. The colour of ethylaldehyde, or formaldehyde-hydroquinone negatives is blue-black.

Paste.—The *Deutsche Photographen-Zeitung* has a note on the preparation of mountants, prompted by the refusal of a photographer to accept some mounts from which the photographs became detached in burnishing. The fault was in the preparation of the paste. It is usual to rub the starch into a paste with cold water and then add a certain quantity of boiling water. But a more adhesive paste may be made in the following manner. Ten parts of starch are rubbed down in 100 parts of water and heated to boiling point, one part of gelatine, cut as fine as possible, is added just before boiling. The paste should be freshly prepared each day, but the addition of one part of carbolic acid, stirred up in ten parts of alcohol, will preserve it for a considerable time.

Photo-micrography.—The *Moniteur de la Photographie* publishes the following process for very fine work, where gelatine plates are unsuitable. Dissolve:—

Ether	400 c. c.
Alcohol	400 „
Collodion	3 grammes.
Iodide of ammonium	4 „
Bromide of ammonium	1 „

The collodion should be rather thinner than for ordinary wet-plate work. After coating, the plates should be sensitised in a seven or eight per cent. silver bath for twelve to fifteen seconds. After washing and draining upon blotting-paper the plate is flowed over with the following:—

Albumen	150 c. c.
Water	15 „
Iodide of potassium	3 grammes.
Ammonia	5 „
White sugar	2 „
Iodine	a small crystal.

After drying, it is immersed for fifteen seconds in the silver bath consisting of

Water	100 c. c.
Nitrate of silver	10 grammes.
Acetic acid	10 c. c.

The plate is then thoroughly washed and dried. With care the plates will keep good for twelve months.

DEVELOPER.

Water	100 c. c.
Gallic acid	0·3 gramme.
Pyrogallic acid	0·1 „
Alcohol	2·5 c. c.

The exposed plate is immersed in this bath for ten to twenty seconds. One or two drops of a two per cent. solution of silver nitrate are then added to each 100 c.c. of developer, when the image will appear. As soon as sufficient density is secured, wash, fix, wash and dry. Very fine positives may be made with this formula.

Protecting Drawings.—It is recommended in the *Industrie-blätter* to use collodion for the purpose. Two per cent. of stearine is added to ordinary plain collodion, and the drawings are laid upon glass or board, and coated in the usual manner. They dry with a matt surface and may be washed without fear of injury.

THE THEORY OF THE LATENT IMAGE.

THE valuable paper recently read before the Royal Photographic Society by Messrs. Hurter & Driffield opens out once more one of the most difficult and perplexing problems of theoretical photography. I refer, at present, only to that portion of their paper devoted to the constitution and properties of the latent image. This is a subject which has received the closest attention and examination of the most eminent chemists since the discovery of photography.

In the very early days when the darkening of silver chloride by exposure to light was the principal phenomenon to be considered, it was early pointed out that the chloride during exposure evolved chlorine, and naturally the conclusion was drawn that a sub-chloride of silver was formed. As time went on, and it was found that an image was also formed by a very short exposure, and, though invisible, was capable of being brought out by a suitable developer, the presence of a light reduction product or sub-haloid in the film was held to be a necessity as the only means of accounting for the phenomena. Although this was only advanced as an hypothesis, it appeared to so completely fill in the requirements that it became an accepted theory, and the Ag_2I, Ag_2Br, and Ag_2Cl duly appeared in all our text-books and technical press as amply sufficient to account for the whole range of photographic phenomena.

There remained, however, the difficulty, that all attempts to isolate and examine these sub-salts of silver failed, and also the fact that no trace of the coloured product, assumed to be a sub-salt, ever appeared in a visible form in the film after a correct exposure had been given. All the ingenuity and skill that could be brought to bear upon the subject gave absolutely negative results. Even attempts to examine these products, prepared on a larger scale by darkening the silver haloids in bulk, were useless to prove definitely their existence with the same clearness and sharpness as in the case of other metallic sub-chlorides. Hence, when authorities of the eminence and standing of Messrs. Hurter & Driffield come forward and state that, as a result of their investigation and experiments, the formula for exposed and unexposed silver bromide is alike AgBr, it becomes necessary to find some other explanation of the change effected by light. It is true other theories have been advanced, and some physical or molecular change, not involving actual chemical decomposition in the constitution of the silver molecule, has been put forward as a possible explanation; but as yet no conclusion or definite

proof of either theory can be said to exist, and we are nearly as far off as ever from any exact knowledge of the change that does take place.

The assumption that these sub-salts were formed and due to the evolution of the haloid has existed from the earliest days. Chloride of silver exposed under water to the prolonged action of light was found to darken, and the water employed gave a fresh precipitate of chloride when treated with a solution of nitrate of silver. The darkened chloride on analysis gave less chlorine than the AgCl formula required. The action, however, was never complete, and the difficulty of exact analysis, from the impossibility of isolating the substance under examination, for a time was insurmountable.

About the year 1890, Guntz claimed to have produced and examined the sub-chloride, sub-bromide, and sub-iodide of silver. His procedure was to pass dry hydrobromic, hydrochloric, or hydriodic acid gas, over a sub-fluoride of silver, when the mass rapidly began to darken in colour, giving products exactly similar to those of light reduction, and which gave on analysis, in the case of the chloride, Ag 83·35 to 84·09 per cent., and Cl 15·07 to 14·19 per cent. This is coming exceedingly near to the theoretical requirements, which would be for Ag_2Cl 85·88, Cl 14·12 per cent., a difference of only 2·53 per cent. From this it has become an accepted proof that Ag_2Cl really exists, and has been isolated and examined. But, in the face of all the other experiments and the immense variety of results obtained, is the proof sufficient? If it is, then the probability would remain that the reduction product on an exposed plate would really be a definite sub-salt of silver, even if only in exceedingly minute quantity.

In the year 1887, the late Mr. M. Carey Lea published, simultaneously in The British Journal of Photography and the *American Journal of Science*, a most valuable series of investigations into the light-reduction products of silver haloids, and to which he gave the somewhat indefinite, if appropriate, name of photo-salts. He prepared the so-called photo-bromide, photo-iodide, and photo-chloride without the agency of light, and claimed quite justly that they were identical in character and composition as those which were produced by light. These investigations have a direct bearing on the present question. Carey Lea also was of the opinion that they tended to prove the existence of the sub-haloid salts. Without reviewing the whole of the investigations, which occupied him some years, I wish to draw attention only to one or two of the products and the analysis of them. A copper red shade of photo-chloride closely resembling that produced in silver printing was made by precipitating silver chloride, dissolving the precipitate in ammonia, and again precipitating with ferrous sulphate. This was washed, treated with dilute sulphuric to abstract the iron, then with dilute nitric acid, and a bright copper bronze photo-chloride was obtained, giving very varying results on analysis in different samples. But, before treating with nitric acid, analysis gave 92·68 per cent. of metallic silver. Again, the red photo-chloride, treated with successive solutions of ammonia until no more AgCl was dissolved, left a residue which, after washing and treated with nitric acid, dissolved with effervescence giving off red vapour of NO_2, and formed nitrate of silver. This points to the fact that the red chloride was really a mixture of normal chloride and metallic silver. Freshly precipitated silver chloride, mixed with finely powdered metallic silver and heated with nitric acid, also gave a red shade of photo-chloride. The photo-bromides differ only in colour, and have the same reactions and appearance as the chlorides.

When pure and chemically dry chloride of silver is exposed to light no apparent action takes place, but in the presence of moisture or of water the characteristic change occurs. Here the water evidently performs the function of a chlorine absorbent. As, however, the water has a decidedly acid reaction, it is evidently not simply a solution of the chlorine which occurs, but that the evolved chlorine in its nascent condition unites with an atom of hydrogen in the water to form hydrochloric acid. To put it into an equation, it may be expressed as $AgCl + H_2O = Ag + HCl + HO$. It might be urged, that by doubling the silver molecule in the equation we should get Ag_2Cl, but the same argument would apply equally with every other multiple and we should get Ag_3Cl Ag_4Cl, and so on, which would be absurd. Yet, the analyses given of the photo-salts show precisely this result, and prove in each instance to be a very indefinite substance. Would it not be more reasonable to drop the subchloride altogether and say that the composition is $AgCl_n + Ag_n$? This is further borne out by the fact that, if instead of water only a solution of any powerful chlorine absorbent such as stannous chloride be employed, the light reduction goes on much more rapidly and completely, and, if the solution be occasionally changed to remove the by-products formed, it will be found that practically the whole of the chloride is reduced to the metallic state and is perfectly soluble in nitric acid. In the case of Carey Lea's photo-salts, it was found that they resisted the action of nitric acid, and his theory was that a combination of the same character as lakes was formed with the ordinary chloride. A more probable explanation is that the silver was in an allotropic condition, such as is described in a further series of researches published two years afterwards. These formed the most remarkable of all the gifted author's publications.

By dispensing with the haloid salts of silver, and substituting an organic salt such as citrate or tartrate, he produced forms of silver of an endless variety of colour, varying from pure white through all shades of yellow, orange, red, blue, brown, and black, and also some having the lustre and brilliancy of metallic gold and copper. But the most remarkable form was one which he himself hesitated to accept until after repeated experiments and analyses compelled him to regard as true. This was a form of silver so nearly pure as to give 99·3 to 99 per cent. metal, yet which was perfectly soluble in pure water. But not only did the physical characteristics of these forms of silver differ from all preconceived ideas of the metal, but the chemical reactions also varied considerably the only point in common was that they amalgamated perfectly with mercury. Some such form of silver as this may well account for all the peculiarities of the photo-salts, and also give a clue to the conditions of the exposed film or plate. Carey Lea pointed out that a solution of sodium hypophosphite if brushed upon an unexposed plate was capable of giving development where applied exactly like light. If the sodium salt and the silver chloride were boiled together, complete reduction to metal took place. The soluble allotropic modification of silver also is capable of causing complete development without light. For this purpose an extremely dilute solution applied to the film, so dilute as to cause no visible mark, will cause vigorous reductions when a developing solution is applied.

To conclude, there exists no evidence whatever that a sub-salt exists even in a darkened product of the silver salt, much less in the rapidly exposed bromide plate or film; that, as far as we are able to trace the action, reduction of the silver haloid results in the complete separation of the haloid and silver and that the possibility of the sub-salt has not been definitely proved, but requires further investigation; and also that the necessity to assume their existence in order to account for the latent image and its development is misleading. This extremely minute trace of a reduced condition of silver may well escape either observation or analysis. We can see and examine the molecule but, of the atom we know nothing. The molecule, as we see it, may, and possibly does, contain millions of atoms, any one of which if liberated would act as a centre of energy and under proper conditions, such as development, communicate the disturbance to the surrounding atoms; and not until the molecule itself is reduced is it rendered evident to our senses.

E. Banks.

SOCIETY DEMONSTRATIONS AND LECTURES.

I.

Looking down the big list of societies which, according to The British Journal Photographic Almanac for 1898, number no less than 250, and then examining the weekly fixture notices, one cannot but be struck by the lamentable lack of lecturing and demonstrating ability which exists in the ranks of the societies in question. Estimating that the average of membership in each society is only 40, which is probably well beneath the actual figure, we get a total of not less than 6000 of more or less expert—or experienced—photographers who may be drawn upon to furnish papers at the winter meetings of the photographic societies and clubs.

From such a multitude much might well be expected. Let us see what they do. Statistics are notoriously deceptive, but, taking as a possibly fair sample of the whole series of meetings held by the various societies, the fixture list of the week ending December 10, 1897, which is printed in The British Journal of Photography, we find the results work out as follows: The total number of fixtures amount to thirty-two; of these exactly half, viz., sixteen, consist of borrowed lectures (*i.e.*, "reach-me-downs" sent on tour by either the Affiliation, or by a contemporary journal), lantern displays, trade shows, and annual and social meetings. Of the remaining sixteen which I have classed amongst the legitimately filled evenings three at least appear to be "scratch fixtures" of doubtful character. Thus one is called "Question Night," while two are entitled "Discussion" nights.

From the above it would appear that less than fifty per cent. of the meetings are filled by original papers prepared by a member or other gentleman. This will, however, be found far too high an estimate

for it must be remembered that the thirty-two fixtures noted in the aforesaid list are those, not of the average, but practically the pick of the societies. An examination of a number of societies' notices leads to the conclusion that *not twenty-five per cent.* of the evenings are filled by original technical lectures.

Why this Inglorious Muteness?

No doubt but that in a small society consisting of mainly mediocrities it is not easy to obtain even dreary twaddle, and such societies are, maybe, well advised to swagger along in borrowed plumes, which the stereotyped circulating lecture and the manufacturer's trade display between them supply. But even these small associations, to say nothing of the larger societies and clubs, should beware of too much gratuitous entertainment. That the manufacturer's representative throws a "roseate 'alo" round his master's wares is quite imaginable, and is perfectly pardonable; "it is his duty, and he does it."

As regards the circulating, ready-made lectures, some are funny, others are saddening, a few I have met with have been misleading, not many are of very much profit to an audience; certainly they are often very deadly dull, which is hardly matter for surprise when it is reflected that, as likely as not, an unsympathetic, untrained reader is selected to gabble through the text, which last has, moreover, probably been flung together by a very good fellow as far as making a negative or a print is concerned, but one who is quite at sea in writing a lucid lecture, all of which recalls the parishioner who told his minister that he misliked his sermon "for three rizzons. Fairst, ye *read* it; secondly, ye didna' read it weel; and, thirdly, it wisna' worth the readin'." Occasionally the reverse fault is met with, which is, however, much more acceptable, viz., the case where the writer is fluent and his language clear and striking, but who is shaky respecting his facts. I could cite more than one example where societies have listened with complete interest, and thanked with complete effusiveness, a gentleman whose lecture was, no doubt, very good to hear, although the lecturer was almost *quite* ignorant of his subject. In one case, I may say that he knew absolutely nothing but what he could crib from books and fill out by imagination.

Such things cannot so easily happen when a member addresses his fellows, for naturally he could hardly pose as a profound authority and safe guide upon any given branch of photographic technology without some foundation, even if only a slight one. For instance, he would scarcely be seriously listened to upon *stereoscopic* work if it were well known that he had never produced stereograms.

Icebound Photographers.

That peripatetic lectures are to be avoided does not, I suppose, need labouring to prove. Presumably, all who have read the foregoing remarks will consider these itinerant discourses as necessary evils, very convenient, as is borrowing an umbrella, but if you keep to them it is as bad form as is sticking to your friend's brollie.

A considerable experience with all sorts of members, and we have at our Croydon Camera Club had an assortment which has ranged from peer to porter, enables me to enlarge upon some of the causes why members do not take a more prominent part in proceedings than they do, and to suggest a few remedies which I hope may be helpful to the executive and also to members of our now so numerous societies. First trouble with all members, is that of breaking the ice. Only those who have been spell-bound by nervousness can imagine the terrible ordeal of standing self-conscious with half a hundred eyes upon one, and thus, semi-hypnotised, try and stammer out what the reeling mind in vain endeavours to formulate.

I have watched with much attention and carefully encouraged several of our members to break the spell of silence, and can assure all who read these lines, and who suffer with a dread of "rising to address the meeting," that although one may not expect all of a moment to change from a mute member to a busy talker (indeed, the change is usually made but slowly), no one possessing an ordinary memory need fear in being able by seizing small opportunities to eventually blossom out into a man of many words. Indeed, once the lips are loosened, the great fear is lest any one should develop into that very odious person, the sempiternal word-spinner or everlasting bore. I remember having an unusually fine specimen of the creature many years ago in a photographic society to which I belonged. This was his style: "Mr. Chairman and gentlemen, respecting the use of eiko'-cum-hydro', some thirty-five years ago, that is before I took up with photography, I met," &c., a long personal reminiscence, with full description of the habits and peculiarities of the friends and his surroundings followed. This goes on for ten or fifteen minutes, with a gradual crescendo shuffling of feet, until the members show such plain signs of impatience that the speaker subsides, having meanwhile said absolutely nothing about the developer under discussion, excepting "I mean to try it." If this man ever did try that developer with as much completeness as he was wont to try his audience's patience, he must indeed be a very prince of experimenters.

After all, he, and such as he, may on occasions prove useful as a wholesome restrainer when there is too much flashing up of epithets, and when disputants' faces blacken over through too energetic a debate. I can well recall how, when presiding at a meeting of photographers where opposing speakers were proclaiming each other anything but gentlemen or but wiseacres, and when even broken heads seemed possible, calling upon the above inexhaustible word-weaver for his opinion on the matter in dispute, with the result of a rapid calming of the tempest. The soporific effects of some twenty or thirty minutes outpouring of the wind-bag was more than enough to take all the sting out of those who followed. In fact, one of the most heated of the party, as soon as he saw Mr. Windbag get up, muttered, "I can't stand this chap at any price," and forthwith retired from the fray.

To return to our sheep. The future prosperity of photographic meetings—and, therefore, of societies—depends upon a fair proportion of members of societies being able to either read a paper, conduct a demonstration, or take part in a debate—which being the case, I think some few items of instruction, which may help the average member to do one or the other of the above, and may indicate to the executives of societies in what manner they may best educate—for it needs doing—members to use their wits and words, will prove of direct value to both the prosperity of photography and of the societies. I have times out of number, after a lecture and discussion, been told of matters which would have been of considerable interest, and perhaps of decided value, had they been brought forward during the meeting. On pointing this out to my informants, they mostly say, "Oh, I didn't like to get up before all the members and make a speech about it."

In the same way, over and over again, members will, when called upon, refuse to ask a lecturer simple questions on points not made quite clear. These same individuals, when the discussion, and questions and answers, are finished, will often have a long private talk with a lecturer, and ask any number of questions.

One great disadvantage of this is that the information which probably three-fourths of the meeting would be the better for hearing, instead of being given out to all, is only imparted to one. Another disadvantage is, that the time which is set aside for discussion, &c., becomes lost, and, moreover, the lecture, instead of being rounded off with intelligent comments, fizzles out in an anti-climax of silence.

Hector Maclean, F.R.P.S., F.G.S.

A COURSE OF FIELD WORK.

Another year has spent itself, and almost instinctively one's mind turns to a review of work done during the past twelve months. For my own part, a year spent mainly in the pursuit of matters directly or indirectly connected with photography has at least brought increased experience. Much of one's work, necessary, though ofttimes desperately dull, is usually performed in a mechanical or perfunctory manner; the heart sets all that on one side in its calculations, counting those only definitely chosen aims which have been accomplished.

I began early in the year but just passed with a determination to carry out at least one definite train of work in photography. Though a multitude of other intentions were on my chronically congested programme, one of them stood out more clearly than all the rest. I wanted to bring such small skill and experience as I possessed to bear upon the study of nature under the varying aspects which she bears from month to month as the round of the seasons passes. This was the primary object. There were also a few side issues at stake, one of which only need be mentioned just now. I wished to satisfy myself that no essential reason existed for flying the field like a summer migrant at the first approach of winter's inclemency, to return only with the flowers of spring, for to hibernate in such a fashion was equivalent to admitting that nature had charms for the eye during one half only of the year, a doubt which any thoughtful man would instantly reject. The poet has told us there is

> "No day nor season but doth wear
> Some grandeur or some beauty there;"

and, although I had long felt the truth of this, yet to receive positive demonstration, which might also be transmitted to others, would, I considered, be worth any reasonable amount of time and trouble involved.

Towards the proposed campaign I looked around for some suitable landscape which, while possessing no particularly strong features of its own, should, nevertheless, serve as a stage, so to speak, on which the different effects of summer, autumn, winter, spring, and intermediate seasons, would be likely to be well displayed. The place had, of course, to be selected with due regard to accessibility, since the changes of weather, often following each other so rapidly, would effectually prevent the accomplishment of satisfactory work if one had to occupy an hour or two in reaching the field of operations. This imposed limitations, and necessitated the selection of a spot within half an hour's walking distance of my house, so that it could be easily reached whatever might be the weather, or time of day, without having to call in outside assistance for the transport either of myself or the camera, and so involving risk of delay.

After casting around and sitting in judgment upon the merits of pastoral and woodland scenery for the particular purpose, I selected finally a little patch of ground at the margin of a small wood, about midway in character between the two qualifications. The trees were comparatively young and slender, a fair distance apart, and had little or no under-brush. In the position I took up, nothing could be seen but a multitude of trunks with the grass-covered ground at their roots and spreading branches above. As far as the eye could reach there was nothing to be seen but a distant vista of trees, no particular object to seduce the eye from such general effect as the scene might bear at any time selected. The choice took place in winter, and, as it happened, when summer came, I had some grounds for regretting the decision. To this, however, allusion shall be made again shortly.

The first picture taken was on one of the earliest mornings of genuine and unmistakable winter, after about an inch of light, fleecy snow had fallen. The morning was bright, but the sun was obscure, and the trunks of the trees had a plaster of snow up that side upon which the wind had blown. A light, fleecy coat covered the ground, through which the taller grasses pushed their brown, withered blades, and saved the floor from becoming one unbroken white area. Not a leaf hung on the naked branches. The night wind had died away, and perfect calm prevailed. I was pleased with the picture secured; the effect of frost and freshly fallen snow in its crispness was distinct, typical, and unmistakable.

In early spring, when the snow had melted, I attempted two or three more pictures, especially on misty mornings. None of these entirely reached my expectations. I could not succeed, although several trials were made, in realising a correct impression.

The next fortunate hit took place about March, and the representation of a cold March day I consider one of the most perfect in my series. No other pronounced effect was achieved until the month of July, when I was fairly successful in getting the trees in full leaf; but here came a disappointment which I had not anticipated. When settling upon the little strip of woodland, I believed that its exposed position would prove a decided point in its favour, since the varying state of the weather would be more promptly and definitely registered there than in a more sheltered spot; but, when summer arrived, it was annoying to find that the trees were greatly lacking in verdancy, their branches but scantily clothed with leaves; consequently my summer picture was far from satisfactory, since the vernal richness of foliage was but weakly represented, and the usual accompaniment of fern wealth below entirely absent. The same drawback followed me through autumn, as there had been but few leaves on the trees, so also the leafy carpet which fell from them was poor, and far from conveying any obvious effect.

Less than a stone's throw away, another little scene presented itself, which, so far as autumn was concerned, told the whole story most satisfactorily, and I moved my theatre of operations to that place, resolving from thenceforward to follow the round of the year there. At the time of writing I am anxiously looking forward to the first fall of snow.

As to the value of work of this description I need say but little. Its didactic nature must be evident to all. The eye becomes educated to subtleties, to the expressions borne on the face of physical nature, rather than to mere form and shape in themselves. As experience is gained, finer issues are observed. Delicate contrasts of light and shade, to which the eye had hitherto been blind, now become visible, and the student progresses steadily in artistic perception. No more useful course of work could be taken up by those who at present employ their skill in practical photography in a dilettante manner, having neither the interests of the chemist nor the culture of the artist. Once well started on some such definite programme, the camera would no longer be laid on the shelf for half the year, but, like a favourite dish, would be in season all the year round.

MATTHEW SURFACE.

THE LATENT IMAGE AND ITS DEVELOPMENT.*

IV.—Speed of Plates dependent on Physical Properties of the Sensitive Film.

OUR previous experiments and calculations indicate that it is highly probable that the difference in the amount of energy contained in the exposed and unexposed silver bromide is very small, and that the rapidity with which the developer attacks the unexposed films of plates, varying considerably in speed, is almost identical, showing that there is but a trifling difference, if any, in the amount of energy contained in the unexposed silver bromide, whatever the speed of the plate. The rapidity of attack of unexposed silver bromide in plates varying in speed is shown in the following table:—

TABLE V.

	H. & D. Speed.	Plate.	Density developed in 2 min.	4 min.	8 min.
Unexposed	24	D_2	·790	1·290	1·890
,, ...	96	D_6	·760	1·370	2·140
,, ...	83	D_5	·745	1·165	1·765

If, then, the silver bromide in rapid plates is of the same composition and contains the same amount of energy as that in slow plates, the difference in the speed of gelatino-bromide plates must be due more to their physical constitution and optical properties than to any difference in the silver bromide.

In our original paper we developed a theory of the action of the light upon the sensitive film in which we assumed that the amount of work done upon the film, at any moment of the exposure, was proportional to the useful light only; and we showed that the light reflected from the surface of the film and the light transmitted were useless.

In the course of the development of this theory, we introduced the term "inertia," which we denoted by the symbol i. We wrote $i = \frac{e}{(k\,l - a)}$ where e was the small amount of energy needed to bring the particle of silver bromide into the developable condition, k the co-efficient of absorption of light of the silver bromide, and a a fraction indicating the amount of light reflected by the plate. These co-efficients referred, of course, to light of that wave-length which alone is capable of affecting the particular haloid salt of silver.

It became interesting to investigate whether any relation exists between the optical properties of the plate and its speed as ascertained by our method. Unfortunately, it is almost impossible to measure the reflected light of that particular part of the spectrum to which the plate is sensitive, and we had to content ourselves with measurements of the reflected white light of the lamp of our photometer.

For the purpose of this investigation, we have examined sixteen different samples of plates produced by ten different manufacturers. We ascertained the speed with reference to ferrous oxalate, the light reflected the light transmitted, and the amount of silver bromide, from pieces of one and the same plate; and we may here point out that, in making these measurements, the edges of the plate, from which the emulsion has receded on drying, should be scrupulously avoided. If a half-plate be taken, a piece the size of a quarter-plate may be cut out of the centre of it, and this will more than suffice for the examination.

Our method of procedure is as follows: In order to ascertain the light reflected by the plate, we make use of our photometer, which, for the purpose, must be provided with a Schmidt and Haensch indicator, which lends itself admirably to our object. The plaster disc, with which this instrument is provided, must be removed, and it must be replaced by a thin piece of timber. On the right-hand side of the photometer a piece of pure white cardboard must be glued on to the timber and a mask of matt black paper, with an opening $\frac{5}{8}$-inch diameter, glued on to the cardboard. The left-hand side of the timber must be covered with matt black paper. Against this the back of the plate to be measured rests, the plate being supported by strips of cardboard into which it slides. In front of the plate, and attached to the cardboard strips, is also a mask of matt black paper with an opening $\frac{5}{8}$-inch diameter, and exactly similar to the one on the other side of the timber. As the area of the plate actually used for measuring is only that of a circle $\frac{5}{8}$-inch diameter, the plate itself is conveniently cut $\frac{3}{4}$-inch square.

In order to ascertain the neutral point of the photometer before commencing to measure plates, a strip of cardboard of precisely similar quality to that on the right-hand side of the timber must be inserted behind the mask on the left-hand side. The neutral point being ascertained, the strip of cardboard on the left-hand side is withdrawn, and the plates to be measured are substituted, one after the other.

It should be here remarked that the photometer we use for this purpose is 20 inches long from diaphragm to diaphragm. A shorter photometer than this cannot be advantageously used with the Schmidt and Haensch indicator.

* Continued from page 105.

The readings which we obtain by the method indicated above are the logarithms of the light reflected by white cardboard, the light reflected by the plate being taken as unit. By deduction the readings obtained from 2·0 (log. 100), the result is the log. of the percentage of light reflected by the plate measured. (White cardboard = 100.)

In order to ascertain the light transmitted, the same pieces of the plates just used for reflected light measurements may be again employed. The plates are placed film side towards, and directly against, the diaphragm at the left-hand end of the photometer. The measurements are then made just as in the case of speed determination. It is, however, necessary to take two precautions: first, a piece of yellow glass must be inserted between the lamp and the diaphragm at either end of the photometer; otherwise the intense light of the lamp will so darken the silver salt on the plate as to render measurement uncertain, if not impossible. Secondly, it is necessary to mask the plate inside the photometer by covering it with a metallic mask having an aperture just a shade larger than the diaphragm of the photometer. If this be not done, the whole area of the plate becomes luminous, and the readings are inaccurate.

The readings in this case are, of course, densities, and by deducting them from 2·0 (log. 100) the result is the log. of the percentage of light transmitted.

In order to obtain the amount of silver salts present upon an area of 100 square cm. of the plates under investigation, we have adopted the following method as sufficiently accurate, and as occupying far less time and labour than would be involved in an actual chemical analysis. A strip of the plate is taken which should measure not less in area than from 20 to 25 square cm. This strip after drying is accurately weighed on a fine chemical balance to a tenth of a milligramme; the plate is then very thoroughly fixed in thiosulphate, thoroughly washed, and dried. It is now weighed again and the difference between the two weighings is, of course, due to the silver salts dissolved out by the thiosulphate.

A further strip of the same plate receives a series of exposures with the revolving disc; it is then developed with standard ferrous oxalate and the speed determined in the usual way.

The following table gives the results we obtained with the sixteen plates we examined.

TABLE VI.

Speed from Physical Properties of Sensitive Plates.

Group.	Plate.	H. & D. Speed to Ferr. Ox.	Light %. Reflected α.	Light %. Transmitted.	Light %. Absorbed.	Silver Salt. Mgrms. per 100 sq. cm.	Product. Ag × (100 − α).	Speed from Physical Properties.
I	A	1·2	86·1	2·18	11·72	132	1833	2·15
	B	2·8	91·2	1·62	7·18	215	1892	2·55
	C	3·0	83·1	1·69	15·21	115	1943	2·90
	D_1	12	71·6	2·45	25·95	122	3464	15·70
	D_2	24	79·4	1·99	18·61	183	3769	19·20
	E	27	75·8	1·73	22·47	187	4525	28·8
	F	31	69·0	2·66	28·24	155	4789	32·8
	D_4	63	63·8	2·63	33·58	179	6579	64·0
	D_5	83	66·0	2·72	31·28	206	7004	72·3
	D_6	96	58·8	2·75	38·45	194	7993	97·0
II	H_1	44	70·8	2·60	26·60	157	4584	29·8
	I	50	67·7	2·75	29·65	136	4392	27·2
	J	53	69·9	2·54	27·56	165	4966	35·6
	D_3	56	66·0	3·27	30·73	146	4964	35·6
III	G	40	75·8	2·13	22·07	128	3097	12·0
	H_2	64	69·1	2·66	28·24	134	4131	23·6

$$\text{Speed} = \left(\frac{(100 - \alpha) \times \text{Silver}}{800}\right)^2 - 3.$$

In considering the probable connexion between the physical properties and the speed of the plate, it will be evident that, with the above method of measurement, the transmitted light refers to yellow light only, but that, as this plays no part in the production of the image, the figure so ascertained is of but little importance. The light reflected will be more or less coloured yellow according to the colour of the plate, but it is clear that the amount of reflected light given in the table will represent the maximum of light reflected of that particular quality which will affect the plate; and, consequently, that $100 - \alpha$ will represent the minimum of active light which enters that particular plate, part of which light may and does pass through the plate unabsorbed.

It must also be mentioned that the figures indicating the percentage of reflected light are relative only and not absolute; they give the percentage of light reflected compared with white cardboard, taken as 100.

The rapidity of the plate may be assumed to be, in some way, proportional to the amount of light which enters the plate, and to the amount of silver haloid which is spread over a given area of the plate. In the last column but one of the table are given the products obtained by multiplying the percentage of light entering the plate $(100 - \alpha)$ with the number of milligrammes of silver per 100 square cm. The speed of the plate, if dependent upon its physical properties only, should be some function of this product.

It will be noted that the plates given in this table are divided into three groups, representing respectively, 10, 4, and 2 plates, the grouping being arranged according to the closeness with which the speed, calculated from the physical properties of the plate, accords with the actual speed.

The speed of the plate to ferrous oxalate is calculated from its physical properties by the approximate empirical formula given at the bottom of the table; for instance, if the reflected light is 69·1 per cent., the light entering the film is $100 - 69{\cdot}1 = 30{\cdot}9$; then, if there are 155 milligrammes of silver per 100 square cm. of the plate,

$$\left(\frac{30{\cdot}9 \times 155}{800}\right)^2 = \left(\frac{4789}{800}\right)^2 = 5{\cdot}98^2 = 35{\cdot}8.$$

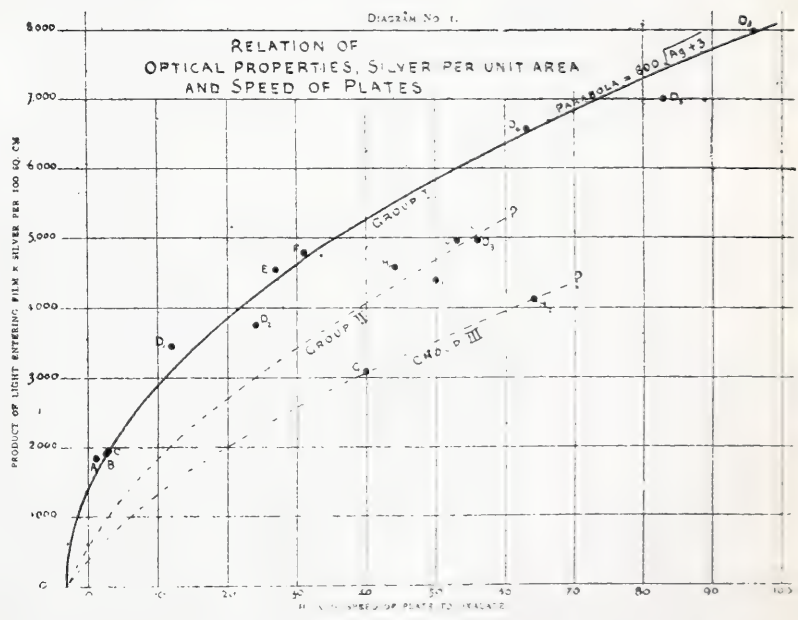
Deducting the constant 3 gives 32·8 as the speed of the plate to oxalate.

Group 1 of this table clearly demonstrates that the speed of the plate is really determined by its physical properties. In group 2 the calculated and actual speeds do not correspond so well, and in group 3, the discrepancy is still more marked. Groups 2 and 3 indicate that the calculation of the speed of a plate from its physical properties requires more knowledge than we at present possess, probably a knowledge of the relative amounts of bromide and iodide in the film.

Nevertheless, for 14 out of the 16 plates examined, the investigation of the plate for reflecting capacity and for the amount of silver contained in the film has given speeds which would be quite sufficiently accurate for practical purposes.

If the speeds of these plates as obtained by our method of speed determination be taken as abscissæ, and the products of the light entering the film and the silver present be taken as ordinates, the plates arrange themselves as shown in the diagram.

In this diagram ten of the sixteen plates examined, and which form



group 1, can be joined by a parabolic curve and relatively correspond with the speeds of the plates.

While these investigations have not given us a method of speed determination which can offer the same accuracy of result, or supply the same amount of information concerning the plate as our original method, yet they are extremely interesting and important, as pointing strongly to the probability that speed is purely a function of the physical properties of the plate. The table clearly indicates that a fast plate is one which is rich in silver and reflects a minimum of light.

We must now leave this subject to the attention of plate-manufacturers. The evidence we have just laid before you has only been completed in time for this paper, and, though much further investigation is needed, we think enough has been done to indicate clearly wherein lie the essential conditions of speed. It is almost impossible by chemical analysis to ascertain, with a sufficient degree of accuracy, the relative amounts of silver bromide and of silver iodide on small pieces of plates, whilst the plate-maker has, of course, the advantage of knowing precisely the proportion he employs.

F. HURTER, Ph. D.
V. C. DRIFFIELD.

SOME NOTES ON LENSES AND ORTHOCHROMATISM.

Before the Gospel Oak Photographic Society, on Tuesday, February 15, Mr. Rayner, the Hon. Treasurer of the Society, gave some "Hints for Economical Photographers," which might almost be described as lectures on elementary optics as applied to photography, and on isochromatic work. By an economical photographer, said Mr. Rayner, he did not mean the man who, after setting up his apparatus and focussing the object, began to think that it was not worth while to expose a plate because it *might* not look so well in monochrome as it appeared on the screen; neither did he mean the man who attended salvage and clearance sales, in the hope of securing bargains in plates and paper. His remarks were rather intended for the benefit of those whose length of pocket would only permit them to indulge in moderate-priced apparatus.

What he had to say, however, was not addressed so much to the older members of the Society, but for those of fewer years and less experience. With regard to lenses, the text-books, in advising the beginner what to purchase, usually said something like this: "Three lenses should be bought, a narrow-angle view lens, a rapid rectilinear, and a wide angle. If the beginner is only able to purchase one of these, then his choice should be the rapid rectilinear." Now, this was advice with which he thoroughly agreed, but before the beginner, who has only only purchased one lens, has made very much progress in the art, he will find that his lens will not do all that he would like it to. He had experienced this himself, and he remembered very well his first attempt to photograph a church. This was not an entire success, for, although an excellent photograph of such portions as were on the plate, yet he had to be contented with a view of the church minus a portion of the steeple and one end. This was on account of the fact that behind him was a brick wall, which prevented him from getting a sufficient distance from the object to be photographed. Furthermore, he had often found the necessity for a lens of a longer focus than that which he was using. The difficulty often arose under the following circumstances. It may be desired to photograph some "pretty little bit," the beauty of which is marred by the too great a prominence of some object in its immediate vicinity. This difficulty could, of course, be got over by moving the camera closer to the object, but one is very often prevented from doing this by the fact that some insurmountable obstacle, such as a river, brook, &c., is between us and the subject. Besides, it sometimes happens that, if one went closer, the point of view would not be so good. There is no help for it but to employ a lens of longer focus; but the economical photographer does not care, or cannot afford, to purchase another lens, so something must be devised to get over the difficulty. The text-book says "that, if one combination only of a rapid rectilinear lens is used, a single lens of twice the focal length will be obtained." That is to say, that supposing the focal length of a quarter-plate rapid rectilinear to be six inches, if only one of its combinations be used, the focal length will then be increased to twelve inches. This will, of course, necessitate an increased exposure, because the value of the stop will be decreased, *f*-8 becoming *f*-16, and the exposure will now have to be multiplied by four.

But he fancied that he could hear some one possessed of a quarter-plate camera saying, "My camera will not rack out to twelve inches; although it is called a double-extension camera, it will not rack out to more than ten or eleven inches." It was a similar difficulty to that which he had himself encountered; but it was not insurmountable. What was wanted was a means of reducing the focal length of the single combination (twelve inches) to, say, nine or ten inches, and he proposed to show the members how this could be accomplished. Spectacle lenses could be obtained from any optician at a very cheap rate, and of various focal lengths. These, mounted in cardboard cells, could be inserted in the place of the back combination of the rapid rectilinear, and, provided they were of suitable focal lengths, would reduce the focus of the other combination, which was being used as a single lens. The meniscus, or concavo-convex form, was that most suitable to be used in this way. The formula for calculating the focus of the supplementsry lens to be employed could be stated in a simple manner thus:—

$$\frac{\text{Focal length of combination} \times \text{focal length desired}}{\text{Focal length of combination} - \text{focal length desired}} = \text{Focal length of supplementary lens.}$$

As an example, suppose a six-inch rapid rectilinear is being used. The focus of the single combination will be twelve inches. Now, the camera will not rack out far enough to permit of this being used, and it is desired to reduce it to ten inches. The formula will then be—

$$\frac{12 \text{ inches (focus of combination)} \times 10 \text{ inches (length desired)}}{12 - 10} =$$

$$\frac{12 \times 10}{12 - 10} = \frac{120}{2} = 60 \text{ inches.}$$

These supplementary lenses can be used equally well with the whole of the rapid rectilinear lens, and are very useful when copying same size. The ubiquitous text-book tells us that, for copying same size, the separation of the plate from the lens, and of the lens from the object, will be twice the focal length of the lens. For instance, with a six-inch lens, whether rapid rectilinear or landscape, the camera must be racked out until the lens is twelve inches distance from the focussing screen. But the camera will not rack out to more than ten inches, and therefore some other means must be adopted to bring about the desired result. Here, again, the spectacle lens will be useful, and the required focus can be found in the way before described. It is supposed that the camera in this instance will rack out to ten inches, or a little more, and it is desired to reduce the focus of the lens used (six inches) to four inches. The formula will be—

$$\frac{6 \times 4}{6 - 4} \text{ or } \frac{24}{2} = 12 \text{ inches,}$$

so that, to reduce the focal length of a six-inch rapid rectilinear lens to four inches, a spectacle lens of twelve inches focus must be employed.

In all the cases above given the lens would be of the magnifying, or positive, form.

Mr. Rayner stated that for pictorial purposes it was advisable to use a lens of the longest focus possible, and it sometimes became necessary to increase the focal length of a lens, as this could also be done by means of spectacle lenses, only in this case they would be of the concave or negative variety. Their usefulness would be apparent when it was desired to increase the focus (and accordingly the size of the image) of a landscape lens. Using a quarter-plate landscape lens of, say, five inches focus, and it is desired to increase it to eight inches, the following is the formula:—

$$\frac{\text{Focal length of lens} \times \text{length desired}}{\text{Length desired} - \text{focal length of lens}} = \text{Focal length of concave spectacle lens required.}$$

or put into figures it would be—

$$\frac{5 \times 8}{8 - 5} = \frac{40}{3} = 13\tfrac{1}{3}, \text{ or 13 inches would be near enough.}$$

It is an invariable rule that positive lenses diminish the focal length and that negative lenses increase it.

Before leaving the subject of spectacle lenses, he wished to impress upon members the wisdom of having a set of such lenses as he has described made by an optician to suit the focus of their own lens. The cost was comparatively trivial (about sixpence each upon an average), and although they might not be often required, they were rather like the American's revolver, which "was not often wanted, but, when it was, it was wanted mortal bad."

Mr. Rayner then went on to speak of the photography of coloured objects, and showed photographs of a chromo-lithograph taken on an Ilford ordinary plate, on a chromatic plate without a screen, and also on a chromatic plate with both light and dark screens. He also showed by experiment that colour resides, not in objects themselves, but in the light falling upon them.

In speaking of isochromatic screens, Mr. Rayner stated that the usually took the form of a piece of light or dark yellow glass, the surfaces of which had been optically worked until both surfaces were perfectly parallel. Screens made in this way were naturally somewhat expensive, costing from 5*s.* to 10*s.*, but an efficient substitute could be made for a few pence each in the way he was about to describe. The materials required are some pieces of patent plate glass, some ordinary enamel collodion thinned with methylated spirit, and penny packets of Judson's dyes in canary yellow and orange tints.

To make the screen, two pieces of the patent plate glass are cut with a diamond or an American glass cutter, first square, then octagonal, and finally the edges are ground away with an old pair of scissors or tinman's snips until they will easily fit into the lens tube between the combination of a rapid rectilinear, or, between the lens and diaphragm if for a single lens. The pieces of glass are then thoroughly cleaned to remove streaks, &c., and coated on one side with the thinned collodion, which is allowed to set. Whilst this is taking place, the dye should be dissolved in methylated spirit to form a saturated solution. This solution is afterwards flowed over the collodionised glasses, which are afterwards allowed to become thoroughly dry, which will be in about five or ten minutes. When dry, they should be cemented together with Canada balsam, which will prevent the films from becoming injured, in the following manner. A small quantity of the balsam is placed upon the centre of the coated surface of one of the pieces of glass, and the other is placed upon it film downwards. The screen is now placed on the hot plate of a stove, and a moderately heavy weight placed upon it and allowed to remain for about five or six hours, and in about twenty-four hours the balsam will have become quite hard, and, after having been cleaned to remove any collodion which may have run over to the uncoated side, the screen is ready for use. In cold weather the Canada balsam will become thick, but may be made quite fluid by being slightly warmed and a few drops of turpentine being added.

The light-coloured screen, which was most useful for landscape work, would increase the exposure from three to four times, and the dark coloured one, which showed to the greatest advantage when used in photographing pictures containing a considerable amount of red and blue, would increase the exposure about six or eight times.

A hearty vote of thanks to Mr. Rayner brought a most interesting and instructive meeting to a close at ten p.m.

HE WARWICK DRY-PLATE COMPANY'S COMPETITION.

Warwick Dry-plate Company announce the following monthly etition. The prizes are: first prize, 20*l.*; second prize, 10*l.*; third 5*l.* Those prizes will be given each month, so long as in the on of the Warwick Dry-plate Co. the number of entries justify them tinning the competition.

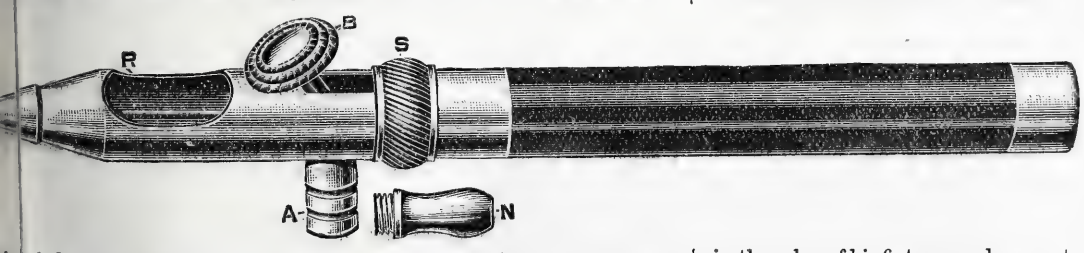
e conditions are: 1. The negatives must have been taken on a ick dry plate, and the competitor must state this on the entry form, will be found in every packet of plates, and which must be filled d sent to the Warwick Dry-plate Co., with a mounted print from egative intended for competition; which negative must have been during the preceding month, or, in case of competitors abroad, the preceding two months. 2. Each print and entry form must nt in before the third of the month in which the award is to be *i.e.*, the third of the month following that in which the negative aken. The print may be by any process, and must be mounted, but amed, and the name of the competitor must be clearly written on ack of the mount. 3. The winning negatives and all prints become roperty of the Warwick Dry-plate Co. 4. The prize-winners will otified of their success on the fifteenth of each month, and the will be paid on receipt of the negatives from which the successful were made. 5. Prints and winning negatives must be forwarded all charges paid, and the senders should see that they are securely d, as, in the event of loss or damage, the Warwick Dry-plate Co. t accept responsibility. 6. This competition is open to both urs and professionals, and the awards will be made for the most ve and pleasing results irrespective of size or subject, and the on of the Warwick Dry-plate Co. will be final. The address of the ick Dry-plate Co. is Warwick.

Our Editorial Table.

The Aerograph.

The Aerograph Company, 30, Memorial Hall, Farringdon street, E.C.

the five years that it has been in use in this country the Aero- has steadily built up a high reputation as an invaluable instru- or working up and finishing photographic enlargements. This is be wondered at when it is remarked how, in skilful hands, the lation of a fine spray of liquid colour to an enlarged photograph es effects of softness and modelling such as are not to be obtained d work. We learn that recently several important improvements een made in the hand piece of the Aerograph which holds and he liquid colours. The working parts have been covered up, s a finer adjustment for lines, while the friction of the internal hism has been minimised. The illustration shows the latest form hand piece. We have many times testified to the valuable pro-



ie of the Aerograph for photographic purposes, and are glad to hear e popularity of this really clever instrument is on the increase n rade enlargers and others. The utility of a fine stream of liquid nds application in carbon, bromide, and platinum printing, as a in the improvement of negatives, and thus a wide field is open h Aerograph. So great is the demand for photographs finished by hod that we learn that the Aerograph Company are themselves king portrait finishing for the trade both in colour and black- e. An experienced American artist has charge of this depart- Mr. Charles L. Burdick informs us that the instrument is now tured under his personal superintendence in this country. Such ious instrument deserves to be popular, not only with photo- , but also with exponents of the other graphic arts.

News and Notes.

RAPHIC CLUB.—Wednesday evening, March 2, at eight o'clock. Bedients Worth Remembering," by Mr. Edward Dunmore.

TINOGRAPH.—Messrs. Marion & Co., Soho-square, ask us to point the Hurter & Driffield Actinograph is sold in a leather wallet, with scale, for 8*s.*; or, in a larger wallet, with thirteen light scales,

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday, March 10, at 8 p.m., Dr. Spitta, F.R.A.S., will read a paper on "Photo micrography," illustrated. The Hon. Secretary will be pleased to see any one interested in the subject at the meeting; visitors are always welcome.

MR. CECIL M. HEPWORTH, of 22, Cecil-court, Charing Cross-road, writes that he is about to take charge of a portion of the animated photograph business of Maguire & Baucus, Limited, at their offices, 5, Warwick-court, High Holborn, W.C.; and that, about March 12, all his future business will be conducted from that address.

WEST LONDON PHOTOGRAPHIC SOCIETY.—The Ninth Annual Exhibition of the Society will be held at the Broadway Lecture Hall, Hammersmith, on Friday and Saturday, February 25 and 26. Open to members and friends on Friday, by invitation card, from seven to ten p.m., and to the public, free, on Saturday, from four to nine p.m.

RÖNTGEN SOCIETY.—The next general meeting of the Society will be held upon Tuesday, March 1, 1898, at the rooms of the Medical Society, 11, Chandos street, Cavendish-square, London W., under the presidency of Professor Silvanus Thompson, F.R.S. Papers will be read on the photographic activity and penetration of Röntgen rays at different vacua by Mr. J. H. Gardiner. Other papers by Mr. Wilson Noble and Dr. Hall-Edwards (Birmingham). Mr. Isenthal will show some new apparatus.

BEVERLEY PHOTOGRAPHIC AND SKETCHING SOCIETY.—The Fifth Annual Exhibition of Photographs, Paintings, and Drawings, in connexion with this Society, will be held in the Assembly Rooms, Beverley, on Easter Monday, April 11. The following are the photographic classes:—Section A (open)—1. Landscape, Seascape, and River Scenery; 2. Architecture; 3. Portraiture, Figure Studies, including Animals; 4. Instantaneous Hand-camera Work, showing moving objects (six direct prints); 5. Gum-bichromate Process, any subject (one or more prints); 6. Enlargements; 7. Lantern Slides (set of six). Section B (members only)—1. Landscape, Seascape, Architecture, River Scenery; 2. Portraiture, Figure Studies, including Animals; 3. Club Excursion Work, 1897; 4. Enlargements; 5. Instantaneous Work, showing moving object (six direct prints); 6. Lantern Slides (set of six). The Society's medal will also be awarded for the best and most useful novelty in Photographic Apparatus (entrance free). Entries and other communications must be addressed to the Hon. Secretary, Mr. T. J. Morley, Toll Gavel, Beverley.

Re CHARLES ALLEN DRAPER, photographer, 27, Lowesmoor, Worcester.—The above-named bankrupt made an application for his discharge at the Worcester Bankruptcy Court on the 17th inst. The Official Receiver reported that the receiving order was made on August 20, 1892, and the assets were estimated at 51*l.* 18*s.* 9*d.*; but, as a matter of fact, they only realised 39*l.*, the discrepancy being accounted for by the fact that the debtor had returned a number of book debts as good which afterwards proved bad and irrecoverable. The bankrupt commenced business as a photographer at Lincoln in 1873, with a capital of 500*l.*, which was afterwards increased to 1000*l.* by gifts from his father. The business was carried on successfully until 1880, when debtor was forced to give up in consequence of his being mulcted in the sum of 2000*l.* damages in an action brought against him for erecting certain buildings which, it was alleged, interfered with his neighbour's light. Between 1880 and 1890 bankrupt held various situations as assistant. He then resumed business as a photographer in Worcester, with a capital of 50*l.* of his own which he had saved, and 80*l.* lent to him by his father, which was never repaid, but was returned in his statement of affairs under the bankruptcy proceedings as an unsecured debt. The business was not a success; after fourteen months' trading he lost all his capital. He alleged his failure to have been caused through ill health and doing little or no trade. He was unable to give proper attention to his business owing to a long illness, which culminated in his going into the infirmary to undergo an operation. His deficiency amounted to 145*l.*, and of that sum 121*l.* was represented by depreciation in the value of his fixtures and apparatus, the property of a photographer being of a very depreciable character. The Official Receiver submitted that the debtor had not kept such books of accounts as were usual and proper in the business carried on by him, and that he had not paid a dividend of 10*s.* in the £ to his unsecured creditors. The debtor, in reply to questions put by the Official Receiver, stated that the furniture was not returned in his statement of affairs as it belonged to his wife. It was sold in 1895, when his wife died, and was spent in defraying the funeral expenses. He had two little children dependent upon him, and since 1894 he had been in a situation as photographer's assistant at a salary of 25*s.* per week. His Honour, in reviewing the case, said he did not think it was at all a bad case, and, as to the creditors not receiving 10*s.* in the £, he found that the debtor could not possibly help that, as his assets cost him considerably more than the amount realised under the bankruptcy proceedings. The debtor was therefore granted an immediate discharge.

THE Fifth Annual Dinner of the Hackney Photographic Society was held on Tuesday evening, February 22, at the Holborn Restaurant. The President (Major Woolmer Williams, F.S.S.) occupied the chair, and the attendance of members and guests numbered about seventy, among the latter being Mr. Fall, Mr. Debenham, Mr. J. A. Sinclair, Mr. Mackie, Mr. A. Taylor, F.R.A.S., Mr. Bedding, Mr. E. J. Wall, Mr. Horsley Hinton, and Mr. C. R. Rowe. The toast list was a short one. Mr. Wall gave "The Hackney Photographic Society," and from Mr. W. F. Fenton-Jones's reply it appeared that the Society was in a very flourishing condition. Mr. Bedding replied for "The Visitors," and, the President having been cordially toasted, the remainder of the evening was devoted to an enjoyable programme of music, recitations, &c.

Patent News.

THE following applications for Patents were made between February 7 and February 12, 1898:—

CAMERA AND MUSIC STAND.—No. 3040. "Combined Music and Camera Stand." G. BURNETT.

PLATE-HOLDERS.—No. 3118. "Improvements in Photographic Plate-holders." J. E. THORNTON and the THORNTON-PICKARD MANUFACTURING COMPANY, LIMITED.

CINEMATOGRAPHS.—No. 3157. "Improvements in Cinematographs." P. MYLNE.

TWIN LENS CAMERAS.—No. 3233. "Improvements in Twin Lens Photographic Cameras." G. E. WOOD.

CAMERAS.—No. 3371. "Improvements in Photographic Cameras." C. HOWELL.

MAGNESIUM POWDER.—No. 3257. "Smokeless Magnesium Powder for Photography and Apparatus for Employing the same." C. HENRY.

DARK SLIDES.—No. 3369. "Improvements in Photographic Dark Slides." T. W. BARBER.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

February.	Name of Society.	Subject.
28.....	Birmingham Photo. Society ...	Opening of Thirteenth Annual Exhibition.
28.....	Bradford Photo. Society	*Light and Photographic Image* Dr. Edwards.
28.....	North Middlesex	*At Home and Abroad with a Hand Camera.* R. Child Bayley.
28.....	Richmond	*Portraiture.* Harold Baker.
March.		
1.....	Bootle	Auction Sale of Members' Apparatus, &c.
1.....	Brixton and Clapham	*Notes on Elementary Composition.* F. L. Pither.
1.....	Gospel Oak	Exhibition of Members' Work.
1.....	Hackney	Annual Meeting.
2.....	Croydon Camera Club	Thirty-fifth Public Lantern Show.
2.....	Edinburgh Photo. Society	*Difficulties of Picture-making.* Alex. Eddington.—*Notes on Stereoscopic Photography.* A. H Baird, F.R.P.S.
2.....	Kingston-on-Thames	*Isochromatic Plates and some Colour Problems.* A. Hill.
2.....	Leytonstone	*Intensification and Reduction.* F. W. Wates.
2.....	Photographic Club	*Old Expedients Worth Remembering.* Edward Dunmore.
2.....	Polytechnic	*Enlarging.* F. Parker.
2.....	Southport	Demonstration: *Slide-making and Bromide Printing by Contact.*
3.....	Bolton Mutual Photo. Society .	*Lantern-slide Making.* S. L. Coulthurst.
3.....	Bradford Camera Club	*Tentative Development.* C. C. Vevers.
3.....	Leeds Photo. Society	*Yarmouth and the Norfolk Broads.* Washington Teasdale.
3.....	Leigh	Prize Prints.
3.....	Liverpool Amateur	Lantern in Use.
3.....	London and Provincial	*Hand-camera Criticisms.* J. E. Hodd.
3.....	Manchester Amateur	*Cloud Photographing.* Horsley Hinton.
3.....	Woodford	*Enlarging.* J. H. Gear.
4.....	Croydon Microscopical	Arrange for Summer Excursions.
4.....	Plymouth	*A Photographic Week in the Wye Valley.* J. Grove and F. E. Turney.
4.....	Wakefield	*The Gentle Art of Making Failures.* P. C. Newstead.

ROYAL PHOTOGRAPHIC SOCIETY.

FEBRUARY 22.—Technical Meeting,—Captain W. de W. Abney, C.B., R.E., D.C.L. (Vice-President), in the chair.

ELECTIONS.

It was announced that the Council had elected the following officers:—*Hon. Secretary:* Colonel J. Waterhouse, I.S.C.—*Hon. Librarian:* Mr. Horace Wilmer.—*Hon. Solicitor:* Mr. Francis Ince.—*Hon. Editor of the "Journal":* Captain Abney. Also that the vacancies on the Council caused by the first two appointments had been filled by the election of Messrs. R. W. Craigie and W. Thomas.

AFFILIATION DELEGATES.

The HON. SECRETARY stated that Messrs. A. Mackie, J. A. Sinclair, and W. Thomas had been appointed to represent the Society on the Affiliation Committee.

PALL MALL EXHIBITION, 1898.

The Exhibition Committee in connexion with the Society's Annual Exhibition was announced as having been constituted as follows:—Messrs. F. A. Bridge, R. W. Craigie, Chapman Jones, F. C. Lambert, A. Mackie, W. Thomas, J. B. B. Wellington, and Horace Wilmer.

PHOTOGRAPHIC MANIPULATIONS IN RADIOGRAPHY.

Mr. A. W. ISENTHAL read a paper upon the above subject, in which he dealt with the action of the Röntgen rays upon sensitive films, and discussed the behaviour of different emulsions, orthochromatic plates, specially prepared plates, plates coated upon both sides, and films. The different s
ports for the sensitive film were also considered, together with the mean
reducing exposure by the employment of fluorescent screens, both single
double, the development of radiographic negatives and of double-sided fi
and the intensification and peculiarities of such photographs. The au
stated that, judging from the very slight and doubtful chemical effects w
the Röntgen rays had so far exhibited, and from the fact that neither collo
nor Daguerreotype plates were of any use for this purpose, the rays exerte
direct action upon the sensitive film, but that in all probability, by impin
upon the emulsion, they caused the latter to fluoresce, and so to give ri
the usual photo-chemical results; in other words, that the emulsion i
converted the exceedingly minute waves, which were imperceptible bot
the eye and to the bromide of silver, into longer visible and chemically a
rays The hypothesis that the photographic action of the rays was d
the fluorescence of the glass support under their impact was disproved b
fact that films supported on non-fluorescing bases had been found eq
effective, whilst the uselessness of collodion films, even on uranium glass,
conclusive evidence that the emulsion was of paramount importance. Ther
little to choose between different brands of plates of approximately the sam
pidity, and the embodiment of certain fluorescent substances in the emulsio
not been attended by satisfactory results; a thick film (*i.e.*, a film rich in s
was however, a decided advantage, in so far as it permitted a more com
utilisation of the rays. An important step forward was marked b
introduction, by Dr. M. Levy, of plates or films coated on both sides
emulsion, with the object of better absorbing and photo-chemically usin
rays without resorting to specially thick films, and, so long as the su
was thin, there would be no danger of blurring the outlines in printing
negatives on such plates. Celluloid, being flexible, light, and thin, pos
decided advantages over glass as a support; and, by placing the
surface outside, and the printing paper in contact with the plain s
the film, prints could be obtained which would be correct as regarded rig
left. Ferrotype plates gave exceedingly good results, possibly on account
impenetrability of the support to the incident radiation, but copies could o
obtained by means of the camera, and the fixed image must be made visib
bleaching or intensifying process. When using the ordinary dry plat
only efficient and convenient means of reducing exposure was to so
fluorescent screen that the rays had to pass through it before reachi
plate, and with double-sided films or plates a fluorescent screen mi
placed in contact with each sensitive surface; Mr. Isenthal exhibite
slides adapted for use in this manner, with flexible screens coated with p
cyanide of barium, and also screens prepared with tungstate of c
Development should be continued for from twenty to forty minutes.
cluding, the lecturer said no hard-and-fast rules could be establishe
every worker should attain proficiency, if possible, with some definite m
which suited his individual requirements. The percentage of failu
still very high, and could often not be accounted for; a most su
worker, with powerful apparatus and every convenience, in recently a
ing to take a radiograph of the trunk of a lady, had five 18×24 plates
whilst the sixth plate, under exactly similar conditions, was a perfect s

The CHAIRMAN said he had been one of the heretics who thoug
development began at the back of the plate; but, upon exposing
stripped from the glass, he found this was not the case. There was n
that the action was due almost entirely to fluorescence in the film, a
fluorescence of the glass when a fluorescent glass was used as a suppo
had made a variety of experiments with different gelatines, and fou
some gave better results than others; it did not follow that the mo
plate was the best, a good deal depending upon the kind of gelatine e
and the duration of the cooking.

Mr. T. BOLAS believed that Faraday had stated that the fluores
uranium glass was on the surface; but this was a mistake, for, if a
light was directed upon a mass of uranium glass, the fluorescence coul
all through; the fluorescence, too, was yellowish green, and one w
expect it to have much action upon a sensitive film. Too much
therefore, should not be placed upon experiments with sensitive film
upon uranium glass.

Mr. SNOWDEN WARD said it had been conclusively shown that so
of extreme rapidity to daylight gave infinitely less radiographic de
plates, by the same makers, of less sensitiveness to daylight.

The CHAIRMAN remarked that he had obtained very good results
chloride films.

After further brief conversation the discussion was closed, and
thanks was passed to Mr. Isenthal, who thereupon proceeded to n
radiographs on films in contact with fluorescent screens, the "victim
taking to develop the negatives in their own way and report results.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIA

FEBRUARY 17,—Mr. E. H. Bayston in the chair.

The HON. SECRETARY announced the decision of the Judges in the
the sum of money placed at the disposal of the Association for the
read before its members. The portion set aside for this purpos
equally divided between Mr. A. Haddon and Mr. Edwin Banks.

The Chairman exhibited several prints upon Velox paper, deve
amidol. In producing them he had departed from the procedure a
the makers, and, instead of working in actinic light, had conduct
operations within the dark room.

Mr. LEWIS MEDLAND entertained the meeting with his lante
entitled "Fair Life," and it must be conceded that his efforts
crowned with considerable success both as regards the descriptive
the scenes depicted by his camera. Mr. Medland seems to have fo
scope for his work at the well-patronised Barnet Fair, and, altho
graphy amidst such a dense and struggling mass of humanity and
would appear to be no light or easy matter, he certainly has acquit
well of the task. Some of the best of Mr. Medland's instantaneo

included in this series, which represents with a truthfulness of character, not often met with, the many interesting details which only a fair can assemble together. The subject has been approached systematically, and the effect is added to by the tone of the lecturer's remarks, which combine with accuracy of description a pleasantly humorous touch. Mr. Medland has employed both field and hand camera in the production of these photographs, with a Ross nine-inch symmetrical and a Wray five and a quarter-inch lens. He works generally at *f*-16 on bright days, and on others at *f*-11, with an exposure for ordinary subjects of about a thirtieth of a second. He uses rapid plates, and has tried all kinds. Speaking of frilling, which he met with in a certain brand, he had found that a candle rubbed along the edge of the plate before development went a long way towards preventing the occurrence of such a thing on a gelatine plate. At the close of the display a hearty vote of thanks was passed to Mr. Medland for his excellent entertainment.

PHOTOGRAPHIC CLUB.

FEBRUARY 16,—Mr. J. R. Gotz in the chair.

Mr. E. W. FOXLEE referred to the demonstration a fortnight ago of the Velox paper for development. At the time it was said to be a chloride and not a bromide paper, but he thought it surprising that a chloride paper should be so sensitive to gaslight as was shown. Knowing that choride papers printed out, he exposed a piece under a thin negative to daylight, and, after an exposure of two days, got the print, which he passed round. The image was rather weak, and was produced wholly by light action, no development being made use of. In his opinion it was a bromide paper. Replying to a question regarding the colour of the print, as to whether a washed chloride paper and one containing free silver would give the same tint, he said that the former would give a print of a greyer colour than the print of which he spoke.

Mr. A. W. Isenthal showed a small piece of film coated on both sides for use in X ray work. The idea was to shorten the exposure required, the action upon both films proceeding simultaneously, and producing twice the density which would result from the use of a single film. Although the idea was not new, its application to the purposes mentioned was new, and one which would be of considerable utility.

Mr. FOXLEE alluded to the paper introduced by Mr. Warnerke, which was coated on both sides, with the idea of getting rid of the grain, and to other films similarly prepared.

Mr. FRANK HAES drew attention to Sir David Salomon's invention of an instrument for producing stereoscopic pictures from a single picture taken in the ordinary way. His instrument, which he calls a pseudoscope, consists of a cylindrical lens divided into two portions in such a manner that each has a flat and a curved side. The picture is observed through these lenses, which have the effect of compressing their particular view of it towards its inner side, as is done in ordinary stereoscopic photography. Such images, viewed with the usual stereoscopic lenses, blend and produce a picture as solid in appearance as given in the double stereoscopic slide.

Mr. F. A. BRIDGE doubted whether a stereoscopic effect could be secured other than by photographing with two lenses, or, what was equivalent, with one lens in two operations, and that it was possible to get such an appearance from a plane surface. It was a thing which did not exist in the picture, and consequently could not be copied.

Mr. A. W. ISENTHAL read a paper on "Electricity and Optics," and, in response to the expressed desire of the meeting, signified his willingness to its publication, which will follow in due course.

Croydon Camera Club.—"Practical Photographic Tips" formed the subject of the meeting on the 16th inst. Mr. JOHN SMITH occupied most of the evening with a very interesting recountal of his photographic ups and downs, and with a no less profitable description of many valuable expedients for ensuring results of good technical quality. As his paper will probably be reprinted *in extenso*, it is needless to condense it here. Just one formula may, however, be given of the retouching varnish used by Mr. Smith; it is one ounce of turpentine mixed with one drachm of powdered resin; rub a suspicion on to the negative with cotton-wool, and retouching can at once be proceeded with. The above costs about a halfpenny instead of the shilling usually paid by the amateur for a similar article. Amongst other gentlemen who subsequently contributed their quota of tips were the President and Messrs. Packham, Kough, Carley, Noaks, Rogers, Hirst, Isaac, Taylor, and S. H. Wratten, the latter of whom gave a valuable note respecting the erratic action of view-meters, which depended upon the darkening of sensitised paper. He found that, given a bright light, the registration of the meter might be correct, but that, when the light is less than of average brightness, the meter is apt to progressively indicate a grossly over-timed over-exposure. In one case recently the meter, during the middle of a gloomy day, indicated eight times as much exposure as calculation, experience, and a subsequent test showed to be called for. Messrs. Maclean, Isaac, Chadwick-Taylor, and other members corroborated Mr. Wratten's experience, which points to the fact that a rapid plate will catch weak actinic light, which the less sensitive print-out paper is inadequately influenced by.

North Middlesex Photographic Society.—February 21, Mr. Mattocks in the chair.—This was the second of a series of instruction lectures, and Mr. GOSLING concluded the subject of Development. He said he had previously spoken only of a fixed developer, but the beginner would soon discover this did not always give good results with different exposures and classes of subject. He strongly expressed these two facts: "That slow development or an excess of pyro tends to hardness," whilst "quick development or a deficiency of pyro tended to softness." He hoped the chief error to compensate for would be over-exposure, for, if in doubt, always be sure and give plenty. If the exposure has not been very excessive, a slowing of the developer will be sufficient. This is done by using the normal quantity of pyro and bromide, and starting with a little soda, adding more as required. If the over-exposure is very marked, this will not be sufficient, so you must double the pyro and bromide, and continuously add the soda as required. He then passed round two prints from negatives exposed on the same subject. To one he had given six seconds, the other eighteen. By following the methods he had been describing, the resulting prints were almost identical. Under-exposure was more difficult to deal with, but by using plenty of patience a lot could be done to remedy it. He advised using half the normal quantity of pyro and bromide, and not quite full quantity of soda, adding a double portion of sulphite to avoid staining through prolonged development. Prints were shown illustrating what could be done in cases of this kind, and also for density of subject, lighting, &c., showing clearly that Mr. Gosling had thoroughly studied his subject, and that by following his method of controlling development improved results could be obtained.

Brad ord Photographic Society.—February 9.—Mr. PERCY LUND ("Matthew Surface"), editor of the *Practical Photographer* and the *Junior Photographer*, related his

EXPERIENCE OF TWELVE YEARS OF PHOTOGRAPHY,

and made his discourse so entertaining, that for over an hour and a half his hearers listened with deep interest to his remarks. In the beginning Mr. Lund pointed out that he had really had more than twelve years' experience, but he thought in the past twelve years the various changes in his manners and methods had been most pronounced. Speaking of his own experience, he pointed out that, when he first started, it was his aim to produce sharp, clear, crisp pictures. He used a rapid rectilinear lens in those days, and he waited until the sun was high in the heavens before he started forth to photograph. Now all this waschanged. The most cherished possession was a spectacle lens, which in the times gone by he would have looked down on as not covering the plate completely from corner to corner, and he rarely did any work in the middle of the day, preferring either early morning or evening, as then the shadows were long and the pictorial mists were generally hanging about. Speaking on fuzziness, Mr. Lund pointed out that it was a quite a wrong word to use in connexion with artistic photography. Fuzzizess alone was not sure of producing a picture; a better word was diffusion, and he was certain that no one would say the slides he was showing that night were fuzzy, although they were certainly diffused.

Moseley and District Photographic Society.—February 18.—Mr. W. J. SPURRIER gave a lecture and demonstration on

MOUNTING AND FRAMING OF PHOTOGRAPHS.

He said that the end was not attained by sticking the print upon a card, and, in illustration, passed round a poor little print of a grand picture; this he slipped into a little frame he had just cut, with a cut-out mount of brown paper, and the improvement was generally admitted. He then went through the various processes, commencing with the trimming of the print; this he did with a Primus lightning trimmer, passing it round, with some waste prints, for the meeting to test, the first attempts causing much amusement; but eventually the prints were reduced to strips. The sticking the prints on to a stiff board or card was effected by Fixit which so pleased one of the members that he borrowed the pot to do some prints he had waiting. The selection of a suitable-coloured cut mount was then gone into, as well as the size of the opening to be made therein. Several photographs were shown, over which he placed smaller mounts, which greatly improved the effect, putting the horizon level in a seascape, and taking unnecessary foliage off others, warming up a cold print with a green mount, cutting a mount to the photograph of a picture, and, in this latter case, gilding the mount. The gilding was done with bronze powder; first, he softened the varnish brush by dipping it in paraffin and rubbing it on a piece of paper held on the side of the fireplace, so that the heat softened the bristles. The mount was then varnished and set aside until it became "tacky," then spreading out a newspaper, and laying the mount thereon, the bronze powder was plentifully dabbed on, and a rough gold mount produced. To make a frame out of prepared moulding he had the simplest tools with which that could be done, viz., a mitre jack and saw, and a clamp for the corners, with a hammer and brad-awl and a variety of wire nails, a wheel glass-cutter and some glass. This latter, he explained, should, after it was placed in the frame, be secured in by some strips of paper to keep the dust out, and for that purpose nothing is better than the strip gummed stuff sold at all stationers in reels for mending music, &c., the glass being secured; next place in the picture, with its backing board, either wood or strawboard. Now, to finish this off in a permanent manner, it must be thoroughly well backed with stout brown paper, if a small one, with the frame and backing board nearly level and the sprigs with which the latter is fixed in not sticking up, the cleanest job is to do it on the "drum-head" plan, thus, damp the paper and glue the edges, and well draw over and rub the edges down; but for larger frames, where there is danger of the fingers, &c., breaking through, glue two-inch-wide strips all round the edges, and then a piece all over the centre and overlapping the strips; then screw in the cord eyes at the places to give the picture its proper hanging angle, and your photograph will be well and properly framed. Mr. Spurrier showed a number of beautiful photographs, some of which will be at the forthcoming Exhibition of the Birmingham Society, to which he suggested the members should go to see how photographs for exhibition should be framed, explaining that the green colour so much in favour could be got by a due admixture of green and black, either by stains or enamels; with the latter a very good effect was produced by taking a dark green and some powdered "blue black" and mixing with additional varnish.

Newcastle-on-Tyne and Northern Counties Photographic Association.—February 8, Mr. W. Parry in the chair.—Special Beginners' Night. Mr. PARKER BREWIS read a paper on

LENSES.

Mr. Brewis, who illustrated his points with lantern slides, treated his subject in a manner which proved interesting not only to beginners, but to every member present. An interesting discussion followed. Many of the newer

lenses were shown and described, and attention was drawn to the fact that English opticians more than held their own in the race for supremacy in lens construction, a fact of which every English photographer ought to be proud. Testimonial to Mr. James Brown, late Secretary to the Society: The Committee entrusted with this matter have selected a gold watch chain and silver cigarette case, and these have been forwarded to Mr. Brown, together with the Society's hearty thanks for his services and good wishes for his prosperity in London.

Oxford Camera Club.—February 7, Annual General Meeting, Colonel Impey in the chair, and there was a large attendance of members.—The report showed that there were now ninety-five members, twenty-one of whom were ladies. Reference was made to Sir W. J. Herschel's lecture on Colour Photography and the purchase of a chromoscope, also to Mr. Cadett's recent lecture on the Photographic Plate. At the annual exhibition there were 331 exhibits and a large number of visitors, but the expenses exceeded the receipts by 4*l.* 10*s.* 6*d.* The Club had undertaken to provide plates for a History of the Colleges which was about to be published. The following officers were elected:—*President:* Sir W. J. Herschel, Bart.—*Vice-Presidents:* Miss Acland, Colonel Impey, Miss Venables, and Mr. V. P. Sells.—*Committee:* Messrs. J. E. Horrigan, E. C. H. Jessop, J. Minn, G. Shelton, J. B. Wilson, C. Rippon, and T. Joyce.—*Librarian:* Mr. James Squire.—*Lanternist:* Mr. T. Joyce.—*Auditor:* Mr. J. E. Horrigan.—*Treasurer:* Mr. R. A. R. Bennett.—*Hon. Secretary:* Mr. George W. Norton, 13, Park-terrace.

FEBRUARY 14, Colonel Impey in the chair.—Mr. SANDELL attended to explain and demonstrate the advantages of the

SANDELL PLATE.

Mr. Sandell said the great latitude of the plates was due to their being coated with two and sometimes three emulsions of different speeds, the top coating being very rapid and fast enough for hand-camera work, the next being ordinary speed, and the coating next the glass was extremely slow. In quick exposures only the upper film was affected, but in long exposures solarisation took place on the upper film, and the image had to be developed in the lower film and printed till development was carried far enough. A good negative was certain, no after-treatment being necessary, except in extreme cases, when a reduction of the over-exposed upper film was advisable. One hundred times the normal exposure might be given, and a good negative obtained. The multiple film also entirely prevented halation. If there was any appearance of halation, it was due to reflections inside the camera. This was proved by the splendid specimens of interiors taken by Mr. Sandell with very long exposures against the light. These were absolutely free from halation, and there was full detail in the deepest shadows. Mr. Sandell developed six negatives of a studio taken against the light; the exposures were from five seconds to five minutes. They were all developed in the same dish, and turned out perfect negatives, the two last only requiring reduction. A print of two photographs of an incandescent gas light, taken by an amateur, was handed round. One, on an ordinary single film, showed, as might be expected, great halation, while that on the double plate was perfectly clear. A negative on a triple plate, exposed to the sun for five seconds, was shown. It was seen that in the upper film there was perfect reversal; in the second, a perfect negative without halation; in the third, a partial negative. Several members produced specimens taken on these plates, and many questions were asked and satisfactorily answered, and a number of very fine lantern slides of interiors were thrown on the screen.

Plymouth Photographic Society.—February 18, Mr. H. S. Hill, Vice-President, in the chair.—There was a good attendance of members to witness a demonstration of

FLASHLIGHT WORK,

by Mr. E. H. MICKLEWOOD, President of the Society, who said that that evening he proposed to take them into one of the by-paths of photography, and show them how to obtain negatives by artificial light. All photographers knew that, for negative-making, one of the requirements was a good actinic light, but sometimes they had to do work at a time or place where this was not available; then an artificial light must be used. Although there were forms of lighting which gave good illumination, and to the eye appeared to be very bright, such as the incandescent gas and electric lights, they did not, under ordinary circumstances, possess sufficient actinic power for negative-making. There were, however, chemical substances which, when used with a simple gas or spirit flame, gave a light of great actinic value. One of these was magnesium powder, and, though the intensity of the light given by this chemical could be increased by the addition of aluminium, chlorate of potash, or picric acid, he advised them to do without them; in fact, his advice was, Avoid all compounds altogether, as many of them were dangerous, whereas magnesium powder alone was a perfectly safe article. It should be kept in a well-stoppered bottle and in a dry place; should it get slightly damp, which fact would show itself by its becoming caked, it could be restored to proper condition by warming it. But here another word of advice, Do it only by the aid of the sun. Before he demonstrated the working of the light, he would explain the lamp he was about to use. It was one made on a very simple principle, and the form adopted by Mr. J. C. Burrow, of Camborne, one of the most experienced of flashlight workers in this country, his work in Cornish tin mines and Welsh underground slate quarries having obtained the recognition of the Royal Photographic Society. The lamp consisted of a container at the bottom, in whith the powder was placed, and from there blown (by means of a piece of rubber tube) through three small tubes to the tin dish over it containing spirits of wine, the powder passing through the lighted spirit causing a brilliant flash. There was one point which he might mention, viz., that, when taking portraits, a better result could be obtained by holding the light behind a screen of muslin, which gave a softer light; and also a good plan was to use a reflector on the shadow side of the subject. About a dozen members under the President's directions set up their cameras, and took photographs of a group of members; half a dozen plates were then developed, and showed good results. Mr. Micklewood exhibited negatives of dramatic scenes he had taken on the stages of two Plymouth theatres, and of pictures obtained in wine cellars well supplied with cobwebs, all showing the qualities of first-class negatives obtained with the aid of sunlight. At the commencement of the meeting the HON. SECRETARY read a letter received from the Royal Photographic Society inviting the Society to contribute some pictures, work of the members, to the forthcoming Exhibition at the Crystal Palace. It was decided to do so.

Sheerness Camera Club.—February 7, Annual General Meeting, the President in the chair.—The officers for the ensuing year were elected by ballot. The result was as follows:—*President:* Mr. J. J. King-Salter.—*Vice-President:* Mr. J. Small.—*Committee:* Messrs. T. Dexter, A. Doran, and W. T. Shutt.—*Hon. Treasurer:* Mr. W. H. Jago.—*Hon. Secretary:* Mr. Arthur D. S. Hughes, 14, Edward-street, Sheerness. The President remarked that he was pleased to say that the Club stood on a firmer basis now than it had ever done, and, as a good course of lectures had been arranged for, he hoped that a good many more photographers would join the Club for their mutual benefit.

Wirral Photographic and Scientific Association.—February 2, Annual Meeting, the President (Dr. Napier) occupying the chair.—The election of officers for the present year was then proceeded with, Dr. Napier being re-elected to the Presidency. The two Vice-Presidents, Messrs. F. V. A. Lloyd and R. W. Stumbles, were also unanimously re-elected. The following members were elected to act upon the Committee, viz., Messrs. J. Gardner (re-elected), W. W. Haywood (re-elected), J. Pride (re-elected), A. Shaw, H. Wells, and Dr. Webb (re-elected). Mr. J. H. Jones (Hon. Secretary and Treasurer) was prepcsed for re-election, but stated that, owing to pressure of business and his frequent absence from the district, he could not accept the duties for another year. Mr. George Wyatt was proposed and duly elected to the office. The Hon. Secretary, Mr. George Wyatt, 17, St. Elmo-road, Egremont, will gladly forward particulars as to membership of the Association to any amateur resident in the district upon application.

FEBRUARY 16.—Mr. A. SHAW gave a demonstration on

ENLARGING.

For the purposes of the demonstration, Mr. Shaw used Hume's cantilever enlarging lantern, fitted with incandescent gaslight. In the course of his preliminary remarks, the lecturer pointed out that the first essential to successful enlarging was a suitable negative, the requisite qualifications being a full range of gradation without undue intensity in the high lights, and, on the other hand, without bare glass in the shadows. In his own practice, the lecturer used pyro soda or amidol developer to secure this class of negative. Mr. Shaw further stated that during his experience (extending over eight years) he found he got the best results with Elliott's Barnet bromide paper. In his hands this paper yields rich blacks and pure whites with ease and certainty. Mr. Shaw then made several exposures, and developed the prints before the members. The results were all that could be desired, and fully demonstrated the lecturer's command of the process. The developer used and recommended by Mr. Shaw consists of soda sulphite, ten per cent. solution; amidol (dry), 4 grains to each ounce of above; bromide of potassium, 1 grain to the ounce. *Fixing Bath.*—Hypo, 4 ounces; water, 20 ounces; 2 ounces ten per cent. solution soda sulphite; to which is added 1 drachm of either sulphuric or hydrochloric acid. The sulphite solution and acid to be then added to the hypo solution.

FORTHCOMING EXHIBITIONS.

1898.	
February	Photographic Society of India. Exhibition Secretary, 57, Park-street, Calcutta.
,, 25, 26	Edinburgh Photographic Society. Secretary, J. S. McCulloch, W.S., 2 George-street, Edinburgh.
,, 25, 26	Woolwich.
March 1–5	Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.
,, 5–12	South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.
April 22–30	National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.
,, 27–May 14.....	International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

SIMULTANEOUS DEVELOPING AND FIXING.

To the EDITORS.

GENTLEMEN,—While experimenting with varying quantities of hypo in an ortol developer, it was noticed that the very thin edges of the film fixed out during development, and the idea then occurred to me to see if it was not possible to develop and fix simultaneously.

My success far exceeded my expectations, and it was clearly shown

that, under certain conditions, it was not only possible, but practicable. From the few experiments which I have made, the conclusion has been drawn that to succeed it is necessary that the plate shall be one which develops and fixes rapidly, and inclined to warm tones.

If the plate is as slow in developing and fixing as the ordinary bromo-iodide plate is, so much hypo is required that the development is made very slow, but even this might be overcome by a nice adjustment of the bath. Lantern slide plates which give warm tones with difficulty generally fog badly in this combined bath.

I succeed best with Seed's G.B.P.R. (warm tone) lantern plate and the following formula:—

A.

Water	10 ounces.
Potassium metabisulphite	35 grains.
Ortol	70 ,,

B.

Water	16 ounces.
Caustic soda	60 grains.
Potassium bromide	60 ,,

C.

Water	20 ounces.
Hypo	1 ounce.

To develop and fix, take—

A	1 ounce.
B	1 ,,
C	2 ounces.

The image appears before the fixing action becomes apparent, and the plate is left in the bath a few minutes after it is apparently fixed. If the exposure was normal, the image is not much different than when developed and fixed separately, perhaps a little harsher. With ordinary negative plates the potassium bromide can be omitted, and stronger caustic soda and hypo solution used; also plenty of sodium sulphite must be added to prevent staining and discolouration of the developer during the prolonged development and fixing.

The difficulties which beset this process, in its application to negative plates, I do not think are insurmountable, and success means the saving of many hours and much labour to the photographer, besides simplifying what is now considered by many a difficult and tedious job.—I am, yours, &c.,

MILTON B. PUNNETT.

St. Louis, Mo.

KEEPING PROPERTIES OF GELATINE PELLICLE.

To the EDITORS.

GENTLEMEN,—Some years ago I used to make my own plates with emulsion of my own make, which I made into a pellicle, and stored away in a light-tight wooden box with a screw top. Having some by me that was made in 1888 (ten years ago), I thought I would try it to see if it still retained its good qualities; so I melted some with the right proportion of distilled water, and coated some opal plates, 15 × 12, and found that it was quite as good as ever. It yielded some very good opal enlargements, quite as good as any I had ever done, and had retained its sensitiveness and good qualities all through these years, and had not deteriorated in the least degree. I believe it would have continued to do so indefinitely. I must say I was surprised to find it had kept so well, and thought the fact might be worth recording.—I am, yours, &c.,

Hitchin, February 18, 1898. THOMAS B. LATCHMORE.

CINEMATOGRAPHY AND ASTRONOMICAL PHENOMENA.

To the EDITORS.

GENTLEMEN,—From General Tennant's letter in your issue of yesterday, I gather that, in connexion with the astronomical cinematograph, some persons appear to attach an exaggerated value to my claims. He has noted some tendency to over-estimate the importance of the little I have done in this direction; and, very properly, he seeks to correct it. Such being the case, I am anxious to acknowledge my obligation to General Tennant for calling attention to the matter, and to thank him for so kindly expressing his belief that I, personally, have had no hand in creating a false impression. Indeed, this is the first I have heard of any misconception, and cannot imagine how it could have arisen. In the little I have ever said on the subject, I have consistently endeavoured to give every one his due.

I have, honestly, no desire to claim either precedence or merit in this connexion. I believe the instrument used by the Rev. J. M. Bacon at Buxar happened to be the first of its kind; but that is merely as it happened. All I have done amounts to no more than every mechanical man has to do every day of his life, viz., adapt and combine existing contrivances to meet a special requirement. I have no feeling in the matter, beyond an interest in the results—however, whenever, and by whomsoever obtained.

Every one must agree with General Tennant in saying that, "as far as the construction and use of an apparatus for taking a succession of pictures of an astronomical phenomenon in rapid change," I have been preceded. Photography is, undoubtedly, prolific of inventions that are forgotten and subsequently reinvented; but instruments for taking astronomical photographs in series have been so frequently designed and used during the past twenty years, that it really never occurred to me that the fact could be overlooked. Such instruments may justly be regarded as stepping-stones to the development of the astronomical cinematograph, although, in themselves, they are far from being cinematographs.

On reading the late Warren de la Rue's description of his chronophotographic instrument, to which General Tennant refers, I think some of our photographic friends would be interested to note the use of the term "photogram."—I am, yours, &c.,

NEVIL MASKELYNE.

Egyptian Hall, W., February 19, 1898.

THE BRUSSELS EXHIBITION.

To the EDITORS.

GENTLEMEN,—I should like to remind exhibitors of the third annual Exhibition of the Association Belge de Photographie, which is to be held at Brussels during next May, and for which I am acting as British representative. The following are the brief details:—

Only works of pictorial merit will be admitted, all photographs received being submitted to the Jury of Selection.

No awards are offered, but each accepted exhibitor will receive a commemorative medal. No charge for space.

Pictures must be framed separately; they must not exceed 50 × 40 inches outside frame measurement, and not more than ten may be sent by any one exhibitor.

Dates.—Entry forms must reach me at latest on March 27, and frames April 8.

Carriage to and from London must be paid by exhibitors. The carriage to and from Brussels will be reduced by packing the frames in joint cases, and the cost equitably divided amongst exhibitors.

The jury is composed of the following photographers and artists:—

M. Jos. Casier ... Pres. A. B. de P.	M. Ch. Puttemans ... Amateur.
M. Ch. Hermans ... Painter.	M. Edm. Sacré ... Photographer.
M. F. Khnopff ... ... Painter.	M. A. J. Waulers ... Professor.
M. Jos. Maes ... Pres. U. I. de P.	M. M. Vanderkindere ...
M. G. Oury ... ... Amateur.	(Sec. A. B. de P.)

Entry forms and details may be obtained from

WALTER D. WELFORD.

19, *Southampton-buildings, Chancery-lane, W.C.*

"THE OTHER SIDE."

To the EDITORS.

GENTLEMEN,—As many employers requiring assistants take your JOURNAL and look through the list of those wanting employment to fill vacancies, it must be very annoying if they receive the same treatment as has fallen to my lot to their letters addressed to employees under the initial-letter system. I wrote to no less than five *lady* receptionists, and in no single case have they proved themselves suitable for the positions they advertised for, as they have not condescended to reply. Is it of any use taking notice of such advertisements under the initial-letter system? Any honest assistant can give a private address under an initial letter. It would help employers to form an idea of railway fares, give quicker communication, erase the idea of something being wrong, and help assistants to obtain suitable situations; and good situations are not to be despised.

I write this wholly in the interest of those seeking employment.—I am, yours, &c.,

J. G. HORSFALL.

16, *Nevill-Street, Southport, February* 15, 1898.

PHOTOGRAPHERS' PRICE-LISTS.

To the EDITORS.

GENTLEMEN,—I am sending you (enclosed) a copy of my new price list, which I humbly consider to be both novel and interesting. In these days of extended and illustrated price lists, I think we, as photographers, are, to say the least, a little behind the times. More often than not, a small piece of paper, or at the most a two-fold card, is what we are content to term our price list, whereas I am of the opinion that something in a more detailed and attractive form is both conducive to business and appreciated by the public; hence I pass the suggestion along for the consideration of my brother photographers. I may say that the picture on front is a photograph of the Mayor basting the ox, in connexion with the Diamond Reign in Salisbury, and that on the back is a copy of the Salisbury Philharmonic Society, reproduced from the original, which measured five feet by four feet.—I am, yours, &c.,

29, *Castle-street, Salisbury, February* 14, 1898. H. C. MESSER.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

P. V. Everill, Lansdowne House, Worcester.—*Photograph of cat on ladder.*

W. G. Honey, 28, Grand-parade, Cork —*Photograph of Prince Henry of Prussia.*

P. Charleton, Garrison Studio, Newbridge.—*Drawing of Buffs Regiment crest and honours. Laurel wreath and ribbons, with dragon on top.*

F. MUTTON.—We have no further particulars than those contained in the paragraph referred to.

THEODOR NEUMANN.—We have no recollection of the article. Can you tell us about the date?

COPYRIGHT.—E. DELACROIX (Leicester) —Send our publishers three prints and one and sevenpence, and they will effect registration for you.

ARCTIC CIRCLE.—1. An extremely good instrument answering all your requirements. 2. Paper. 3. Newton & Co., Fleet-street; Tyler, Waterloo-road; J. H. Steward, Strand. 4. Yes.

PRESERVING NEGATIVES.—PUBLISHER. The best way to protect gelatine negatives is to well fix them in fresh hypo, thoroughly wash, and, when dry, coat with good enamel collodion. Then, finally, varnish with a hard spirit varnish.

T. HAWTHORNE.—1. Like the large firms you have applied to, we know nothing of the material you mention. Are you sure you are right in the name? 2. Litmus and turnsole are one and the same thing, consequently their tincture would be alike.

BLOCKING OUT.—A. ROBERTSON says: "I have been using black varnish for blocking out skies, but it is not dense enough with very dense negatives. Can you recommend anything better?"—Add to the varnish some lamp-black; with the addition of that, any degree of opacity may be obtained.

DEBT.—S. M. The proceedings must be in the County Court. You will, doubtless, get your case. As the portraits were ordered after the proofs were approved of, and no complaint made until payment was requested two months afterwards, there can be no valid defence that will avail.

CHANGING BAG.—W. BLAKE. Black macintosh cloth is about the best thing you can have; but it should be carefully examined in a strong light to see that there are no pinholes in it. In good-quality macintosh they seldom exist, but they accidentally do occasionally, and then they lead to trouble.

S.—The converted formula will stand as follows: Eikonogen, 6 grains; metabisulphite of potash, 10 grains; washing soda, 30 grains. But in a one-solution developer the metabisulphite offers little or no advantage over the neutral sulphite, as its extra preservative action is destroyed on the addition of the alkali.

MOUNTANT.—S. R. E. Dextrine is best mixed with cold water. But we have on many occasions said that, though convenient to use, it is not a suitable mountant for silver prints, inasmuch as it is (that is, the commercial samples) invariably acid, and may have an injurious action on the print as regards stability.

APPRENTICESHIP.—PLATINOTYPE. We should say that the premium is far too high, under the conditions as to wages, unless you are prepared to teach the apprentice a great deal more than is usually the case in a middle class business. No premium at all would seem fairer unless the apprentice is a very juvenile one. 2. Yes, certainly, under any title you like.

FIRE INSURANCE.—R. W. In most policies a limited small value only is placed on each negative; but, if you have any of a very exceptional value, you can have a separate policy for them, but they will have to be individually specified, and the value also specially specified. Of course, a special premium for these will have to be paid, according to the risks under which they are stored, &c.

LENS.—R. BELCHER. By bringing the lenses of a rapid rectilinear closer together it will include a wider angle, but it will only do so at the expense of other qualities. For instance, to include the wider angle, with good definition at the margins, a much smaller stop must be used, and that means a much longer exposure. Hence it can only be used in a very good light with a hand camera.

PORTRAIT LENS.—R. WILSON. The lens may be a very good one, notwithstanding that it bears no maker's name. Your diagram, however, shows that the elements of the back combination are misplaced. They are right as regards each other, but should be reversed in the cell. In that position the performance of the instrument will be very different. It is evidently of early French make, and has but little commercial value. Still, it may be a very good lens for all that.

POSITANO (Salerno).—1. You might try diluting the bath; but we would suggest that you repeat your query to the makers of the paper, sending them two or three examples of what you complain of. They have had a much more extensive experience with the use of the paper under adverse conditions than we have. 2. It is unfortunate so good a negative should have been ruined by a pinhole in the front of the camera. As the injury is so great, we should have thought it would have been detected while focussing. Evidently the "pinhole" was a very large one.

RETOUCHING-LENS.—N. C. HARBUTT says: "I am asking two questions, which I have found some difficulty in answering to my satisfaction. 1. From whom could I get a good book on the use of the knife in retouching; and also the knife itself? 2. What would you call a fair price for a la 'Dallmeyer' lens, second hand, and in good condition, with exception of screw?"—1. Retouchers' knives are supplied by Marion & Co. and all large dealers in photographic requisites. We know of no book on the use of the knife in retouching. Better get a lesson or two on its use from an experienced retoucher. 2. It is out of our province to value second-hand apparatus.

LENS FOR PORTRAITURE asks: "Will you kindly give me your opinion as to whether a cabinet portrait lens of 7½ back focus or a whole-plate portrait lens of 9⅝ focus would be the most useful and best lens all round for every-day use in studio, cabinet-size negatives being the largest required? The studio is 25 feet long. Thanking you in anticipation."—"Back focus" is but an approximate guide as to the real focus of a lens. We should say, however, that the longer-focus one would be the more generally useful one of the two, as it would give the more pleasing perspective, while we imagine it would permit of full-length portraits being taken in a studio of the length given. If we knew the equivalent focus, we could speak more definitely.

AIR BRUSH.—OTTO (Durham) writes: "Can you inform me as to the exact process worked to obtain the even grain on faces and clouded backgrounds on bromide prints? I have an air brush, but the ordinary water colour makes splashes, and does not dry like those obtained from first-class firms. Is there a spirit used, or is the picture ground in graphite first, and then spirit used? If so, what kind of spirit?"—All that is required is skill and experience in the use of the apparatus, which is only acquired by practice, such as the best workers have attained. If you can get a few lessons from one who is proficient with the air brush, it will help you materially in its working, and be cheapest in the end. Much, however, depends, as in water colouring, on artistic ability.

PHOTOGRAPHS ON ZINC.—J. R. W. writes: "I have an enlarging camera, and should be very glad if you could, through the medium of your valuable paper, give me any information that would assist me to photograph enlargements of designs direct on to zinc plates. At present I paint the zinc with a covering of white lead and turpentine (so that, when the turps has evaporated and the white lead set hard, a surface similar to white paper is obtained). I then place the design to be copied in the enlarging camera and trace the enlarged design with a black-lead pencil on to the zinc plate; sometimes I first make a negative, exact size of design, and trace enlargement as stated above. My chief difficulty in photographing (instead of drawing) seems to be in the want of a chemically pure substance with which to coat the zinc preparatory to sensitising the zinc plates. If you could suggest any formula to coat or satisfactorily sensitise the zinc plates, or refer me to any book that would give me the information, I should be extremely grateful to you. I may add that the enlargements made are usually five times each way larger than the original designs."—We know of no method such as that idealised by our correspondent; but, if an enlarged negative is made, the matter is easy, as it may be printed on the zinc by the bitumen process or the fish-glue method as used by the process workers; or a transfer may be put upon the zinc, *à la* photo-zincography; or a carbon picture may be developed upon it.

PORTRAITURE.—A. J. C. writes: "I should feel much obliged if you can help me in my difficulty through your columns. You will notice by the rough sketch that I have only a back yard, which I have converted into a studio, and which answers my purpose very well indeed. Except when my enemy (yet our best friend), the sun, shines into the yard, which is about from February to October, during the other months I never get the sun. Consequently, I never use any blinds as I place setters under zinc roofing at west end, and the enclosed photos, taken without blinds up, are a few results. Now, (1) I want to know if you can tell me what kind of blinds to use (from February to October, when the sun shines down into the yard), whether black, grey, blue (light or dark). 2. How to place them up for quickness, and in what order, if all colours are required. 3. Where to buy the material cheap. 4. If I cannot get the colour, could I dye the material? 5. Also any other point which may help me, as I am only a young beginner of a few years in this line of business. If I can manage these blinds to suit me, I shall be quite satisfied to remain here, as I am just getting known in this direction and able to suit my customers with work."—In such a circumscribed space and with such surroundings, the portraits enclosed are fairly good. As the sun seems to be the only difficulty, we should suggest covering up the yard with thin blinds that will obstruct it—say a light blue muslin. 2 Impossible to say without seeing the place. 3. At any furnishing warehouse or draper's. 4. All colours are obtainable. 5. We can only suggest that you study the light, as you receive it, at different times of the day, and then fit blinds to meet the difficulties.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1974. Vol. XLV.—MARCH 4, 1898.

Contents.

	PAGE
THEDRÂ	129
E-SOLUTION DEVELOPERS	131
ERETTES :— urious Property of Potassium latino-cyanide — Is Animated hotography on the Wane? — ill Another Method for Esti- ating Iodine, Bromine, and hlorine — Photography at the te Solar Eclipse — Art in hitechapel—South Kensington A Complete Installation of etylene for Illumination — re Risk at the National Gal- y—A New Vacuum Tube — Unique Reflecting Telescope.	132
THEORY OF THREE-COLOUR NTING.—I. By A. Freiherrn fübl	133
ATENT IMAGE AND ITS DEVE- IENT	135
GRAPHIC HALATION: POS- OB AND ANTERIOR. By G. OW	137
FOG. By J. Pike	139
THE WEST LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION	140
EXHIBITION OF THE WOOLWICH PHOTOGRAPHIC SOCIETY	140
OUR EDITORIAL TABLE :— The Vanguard Matt Varnish — Lumière's Acetone-pyro De e- loper—The Joly Colour Process	141
NEWS AND NOTES	141
MEETINGS OF SOCIETIES :— London and Provincial Photogra- phic Association—Photographic Club—Croydon Camera Club — Newcstle-on-Tyne and Northern Counties Photographic Associa tion—Portsmouth and Southsea Amateur Photographic Society— Blairgowrie and District Photo- graphic Association	142
FORTHCOMING EXHIBITIONS	143
CORRESPONDENCE :— Cinematography and Astronomical Phenomena—Conversion of For- mulæ Exposure-meter Paper	143
PATENT NEWS	143
ANSWERS TO CORRESPONDENTS	144

EX CATHEDRÂ.

the subject of colour photography has great fascination en of science was clearly shown on Friday evening last at oyal Institution, when Captain Abney lectured on "The ry of Colour Vision Applied to Modern Colour Photo- y." The theatre of the Institution was filled with a very audience, many of those present being of eminence in the of science, while the purely photographic section of the any was both numerous and distinguished. In the library e Institution colour transparencies by the Joly and Ives sses were placed on view, and there was a very good ple of the Lippmann interference method, besides many exhibits of a photographic character. Mr. Ives's in- us instrument for projecting his kromgrams was practi- demonstrated by Mr. Herbert Newton, to the great t of the company who, although having been similarly ained during the lecture with a display by Mr. Ives lf—one of the most beautiful and fascinating exhibitions our projection that we have seen—yet pressed forward to ss a second demonstration.

Captain Abney's lecture was an exposition of the three-colour sensation theory and its development in the work of Mr. Ives and Professor Joly, both of whose processes were illustrated by lantern projection. Reference was also made to the application of the three-colour method to paper; but the lecturer caused some little surprise by omitting all mention of Lippmann's work. Applause was greatest when the Ives kromgrams were placed on the screen, and the three separate coloured images were superposed to give the total effect of natural colours. The registration was of course perfect, and the audience obvlously very highly appreciated the superb examples of colour photography Mr. Ives was enabled to show. Personally we can say that we thoroughly enjoyed the sight of those pictures, and that our admiration of them was all the heartier for that during several years past we have been called upon to admire and accept as "photographs in natural colours" the crude productions of several empirics and impostors.

* * *

Reflecting on the fact that the Ives, Lippmann, and Joly processes are purely physical, we are led to wonder whether Captain Abney's often-expressed definition that "photography in natural colours is photography in pigments" will be vindicated by the invention of a purely chemical process giving permanent results. It has struck us many times since their publication in these pages eleven years ago that the experiments of Carey Lea in the production of what he termed coloured photo-salts of silver, if taken up and pursued by other experimentalists, might lead to something more than negative results in connexion with the problem of natural-colour photographs in pigments. But it is strange to note how seldom investigators of scientific problems attempt to verify or refute each other's results. Two things are certain: that the field of work in connexion with natural-colour photography has not been appreciably narrowed down by what has so far been done in it, and that the earnest student of the subject will find much valuable information at his disposal if he should be disposed to attack the problem from Abney's "pigment" aspect.

* * *

Among those whom we met at the Royal Institution was Mr. J. Wallace Bennetto, of Newquay, whose name, as our readers know, has for some time past been associated with natural-colour photography. Mr. Bennetto was kind enough to give

us some idea of the work he has been doing in connexion with the problem during the past eight years, and we hope shortly to be in a position to announce the nature of his achievements. We gather that Mr. Bennetto's results are obtainable on glass and paper; indeed, we were shown an interesting photograph in natural colours on paper, produced, we understood, by simple printing out under a negative, and without the intervention of chemical treatment. Mr. Bennetto appears to have devoted a great amount of effort to experimental work in colour photography, but has not hitherto been free to allude *urbi et orbi* to the exact nature of his results, or the methods by which they are obtained. The obstacles in his way will, however, shortly be removed.

* * *

"A Fellow of the Royal Astronomical Society," the well-known contributor to our contemporary *The English Mechanic*, last week had the following note regarding what we take to be a case of fading of star images on gelatine plates: "In common with, I imagine, an overwhelming majority of astronomers, I have always considered that the chief value of the Astrographic Chart and Catalogue now in process of construction would lie in the means it furnished for comparison of the heavens, as they now exist, with their configuration in the more or less distant future. In order, however, to ensure this, the very essential is that the photographs themselves should be permanent. It is, then, with a feeling of real sadness that I heard from one of our greatest astronomical photographers the other day that the plates are not permanent, and that stars had disappeared from those which he had taken some years ago. This, I venture to think, is a subject requiring urgent and immediate attention." In the opinion expressed in the last sentence of this extract we entirely concur. The remarks that the "plates are not permanent," and that "stars have disappeared," give no clue whatever to the cause of the fading. We hope that the plates, with details of their preparation, development, intensification, if any, and method of storage will be submitted to competent examination, and the cause of this unwelcome phenomenon fully investigated. The alleged fading of images on gelatine plates is a subject that is of extreme interest to all photographers.

* * *

The *Journal* of the Society of Arts announces that Messrs. Maull & Fox have for some time taken photographic portraits of members of the Society, and they have just presented the Society with a series of nearly 200 cabinet-sized portraits. Messrs. Maull & Fox have expressed their willingness to take photographs of the members of the Society gratuitously, and to present a copy to the sitter. Will not some enterprising photographer anxious for a little cheap advertisement take this hint with regard to the members of the Royal Photographic Society, a collection of whose portraits might form a useful and interesting addition to the Society's "Museum?"

* * *

The slides illustrative of many of the places to be visited during the meeting of the Photographic Convention in Glasgow, July 4 to 9 next, were shown at the Photographic Club on Wednesday evening, February 23. The set numbered 200, and the quality of many of the pictures was extremely high. We were sorry to observe that not more than a dozen people attended to see the slides, and that among the dozen there were only three probable visitors to the Convention. We understand that the slides are to be sent for exhibition to several other photographic societies in London and the country and we hope that the effect of this publicity will be the determination of many photographers who have not hitherto visited a Convention to join the Glasgow gathering.

* * *

Regarding the Convention of 1899 nothing as yet has been settled; action in the matter can, of course, only be taken at Glasgow in July, when, according to precedent, the scene of next year's meeting will be decided upon. We are sorry to learn that the chances of Hastings inviting the Convention there in 1899 are not so great as they formerly appeared to be, the local photographic society having changed its mind in the matter. A suggestion has been made to us that Paris in 1899 would form an admirable meeting place for the Convention. Antwerp has also been mentioned. Both cities offer attractions of an interesting kind to such a body as the Photographic Convention, which would, doubtless, be cordially welcomed by the French or Belgian photographers and photographic societies.

* * *

A correspondent of the *Stage* is anxious that photography should be more largely utilised at theatrical celebrations than is at present the case. The lady writes: "I have so often thought how many opportunities are missed of securing interesting souvenirs of memorable gatherings, and of adding to the funds of the various theatrical charities. It never struck me so forcibly as it did at the Charles Wyndham celebration. If the stage could have been taken just at the moment of the presentation, how that photograph would have sold, very much to the advantage of the charities. And it could have been done so easily from the dress circle. And again, on the opening night of Her Majesty's, why not have had the house taken both inside and out? I am certain that any one who takes an interest in collecting souvenirs, speciprogrammes, &c., would be only too glad to add these data photographs to their collections." There may be practical difficulties in the way of taking photographs on such occasions as are here referred to, but we give place to the lady's idea as in case it may be worth the while of some of our readers to make a point of endeavouring to carry it into effect when opportunity offers.

* * *

The Vienna correspondent of the *Daily Telegraph* is responsible for the statement that a Galician schoolmaster, named Jan Szczepanik, in poor circumstances, has solved a problem upon which Mr. Edison has expended much labour and thought during the past twenty-four years, though without success. "Herr Szczepanik has discovered an electroteleoptical apparatus, upon which he has already obtained a patent. At present he keeps secret the exact construction of this machine, simply saying that it resembles a telephone. If a picture or any other article be placed before the box containing the instrument, a spectator situated at another box connected with the first one by a wire, no matter at how great a distance away, will be enabled to see the object in its natural colours. Herr Szczepanik states that the picture is separated by means of two mirrors into a number of dots, which are distributed upon an endless line. The different vibrating

light from these dots produce in the first apparatus electrical rrents of varying strength, and in the second apparatus, here the currents are received, they are changed again into ys of light, two swinging mirrors transforming them into a nited picture. In scientific circles opinions are reserved as the merits of this invention. Herr Szczepanik, who has the pport of a banker, says that up to the present he has been ccessful in all his experiments. He intends to take a pavilion the Paris Exhibition of 1900, where, by the aid of his tele- tical apparatus and a skiopticon (*sic*), he will show to a thering of 10,000 persons the manœuvres of the French my and navy when many hundreds of miles distant from aris." We should think that opinions would be very much served as to the merits of an invention of which practically thing is known. From the foregoing it would appear that e Galician schoolmaster has been working on the subject of e telegraphic transmission of pictures, a problem that has ready engaged much attention in America, as our readers ell know. The latter part of the message we have quoted so appears to suggest that he is sanguine of being able to ry much extend the limits of ordinary human vision.

SINGLE-SOLUTION DEVELOPERS.

ALTHOUGH, from the point of view of control in use and capacity f modification to meet errors in exposure, it is impossible to efend the employment of single-solution developers, there can e little doubt that they are pretty extensively in use by nateurs, who value them for their simplicity, if they do not me up to the separate solutions in the general average of sults.

The convenience of a single-solution developer, complete in self, as compared with one compounded from two or perhaps ree separate solutions, is beyond cavil, and, if it were accom nied by the same power of control or modification to meet rcumstances as they arise, without doubt that form of deve per would secure universal adoption, but that is not the case. would be, perhaps, incorrect to say that no power of control ists, for, to some slight extent, small errors in the direction over-exposure may be corrected by dilution, but no remedy ers under reverse conditions. It is, of course, possible, by, ving separate solutions at hand for use in case of emergency bring the single solution on to something like level terms th the ordinary form, but this at once robs it of its charm of mplicity, and for other reasons it would be preferable to rely lely on the separate solutions.

One of the reasons alluded to is the undoubtedly better eping property of the separate solutions, for it is an obvious ct that, when the reducing agent and the alkali are both esent in the same solution, they must react upon one other with more or less rapidity and energy, notwith- anding that they are accompanied by a restraining or pre- rvative agent in the form of sulphite of soda or other oxygen sorber. That this want of keeping power is a much-felt one evidenced by the fact that, since the appearance of our ticle on "Sulphite of Soda and Metabisulphite of Potash" o or three weeks ago, we have received several communica- ns from individuals desirous of utilising the latter salt in nsequence of the character we gave it as a superior preserva- e; but these communications bear evidence, further, of the istence of a considerable amount of misunderstanding as to e power and functions of the preservative agent.

The neutral sulphites act in this capacity simply by virtue of the readiness with which they absorb oxygen and become converted into sulphates, their presence in the solution, in conjunction with pyro or other reducing agent, rendering the latter, at least, less liable to oxidation than if it were alone, although they do not entirely arrest the action. In the case of the acid sulphites—the bisulphites and the metabisulphite of potash—the additional restraining or preservative action is due to the presence of the free acid, which, while equally liable to oxidation, is converted not into an inactive sulphate, but into sulphuric acid, which, especially in the case of pyro, is still a powerful preservative. This will, we think, render it perfectly clear why metabisulphite of soda, as such, confers the greater keeping qualities it does upon the solutions in which it is present.

But in the case of single-solution developers, in which the metabisulphite may be employed, it ceases to be metabisulphite the moment the alkali is added, or, at least, as soon as sufficient of the latter has dissolved to neutralise the extra or free atom of sulphurous oxide. It is, in fact, converted, supposing carbonate of soda to be used, into neutral sulphite of potash and soda, and, as such, differs in no respect in its action, preservative or otherwise, from plain sulphite of soda; from which explanation it will, we trust, be clear to some of our correspondents why they have failed to derive any benefit from the substitution.

In one small point, however, metabisulphite may perhaps be considered to offer advantage even in compounding a one-solution developer. It is an undoubted fact that must have forced itself upon the notice of any ordinary observant worker that, the more carefully the solution is prepared at the outset, the better and longer will it keep; in other words, that the less evidence there is, in the form of discolouration, of incipient oxidation when the developer is newly made, the less rapidly will oxidation proceed; in fact, the less colour the fresh solution shows, the less rapidly will it be developed. In stating this, we may apply the remarks not only to single-solution developers, but also to the separate solution of sulpho-pyrogallol, as the mixture of pyro and sulphite of soda has been called. It would appear, indeed, as if, when the oxidation is once started, it is bound to proceed; whereas, if it can be altogether avoided at the outset, *i.e.*, in mixing the solution at its commencement, it is materially delayed.

Parenthetically we may remark that this is especially noticeable in the case of a developing solution that has been used, but not exhausted. If a quantity of mixed solution be divided into two portions, one used to develop a plate and then both carefully bottled, it will be found in an hour or two's time that the portion already used will have become decidedly less energetic than the unused, far more so, indeed, than is warranted by the development of a single plate. The extent of the difference will vary according to the developer used; but, even with those that are stated to be capable of repeated use, it will be appreciable, and this should be borne in mind by those who make a practice of using made-up solutions over again, that the used solutions should always be kept separate and not mixed with the unused. Some years ago, in the earlier days of the ferrous-oxalate developer, when this was almost invariably a single solution, made by dissolving oxalate of iron in oxalate of potash, we had a remarkably distinct lesson on this point. A quantity of solution had been made and stored in two separate bottles, from one of

which a small quantity was taken to develop a plate, and afterwards returned to the "stock." Upon attempting to use from the same bottle the following day, it was found to have completely lost its developing power for any useful purpose, and we may say that the "new developer" acquired with us a decidedly bad reputation.

Some weeks later, in clearing our shelves, we were struck by the different appearance of these two bottles of developer, which had been both untouched in the interior. One, that which had been used from, exhibited a muddy sediment, as well as a plentiful crop of the Canadian green crystals; the other had apparently undergone no change since it was mixed. We were, therefore, induced to try the two again, when it was found that, while the one was absolutely without developing power, the other was apparently as vigorous as when freshly made. Therefore, we say, Be careful to keep used and unused solutions separate.

But, to return to metabisulphite, it may be decidedly advantageous to employ it in mixing a one-solution developer, if only that a perfectly clean and unoxidised solution may be obtained to start with, as upon this point the subsequent keeping qualities of the mixture in great measure depend. If this be done, and care in another respect exercised, it is possible, even with pyro, to prepare a single-solution developer that will keep fairly well; and pyro lends itself less readily than any of the newer agents to this style of solution.

In the case of metol and some others of the new developing agents, it is necessary to dissolve the active developer before adding the metabisulphite, but in the case of pyro the reverse is imperative. But, in any case, let a *clean* solution of the developer and its preservative be first prepared. Matters in this respect will be materially aided if the water employed be first boiled to drive off any air it may contain, and in the process of solution, especially with pyro, the mixture should be as little shaken, particularly in contact with the atmosphere, as possible. No attempt should on any account be made to *filter* the solution, as this will infallibly cause serious discolouration. Then place the clean solution in a bottle only just large enough to contain the finished developer, and with a long-necked funnel reaching nearly down to the bottom introduce the alkali, previously dissolved, by pouring very gently so that it forms a layer at the bottom of the bottle, or the alkali may be added in crystals or the solid state, and allowed to dissolve gradually, but we prefer the former plan. Only when the bottle has been closed should it be shaken, and then as little as possible or necessary to mix it thoroughly. By following this plan a perfectly clean solution is obtained which will remain in the same state for a considerable time.

A Curious Property of Potassium Platino-cyanide.—Herr E. Sonstadt, at a recent meeting of the Chemical Society, described some hitherto unknown properties of the above-named salt in solution. It appears that a solution of 0·1 per cent does not change upon being heated, but that, if diluted to one-tenth that strength, dissociation takes place, and platinum monochloride is precipitated.

Is Animated Photography on the Wane?—In the Queen's Bench Division, before the Lord Chief Justice and a special jury, an action was tried one day last week in which cinematography was concerned. The plaintiff was Mr. Robert William Paul, and the defendants the Alhambra Company, Limited. The action was for damages for wrongful dismissal and breach of contract. The plaintiff's case was that he had gone to great expense to obtain photographs of the Jubilee procession last year, and entered into negotiations with the defendant's manager for the exhibition of the pictures at the Alhambra for eight weeks at thirty pounds a week. The defence raised was that the Alhambra was to have had the exclusive use of the pictures for London, but this was denied by Mr. Paul. In the end the jury gave a verdict for the plaintiff for 150*l.*, for which judgment was entered with costs. An interesting point in connexion with the case is this: In March 1896, when Mr. Paul was first engaged, it was at a salary of 66*l.* per week, which salary was gradually reduced to 30*l.*—less than half. Was that owing to animated pictures being less appreciated by the public than they used to be, or is it that a greater number of cinematographers have entered the field, and so, by competition, brought down prices? We are inclined rather to the latter opinion, as the interest in animated photographs does not appear to be materially declining.

There seems some proof of that, for the premises of a firm of photographers and film-makers in Islington were, one morning last week, entered by burglars, who carried away some fifty or more cinematograph films, each from sixty to seventy feet long, and contained in the usual tin boxes. It would appear to most people that cinematograph films were not a very marketable commodity in the hands of burglars, and they would also be almost sure to lead to the arrest of the thieves. However, we must allow the burglars to know their business better than we do. With the films other property was taken, amongst which, according to the daily press, some "brass lenses." Brass lenses are certainly a novelty.

Still Another Method for Estimating Iodine, Bromine, and Chlorine.—As our past pages will show, the method of carrying out such estimation is one that is very attractive to the analytical chemist, so many have been the plans proposed. The one now referred to seems to possess many elements of superiority over others previously published, and would seem to be very useful for estimating, for example, the relative proportions of the ingredients present in a dry plate of unknown constitution. It was recently read at a meeting of the Paris Academy of Sciences.

The new method is based upon the following reactions: In a mixture of chlorides, bromides, and iodides in solution, sulphuric acid, charged with nitrous vapours, is able to displace the iodine entirely, in the cold, without acting on the hydrochloric or hydrobromic acids present; the iodine can then be entirely dissolved and removed by sulphide of carbon. If, now, sulphuric and chromic acids are added, bromine can be recovered, but only partially in the cold; but if the liquid be brought for about half an hour to about boiling point, and then allowed to cool, the addition of further sulphide will entirely remove all bromine. In neither case is a trace of chlorine removed, and the estimation of this substance can be made with nitrate-of-silver solution in the usual manner.

Photography at the late Solar Eclipse.—As full details come to hand from the observers at the different stations, the first reports of complete photographic successes are more than fully confirmed. At the last meeting of the British Astronomical Association, Messrs. Thwaites & Johnson, members of the Association's expedition to India, were present to make a statement with reference to the observations made, which had been perfectly successful. Mr. Thwaites said that he exposed three plates, the respective times of exposure being one and a half, nine, and thirty seconds. There was no time for a fourth exposure, as the period of totality proved less than had been anticipated, one minute fifty-six seconds. The photographs were afterwards projected upon a screen. The instrument used in taking the photographs was

uatorial refractor with an object-glass of six feet focus. On the hole, this has proved to be, most generally, successfully observed of y solar eclipses.

Art in Whitechapel.—For seventeen years past a loan Exbition of pictures has been held, during the Easter holidays, at St. ude's Schools, adjoining the Toynbee Hall, and it has always been sited by thousands of persons daily, to their great enjoyment. rrangements are now in progress for this year's show, and it will clude several of Millais' works that are now on view at Burlington ouse. Amongst those who have promised the loan of pictures is e Duke of Westminster, together with other owners of the best ctures in this country. Whilst art seems to be so highly esteemed y the denizens of the East End, it is surprising that it seems to be entirely ignored by the majority of the local photographers. hey evidently do not profit by these local exhibitions, and a visit to ie neighbourhood will show there is ample room for them to do so, one may judge from what is exhibited in the shop windows and oorways. However, perhaps one must not expect much "high art" a shilling "likeness."

South Kensington.—The public will be glad to know that ie inquiry into the administration of the Science and Art Departent is not to be allowed to drop. In the House of Commons, a w days back, Sir F. Powell asked the First Lord of the Treasury it was the intention of the Government to reappoint the Comittee on the Museums of the Science and Art Department, and, if o, whether it was intended to do so at an early date. In reply, Mr. alfour said he thought it would be desirable to reappoint the Comittee, and that it should be done at an early date. It will be emembered that, last year, that Committee issued a preliminary and rgent report on the danger there was from fire to the building and heir valuable and irreparable contents. There was nothing new in hat, for the subject had continuously been dealt with in the daily ress for years past, and now remedial steps are being taken.

At the time that report was issued we expressed the hope that the rincipal point that the Committee was appointed to inquire into ould not be lost sight of—namely, the administration of the epartment, and whether the public who found the money obtained ll value for the grants annually made to it. For years past mours have been rife of mal-administration, jobbery, incomtency, cliques, &c. Now that the Committee is to be reappointed, is to be hoped that these charges will be cleared up; also that ey will be proved groundless.

A Complete Installation of Acetylene for Illumination.—There can be no doubt that the obstructive policy of the re insurance companies with regard to the insurance of premises here acetylene is used will gradually have to give way to the emands for the new illuminant. It is not denied that explosions used by its use have occurred, but, then, so have they with ordiary coal gas, yet with probably a far smaller percentage than ccurred in the early days of the latter. All new experiments in ch directions must naturally be liable to accident. But, apart om the use of the gas in a compressed form, which must always resent graver elements of danger, we submit that the time has rrived when a broader and less timorous view should be taken of is important agent. On the Continent the subject is treated in a ore rational manner, and already, for example, in a small town in ustria, there is a complete installation of the gas for use in the reets, private houses, municipal buildings, &c.

A new mode of making the carbide is described and patented by rofessor Wilson, of St. Catherine's, Ontario. The refuse of saw ills is converted into carbon, which is mixed with lime and treated the usual way in the electric furnace. The carbide thus produced broken up and sold for the production of acetylene.

Fire Risk at the National Gallery.—It is well to know that the authorities are fully alive to the danger, from fire, to our National pictures. In reply to a query put in the House of Commons, Mr. Akers-Douglas said he did not think an expert report was necessary, or could add to the knowledge already possessed by the Office of Works. He added that the construction of the several portions of the buildings and the circumstances of their surroundings are well known to the Department, and the questions of danger from fire from outside inflammable buildings has constantly engaged its attention. He further stated that adjacent property had quite recently been purchased by the Government, with a view to lessening any such danger, and that a similar course would be adopted as opportunities occur. That is satisfactory, for England cannot afford to lose any of its National pictures; it has already too few of them.

A New Vacuum Tube.—In the current number of the *Philosophical Magazine* a very remarkable kind of tube is described, in which the anode or cathode is entirely done away with. A continuous wire is passed through the vacuum and then inserted in a circuit with a spark gap and one of Trowbridge's improved rheostatic machines charged with a battery of 10,000 cells. The condensers are charged in parallel, and the voltage possible approaches a million. With such an arrangement unusual results may naturally be expected. Röntgen rays are produced, but, unfortunately, cannot be studied photographically, seeing that they pass in brush form from tube to plate and show on development with a star-spangled appearance. An aluminium mirror inside throws upon the wall cathode rays, which may be deflected by a piece of tinfoil.

A Unique Reflecting Telescope.—The *Proceedings* of the Paris Academy of Sciences for January 31 contain an account of a very remarkable reflector for astro-photographic use. At the Meudon Observatory M. A. Rabourdin has been making use of a telescope whose aperture bears the extraordinary ratio, compared with the focus, of one to three. It will be remembered that quite recently a ratio of one to five was stated to be the maximum beyond which all objects situated much outside the very centre of the field were bound to be displaced and distorted; but, be that as it may, M. Rabourdin has obtained some very wonderful negatives of nebulæ. The various nebulæ, those, for example, in Aquarius, Andromeda, Triangula, &c., have been taken, and with very quick exposures, though, according to Mr. Wadsworth's contention, as recently described by us, an instrument of such immense angular aperture ought not to be any more rapid than one of equal diameter and longer focus; but such is the rapidity and resolving power of this *f*-3 instrument that the negatives obtained by its aid in a short time exhibit details not to be found in any, even the most beautiful, chart in existence.

THE THEORY OF THREE-COLOUR PRINTING.

I.

[Photographische Correspondenz.]

Although the theory of three-colour printing has been thoroughly explained for some years, up to the present no common agreement on the requirements has been come to, which in part lies in the difficulty of the problem, and also partly also because strict adherence to the theoretically correct fundamental bases will not secure practical results.

A correct theory is, however, of the greatest value for the further development of this process; it teaches us the causes of failure, shows us the dodges which we must take advantage of in order to obtain perfection, and proves before all things those erroneous and purposeless experiments to which false bases would lead us.

Convinced of these facts, I felt constrained to advance a general theory as far as possible satisfying the requirements of practical work, which formed the foundation of my work, *Die Dreifarben Photographie*.

This communication is issued with the idea of clearing up some of the existing and contradictory theories of three-colour printing.

A rational theory of three-colour printing must be divided into two parts, which must be kept totally distinct.

1. The first part treats of the choice of the fundamental colours, which obviously must be based on the ground of colour mixtures. These three colours must so behave that mixtures of any two must be of equal purity. These requirements are only satisfied by the colours yellow, purple, and blue-green, for these give an equally pure zinnober red, violet-blue, and green. The colours chrome yellow, carmine lake, and Paris blue only an impure green, the blackness of which can only be estimated by comparison with a pure green. A blue has been recommended as a printing ink which approximates to ultramarine, because it was assumed that pure blue, red, and yellow must correspond best to theoretical requirements. Pure blue, that is, one which excites the blue sensation without the secondary excitation of green or red, is, however, complementary to yellow, and can therefore under no conditions be used to form a useful green.

The green present in a painting is never pure, but consists of green and black, and photography therefore decomposes it into its three constituents —blue, and yellow, and red. Only when the blue and yellow give a pure green will the necessary degree of sadness (or blue blackness) be formed; if, however, the mixture of blue and yellow is already degraded, there will be formed by the subsequent addition of the red only a greenish-grey.

For the existing three-colour prints the deficiency in the green is characteristic; it is solely to be ascribed to the use of incorrectly chosen fundamental colours, and only to be avoided by the use of blue-green, purple, and yellow as printing inks. Instead, however, of recognising this fact, the fault is sought for in the red negative, and attempts are made to produce a negative which will reproduce the green of the original which is green and black absolutely covered, which will remain, indeed, a fruitless quest.

But, still, there are two further reasons in support of the choice of the above-mentioned fundamental colours.

The intensity of the three inks must obviously be so chosen that red and yellow, yellow and blue, and blue and red produce the mean sensations, orange, green, and violet. If we choose, however, such intensities in Paris blue, carmine lake, and yellow, the result when all three colours are mixed together is not black, but brown. In consequence of the ignorance of this fact, it is contended that three-colour printing cannot produce black and grey, and thence has been deduced the necessity of a neutral grey plate. When using blue-green, purple, and yellow, there is nothing, from the theoretical standpoint, that stands in the way of the formation of black or grey. Practically, however, it is different, and I have in my work recommended the use of a grey plate, but only on account of the incompleteness of the photo-mechanical processes.

The third reason why blue-green, purple, and yellow must be chosen as fundamental colours lies in the difficulty or impossibility of splitting up the colours of the original by photographic means into other colours.

The negative for the yellow printing should have the blue and red opaque; the yellow, on the other hand, should be clear glass.

This requirement is only fulfilled when purple* is chosen as the fundamental colour for red, which must reflect the whole of the blue rays, and therefore act on the blue sensitive plate as white.

A pure red can never be photographed with red so that the former acts like white and the latter like black, for the red colour reflects almost exclusively the orange and red rays; the yellow pigment, on the other hand, the green, yellow, orange, and red rays.

We must have now a plate which will reproduce the red like white, the yellow like black. Even if one sensitises for the extreme end of the red, the yellow pigment will still be active, for it reflects red rays. This fact cannot be got over by any sensitiser or any violet screen, nor by the malachite green recommended by Duchochois, nor the Nile blue BB recommended by Hruza. Not the most vigorous red sensitiser, chlorophyl, can satisfy this requirement. It cannot, indeed, be fulfilled, and the attempts made by the practical worker are merely a bypath if he leaves out the spectral properties of the pigments. Photography can only split up the original colours into three fundamental colours, which show as far as possible striking differences, for only then can the requirements that each of the three negatives should have two colours opaque and the third transparent be fulfilled. With the fundamental colours—blue-green, purple, and yellow—this can be easily obtained. A purple pigment of the particular shade or colour of dry erythrosine collodion reflects red, violet, and blue rays. A yellow dye, however, as already mentioned, reflects green, yellow, orange, and red rays. A violet-blue sensitive plate will therefore reproduce the former like white, the yellow like black, however, and thus separate the two colours in the desired way.

* Hübl here uses the word purple in the same sense as we use crimson.—*Trans.*

The vermilion red of the original will then be formed by a mixture of equal parts of yellow and purple, for it will be quite correct and satisfactory if the vermilion be equally inactive for the yellow and the red printing. If, however, one uses for printing a carmine lake instead of the purple, then there will always be formed an orange instead of the vermilion.

From these explanations it will be seen how important the choice of the fundamental printing inks is, and that it cannot be dismissed with the apodictic statement that "only three stable printing inks are required." If there are at present no stable purples and blue greens, we must, in order to obtain successful three-colour prints, seek for such colours, and as long as we cannot obtain them we must be content with Paris blue and carmine lake, and take into account the faults of this choice of colours; and if the pure green is wanting; if, in place of the red and blue, an orange and violet appear; if we can obtain no black and grey without upsetting the balance of all the other colours; if the negative, in spite of the best complementary filters, will not show the correct appearance, we should seek the fault where it actually lies, and not strive after an impossible separation of colours.

Much perplexity has also been caused by the shibboleth of the "impurity" of the pigment colours. Thus a correct reproduction of the colours is not possible by three-colour printing, because the colours of the pigments in comparison to the spectral colours are "impure." For this reason is the expression "impurity" used sometimes for the dinginess, sometimes for the presence of different coloured rays by reflected light.

The dinginess of our colours can only have the effect of making the compound colours in three-colour printing appear dingier than in the original, on the correctness of the colour itself, therefore on the tone of colour is it quite without influence.* The fact, on the other hand, that the pigments reflect not only rays of one region, that, for instance, chrome yellow emits with the yellow also red and green rays is without any importance on the theoretical possibility of three-colour printing. Coloured glass also only lets through compound light, and yet it behaves when mixed exactly the same as spectrum rays, and the light passing through a yellow glass screen, which consists of red, yellow, and green rays, shows in the mixture of colours exactly the same behaviour as spectrum yellow.

The so-called impurity of the colours has thus, with the incorrect reproduction of the colours in three-colour printing, nothing at all to do, and it has been found to be a plausible ground for the incompleteness of the process from a want of complete theoretical knowledge.

2. Photographic analysis of colours.

Whilst the necessity of theoretically correct printing inks has scarcely been recognised, and, without special consideration, a red, blue, and yellow have been intuitively chosen for three-colour printing for carrying out the photographic processes, for the analysis of the original into the three constituent colours various theories have been advanced.

On the naturally intimate connexion between the printing ink and the preparation of the negative, mostly, indeed, no weight has been laid, and at present the negatives correspond to the theoretically correct colour system, whilst Paris blue and carmine are used for printing with.

The Young-Helmholtz colour theory, on which a theory of three-colour printing has been built, is for this purpose, as I have already shown in my book,† scarcely suitable.

How Ives arrived at Paris blue, purple, and yellow as printing inks by the use of this theory is not to be conceived.

The theory of the photographic process which is stated in the above-mentioned law "that two of the fundamental colours should act like white but the third like black," corresponds much better with practical needs.

This requirement can only be fulfilled when those rays act on the photographic plate which are common to the two fundamental colours and which are wanting in the third.

In the accompanying table will be found the spectrum colours reflected from the fundamental colours, yellow, purple, and blue-green:—

Yellow reflects	Green. Yellow-green. Yellow. Orange. Red.

* This is always assuming that the important parts of the absorption band of the three colours do not interfere, *i.e.*, that any two colours mixed must show an intermediate tint (although of a dingy shade).

† *Die Dreifarben Photographie*, pp. 29, 90.

Purple reflects	Orange. Red. Violet. Blue.
Blue-green reflects	Violet. Blue. Green. Yellow-green.

The negative for the yellow printing plate should have the yellow like black, the purple and blue-green like white. There must be on the photographic plate therefore the rays reflected in common by the purple and blue-green, that is the violet and blue be used.

The negative for the red printing plate should reproduce the purple like black; the yellow and blue-green, however, will be opaque, therefore the yellow-green and green rays must act, for they are contained in the light reflected from the yellow and blue-green, but are wanting in the purple.

The negative for the blue-green printing plate must reproduce the blue-green like black; the yellow and purple, however, like white. This requirement will only be fulfilled when the orange and red rays act on the plate.

From these statements it follows therefore that, in the preparation of the negative for—

The yellow printing plate, the violet and blue rays,

For—

The red ,, ,, , the yellow-green and green rays,

For—

The blue ,, ,, , the orange and red rays,

must act.

A. Freiherrn v. Hübl.

THE LATENT IMAGE AND ITS DEVELOPMENT.*

Discussion:

Mr. Chapman Jones: It is difficult to discuss at once the details of this paper, because it contains so many figures which one cannot bear in mind, but as a communication of this sort is being read, one gets a sort of instinctive feeling with regard to it, and no doubt one is in some cases more or less misled by that feeling. I would rather ask Mr. Driffield whether I am right, for example, in supposing that the authors of the paper estimate the silver salt in the plate by weighing the plate, fixing it out, washing, and reweighing. If that is so, why do they choose the indirect method rather than the direct? I should have thought the direct method—getting out the silver and weighing it—would have been much more exact. With regard to the speed of plates, I am not quite sure whether I understood Mr. Driffield aright, in saying that the speed was increased by the thickness of the film; I should like to ask whether, theoretically or practically, it is possible to notably increase the speed of a plate by increasing the thickness of the film, if the speed is determined by the amount of light absorbed. We know that light is absorbed according to certain definite rules (I think we have to thank Messrs. Hurter & Driffield for emphasising that fact), so that if the thickness of the film is increased in certain proportions, there will also be a certain increase in the amount of light absorbed; does the rapidity increase in any similar way? For example, could we, by using a slab instead of a film, get a marked increase in speed by the absorption of the light which, with an ordinary film, would be lost by escaping at the back? I understood Mr. Driffield to say that the latent image was lost if you started with silver bromide in the developable condition, and changed the silver bromide—by the action of potassium iodide—into silver iodide; that may be correct, but he did not add that the latent image *can* be transferred from one compound to another, as has been done, notably by Carey Lea, and also, I believe, had been done before he experimented on the subject. With regard to the estimation of speed, Messrs. Hurter & Driffield have, in this paper, somewhat limited the statements which they set forth in their original paper of 1890. I feel, with regard to the present communication, so far as one can judge by simply hearing it read, that they have perhaps generalised rather more than the experimental results would seem to justify. Taking the estimation of speed, which is their chief point, I think that we have plenty of evidence—and Mr. Driffield has adduced some to-night—that the speed of a plate is not an inherent quality of the plate, but depends upon the circumstances under which it is used. I believe he said in effect that it varied with the thickness of the film, but we know that it varies according to the developer used; then surely the comparative speeds of plates will vary according to the light. I suggest that a very great deal of the difficulty that one has had in accepting the earlier work of Messrs. Hurter & Driffield—I do not speak of the principles of it, which are excellent—is due to the fact that it has not been sufficiently qualified. If they were to say that the proportional speeds, for example, are as estimated under certain fixed and stated conditions, I think that would meet the whole case; but to put down the speed as a fixed quality of the plate, when it is really alterable by the circumstances to which the plate is subjected, is a mistake. I was very pleased to hear Messrs. Hurter & Driffield take up the position that they did upon the question of the latent image; I cannot profess to have quite followed their arguments, but I have always held that there is no evidence of chemical change in ordinary negative plates when the developable condition is produced, although the case may be different with regard to printing-out papers The tendency nowadays is to suppose that everybody believes that, when a plate is exposed to light and the sensitive substance is changed into the developable condition, that there is a formation of sub-bromide of silver; I believe that a good many have very grave doubts as to that. I have not attacked the subject quite from the same point of view as it has been attacked in the paper to-night. Accepting our ordinary ideas with regard to physical and chemical change, one must allow that a physical change precedes a chemical change, that is, one must allow that there is a motion within the molecule before a part of the molecule can be separated from it; the motion must begin within. There can be no doubt whatever that there is a change—that the developable silver bromide is different from the non-developable silver bromide; the question is whether the change is pushed on to the extent of a chemical decomposition. I hold, therefore, that the burden of proof rests with those who maintain that there is a chemical changes, and I do not think there has ever been any proof brought forward that this is so. I think, too, that all the evidence that one has, so far as we can apply it in this case, rather tends to show that there is not a chemical change. It is very well known that if you continue the exposure you get the odour of bromine, but then we have the difficulty of the reversal of the image. It is the rule that where there is a chemical reaction, and the product of the change tends to prevent the reaction, the effect of the accumulation of the product is to gradually slow the reaction till it at last dies down to nothing. But we are asked to believe, by those who hold that the silver bromide is decomposed, that the bromine is first given off, and then is in some way returned to the silver in spite of the continuation of the light action. That is a series of changes which I have not so far been able to picture to my mind, because the idea carries with it a great many anomalies. Long exposure certainly—if exposure separates bromine—separates more bromine, and one ought therefore to get a more developable image if the developable condition depends upon the separation of the bromine. But the fact is that before there is any definite evidence that bromine is separated, the developable condition has arrived at its maximum, and has nearly, if not entirely disappeared again. The physical properties of plates have been very much neglected in the past; Messrs. Hurter and Driffield have tackled a subject which is comparatively new, and if they have only opened it out—so that it can be further pursued by themselves and other workers, though probably they have done a great deal more—I think they have deserved the very best thanks of the Society.

Mr. C. H. Bothamley: I have listened with great interest to what we must all recognise as a very important paper, and I appreciate fully the great difficulty of discussing it adequately so soon after hearing it read for the first time. One thing which struck me in the paper was that a great many of the facts stated to have come out of these researches did not seem to be new acquaintances. For example, although we have never before had the points put into figures with so much laborious quantitative work, I think we have all recognised that in the process of developing the latent or developable image, the diffusion of the solution into and out of the gelatine plays an important part; I have always myself been under the impression that it was in order to accelerate that diffusion—by bringing fresh liquid into contact with the surface of the gelatine, and thereby accelerating the reduction and the rate of development—that we are in the habit of rocking the dish during the process. I do not propose—indeed, it would scarcely be proper—to discuss in detail those thermo-chemical considerations with which Mr. Driffield opened the paper; I will only say that I think it may appear, when one has time to consider the paper, that some of them require a little modification, and I think there are certain points that ought to be dealt with, but which, so far as I gathered, were not taken into account. With regard to the light thrown by these experiments, and by Messrs. Hurter & Driffield's former experiments, on the constitution of the latent image, I differ—and, I believe, always have differed more or less, from my friend Mr. Chapman Jones, but it may be a difference rather of terms than of ideas. In the first place, it seems to me that we can no longer deny that the sub-salts of silver do actually exist; they were first prepared and described by Antoine Guntz, whose results as regards the sub-fluoride were confirmed by Moissan, and they have been prepared and used by Otto Wiener, and independent testimony from three men of their standing seems to me to be much stronger evidence than we have in favour of the existence of a large number of other compounds whose identity is very rarely called into question. One point, of which I was astonished to find that Messrs. Hurter & Driffield took no account in their paper, is the very great tendency of gelatine to combine with bromine. Mr. Driffield referred to a view held by various people to the effect that, when light acts upon silver bromide, there is formation of a sub-bromide, and, as I thought he said, a setting free of the bromide; I can only say, in connexion with that, that I do not know any chemist who has given attention to photographic questions, and who holds any

* Concluded from page 121.

view of that kind. The evidence, as far as we have it at present, seems to me to be something like this: Gelatine is known to be capable of combining with great rapidity with large quantities of bromine. I have myself prepared these bromo-derivatives of gelatine, and it is quite easy to get solid compounds containing close upon thirty per cent. of bromine, and in the formation of these derivatives a very large amount of heat is developed. Now I will try to explain concisely the view which, as I understand it, is held by those who consider that a chemical change takes place in the production of the developable image. We know quite well that, in many cases, perfectly pure compounds show little tendency to undergo chemical change; for example, that combination will not take place between carbonic oxide and oxygen if they are both quite dry. In the case under consideration we have light as the active agent, and silver bromide as the substance that may undergo change. I am bound to admit, of course, that the evidence as to whether pure silver bromide alone is affected by light or not is rather vague, and the statements of different observers are rather contradictory; but there is an experiment of Schumann's which seems not to have attracted the attention it deserves. He covered one half of a glass plate with gelatine, leaving the other half bare; then he put that plate in the bottom of a vessel in which he produced, by precipitation, some silver bromide, so that the precipitated silver bromide gradually settled down on the glass plate and came in contact with the glass of one half, and with the gelatine upon the other half. The plate was then lifted out, very carefully washed by gentle diffusion of water, dried, exposed to light, and treated with a developer; there was found to be practically no change in the silver bromide which had been in contact with the bare glass, but there was an abundant formation of reduced silver in the silver bromide that had been in contact with the gelatine. Therefore, in considering any question of the formation of the latent image, we must take into account the function of the gelatine. Everybody knows how different the phenomena are when silver bromide is in collodion and when it is in gelatine, and the view that I and others hold is that in a gelatino-bromide plate we have an intimate association of silver bromide and gelatine, and that when light falls upon the silver bromide and throws the molecules of it into violent agitation, and thereby, as Mr. Chapman Jones has already said, into unstable equilibrium, if the action of light is sufficient to produce a developable image, it is because the condition of unstable equilibrium has reached such a point that part of the bromine, at least, ceases to be in chemical union with the silver and *simultaneously* combines with the gelatine; we do not believe that there is any setting free of the bromine in the ordinary sense of the term "setting free." Now, Messrs. Hurter & Driffield describe an experiment which they consider proves that the composition of the latent image is the same as that of silver bromide, and the experiment consisted in treating a plate with a reducing agent and showing that there passed into the reducing agent or developer an amount of bromine equivalent to the amount of silver that has been reduced. Now, what I want to point out is that that experiment does not prove that all the bromine was in combination with the silver, because the reducing agent which would reduce the bromide of silver would most probably also reduce the bromo-gelatine; and it does not in any way disprove the view that I have endeavoured to explain that silver sub-bromide and bromo-gelatine are formed, because the amount of bromine would be the same, and it would equally pass into the developer in the two cases. With regard to the statement that if you take an exposed gelatino-bromide plate, and treat it with potassium iodide, you destroy the latent image. Some few years ago, in preparing a paper on "The Latent Image," for a Camera Club conference, I treated two or three exposed gelatino-bromide plates with a five per cent. solution of potassium iodide for a considerable time, washed out the potassium iodide, treated the plates with developer, and casual observation would have led one to suppose that the developable image had been destroyed; some later work, however, threw doubts upon that conclusion; it seemed impossible that the latent image was there, but that the time required for its development was very long, and I found that by allowing the ferrous-oxalate developer to act for a good many hours, I was able to develop an image. Recently Schumann has made experiments in which he has found that the ordinary belief that an emulsion of silver iodide in gelatine will not give a latent or developable image is contrary to actual fact, and that, if such an emulsion is subjected to light of very high refrangibility, you can get an image and develop it just as in the case of silver bromide. Therefore, coupling these facts with the well-known fact that there are certain chemical reagents which will cause the disappearance of the developable image, whilst other chemical reagents will not, I am bound to say that, whilst I do not commit myself to any definite opinion as to the precise composition of the image, it seems to me that the evidence in favour of some chemical change is very considerable, and certainly that the experiment of measuring the amount of bromine that goes into the developer does not prove anything to the contrary.

Mr. W. E. Debenham asked whether the authors, in speaking of the greater rapidity of fixation with a half-saturated solution of thiosulphite than with a saturated solution, referred to a plate in a dry condition or to one imbued with water such as would be the case after alkaline development and washing?

Mr. Sebastian Davis said that in preparing the Taupenot, and his own collodio-albumen plates, in which there was a combination of iodide of silver with a very small proportion of bromide, the plates were prepared in daylight, under the action of which considerable darkening took place, and, to restore them to a proper condition for resensitising, they were treated to a ten per cent. solution of potassium iodide. In considering the nature of the molecular change produced in the sensitive film by exposure to light, it appears to me that the subject may be advantageously studied, not only in connexion with the alkaline development of the bromo silver gelatine emulsion, but also in association with the reaction of the exposed film upon free nitrate of silver and an acid developer. Although in the latter case we have a deposition of silver reduced from the argentic nitrate, yet the action of the light on the dry or wet film equally constitutes the determinating cause of its reduction according to the ratio of its action. Alkaline development followed by intensification with an acid developer, although modifying the relative intensities of different parts of the negative, is primarily dependent on the variations of the original molecular change effected by light.

Mr. E. Banks: There is one point which Mr. Driffield has not mentioned in connexion with the physical properties of silver in combination with gelatine, and that is that the sensitiveness of the plate depends to a great extent upon a crystalline formation of a bromide during the process of preparation. It is not as generally recognised as it should be that bromide of silver, although insoluble in water, is soluble in gelatine; the crystalline formation which gives the sensitive salt of bromide of silver is formed by the crystallising out of this salt in the emulsion. It is well known that many of the most insoluble salts are soluble in gelatine, such as sulphate of baryta and sulphate of lime, and the crystalline formation arises from the crystallising out, as it were, on the nucleus of a precipitate in the gelatine. It is an important question as to the effect of difference of temperature on the amount of silver bromide dissolved, and also the certain amount of decomposition which takes place during the cooking of a gelatine emulsion; there is no doubt that the gelatine is in a different state at the end of the cooking process that it was in at the beginning. If you take a precipitate of silver bromide (precipitated in the manner that Captain Abney, I think, was the first to point out), precipitated in water, or with a very minute portion of gelatine, and then emulsifying that, I think you would find—if you divided the precipitate into two portions, and put one portion into an uncooked solution of gelatine, and the other into a cooked solution—that there would not be much difference between the two, and I do not think either of them would be any good.

Mr. J. Cadett: Referring to the action of the bromides in development, many people say that by adding bromide the plate is made slower, but I have found that, although a certain amount of bromide will slow a plate, yet if the bromide be considerably increased, so that about two and a half hours are necessary for development, the plate if tested will show a higher speed than if developed with a normal developer. In testing plates with various developers, a great deal depends upon the development factor that you have to obtain, and I think that in all such experiments one should aim at the same development factor throughout.

Mr. Driffield in replying, said: I will try, as shortly as I can, to answer one or two of the queries that have been brought forward; but, as I should like a little time to consider some of the points, I will ask you to kindly excuse me going very deeply into them. On the subject of bromide, I do not intend to anticipate what we shall have to say in the two concluding parts of our paper. Mr. Chapman Jones asked why we elected to use the indirect method of ascertaining the quantity of silver on a plate rather than the direct method. I fancy that if Mr. Jones had to ascertain the amount of silver on fifty different plates he would be glad to use the indirect method; it is no light task to analyse the quantity of silver upon a large number of plates by chemical analysis whereas, in this ways it is a very simple matter, and the results are quite sufficiently accurate for many purposes. As to the influence of the thickness of the film on the speed, I do not think I said anything about this; I can quite conceive two films of equal thickness which might have very different speeds—one might be much more capable of absorbing light than the other, in which case the mere thickness of the film would not be a factor which would affect the speed, and I do not quite see why it should if the thickness were constituted of gelatine; if it were silver of course it would, because you saw from the formulæ what an influence the amount of silver in the plate has.

Mr. Chapman Jones: I thought Mr. Driffield said that the power to absorb light had an influence on the speed of the plate, and that the speed of the plate could be measured by the light absorbed.

Mr. Driffield: That is true, it is the light absorbed which is the factor—the light absorbed, multiplied by the amount of silver on the plate.

Mr. Bothamley: What you really measure is the light reflected, is not that it?

Mr. Driffield: Yes, the light that passes through may be ignored; we simply measure the light reflected, as compared with white cardboard which we call one hundred. I understood Mr. Bothamley to say that he had developed an image which had been treated with iodine; was this done with pyro?

Mr. Bothamley: No, with ferrous oxalate; it took about twenty hours.

Mr. Driffield: That would simply indicate to my mind that iodide is after all developable, and that the latent image is not absolutely wiped

out; but it quite supports our contention that the iodide wipes out the image for all practical purposes. Mr. Chapman Jones rather complained about our generalising, as he always has done, and said that we did not specify how the speed was obtained. I think we do specify how the speed is obtained; it is obtained by a standard candle, with standard development and under standard conditions of temperature. Though, of course, I certainly think that the artificial illumination might be improved upon, and a light approximating more closely to daylight might be, and probably some day will be, found, at the same time all I maintain is that, though the speeds may not be absolutely relatively correct, they are sufficiently nearly relatively correct to be all that one requires for practical purposes. Mr. Bothamley remarked that the ideas that we introduced with regard to diffusion and absorption are not new; of course they are not new, and that is why I was disappointed that we should have to conclude this evening with the sixth chapter. It was absolutely necessary to make these investigations, and to ascertain quantitatively what is done by absorption and diffusion respectively. The why and wherefore of this you will see when you come to the next two chapters. A question was raised as to whether, when we spoke of the weaker thiosulphate fixing more readily than concentrated, the plate was supposed to be used in a dry condition or wet; the experiment was made with a dry plate, but I think the result would be the same with a wet plate, because we show that a wet plate very rapidly exchanges its water for the saline solution in which it is placed.

Mr. Debenham said he made experiments in this direction some years ago, the results of which were published, and found that a plate embued with water fixed much more quickly in a saturated solution of hypo than a dry plate would. The water in the film supplied what was required.

Mr. Driffield: Mr. Banks made some remarks as to the gelatine being altered by cooking, and I should imagine this would be the case. I think he said, too, that on mixing bromide of silver with cooked gelatine and with uncooked gelatine the results were the same. I have made no experiments of that nature, but, on the face of it, I should not have thought the results would be quite the same, as the cooking of the gelatine would be likely to influence, to some extent, the reflecting power of the film. The most important influence, however, of cooking is the conglomeration of the silver bromide into masses, as is evidenced by the coarse distribution of the silver in a rapid as compared with the fine grain of a slow plate; but this is a matter for emulsion-makers, and one that I do not profess to have gone into or to know much about. With regard to some of the queries raised in the discussion, I will reply to them in the *Journal* after I have had an opportunity of reading and considering them.

Messrs. Hurter & Driffield sent the following communication in reply to the foregoing criticisms:—

We quite agree with Mr. Chapman Jones that the direct estimation of silver is the more accurate method, and for many of our experiments we adopt it. All the results given in Table XI., for instance, are obtained by the direct method. On the other hand, the indirect method is very reliable, and one advantage of it is that it admits of being carried out by the amateur photographer (if he be possessed of a sufficiently good balance), without calling into requisition the experience and apparatus necessary for direct determination. We think it very desirable that the user of dry plates should be in a position to readily ascertain for himself the amount of silver haloids on the plates he buys.

There can be no doubt as to the influence of the thickness of the film upon the speed of the plate, if by thickness of film is meant the quantity of silver per unit area; but the mere weight of silver is not alone responsible for the greater or less speed of the plate. A plate may be very rich in silver and yet very slow; it depends upon the physical condition of the silver, or, if we may use the term, upon the allotropic modification of the silver bromide.

Our present views regarding the absolute and relative speeds of plates will be clearly indicated in the latter part of our paper. The remarks of Mr. Chapman Jones as regards the latent image call for no reply from us, and we thank him for his kindly expressions regarding our work. He differs from us, however, in the value he attaches to generalisations. Our view is that broad, general statements lead to more profound discussion and to further experiments, and are thus extremely valuable in promoting progress, while the bare account of a number of facts, not connected by any general principle, are apt to be passed over and forgotten, instead of leading to practical and useful conclusions.

Professor Bothamley has directed most of his remarks to chemical change, which he believes to be induced by the light, and which he supposes to be so profound as to actually reduce the silver bromide to some sub-bromide. Whatever may be the formula of this sub-bromide, it means the complete separation of some bromine from silver. Professor Bothamley does not say that the energy necessary for this reaction is supplied, even in part, by the supposed formation of a bromine compound of gelatine, but this must be the meaning of his remarks as to the facility of the formation of a bromine compound of gelatine and as to the amount of heat developed. His belief, summed up, appears to be that the latent image is formed by the transference (under the influence of light) of bromine from the silver bromide to the gelatine, with the consequent formation of some sub-bromide of silver, the possible existence of which, as a laboratory product, we do not deny. But we have always understood these sub-bromides to be coloured bodies, and the latent image resulting from ordinary photographic exposures is not coloured. Professor Bothamley will readily admit that bromine, when combining with gelatine, will do so either by forming a substitution product (when hydrobromic acid will appear as well), or by forming a simple addition product. Our quantitative experiments are quite decisive as to the non-production of hydrobromic acid, and to prove that there is, at any rate, no substitution product. They are, however, not decisive as regards the formation of an addition product, and this fact was stated in our original communication in 1890.

But, whichever product be formed, the great question still remains, Whence is the energy derived which separates the bromine from the silver? The possible formation of a bromine compound of gelatine may reduce the amount of energy required to bring about this separation to about one half of the twenty-three calories, since the heat evolved on substituting bromine for hydrogen is, at most, eleven calories per atom of bromine taken from the silver, and fourteen calories if an addition product be formed. The greatest difficulty with regard to the sub-bromide theory, therefore, still remains, namely, the energy difficulty, and it remains even if the combination of bromine with gelatine were a proved fact, which, as far as we are aware, it is not, it is simply an opinion.

With regard to the processes of diffusion and absorption of the constituents of the developing solution into and by the film, we did not intend to imply that the mere distinction of terms is a novelty. What we believe to be novel is our indication of the characteristic difference in the results of development (1) when the developer is so compounded as to be independent of diffusion, and (2) when it is so compounded that this process of diffusion has almost entirely to supply the reagents to the silver bromide.

Mr. Sebastian Davis is evidently at one with us in holding that the determining factor in the production of the latent image is primarily the exposure. The darkening of a sensitive plate in open daylight contributes nothing to our knowledge of the constitution of the latent image, for it is a well ascertained fact that the prolonged action of light, and particularly of sunlight, splits up the silver haloids. Our arguments and statements refer only to the very short exposures given in producing ordinary pictorial negatives.

Mr. Banks appears to think that we ought to have taken into consideration the processes which go on in the cooking of gelatino-bromide emulsions. We have, however, regarded the manufacture of sensitive plates as outside the scope of our inquiry. We merely desired to show that the compounds contained in the film both in slow and in fast plates, as well before as after their exposure, do not differ in kind or in chemical composition, but in degree only. To have shown that the difference in the speed of a plate is attributable, with a high degree of probability, to the physical properties of the silver bromide and iodide, and more particularly to the capacity of the film for absorbing light, is sufficient for us. An inquiry into the precise causes of these differences in the physical properties of the silver haloids lies in the province of the plate-maker. Those who wish to know more of this subject, and who are not already acquainted with them, may, with advantage, consult the researches of Stas, who has described at least six modifications of silver bromides.

PHOTOGRAPHIC HALATION: POSTERIOR AND ANTERIOR.

Part I.—Posterior Halation—its Birth, Death, and Resurrection.

[Paper read before The Birmingham Photographic Society.]

I do not think I shall be wide of the mark when I state that most photographers, whether professional or amateur, are interested more or less in the question of photographic halation in some form or other. Even the portraitist, who has least to fear from this defect, may find occasionally subjects which would be better for attention to this matter. It is getting to be rather an ancient subject and pretty widely understood in regard to cause, effect, and cure, at least in most of its forms. There is a form I have designated *anterior halation* in contradistinction to that form which is cured by preventing the reflection of mischievous light exposing the back surface of the photographic film. The latter I propose to designate *posterior halation*. My main object is to give a short history of the latter—its birth, death, and resurrection—and, later on, to briefly discuss these two forms of halos.

To begin at the beginning will not be a very difficult task, for the simple reason that it began with the birth of photography on transparent media, such as glass, when certain conditions were present. What those conditions were remained hidden, or unknown to the general photographic public until thirty-six years ago. Several years previous to this, whilst developing stereoscopic transparencies, the phenomenon presented itself to me very plainly. Turning the plate about to seek for a cause, I noticed it to be plainest at the back of the picture. "A word to the wise is enough." I was persuaded I had got a clue, and that it was caused by light which had passed through and had been reflected back on to the under surface of the film and exposed it.

In my youth I had been familiar with the preparation of the glass reflectors used in the kaleidoscope, so I knew how to stop the reflecting surface at the back of the photographic glass plate. In the upshot, a paper was sent to the London Photographic Society. I first asked the late Mr. Sutton, who was professor of photography at King's College, London, at the time, to read it for me, he advised me to apply to the Secretary of the Society. I consequently sent it as advised in April 1861, or thirty-six years ago. It was accepted, read, and discussed or commented upon with a certain amount of contemptuous incredulity. If the paper had been the only factor in the communication, this might have been excused, but I sent specimens of both the defect and the remedy. There was one exception at the reading of the paper; one of the members (Mr. Malone) spoke cautiously concerning it.

At that time there was a perfect Babel in the nomenclature of the phenomenon, the same terms being used for quite opposite things. Hardwich's designation seemed to me the most reasonable and appropriate, so I adhered to it through thick and thin. Some were for calling it nubation, others blurring by reflection, others irradiation. There was the lateral wandering theory of Hardwich's, and the outstanding rays (not brought to the true photogenic foci) of Malone.

At this time the late Mr. Shadbolt was Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY, and he honoured me with an editorial such as it was. Well worthy of notice is the unreasonable opposition, not only to the name, but also to the facts concerning cause and remedy which he inserted in his paper at the time of publishing my memoir, and this in spite of the proofs that accompanied it. But there were other magnates of the parent Society quite as unwilling to be convinced, as you will see when I read a letter sent to me three years afterwards.

"*Stubbers, near Romford, October* 27, 1864.

"DEAR SIR,—Ever since I knew that you were the author of the reflection theory, I have wished to write to thank you for this very important contribution to photography, but have only just found out your directions.

"I should be very sorry that you should think I wished in any degree to rob you of any portion of the credit due to you. I do not know whether my letter, a portion of which was published in THE BRITISH JOURNAL OF PHOTOGRAPHY, sufficiently explained to you my position in the matter. On seeing a quotation from Mr. Sutton in one of the JOURNALS, I perceived at once the great probability that the action of reflected light was the cause of an evil that had troubled me much, and which, I had long perceived, greatly limited the capabilities of photography.

"One experiment with a film on orange glass was sufficient to convince me. I next tried a few experiments in transferring, and found it a rather troublesome business, and, by way of an easier remedy, tried orange water-colour at the back of the glass. I called Mr. Dawson's attention to the subject, and showed him the results of my experiments; he appeared quite satisfied, but, to make quite sure, tried a few experiments himself, and wrote to say that there could be no doubt at all about the matter.

"In my letter to THE BRITISH JOURNAL OF PHOTOGRAPHY I gave the credit to Mr. Sutton, as he at any rate brought the subject to my notice. I did not say he was the discoverer, for I did not feel sure about it; whilst I was making experiments, my brother told me that he recollected something of the kind having been discussed at a meeting of the Photographic Society, and that there was a diagram in the JOURNAL showing angles of reflected light. My brother's remembrance of the article was so vague, that I was not sure that the subject in question was the one referred to, and for anything I knew Mr. Sutton might have been the author of the paper, and I did not know the date, so could not refer to it. The only remedy I had heard of was Mr. Sutton's, that of putting the glass wrong side forward in the slide; this seemed to me so unsatisfactory a way that I did not think it worth trying. I did not hear of your communication until, I think, the same day, or the day before, I am not sure which, that I received THE BRITISH JOURNAL OF PHOTOGRAPHY which contained my letter, when I also received a letter from Mr. Dawson on the subject. On referring to THE BRITISH JOURNAL OF PHOTOGRAPHY of the date, I was as much surprised as you could have been at the time at the manner in which your very valuable communication was received, but did not think it necessary immediately to write to the journals on the subject, as Mr. Dawson had already so fully acknowledged your claim to the discovery. I would gladly have done anything I could to "show up" the *authorities* for their absurd and ignorant conceit, but supposed that the present editors of THE BRITISH JOURNAL OF PHOTOGRAPHY might not like to publish anything hard on Mr. Shadbolt, who, I think, was the principal offender. I had a long correspondence with Mr. Simpson on the subject, and told him pretty plainly what I thought, and that my only motives in pressing the matter were that I thought the subject very important, and that it was due to you that the truth of your statements should be acknowledged. I told him also that I did not intend to let the matter rest until it was generally and fully acknowledged good.

"I did not write the letters for the purpose of being published, but gave him permission to use any extracts he might think fit. The reason he did not do this was, I suppose, that he was not convinced of the truth of your theory.

"I fancy, however, that by this time he has a strong suspicion that you were in the right. I have done all I could to convince him by arguments, explanation, and specimens which I have sent him. I also offered to give him proof of the matter (if he would only tell me what he would consider proof) with any process on glass which he might name. I have seen Mr. Jabez Hughes since he wrote to the journals, and believe that I have satisfied him. I cannot imagine, as I told Mr. Simpson, what sense or motive there can be in arguing against a clearly proved fact, especially without taking the trouble to investigate.

"It has been said, I forget by whom, that, when a new discovery is made, the first thing said is: 'It is contrary to religion;' the next, 'That it is not true;' and the last, 'That everybody knew it before.' Something like this seems to have occurred in your case. As I have said before, I claim no merit in the matter; as you justly observe, when a clue is once obtained, the rest followed as a matter of course. I shall be glad to do anything to assist you in bringing the matter forward, and hope that the disgust and indignation which you must have felt will not prevent you rendering further services to photography.—Yours, faithfully,

C. RUSSELL."

Mr. Sutton was the gentleman whom I first asked to read my paper. Three years afterwards in his periodical, the *Photographic Notes*, he brought this subject forward again, not in a straightforward manner as the result of experiment and cogitations of his own, but excluding any mention of what had been most prominently brought to his notice before. He worded his allusion to the subject in such a manner as to lead others to suppose it was he who had explained the true cause of the defect under consideration. He, however, disclaimed this afterward. A contemporary charitably alluded to the awkward position in which he had placed himself by suggesting it to be a rediscovery. His close connexion with myself and my paper as above narrated casts, of course, very grave doubt on this. It is extraordinary how prejudice will bear sway sometimes even against the plainest truths.

One cannot but admire Major Russell's determination to bring the thing prominently forward and do justice to whom justice is due as well as to forward the perfection of his favourite subject. He had to fight as it were on the battle-field of science. This he did in a very effective way by means of a series of pictures as specimens of the fault and cure, which he sent to the Chairman of the North London Photographic Association for exhibition at one of their meetings. There arose a very animated discussion—almost stormy, mostly relating to the christening of the phenomenon, which I found very recently was first done by Mr. Perry of Melbourne, Australia, in the year 1859. This information came out in answer to a notice in one of the papers by Dr. Murray, requiring for his dictionary a reference to the earliest use of the term halation as applied to photography. This information was supplied by Mr. H. P. Robinson of Tunbridge Wells, April 24, 1897. The first use of the designation that came under my notice was in January 1861, by Mr. Hardwich in THE BRITISH JOURNAL OF PHOTOGRAPHY. Having no prejudices or scruples I adopted it forthwith, and have at last succeeded in gaining for it a secure footing in our photographic literature.

[THE BRITISH JOURNAL OF PHOTOGRAPHY, April 30, 1897, p. 287.

"THE PHOTOGRAPHIC USE OF THE TERM HALATION.

"*To the* EDITORS.

"GENTLEMEN,—Referring to Mr. Marlow's letter, all old photographers will remember this gentleman's classic papers, in which he describes halation and its cause, read before the Photographic Society of London in 1861. These were among the most important contributions to our literature, but what Dr. Murray required for his dictionary was a reference to the *earliest use* of the term *halation*. This I was enabled to supply to him immediately after publication of your paragraph drawing attention to the want, and it earlier than Mr. Marlow's.

"In the journal of the Photographic Society for November 15, 1859, may be found a letter from a Mr. G. W. Perry, dated Melbourne, describing a fault he has met with in his negatives. He speaks of 'the peculiar appearance which, until a better one is found, I have applied the term *halation*.'—I am, yours, &c.,

"H. P. ROBINSON.

"*Tunbridge Wells, April* 24, 1897."

Both Mr. Robinson and the Editor of the *Amateur Photographer* represent Mr. Perry as *describing* what is now known as halation, but must be quite evident his description was not perfect, or there would have been no need for my labours two years afterwards. His description fell short of the one thing needful, and that was the state of the picture or negative at the back of the sensitive film; this state is seen before fixation, he evidently described it after this process.

Referring again to the incident of 1861, I will read a sentence or two from a letter I sent to the JOURNAL of the Society, in answer to the adverse criticism of my paper, and then you will see the unreasonableness of Mr. Shadbolt's suggestions concerning the nature of the subject of the paper. Let the facts of the case be looked at in whatever way we may, it does not strike one very favourably respecting the far-sighted ness of our metropolitan photographic critics. I am sometimes inclined to attribute the opposition to so important a matter, having emanated from an obscure or unheard of provincial, and not from one of themselves. The portion of the letter above alluded to runs as follows:—

[*Photographic Journal*, June 15, 1861.

"Mr. Shadbolt's belief in the efficacy of black cloth or velvet at the back of the plate is like a great many more beliefs, when put to the test—not very much. The most remarkable part of this article of his belief is that I should make one of these substances a matter of experiment beforehand. As I referred to as one of the conditions at the back of plate No. 8. As regards velvet, all the experiments that were not conducted in the camera were exposed in a pressure frame, which had black velvel on the back-board. If the expression of his belief had been an incidental remark during the discussion, it would be rather excusable, but to insert it in his editorial remarks, having had the opportunity of reading over the paper, is not quite excusable."

During the interval between 1861 and the resurrection of the subject September 1864, the Editorship of THE BRITISH JOURNAL OF PHOTOGRAPHY had changed hands. You may guess my surprise when one day friend having informed me of an article in this paper on the subject, found on reading it a total reversal of opinion. The Editorship had assed from Mr. Shadbolt to Mr. Traill Taylor, and the Professorship at ing's College to Mr. George Dawson from Mr. Sutton.

Looking up the subject again in *The Illustrated Photographer* of this eriod, I find an article by Major Russell. In 1868 he writes:—

[*The Illustrated Photographer*, July 24, 1868, p. 299.]

"It seems that some persons still doubt that 'halation' is caused by transitted light. If they would prepare a sensitive film, by any process, on dark range glass, and another similar one on common glass, and give both a long xposure with a subject presenting great contrast, on developing them their oubts would be removed, and they would see the great advantage which can obtained by absorbing transmitted light. I did this on first seeing the use of the evil suggested, and the proof was irresistible. As good a subject any for the trial is a dark interior with a bright sky showing through a indow."

This paper deals principally with suggestions of various kinds for coping ith the defect. It commences by stating, "Mr. Marlow and Mr. Dawson e, I think, right in preferring halation to blurring as the name of the ult caused by transmitted and reflected light." It should be noted in assing that this experiment with orange glass had been made seven ears before by myself, and was one referred to in my paper, as the llowing quotation will show:—

[THE BRITISH JOURNAL OF PHOTOGRAPHY, April 15, 1861, p. 141.]

"To demonstrate the correctness of this view, I procured a piece of crimson ass, and coated in the usual way with collodion. It is evident with this rrangement, however much light might be reflected from the back, it would e non-actinic in its nature, and could not therefore expose the under surface f the film. This experiment was completely successful, for although the icture was extremely over-exposed, not a trace of halo existed."

Still looking over back numbers, I find I headed an article Halation, sometimes styled Blurring," and went on to say, Canot we begin to call this phenomenon by its right name? Let us ake a start, and further observed it to be rather singular that the uestion of discovery and rediscovery raised by Mr. Dawson should have be reverted to again; one would have thought the matter had been so early stated during the last discussion it would not have to be done a cond time.

It is worthy of remark as being a very curious fact, in respect to Major ussell (and the trouble halation had caused him for a long time ter my discovery of its cause and remedy were made known), that he ould have a paper inserted, calling attention to matters concerning s labours in dry-plate photography (among other matters to this ult), under consideration in one of the very papers my original article peared (THE BRITISH JOURNAL OF PHOTOGRAPHY, April 15, 1861, pp. 0 and 141), and not only so, but where his notes ended mine began, or re the next to follow. I do not know if he ever knew of it, and I did t discover it myself until several years afterwards. I can only account this oversight on my part by supposing the title of his paper, not lling attention to matters I was engaged in at the time, escaped my tice. But how mine escaped his eye seems a mystery; it would pear impossible when the heading of my paper was the next line, and the int in large type. If he saw it, and the word halation meant something e to him, this may have misdirected his attention; may be he never d his own communication in THE BRITISH JOURNAL OF PHOTOGRAPHY. is most extraordinary that a remedy should be at his fingers' end and ape his eye, but Fate ruled the course of events.

In August 1872 the subject was again revived by Lord Lindsay and . Cowper Ranyard in a paper to *Nature* entitled "Photographic adiation or Blurring." At the time of the publication of their views I ld not quite understand the phenomenon they were describing. No e that I know of has taken the matter up where these gentlemen left An article by the Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY a fortnight afterwards refers to the paper, but does not allude to one thing they seem to be driving at, which was different to that o which is dealt with by the ordinary backing of the glass plate. On nore recent examination of their paper I find they speak of an inner ge in addition to an outer one. They found that "backing a piece of ow glass ground on each side with black varnish, the outer haze, r, or halo, may be rendered quite imperceptible, while, however, the er border of irradiation still remained as before." I cannot yet quite erstand what this inner border can be. In another rather plicated experiment, the conclusion come to was that this defect or er border was not due to any lateral reflection of the light of the ge from the particles of the sensitive film, but to some optical defect to slight obliquity of light composing a so-called point of light—that y point of a luminous object is not represented by a simple point of t in the luminous image, or, in other words, the circle of least sion of any pencil is a curve of sensible area, of which the central most interior portions impress themselves first upon the collodion . Whether this inner blur or irradiation is broad or narrow in comparison with true outer halo is not mentioned. If I am not much mistaken, this is an old observation spoken of during the discussion on my paper in 1861, and was described as a white line in the sky over and in direct contact with, the distant hills, a little whiter than the sky above, unassociated with posterior halation, and as coming on prior to this some considerable time.

[THE BRITISH JOURNAL OF PHOTOGRAPHY, April 15, 1861.]

"These were somewhat modified repetitions of my original experiments on 'plate No. 4, which was ground on one half of it, and black varnished on one half at right angles to these, so as to get four experiments on one plate, and have all of them exposed and developed at the same time; the square with the plain-ground back produced practically no effect, whilst both the varnished squares were completely free from halation.'

Before making this experiment the ground glass was examined for internal reflection and condemned; but, being determined not to leave a stone unturned, I put it to the test on plate No. 4, with the result as mentioned above. It was most unfortunate for a firm of plate makers to adopt this measure to overcome this evil; to say the least of it, it was a most precipitate procedure.

Later still, in the *Amateur Photographer* of March 15, 1889, I found, according to the Editor, I had not completed my work in 1861, and he gives the credit for doing this to some one else, Mr. Carey Lea, seven years after my second communication to the *London Journal*, explaining the same thing in the same way.

It would seem that, if nobody else puts in a claim for priority, editors will. This was a case of the sort. It would also appear that, in 1889, there was considerable discussion on the true cause of halation. The Editor did, however, allow me some little credit, and admitted I had ascribed what is now known as halation to internal reflection of the glass plate, and says, at the same time, this gentleman, meaning myself, although clearly tracing the defect to reflection, did not properly follow out the actual causes, so that it was left to Mr. Carey Lea to be the first to correctly explain them. The Editor brings Captain Abney in to demonstrate the truth of the reflection theory by calculation. We do not object to truths being demonstrated by calculations, but it had been proved by experiment years before the gallant Captain took it up.

Of course, I could not let things stand in this fashion, so I wrote a long letter to the Editor, stating the true state of the case, and directed his attention to my letter to the *Journal* of the Photographic Society in 1861 in answer to the discussion which took place after the reading of the paper. I also wrote to say I had not left the other forms of halation untouched, and pointed out when and where a number of articles dealing with quite a large family of halos could be found. The Editor ended with a note by saying: "We are, of course, pleased to hear that Mr. Marlow had himself followed out the real cause of halation, and are very pleased to give him the opportunity of establishing his claim."

By this time I was becoming used to this kind of thing, as you will see if I refer back to October 21, 1864, when I sent a long letter to THE BRITISH JOURNAL OF PHOTOGRAPHY concerning what I considered at first a pretty hash-up of the subject between the Editor, Mr. Sutton, and Major Russell. In that letter I criticised their position in the matter, and pointed them to my answers in 1861 to the *Journal* of the Photographic Society. In that number (1864) will be found letters from Mr. Sutton and Major Russell disclaiming all attempts at originality, and the Editor finishes by saying: "We have great satisfaction in according the *amende honorable* to Mr. Marlow, and we trust he also will experience equal satisfaction in feeling that his great service to photography has at last been fully, although tardily recognised."

Four years after this (1868) there appeared an article in THE BRITISH JOURNAL OF PHOTOGRAPHY by the Editor entitled "Wanted a name," for a defect which was the opposite to that which is now known as halation. He ends his communication, which would be too long to go into now, by saying, accepting the term halation as a proper generic name, we now request Mr. Marlow to devise an appropriate designation for each of the two divisions of halation to which we have directed attention." This request, you may guess, took me by surprise, at finding myself suddenly famous in this particular. Just fancy, after being treated almost as a nincompoop a few years ago, and my subject with almost perfect silence. This I attempted to do in an article entitled "Photo Nomenclature—a Family of Halos." On September 11, 1868, I followed this up by a paper to *The Illustrated Photographer*, more fully detailing the different kinds of defects associated with the edges of objects represented in photographs. I find still another in February 1889, to THE BRITISH JOURNAL OF PHOTOGRAPHY. Particulars of these I must forego, as some of them do not apply to the present dry plates.

G. MARLOW.

GREEN FOG.

IT is some time since we had anything in the JOURNAL upon the above subject; but, judging from some late personal experiences, and that of a few friends dependent somewhat upon the average provincial dealer whose stock, as regards age, it is rude to call into question, the fault must still be prevalent to a considerable extent.

Of course, we know that this kind of fog usually puts in an appearance with the batch of "old stock" plates; plates stored in a room devoted to

other purposes, as, for instance, laboratory work, may very well develop this stain. Very rapid plates are liable to an early attack of the disease, and the use of old developers (solutions which have been made some months) does not tend to mitigate the effects. Confirmed users of pyro-ammonia developers know, perhaps, more about "green fog" than others, but I am inclined to think that most developers containing sulphite (probally because this salt is often not so pure as it should be, from age or other causes) have a similar tendency with pyro to produce the fog.

For the last few months I have been using plates which have developed green fog to an exaggerated extent, not alone the iridescence and metallic stain, but markings upon the surface as if made by squirming worms. Now, when the fog is of modest proportions, a mere suspicion round the edges of the plate, little or no inconvenience results; but, when it covers the whole area strong and deep enough to prevent, or stop, or retard development, the trouble becomes serious. The remedy usually put forth is to develop the remainder of the batch with ferrous oxalate, as with this solution no green fog is ever seen; but, for my part, I prefer to "stick to my pyro," and besides this, the tendency of a batch of plates once known, the trouble may be reduced to a minimum by a course of procedure which, no doubt, will be obvious to the older, not to say better informed and experienced, of your readers. That procedure is, firstly, to ensure each plate a full exposure; secondly, develop with a solution of full strength, so as to secure fair action of the same, that is to say, detail and density in the negative, as quickly as possible in *advance* of the fog, which is sure to appear early or late; thirdly, after thorough fixation of the negative, to clear off the stain and markings with Howard Farmer's reducer; and finally, after washing and drying, to intensify, if required, with a solution of mercury bichloride to which a drop or two of hydrochloric acid has been added.

It may seem strange, but it is, nevertheless, true, that the dozen of plates ($8\frac{1}{2} \times 6\frac{1}{2}$), which have been in my experience the very worst plates to develop the green stains, have produced for me as fine a lot of negatives as a man need wish for. They have been used for X-ray work, and, with the exception of the first, have given uniformly excellent results; the plates were cheap, but were extremely sensitive. Some of the exposures were very brief, but each is fully exposed, and quite dense enough for good printing without intensification, by far the best plates and most sensitive I have used in X-ray practice, so much so that I am prepared to run the risk of the fog appearing in any further batch.

This strongly marked iridescent stain is not easily got rid of, except with the ferridcyanide reducer. Development is first carried as far as it will go, with due regard to the danger of general fogging or clouding over of the negative, the plate fixed, and the clearing solution applied freshly made, and not too strong. Every vestige of stain is thus got rid of without any perceptible reduction in density. You work down, as it were, to the gelatine negative surface, and, with the disappearance or solution of the last trace of stain, the plate is at once removed, and carefully, but thoroughly, washed. Finally, after drying, it may be "densed," if it requires to be so treated; but this should be avoided if possible.

J. Pike.

THE WEST LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The Ninth Annual Exhibition of the photographic work of members of the West London Photographic Society was held on the evenings of Friday and Saturday last, the 25th and 26th ult., at the Broadway Lecture Hall, Hammersmith. On the first evening there was a large attendance of the members and their friends, on Saturday evening the Exhibition was open free to the public. On both occasions the competition slides were shown by the lantern with a fine selection of others, notably a series of views of Stratford-on-Avon, by the late Charles Whiting.

The Exhibition was, undoubtedly, in advance of any that the Society has previously held as regards the quality of the work shown, while there was no falling off in the number of the exhibits. There were 160 pictures on the walls, contributed by sixteen members. The hanging of the pictures was well done, and the best had been made of a not ideal hall for the purpose of an exhibition. In one respect, however, we think a better arrangement might be made. The Society does not issue a catalogue, and in a large number of cases there was nothing to indicate the title of the picture or the name of its author. When the information was given by a ticket on the frame, the ticket was naturally made of the smallest dimensions to avoid spoiling the general effect of the picture, and, in a somewhat crowded assembly, it was not always practicable to get near enough to read it. We would suggest that the extra labour entailed on those who have the management of the Exhibition in placing a notice giving these necessary particulars under each frame would be amply repaid by the increased interest that would be felt in the pictures themselves.

The acting Judge was Mr. C. H. Oakden, F.R.P.S. He had at his disposal one silver medal and bronze medals at discretion. The silver medal was awarded to G. Lamley for *Transfigured by Golden Haze;* four bronze medals were given: to A. E. Cottrell for *Where the Castle grey in ruins boldly stands in morning light;* to Mr. W. Cottrell for *Bathed in light of sunset skies;* to Leslie Selby for *Chiswick*, and to A. E. Beard for *On the Thames, below Bridge.*

The lantern slides in competition were numerous and of more than average excellence. A bronze medal was awarded to J. Brown for *Winter*, and to W. Wilson for *Hamburg.*

In addition to the exhibitors who were the recipients of awards we noticed particularly the work of Harry Selby, T. Coysh, and the President of the Society, G. F. Blackmore. The last showed several examples printed in gum bichromate, which demonstrated the pictorial possibilities of the process and also, in some cases, its defects.

EXHIBITION OF THE WOOLWICH PHOTOGRAPHIC SOCIETY.

The Woolwich Photographic Society held its Fourth Annual Exhibition on Thursday, Friday, and Saturday, the 24th, 25th, and 26th ult., at St. John's Schools, Wellington-street, Woolwich.

In addition to the members' work, there was the circulating Exhibition of the affiliation of Photographic Societies with the Royal Photographic Society, and a small but interesting loan collection, contributed by Messrs. A. Horsley Hinton; C. H. Oakden, F.R.P.S.; and W. F. Slater, F.R.P.S. The Apparatus Section which, in previous Exhibitions, had formed a prominent feature, was, on this occasion, represented by the exhibits of the local dealers, E. C. Carter, and A. J. Wing, a new arrangement having been made to hold the lantern show in the exhibition hall instead of in a separate room, thus occupying the space in the centre hitherto devoted to this section.

In reviewing last year's Exhibition, we were able to congratulate the members on the general improvement in the quality of the work upon that shown at the previous Exhibition; but we had also to comment adversely upon the unsuitable magnificence of some of the frames and mounts. We are pleased to be able to congratulate the Society upon having again improved its work, and, though there were still a few offenders in regard to framing and mounting, the majority of the pictures were well framed and mounted, and, in many cases, admirable taste had been shown in these particulars. We have also to congratulate the Society upon its courage in conducting its Exhibitions on non-competitive lines, and not offering any awards, and still more upon the success it has achieved under conditions which are popularly supposed to be inimical to success.

In the members' portion of the Exhibition there were 120 frames contributed by 22 exhibitors. We noticed that there was an unusually small proportion of portraits and figure subjects, and would suggest that the members should devote more attention to this kind of work; but, among the landscapes, there is no lack of diversity of subject, and a commendable absence of a common feature in the work of a society, that of many of the members slavishly following one particular style. The members seem to be great at carbon, and some of them have a tendency to indulge, not always wisely, in the bright-coloured prints that that process renders possible; blue, green, or red prints are sometimes very effective, but the bad choice of a bright colour is fatal.

M. Gottfried's work is careful, and, in most cases, technically very good. A frame of several pictures entitled, *Winter*, was evenly good, but perhaps the best was *In Cloudland*, which only required a figure or some object of known size to be included, to indicate the height of the cloud-capped crags, to make it a very interesting picture. J. Hope's exhibit consisted principally of carbon enlargements of architectural subjects; on the whole, they were very good, but somewhat flat. A comparison with the lantern slides, made obviously from the same negatives, showed that the defect was introduced in the enlarging. Mr. H. Dawson's architectural scenes were all very good indeed, and tastefully got up. We shall not be surprised if he takes a place among the leading exponents of work of this kind.

W. N. Dunger, C. Churchill, A. Ames, and J. Desforges deserve a word of praise for their careful photography; but they require to study seriously its pictorial applications, landscapes printed on glazed papers seem almost archaic nowadays. The same remark applies to H. H. Smith, but his flower subject, the only one, we think, in the Exhibition, was distinctly good. J. Cregan gave us little opportunity of studying his pictures, the principal attraction in his frames was the blue mounts, which, though beautiful perhaps in themselves, were quite destructive of what they surrounded. H. H. Barker showed taste in the selection and treatment of his subjects. His best picture, *Off Gravesend*, was unfortunately marred by a technical fault, a dark circle, like a flare spot but dark instead of light. If this could be avoided, it would be a charming little picture, and the colour of the print suited it admirably.

C. H. Imrie has two pretty little pictures in *A Snug Harbour*, and *Sol tude*, but we should have preferred a more sober tint for the former and he has not been quite successful in his mounts. F. W. Machen had several carbon enlargements which were rather flat in effect, and the flatness was accentuated by the bold frames by which they were surrounded. *Sunset, Sea and Sand*, a charming little picture relying upon its extremely delicate gradations for its beauty was also marred by its green bronze frame. J. N. Edwards deserved praise for his *Shi Tan Rapids* (Upper-Yang-tsi-kiang) a panoramic view on two plates the prints from which had been skilfully joined, and the picture was not without pictorial effect. The bright green mounts he adopted would, however, ruin anything.

The Morning Bath, by A. J. Allen, was distinctly a good thing in it

way. J. V. Thompson seemed to spoil otherwise good work in his printing, *Leafless Trees* is obviously a subject that should not be printed in blue carbon, and his *Portrait* was quite a curiosity. It is certainly the most striking example of double toning in a chloride print we have ever seen.

R. J. Redding had some pleasing pictures. *The Valley smiled in Living Green* was a very nice thing indeed, but we thought the title not particularly appropriate. To us it represented a woodland scene, and, as the subject consisted of trees in full foliage, the blue-toned bromide print seemed neither to carry out the idea of the subject itself nor of the title given it.

H. J. Spencer sent admirable work, and much of it was worthy of a place in a more ambitious collection of photographic pictures than that of his own local Society. We sincerely recommend the members to study his work, his treatment of the subjects, and his methods of getting up his picture for exhibition. We preferred his winter scene, but there was something to admire in each. *Autumn Woods* was unfortunate in having a not very graceful figure, and was printed in a tint a little too warm for the subject, but otherwise it was good; and *Evening* was also a charming composition, but struck us as being too warm in colour. E. Reavell seems to be the portraitist of the Society, but we cannot honestly say that his measure of success has been great. His faults are just those that most amateur beginners fall into at the outset, spotty, or "noisy" backgrounds and harsh lighting of the subject, but he should persevere in his work and should spend more time and thought in arrangement before the camera is brought into requisition.

G. Tapp had two very similar subjects. They were effects of mist, and, though not quite successful, showed some feeling. The effect was well rendered, but the choice and composition of the subjects left much to be desired. *Approaching Mist* suffered, too, from a white sky. H. J. Dalby, whom we understand is a professional photographer, showed a very good picture, *A Portrait of a Child*, which was free from the ordinary faults that professional portraitists are apt to fall into.

The lantern slides, of which there were fourteen sets of six, we can universally praise. Among them we did not notice a slide that was not good, technically, and many of the slides—indeed, several of the sets—were first-rate in every respect.

Our Editorial Table.

The Vanguard Matt Varnish.

Manufactured by the Vanguard Manufacturing Company, Maidenhead.

From the Company named, the source of many elegant and carefully compounded photographic preparations, we have received a sample bottle of a new yellow matt varnish. The varnish is sent out in British flint-glass bottles that will pour properly, having corks that can be drawn by the fingers, while the sealing material is unaffected by the contents of the bottle. The varnish gives a perfectly fine and even grain, drying with a matt surface that can be worked upon in the usual manner.

Lumière's Acetone-pyro Developer.

Fuerst Brothers, 17, Philpot-lane.

Messrs. Lumière, who have introduced acetone as a substitute for alkali in the pyro developer, recommend the following composition as the best for a normal developer:—

Water	100 parts.
Sulphite of sodium (anhydrous)	5 ,,
Acetone solution	10 ,,
Pyrogallic acid	1 part.

By comparing the pyro-acetone as against pyro and alkali, the following are the advantages which the former is claimed to show over the latter:—

Firstly.—No colouration of emulsion, and very little variation in the colour of the reduced silver (when ten per cent. of acetone is not exceeded), be the negative over or under-exposed.

Secondly.—Suppression of the habitual inconveniences when using alkalies.

Thirdly.—Interesting range of tones of the reduced silver when acetone is increased, a property which is very useful when obtaining glass positives (lantern plates).

We have received for trial solutions of pyro and acetone, upon which we hope to report at an early date.

The Joly Colour Process.

The Natural Colour Photograph Company, 12, Great Brunswick-street, Dublin.

A little pamphlet giving directions for using the taking and viewing screens in the Joly colour process has been issued by the Natural Colour Photograph Company. The Company have also sent us a list of lantern slides prepared by the process, the subjects including flowers, copies of paintings, stained-glass windows, natural history specimens, &c. Some of the results shown at the Royal Institution on Friday last excited great admiration.

News and Notes.

Messrs. B. Dellagana & Co. have removed from No. 106 to No. 11, Shoe-lane, E.C.

Photographic Club.—Wednesday evening, March 9, at eight o'clock Members' Open Night. Slides, &c.

Royal Photographic Society.—Ordinary Meeting, Tuesday, March 8, at 12, Hanover-square, at eight p.m. "The Passage of a Few of the Salts Used in Photography through Gelatine Septa," by Mr. A. Haddon.

The next meeting of the Manchester Photographic Society will be held at the Rooms, 44, Mosley-street, on Thursday, March 10. Subject, "The Gum-bichromate Process" (demonstration on), by Mr. Harry Wade.

At the moment of going to press, we regret to learn of the death of Mr. Francis Frith, founder of the well-known firm of Frith & Co. The deceased gentleman, who was in his seventy-fifth year, passed away at Cannes on the 25th ult.

Mr. Joseph Warren Zambra, of Walden House, No. 80, Fitzjohn's-avenue, and formerly of the firm of Negretti & Zambra, of 11, Holborn-circus, optician, who died on December 23 last, aged seventy-five years, left personal estate to the value of 176,075*l.*

We are informed that the National Photographic and Allied Trades' Exhibition, 1898, to be held at the Portman Rooms, Baker-street, London, W., April 22 to April 30, will be open each day from twelve noon to ten p.m. The list of exhibitors includes most of the leading manufacturers of photographic, lantern, and cinematograph apparatus.

An interesting event took place at Messrs. W. & D. Downey's, 61, Ebury-street, on Friday last, when Miss Parker, who is retiring after having been with the firm for twenty years, was presented by Mr. William Downey, on behalf of the staff, with a handsome clock, subscribed for as a token of the great respect entertained for her by all the *employés*. After a few well-chosen words of eulogy for her long and faithful services, he begged her acceptance from himself and Mr. W. E. Downey, his son, of a silver tea set, pieces of Dresden china, &c. Mr. Johnson, being senior *employé*, endorsed Mr. Downey's remarks, and spoke of the amicable relations which have always existed between Messrs. Downey and their assistants. Miss Parker's future health and prosperity was drunk very heartily by the entire staff, and the little ceremony was at an end.

Bolton Mutual Photographic Society.—The Bolton Mutual Photographic Society has not been in existence long, but already, by the activity of the Hon. Secretary (Mr. P. Woods) and the Committee, it has succeeded in promoting the mutual interest and enlightenment of those interested in photographic pursuits, and on Wednesday evening the First Annual Exhibition and *Conversazione* was opened in the Co-operative Small Hall by Alderman Nicholson, J.P. About 100 pictures were on view, and local amateurs made an excellent show, the most prominent exhibitors being the Rev. G. H. Carnson, with Bristol views; Mr. J. Marsden, *Bolton from the Park* and *Smithills Grounds;* Mr. Gordon Clark, *Autumn in the Woods;* Mr. M. Roscoe, *Deane Church;* Mr. P. Farnworth, *Yacht Race;* Mr. J. Rushton, *Reflections in the Jumbles* and *Deane Church;* and a flashlight by Mr. Woods.

The Birmingham Society's Exhibition opened at the Royal Society of Artists' Room, New-street, Birmingham, on Monday last, is a decided advance upon anything yet attempted. The Lady Mayoress (Mrs. Beale), in declaring the Exhibition open, paid a high tribute to the Birmingham Society. In one of the most charming speeches it has been our lot to hear from any lady, Mrs. Beale said it afforded her the deepest pleasure to see the advance that photography had made in recent years; and, further, that, on looking round the room, one could not help seeing that the tendency of such an Exhibition as this was decidedly to maintain a high standard of excellence. After Sir J. B. Stone had moved, and Dr. Hall-Edwards had seconded, a vote of thanks to Mrs. Beale, the Thirteenth Annual Exhibition was declared open. Our report of the Exhibition is unavoidably held over till next week.

"Kodak."—Eastman Photographic Materials Company, Ltd. *versus* the John Griffiths Cycle Corporation, Ltd.—This was a case of considerable interest and importance to the photographic and cycling world, involving the question of the right to appropriate a trade mark for use in trade other than for which the trade mark was registered. The Eastman Photographic Materials Company, Ltd., are the owners of the trade name "Kodak," which has a world wide reputation in connexion with that Company's photographic appliances, and they were the plaintiffs in the action. The defendants are the John Griffiths Cycle Corporation, Ltd., and the Kodak Cycle Company, Ltd., and from the evidence it appeared that towards the end of last year the defendants registered the word "Kodak" as a trade mark in connexion with cycles. The John Griffiths Company also incorporated a Company called the "Kodak Cycle Company, Ltd.," and, upon these facts coming to the knowledge of the Eastman Company, an application was made to restrain the defendant Companies from, *inter alia*, carrying on business under the name of the Kodak Cycle Company, Ltd., or under any name comprising the work "Kodak." Mr. Justice Romer, in giving judgment, said the plaintiff Company carried on a very large business. Some years since it invented the word "Kodak," which it applied to certain of its cameras. Those cameras have become very well known indeed throughout the length and breadth of this land under the

term "Kodak." The Kodak cameras had been largely advertised, they had become well known to the public, and the term is identified as applied to cameras, and as denoting the goods of the plaintiff Company; in fact, it might be said that the name "Kodak" was identified with the plaintiff Company, and was the trade name of that Company. Several trade marks had been registered by the plaintiff Company, in which the word "Kodak" formed a prominent part. It appeared that the Kodak cameras were especially available for use on cycles, and that they were much used by cyclists, and the plaintiff Company had done a large trade in those Kodaks. For the purpose of cycles it had made certain special forms of Kodaks so as to specially adapt them for use on cycles. It had advertised for some time these special Kodaks as "Cycle Kodaks," or "Bicycle Kodaks," and it also had a considerable trade in bicycle accessories so far as related to adaptation of the bicycle for photographic purposes. At one recent large cycle show the plaintiff Company had a stall, and the evidence showed that between the two trades, the bicycle trade and the camera trade, there was an intimate connexion. Many shops sell and deal in both bicycles and photographic cameras and materials; the plaintiff Company was identified with the name "Kodak," as connected with cycles, and so great is the connexion between the two classes of business that in all probability the plaintiff Company may wish hereafter to manufacture and sell cycles specially adapted to carry their Kodaks. After reviewing the evidence, his Lordship said, "I grant an injunction to restrain the defendant Company, or any of them, from carrying on business under the name of the 'Kodak Cycle Company, Ltd.,' or under any name comprising the word 'Kodak' likely to mislead or deceive the public into the belief that the defendant Company is the same Company as, or is connected with, either of the plaintiff Companies, or that the business of the said Companies, or either of them, is the same as, or is in any way connected with, the business of the Eastman Photographic Materials Company, Ltd. I also grant an injunction to restrain the defendant Companies, and each of them, from selling or offering to sell any of their cycles or goods as "Kodak." I think that will sufficiently protect the plaintiffs. Of course, the defendants must pay the costs, including the costs of the comptroller.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

March.	Name of Society.	Subject.
7	Bradford Photo. Society	*The Camera and the Wheel.* F. O. Bynoe.
7	Camera Club	*The Caucasus.* Clinton Dent, F.R.C.S.
7	Ealing	*Ireland.* W. T White.
7	North Middlesex	Informal Meeting
7	Putney	*Notes on Stereoscopic Photography.* L. S. Zachariasen.
7	Richmond	Display of Slides by Kingston Photographic Society.
7	Stafford Photo. Society	*Carbon Transparencies.* H. Cliff.
8	Birmingham Photo. Society	*Lantern-slide Making by Contact and Reduction.* S. L. Coulthurst.
8	Brixton and Clapham	*The Artigue Method of Printing.* E. Pointon.
8	Hackney	*Elementary Optics* R. Child Bayley.
8	Isle of Thanet	*Photographic Dodges.* C. M. Hepworth.
8	Manchester Amateur	*Cloud Negatives: How to Take and Use.* T. Morley Brook.—Discussion: *Films v. Glass Plates*
8	Royal Photographic Society	*The Passage of a Few of the Salts Used in Photography through Gelatine Septa.* A. Haddon.
8	Shropshire	Lecture: *Behind the Scenes of Popular Journalism.*
9	Leicester and Leicestershire	*Acetylene.* E. M. Marshall and W. Murray.—*Photo-micrography.* O. T. Elliott.
9	Leytonstone	Sixth Annual Dinner.
9	Photographic Club	Members' Open Night: Slides, &c.
9	Polytechnic	*Hand camera Criticism.* M. Weir.
9	Southport	Bromide and Carbon Print Competitions.—Practical Developing (Demonstration with Metol and Hydroquinone).
10	Bradford Camera Club	Annual Meeting.
10	Camera Club	*The Photographic Plate, its Present and Future Capabilities.* J. Cadett.
10	Darwen	Lecture: *Cloud Photography.*
10	Liverpool Amateur	Lantern in Use.
10	London and Provincial	*Photo-micrography.* Dr. Spitta, F.R.A.S.
10	Manchester Photo. Society	Demonstration: *The Gum-bichromate Process.* Harry Wade.
10	Woolwich Photo. Society	*Photographic Experiences during* 1897. W. H. Dawson.
11	Croydon Microscopical	Discussion on Proposed Extension of Portfolio.
11	Ireland	*Wanderings in Italy.* Edward Tickell.
11	West London	*Home-sensitised Paper.* M. W. Cockerell.
12	Hackney	Excursion: Forest. Leader, W. Selfe.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 24,—Mr. A. Mackie in the chair.

Mr. H. C. RAPSON raised some discussion on the question of obtaining sharp focus when using a screen. He brought up two negatives, one taken with the screen in position and one without; also the screen itself, which was composed of picrate of ammonia. When using the screen the sharpest image he could get was decidedly fuzzy compared with the second taken without any screen at all, and he wished to hear it accounted for.

It was thought that the tones of the coloured picture of which the negatives were copies were better rendered in the less perfectly defined negative, but no suggestions were offered to overcome the want of sharpness with the screen.

During the evening the question of copying coloured pictures by means of yellow light thrown upon the subject was referred to.

Mr. E. H. BAYSTON had used such illumination in so far as it could be obtained by means of a paraffin lamp.

Mr. R. P. DRAGE spoke of the method of altering the colour of bromide prints mentioned by Mr. S Fry, consisting of bleaching with bichromate and a little acid, and allowing the print so treated to darken by light. Although he had got some very pleasing colours in this way, Mr. Drage found in some cases that the print still assumed a rather unpleasant colour after the treatment, and it would be interesting to hear of any toning or other means whereby a desirable tint could be imparted to such prints.

The CHAIRMAN inquired whether this might not be due to the quality and nature of the negative, or was it purely a question of the print itself?

Mr. DRAGE thought the print only was concerned. Continuing, he said that, when the prints were thoroughly bleached, very satisfactory results were obtained, but, should the action proceed for less, the image came up of the unpleasant brown colour mentioned. Therefore he wanted to know whether there was any supplementary method to avoid the necessity for rebleaching. In his opinion it was the best existing way of toning or altering the colour of bromide prints.

Some discussion ensued regarding the possibility of toning in the way Mr. Drage desired, but it was remarked that the blackening of the silver chloride was only superficial, and the image could not be fixed or toned, although there was nothing to be said against its permanence.

PHOTOGRAPHIC CLUB.

February 23,—Mr. G. W. Tottem in the chair.

Mr. H. L. Noel-Cox sent up for examination several stereoscopic slides illustrating the havoc played by the great City fire.

Mr. G. W. Tottem, on behalf of the Eastman Company, exhibited a folding pocket Kodak, designed with the idea of being easily carried, and to afford a larger size of picture than did the original pattern. The lens was at a fixed focus, and the shutter of a novel design. A sliding plate bears three different diaphragms, and to the camera is fitted a couple of small finders. Daylight cartridges are used. The shutter, which is everset, is released for instantaneous exposure by a knob on the top of the camera front, while for time exposures a knob at the side is pressed (the camera resting on a firm basis meanwhile), which opens the shutter, and a second movement of the knob closes the aperture. The size of picture given by this camera is $2\frac{1}{4} \times 3\frac{1}{4}$ inches. There was also shown a form of roll-holder, taking the daylight cartridge, to be attached to any form of plate camera.

Mr. E. W. Foxlee showed an interesting photograph of the late Andrew Ross, the oldest English lens-maker. The photograph, which was taken some forty years ago, was a fair index to the state of photography in those days.

Mr. F. A. BRIDGE showed and described a series of slides, entitled "Glasgow and the Vale of Clyde." These were the work of the Glasgow and West of Scotland Amateur Photographic Association, and are making a tour amongst the various centres at which Conventions have been held. Arrangements have been made for their display at Birmingham, Leeds, Shrewsbury, Yarmouth, Derby, &c., and, from the fact that this year's Convention is fixed to take place at Glasgow, considerable interest attaches to the set on account of the locality in which the photographs were taken. For this reason the series, which contains some very good work and is fully up to the average, should prove a very interesting subject for an evening's display.

Croydon Camera Club.—A very fair attendance assembled on Wednesday, the 23rd ult., to see a demonstration by Mr. Ibbotson of the possibilities of the newly announced printing process, known as Velox. The advantages of this paper are twofold. Firstly, it is so easy that a photographic ignoramus can hardly fail to get passable results at the first trial. Secondly, prints are at all times obtainable much more quickly than with any other process. The procedure is simplicity itself. Expose, at eight inches from a gas burner, for six minutes or more, under an average negative; lay the print, face upwards, upon a piece of glass, or other convenient support, and brush over with a metol-quinol developer of about double ordinary strength for negatives. The image appears in a second or two; as soon as it is strong enough, the plate is placed straight into an acid fixing bath. To show how simple is the procedure, two of the members present, viz., Messrs. Kough and Smith, successively exposed and developed a sheet of the paper, and, although it was their first experience, the prints were in each case satisfactory. A peculiarity about the paper is that it may be developed by ordinary gaslight, no screen being needful, as with other kinds of bromide paper, of which this is a particular variety. A cordial vote of thanks was, at the instance of the President, awarded to the demonstrator. The meeting resolved, on the invitation of the Royal Photographic Society, to contribute slides and prints to a special display which the Society is arranging in connexion with the Exhibition to be opened by the Prince of Wales in the spring at the Crystal Palace. It was announced that the eighth annual dinner would be held on March 30 at the King's Arms Hotel, Croydon.

Newcastle-on-Tyne and Northern Counties Photographic Association.—February 22, Mr. W. Parry (President) in the chair.—Mr. W. E. COWAN read a paper, entitled

A RECORD OF FAILURES.

This paper had been prepared for the benefit of beginners, and in it Mr. Cowan, in a very humorous and racy manner, dealt with the failures which are apt to beset the path of the photographic tyro. As Mr. Cowan dates his experience from the wet-collodion days, his record of failures equals that of many while his record of successes surpasses that of most. Mr. Cowan's advice to beginners (and it applies equally well to those more advanced) may be summed up as follows: Use one plate (preferably a slow one)

and one developer until you have mastered them. You will probably then find you do not wish to leave them for anything new, as they will do all you require in the ordinary way. Thoroughly test your apparatus, and see that it is in perfect order, for even the best of makers are not infallible. See that your dark room is worthy of the name. Keep to one branch of subject until you master the technical difficulties of development, &c. Whilst away photographing do not scatter promises of your work broadcast; promise as few as possible, and religiously keep your word, sending a post-card if you are unable to do so through failure, and remember that your sins of omission in this respect will probably be visited on the heads of your fellow-amateurs who may follow you in the same district.

Portsmouth and Southsea Amateur Photographic Society.—At the recent Annual General Meeting of the above Society, Mr. George Whitefield was elected President for the ensuing year; Mr. H. T. Lilley, M.A., Vice-President; and Messrs. A. Fisher, F. W. Fox, M.A., Colonel Bruno, and Dr. Newby, Council. Dr. F. Lord re-elected Hon. Treasurer, and Messrs. Gilbert Wood, of 10, Pelham-road, Southsea, and F. J. Mortimer, of 10, Ordnance-row, Portsea, joint Hon. Secretaries.

Blairgowrie and District Photographic Association.—February 22, Annual General Meeting.—There was a large attendance, presided over by Mr. John B. Maclachlan (Vice-President) The Secretary (Mr. T. C. Gorrie) and the Treasurer (Mr. James Richardson) submitted their annual reports, which were considered highly satisfactory. The former spoke of the great interest taken in the Association by the members, and pointed out that, although they resided in "the far north," still they were not far behind the times, as the first demonstration of the gum-bichromate process that he had seen any notice of was that given before the Blairgowrie and District Photographic Association by Mr. W. Grant Murray on October 19. The recent Exhibition was also alluded to, and its great success noted as an incentive to even greater efforts. The Treasurer's statement (which did not include the Exhibition balance-sheet) showed a slight decrease in funds, but a corresponding increase in assets—hand cameras, &c. He stated that, although he had not yet received all the moneys due in connexion with the Exhibition, still he was certain that it would be a financial success as well as an artistic one. Both reports were unanimously adopted. Office-bearers for the season were elected as follows:—*President:* Mr. A. Geekie.—*Vice-Presidents:* Messrs. John B. Maclachlan and W. Grant Murray.—*Executive:* Messrs. Petrie, Monan, Clyde, Hendry, and Macfarlane.—*Hon. Lanternist:* Mr. H. S. Tyffe.—*Hon. Treasurer:* Mr. James Richardson.—*Hon. Secretary:* Mr. T. C. Gorrie, Beechbank, Rathay, Blairgowrie. The Secretary and Treasurer were instructed to negotiate for a renewal of lease of the premises. A draft syllabus for the coming season was submitted and remitted to the Executive for publication.

FORTHCOMING EXHIBITIONS.

1898.

March 4, 5 ..... Birmingham. C. J. Fowler, Court Mount, Erdington, near Birmingham.

,, 5–12 ..... South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.

April 22–30 .... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 27–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CINEMATOGRAPHY AND ASTRONOMICAL PHENOMENA.

To the EDITORS.

GENTLEMEN,—The experiment referred to by Lieut.-General Tennant was an interesting one, and I have some recollection of seeing one of the negatives at the Greenwich Observatory. A sensitive plate was made to revolve, and the photographs were taken in a circle at the outer edge. My memory is not very clear on the point, but I think Captain Abney had something to do with it, and, if so, the apparatus was shown in the grounds of the Observatory when it and other apparatus was erected for the purpose of practice.—I am, yours, &c., A. BROTHERS.

Manchester, February 22, 1898.

CONVERSION OF FORMULÆ.

To the EDITORS.

GENTLEMEN,—There seems frequently to be a want of exactitude about the operation of converting English into metric formulæ, and *vice versâ*. The following method gives exact results:—

Taking, as standard formulæ, grains to the ounce for English, and grammes to 1000 c. c. for metric, (1) to convert from metric to English, multiply grammes to 1000 c. c. by $\frac{7}{1}\frac{7}{5}$, which is $\frac{1}{2}(1-\frac{1}{8})$. Hence subtract $\frac{1}{8}$ part and divide by 2. (2) For English to metric multiply grains to 1 ounce by $\frac{1}{7}^{6}$, which is $2(1+\frac{1}{7})$. Hence add $\frac{1}{7}$ part and multiply by 2. Thus 8 grammes to 1000 c. c. $=\frac{1}{2}(8-1)$, or $3\frac{1}{2}$ grains to 1 ounce; or 14 grains to 1 ounce $=2(14+2)=32$ grammes to 1000 c. c.

The Diogen formula, which is given so inconveniently in English measure, is evidently derived from the metric formula.

Diogen	100 grammes.
Sulphite	400 ,,
Potash	500 ,,
Water	1000 c. c.

Which gives in English:—

Diogen	$43\frac{3}{4}$ or 44 grains.
Sulphite	175 grains.
Potash	$218\frac{3}{4}$ grains or $\frac{1}{2}$ ounce.
Water	1 ounce.

CLIFFORD E. F. NASH.

EXPOSURE METER PAPER.

To the EDITORS.

GENTLEMEN,—In the report of a meeting of the Croydon Camera Club, it appears that some of the members arrived at the hasty conclusion that the ratio of sensitiveness of the paper in an exposure meter to bright and feeble lights is greater than the ratio of a sensitive plate under the same circumstances. In a condensed report it is impossible to judge whether the evidence brought forward justified this conclusion, but the fact stated, that over-exposure resulted when timing an exposure in dull light, is insufficient as evidence.

It is evident that a print-out paper can be made to approximate in ratio of sensitiveness to a sensitive plate (in bright and feeble lights) by careful selection of formula only, and it is also probable that there is a wide difference in this respect between different brands of plates, which may account for the complaint.

Let me give my own experience. Eight years ago I experimented with many variations in formulæ for an actinometer paper, with a view of getting the most useful ratio of sensitiveness between bright and feeble lights. To my surprise, I found that most papers darkened too quickly in feeble light to indicate sufficient exposure for the plate, and I had to fix on a formula which was comparatively slow in feeble lights.

Since then I myself have continually exposed plates, including isochromatic, in bright and feeble lights, judging the exposure by my exposure meter, and developing together. I have found no extra tendency to over-exposure of the plate in dull lights.

Moreover, I have kept in touch with some hundreds using my exposure meter, often answering two or three letters a day from users, and I do not remember a single case of complaint on this point. On the other hand, I have received repeated testimony of the value of the meter for dull light.

I have only had time since your last issue to make one trial on this point.

A Cadett ordinary plate was exposed at 2.30 on an outdoor subject, not sunlight; actinometer, fourteen seconds; exposure, two seconds. At 5.40, getting dusk, the same brand of plate was exposed on the same subject, with the same stop; actinometer, ninety seconds; exposure, thirteen seconds. The two were developed in the same dish, for the same time, and the evening exposure was a trifle under-exposure compared with the other. I hope that some of your readers will make similar trials and give results, stating what sensitive paper and what plate was used. I can easily find a formula to produce a paper more sensitive to feeble light than that at present used with the meter, but I have not yet seen any evidence that it would be an improvement.—I am, yours, &c., ALFRED WATKINS.

Hereford, February 28, 1898.

Patent News.

THE following applications for Patents were made between February 14 and February 19, 1898:—

MUTOSCOPES.—No. 3647. "Improvements in Mutoscopes." Communicated by H. Casler. E. B. KOOPMAN.

PHOTOGRAPH-HOLDERS.—No. 3779. "Improvements in Cases or Receptacles for Holding Stamps, Cards, Photographs, and Analogous Articles." J. SPENCER.

STEREOSCOPY.—No. 3961. "Improvements in the Method of and Apparatus for Producing Photographic Pictures and Images with Relief or Stereoscopic Effects." C. A. BURGHARDT.

PROJECTION APPARATUS.—No. 3990 "Improvements in or connected with Optical Projection Apparatus." Complete specification. F. MÜLLER.

PHOTO-SURVEYING.—No. 4000. "Improvements in Apparatus for Surveying with the Aid of Photography." J. B. LEE.

NATURAL COLOURS PHOTOGRAPHY.—No. 4044. "Improvements in or relating to the Art of Producing Photographs in Natural Colours." J. JOLY.

PARA-AMIDOPHENOL.—No. 4226. "Improvements in the Preparation of Para-amidophenol." H. R. VIDAL.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

VINDEX.—See reply to Shuter Bros.

MISS C. M. PRESTON.—No report that we are aware of has been published.

SHUTER BROS.—A threat of legal proceedings will probably have the desired effect.

RECEIVED.—F. R. W.; E. A. GRAINGER; E. A. BASCHE; AJAX; J. H. HIELD. In our next.

GEORGE BEARDER.—See THE BRITISH JOURNAL OF PHOTOGRAPHY for August 23, 1895, where the complete paper is given.

FORGET-ME-NOT PORTRAIT PAINTING CO.—The price is eight marks; the publisher's address, Verlag von Gustav Schmidt, Berlin.

GEORGE HINDLESHAM.—We can recall no book in English dealing exclusively with the subject. If you could refer to this JOURNAL for the last seven or eight years, you would find the matter treated very exhaustively. Abney's *Instructions* and Wall's Dictionary, among other standard books, may also be consulted.

PHOTOPHIL.—1. We are unable to supply the information. The material is a trade article, and the makers keep its preparation as their secret. 2. Copious washing will usually remove the colour. The plates, however, will require several hours' soaking to get rid of all the colour. A little left, however, will not materially interfere with the printing.

BURNISHER.—ALICE W. The longitudinal marks on the three prints sent are due to the bar of the burnisher being scratched. Surely your employer should know the cause from which they proceed, and not blame you for carelessness in mounting. He must get the scratch ground and polished out of the burnishing bar. Till that is done all the burnished prints will be the same.

CARBON PRINTING.—G. A. HOWARTH writes: "Kindly answer the following: In printing carbon, is it not possible to do without a safe-edge in the negative, and why?"—The "safe-edge" cannot safely be dispensed with if there are any dark portions at the margins of the negative. If the margins are very light, the safe-edge can be done without. The safe-edge is to avoid frilling.

EXPOSURE.—B. RALPH. Primarily the fault is over-exposure, and very much so. You have have evidently overlooked the fact that the actinic quality of the light has increased greatly during the last month or three weeks. The plates you are using are amongst the most rapid in the market, and are consequently the most difficult for a beginner to deal with. We should recommend you, as a novice, to use a grade slower plate; it will be quite equal to your requirements for such subjects as those enclosed.

PHOTOGRAPHING AT HOME AND ABROAD.—A. WILLIAMS says: "Can you give me an idea of—1. Where I should have to apply for permission of photographing about the interior of St. Paul's, Westminster Abbey, and a few other fine cathedrals in neighbouring counties? 2. Also can any one photograph in Belgium, without any special permission, the various places, buildings, and interiors of fine churches, &c.?"—In reply: 1. This information is given in the ALMANAC for 1898, to which we refer you. 2. We believe that permission has to be obtained for interiors of buildings and churches, but there is no special difficulty.

BROMIDE PAPER.—BROM says: "Will you kindly give me—1. A reliable formula for preparing a rapid bromide paper? 2. Also the most convenient method of coating the roll without machinery? 3. Can you also give me the address of a firm supplying the rough and glossy enamel papers ready for sensitising? 4. Is there any book published on the subject?"—In reply: 1. Formulæ are published in our ALMANAC for 1898. 2. See answer to No. 4. 3. Messrs. Otto Kœnig & Co., 27, Cross-street, Finsbury-pavement. 4. *Plates and Papers*, by Dr. Stiefel, published by Percy Lund & Co., Amen-corner, E.C., 2*s.*, contains many useful hints on the subject.

OIL ON PICTURE.—T. W. says: "When framing a bromide enlargement, expensively finished, two or three drops of sweet oil, used for the rolling press, fell upon it, close to the shadow side of the face, and rapidly spread, spoiling the picture. I suppose there is no possibility of getting that out?"—It is possible the grease may be got out in the following way. First apply pure, clear benzole, and, after it has been on a few seconds, blot off with clean white blotting-paper. Repeat this treatment several times with fresh blotting-paper. With this treatment the grease may be extracted, and, if any little stain is left, it can be worked out by the one who finished the picture.

STUDIO BUILDING.—BARR writes: "Kindly answer these two questions in THE BRITISH JOURNAL OF PHOTOGRAPHY. 1. I am about to build a portable studio right on the seacoast. I want to know what kind of glass would be best for lighting the studio, ground or plain, or to have ground glass on top and plain for side? 2. If I build the portable studio on wheels, should I have any rates or taxes to pay?"—1. Better have ground glass at the top, and plain at the sides; or, if you are overlooked, it would be better to have ground glass at the sides as well as the top. 2. If the studio is really built on wheels, that is so that it can be moved from place to place on them, and wheeled away from the premises if required, it will be exempt from rates.

MEDALS AND THEIR COST.—THOS. ROGERS says: "Would you kindly inform me where I may obtain silver and bronze medals similar to those awarded at various photographic exhibitions, also what might be the cost of same? I am Secretary of a Postal Camera Club, and would like to offer two medals each year amongst our members, if not too expensive?"—In reply: Messrs. Vaughton, Gothic Works, Birmingham, will supply you. About 2*s.* each is a fair average price. Medals are very cheap—in more respects than one.

LENS AND STOPS.—INQUIRER says: "I have a whole-plate rapid symmetrical lens by Ross. Could you please tell me how much longer to expose when using the different stops? They are Waterhouse, and figured 0 up to 6. Will you kindly inform me what work it can be used for, and how to arrange it for different purposes? Thanking you in anticipation."—The lens may be used for all purposes. If the front combination be removed, the back one can be used as a single lens for landscape purposes. The instrument is apparently of somewhat old make, and we are not quite sure, without seeing the lens, whether double the exposure is required for each succeeding smaller stop, or only half as long again. Write to the makers; they will tell you which.

MARIOTYPE.—HUNTLEY writes: "In THE BRITISH JOURNAL OF PHOTOGRAPHY, No. 1960, November 26, 1897, page 755, article on 'An overlooked Property of Bichromated Gelatine,' in the second column, line 6, is 'the sensitising of the transfer paper is done on a six per cent. solution of bichromate of potash, to which a little sulphuric acid has been added.' 1. The formula for above: Bichromate of potash, 6 ounces; water to make 100 ounces; sulphuric acid (?) 2. Can above solution be used several times, say for six dozen whole-plate prints, or would it require to be renewed in any part; and, if so, to what extent? 3. If above can be kept, would it be advisable to keep same in the dark?"—In reply: 1. The formula is given as it was published at the time, from half to one per cent. of sulphuric acid will suffice. 2. Yes, no addition is needed. 3. Yes.

SIDE LIGHT FOR STUDIO.—STUDIO says: "I should be very glad if you will help me in forming out the best way to get a side light in the enclosed studio; you will do me a great favour. The landlord is not willing for the heavy coping and stonework at the gutter to be removed, but is willing to allow the two windows to be made into one. What I want to know is, will this better me? I use the window with plain glass and a reflector now as a side light, only cannot get the results in three-quarter figures and full length. Will the 3 feet 4 inches of wall cut the light that will be left across and make it worse; have marked size on photograph enclosed?"—Unless, in making the two windows into one, they can be heightened to the stone coping, we do not see there will be such a material gain as to recompense for the outlay. If that can be done, it will prove a great advantage.

LENS.—PORTRAIT LENS says: "I have a twelve-inch-focus portrait lens, which occasionally I wish to shorten to eight inches focus. To do the same was answered to a correspondent in your columns. "It can be done by inserting a double convex lens at the position of the stop." On page 122 of THE BRITISH JOURNAL OF PHOTOGRAPHY a Mr. Rayner gives a formula for finding the focus of the supplementary lens for a rapid rectilinear. Will the same formula answer for the portrait combination?"—Yes. It applies to all combinations, but the calculations must be based upon the equivalent focus, and not the back focus; that is misleading. Any working optician will supply a lens of any given focus and diameter. Spectacle lenses would answer, but as they are, as made, only about one inch and a half in diameter, they would obviously curtail the aperture of a whole-plate portrait combination.

SENSITISING PAPERS.—A. SHEVILL says: "I shall be obliged if you will answer one or two questions. Do you think nitrate of silver is absorbed through the finger nails of some persons when sensitising? If so, in what way would the symptoms show? Sensitising I do about three times per week, and have been rather suspicious of late. I am also expecting to have to make ferro-prussiate paper once a fortnight, the sensitising bath of which contains a large quantity of ferridcyanide of potassium, &c. My hands I shall have to put in the solution during the whole process. Do you think the body would receive any poison in this way?"—We do not think it is at all likely that silver would be absorbed into the system through the finger nails, neither do we imagine that any ill result will result from preparing the ferro-prussiate paper once a fortnight if care be taken to thoroughly wash the hands in warm water after the work is done. It is not advisable, however, to have the hands in any chemical longer than is absolutely necessary. Indiarubber gloves may be had, which are a perfect protection to the hands when working with injurious materials.

PIRACY.—PROFESSOR STEBBING (Paris) writes: "In the interest of your humble servant and Continental photographere in general, you would oblige by giving advice as to how we can obtain redress and protection from the illustrated journals, who in their own interest reproduce our proofs without permission, and often against our will, under the pretext that photographs are not protected by law. In France, editors now pay a right of reproduction; but some of the English, and especially American, journals will not comply with our rightful demand. What can be done to prevent unscrupulous editors pirating our property in this way?"—In reply: So far as England is concerned, the International Copyright Law gives redress. If a photograph is made copyright in France, the copyright holds good here the same as if it had been made copyright in this country; and its owners can recover damages and penalties in our law courts. That has often been done. We should recommend Professor Stebbing to join the Photographic Copyright Union, the Secretary of which is Mr. Henry Gower, London Chamber of Commerce, Botolph House, Eastcheap, E.C. The Union will institute proceedings for its members in case of piracy.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

PAGE

x Cathedrâ 145

ATENT Fog 147

EADERETTES:—
A Record Short Exposure—Photo-astronomical Telescope of Large Angular Aperture — Glass Impermeable to Heat — A Record January—Remarkable Effect of Ultra-violet Radiations 147

TTINGS. By Cosmos 148

HOTOGRAPHIC HALATION: POSTERIOR AND ANTERIOR. By G. Marlow 149

IE MODERN SCHOOL OF PHOTOGRAPHY 150

CHAT ON ELECTRICITY AND OPTICS. By A. W. Isenthal 151

UTH LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION 153

RMINGHAM PHOTOGRAPHIC EXHIBITION 154

PAGE

DEATH OF DR. FERDINARD HURTER. 155

OUR EDITORIAL TABLE:—
The Birt Acres Films for Animated Photography—Specimens of Portraiture — Specimens of Phototypic Illustration 155

NEWS AND NOTES 156

MEETINGS OF SOCIETIES:—
London and Provincial Photographic Association — Photographic Club — Camera Club — Croydon Camera Club — Hackney Photographic Society — Richmond Camera Club — Oxford Camera Club — Sheffield Photographic Society 156

FORTHCOMING EXHIBITIONS 158

CORRESPONDENCE:—
The Metric System — The Insurance Companies and Exhibitions of Animated Photography — The Return of Specimens — An Appeal 159

ANSWERS TO CORRESPONDENTS 159

EX CATHEDRA.

RNITHOLOGICAL photography is a branch of work that has cently been brought into great prominence, mainly by the forts of Mr. R. B. Lodge, the Messrs. Kearton, and others. ese gentlemen, with great perseverance and at times at inconsiderable personal risk, have employed the camera to pict the rarer birds and wild fowl amid their natural surundings and in their all-but-inaccessible haunts; and the ords of the photographers' adventures in quest of their ey supply much reading of a highly exciting character. ch credit is due to them for what they have achieved in s direction, and there is no doubt that their results are of y great value to students of this department of natural tory.

* * *

ONE of the earliest natural history books to be illustrated photographs of birds taken *in situ* was Dr. P. H. Emerson's *rds, Beasts, and Fishes of the Norfolk Broads*, which contains ny such pictures. This interesting book is a striking mple of the author's many-sided genius, for in power and ail of observation it stamps him as an acute and painstaking naturalist. We believe that some of his comparatively early photographic work was directed towards the endeavour to secure photographs of birds, &c., from distant points of view, on the wing, &c., and it is therefore interesting in this connexion to note that, only a few weeks ago, we gave publicity to a request, emanating from the Boston Camera Club, for photographs of this character, for which money rewards are offered.

* * *

MANY years ago Dr. Emerson wrote an article in the *Naturalist's Record* on natural history photography, and he is good enough to remind us that so long ago as the year 1881 the well-known photographer, Mr. W. Green, of Berwick-on-Tweed, undertook the photography of birds and their nests on the Farne Islands. Mr. Green says: "I think it was in May 1881 that I was waited upon by Mr. R. Chase (of Birmingham), Mr. Saville (of Birmingham), and Mr. Bidwell (of London), all prominent members of the British Ornithological Union, who told me that a most interesting series of photographs of birds and nests on the Farne Islands might be taken, and they asked me if I would undertake to do them. This I agreed to do. Mr. Bidwell went with me, and pointed out those subjects which would be of most interest to ornithologists, and the Farne series were first produced; this, I think, was on June 3, 1881. I am not aware that any one had done the work before me; in fact, the above almost proves the reverse. I called them the Bidwell Series to mark the share this gentleman had in their production.

* * *

"ON June 8, 1882, Mr. Bidwell again accompanied me to the Bass Rock, when the photographs of that series were taken under his immediate supervision. I have supplied copies of my photographs to many ornithologists all over the world. I have also supplied sets to most of the principal museums in this country, and to some on the Continent. I have never shown them at exhibitions or competitions, so have gained no prize or medal."

* * *

WE believe that Mr. Green's bird photographs have deservedly received great praise from ornithologists and others. Certainly he was very early in the field in this difficult and interesting branch of work, and is entitled to great credit for what he did. We are the more pleased at giving publicity to Mr.

Green's achievements in ornithological photography, because he has himself modestly kept in the background while the credit of a new departure in camera work has in some quarters been wholly assigned to recent workers, who, despite the unquestioned skill they have shown, were yet preceded by Mr. Green seventeen years ago.

* * *

A MEETING of the Council of the Photographic Convention of the United Kingdom was held last week in London. Mr. J. Craig Annan, of Glasgow, kindly attended, and submitted the proposed arrangements of the Local Committee for discussion. These were generally approved of. Among other decisions come to by the Council was that of not having a specially arranged photographic Exhibition this year, although it is understood that the Local Committee will provide a display of photographs of some kind. The Apparatus Section, however, will remain. A committee was appointed to take in hand the collection and selection of lantern slides for exhibition at the meeting, special attention having been called to the hitherto unsatisfactory nature of these exhibitions. The Council are determined that in future the slides shown, particularly on the opening night, shall be of the highest possible quality, and shall worthily illustrate the scientific and artistic phases of photography for the information of a general audience.

* * *

THE Council voted a sum of 10*l.* to Mr. C. H. Bothamley in aid of research, the results of his work to form the subject of a communication to the Convention. The matter Mr. Bothamley has taken up is that of the essential factors of development, covering to some extent ground that has already been traversed by Messrs. Hurter & Driffield and Mr. Watkins, but dealing with it in a somewhat different way.

* * *

AT the recent meeting of the Physical Society at Eton, the Rev. T. C. Porter demonstrated a method for viewing lantern projections in stereoscopic relief, in which a slotted disc rotates in front of two lanterns. These project two stereoscopic views in rapid alternation upon a screen, in such a way that the two projections are approximately superposed. In the rim of the disc other slots are cut, through which the observer looks. The arrangement of slots is such that the right or left eye is only able to see the screen at the moment when its own picture, *i.e.*, the picture from the right or left lantern, is on the screen. When the rotation is sufficiently rapid, the views appear as one, without "flicker," in stereoscopic relief.

* * *

THERE has been some call, we presume, for transparent emulsion plates suitable for the Lippmann interference process of colour photography, but they have not so far been forthcoming. The difficulties of preparing such plates appear to be exceptionally great. Messrs. Cadett & Neal, in the March number of *Dry Plates*, point out that plates for the Lippmann process are extremely slow. We are in the habit, they remark, of calling lantern plates slow, but they are fast indeed in comparison with those they have up to the present been able to make for the Lippmann process. An attempt was made in France to produce these plates commercially, but it was given up, probably on account of the extreme slowness of the plat There is another difficulty which arises; and it is, that it seem as far as present knowledge goes, that pictures of wide angl are not easily taken by the Lippmann process. "We have n attempted experimentally to decide this point for ourselv though we will shortly do so; but it is easy to see that o would expect, where an image depends on reflection from film of mercury, that the nearer we can keep to the normal, as to get our reflection as near as possible in a line with t incident rays, the better our chance of securing good resul This would point to the probable use of long-focus lenses whe pictures of any size are to be made. It is very curious al that methods which orthochromatically suit plates of mo rapid make do not orthochromatise in the same way when t extremely slow speeds of the transparent Lippmann emulsi are made. These are difficulties which we are endeavouring surmount."

* * *

No more welcome and forcible tribute to the value of ph tography to the astronomer has recently been penned than t remark of our contemporary, *Nature*, in its last issue, that t brilliant lantern slides exhibited by Dr. Isaac Roberts at t Royal Society's Club on Wednesday, February 23, in illust tion of his lecture on "Recent Intelligence from Regions in t Stellar Universe," constituted a striking testimony to achievements in astronomical photography. The nebulæ a cluster of stars, which Dr. Roberts has now photograph number about 500, and a list of them, as they are tak each year, is published in his annual Observatory Report in *Monthly Notices* of the Royal Astronomical Society. "It is too much to say that these photographs contain a mine new astronomical information which has not yet been work and the value of which will increase with years. The pictu represent celestial species awaiting the mind of a Darwin co-ordinate them, for they show stellar systems in the vari stages of growth from the embryonic nebula to the finis star. Dr. Roberts has himself endeavoured to discover scheme of stellar evolution as revealed by his photographs, he placed the results before his audience last week. method of doing this was soundly scientific. To begin w he showed a number of photographs of star regions in wh the stars could be seen grouped into semicircles, segme portions of ellipses, and lines of various degrees of curvat Some of these groups were composed of bright stars of ne equal magnitude; some of faint stars, also of nearly e magnitude; while the distances between the stars in various groups were remarkably regular. Passing from th characteristics of stellar arrangement to photographs of sp nebulæ, Dr. Roberts pointed out that the nebulous matte the spirals was broken up into star-like loci, which, in regularity of their distribution resembled the curves and c binations of stars exhibited by photographs upon which trace of nebulosity was visible. It thus seemed that curvilinear grouping of stars of nearly equal magnitude g evidence that the stars had been evolved out of some att ated material in space by the action of vortical motions an gravitation. Exactly how the vortical motions were cau or what has brought about the distributions of nebulosit the spiral nebulæ, cannot be answered; but the marvel pictures exhibited by Dr. Roberts establish the reality of grouping, and furnish students of celestial mechanics with food for contemplation."

LATENT FOG.

call attention to an article in a recent number of *La ure*, entitled, "Causes of Error inherent to the Production Fog in Photographs;" it leads to the consideration of a ect of very great importance, which, nevertheless, has ived scant attention from writers upon the theory or the tice of photography. Referring to the subject of actinic via emitted by the human hand, which had formed the text a communication to the Paris Academy of Sciences, a *précis* t having been given by us at the time, the article refers to rther paper, presented to the same body by M. P. Yvon, hich he gives a complete explanation of the effects supposed e produced by these hypothetical emanations. The writer he article says: "It is known that the gelatino bromide es used in these experiments only owe their sensitiveness ight to the commencement of molecular modification indi- ed by a fog when, in the shade, a plate is placed in the eloper without its having been previously submitted to any t action whatever. This fog, which M. Yvon designates ent fog,' appears so much the more intense, and more idly, according as the developer is more energetic and its perature more raised; it follows that every time the im- ssion on the plate is not normal, and that it is left too long the developer, the darkening due to latent fog becomes more ense, and may, in certain cases, cause the image to dis- ear." After referring to the impressibility of the plate to er agents than light—heat, electricity, mechanical action, —and the developability of such impression, he deals with extension of the subject, and points out that while, as ted, a plate not exposed to light will fog in the developer, h action will be intensified if the plate be developed for ut twenty minutes under a red light. He then describes v M. Yvon, placing a plate in the usual spot for developing, ted by the usual red light, was able to show the silhouette n object placed on the top of a piece of yellow cardboard millimetre thick after a quarter of an hour's exposure. rest of the article deals mainly with the effects pro- ed when critical experiments were made with regard the effluvia theory. This we may pass by for the present dealing with the two important theses advanced—firstly, fogging of an unexposed plate developed in the dark; , secondly, the fog produced by the action of the dark-room t.

he question arises, "Does a plate necessarily fog in the eloper?" That it should fog by the action of the dark- n light is a *primâ-facie* certainty, as it has long since been ved that there is no such thing as a "safe light." We , therefore, only to deal with the first question. We will attempt to answer it, but we make the assertion that ty per cent. of such fog usually produced is entirely avoid- ; and for this the authors of formulæ are largely onsible. Confining our attention to pyro-ammonia develop- t, we may point out that, notwithstanding the elaborate most illogical formulæ they place at the disposal of pho- aphers—apparently to deter any one from making com- sons—the fact remains that a very large proportion of e formulæ are not worth the paper they are written on, so y of them giving such a large proportion of ammonia to pyrogallic used. There is scarcely a plate-maker who ses less than a minim of ammonia to a grain of pyro, while recommend four times more ammonia than pyro. Yet are many plates which will not stand the first-named amount, and none, indeed, that will submit to four times that proportion of ammonia, without fog being produced.

Now, we pointed out in these columns many years ago that the addition of ammonia beyond a certain proportion was more than useless, it was harmful. It produced a veil and greatly diminished density, and we hold the opinion that, when the fog point on a plate is even just touched, not a drop more ammonia is any advantage, and the printing quality is injured. It is undoubted that the plates on the market vary immensely in this respect, some being capable of standing five or six times more ammonia than others before the fog point is reached; but we are quite certain that no such difference will be found in the makers' instructions. We have alluded to one maker recommending four times as much ammonia as pyro, which in the case in question is far too much.

In this regard we would venture the opinion that, unless it has some very special qualities which render its use advisable, no plate should be used which, with a small proportion of ammonia, gives an appreciable amount of fog. If any one will turn to Messrs. Hurter & Driffield's first paper, which may be termed classical, "On a Method of Determining the Sensitiveness of Plates," they will see the fog factor reduced to a measurable quantity. As far as our recollection carries us, the amount of deposit produced by fog on the plates then available varied from twenty to forty per cent. of the total deposit under varying conditions. An average plate of the present day would be worthless if the shadows were fogged or stained to a depth equal to one-fifth of that of the highest lights. If we obtained such a deposit, we should reduce the ammonia step by step till a point was reached that caused undue protraction of the time of development; if fog still appeared, such as could be perceived without instrumental means, in, say, the part covered by the rebate of the slide, we should dissolve the silver from those plates and place the result among the residues.

Very much more could be said on this subject, but our purpose will have been answered if we cause some attention to be given to the fact that many plate-makers recommend far too much ammonia, if fog is to be avoided, and that no plate is worked to advantage if ammonia be employed in such proportion to pyro as to bring about the production of stain, veil, or fog.

A Record Short Exposure.—Hitherto probably Professor Boys' photographs of flying bullets have recorded the shortest periods of exposure ever reached in photography, but now this record is broken. At the meeting of the Paris Academy of Sciences, held on the 14th ult., M. L. Decombe described experiments he had made to measure directly the period of the Hertzian oscillations. A mirror revolving at an extremely high velocity was set up, and the explosive spark reflected from it through a collimating lens of very short focus, the spark being emitted in the focal plane of the lens. The oscillation period photographed occupied less than the five-millionth of a second.

Photo-astronomical Telescope of Large Angular Aperture.—As bearing upon a recent leading article in these columns referring to Mr. Wadsworth's views of the uselessness of angular aperture in photo-stellar work, it is worth drawing our readers' attention to the remarks of M. Janssen at a recent meeting of the Paris Academy of Sciences, upon photographs of nebulæ and other faintly luminous objects, taken with the telescope of one metre aperture and three metres focal length, referred to by us last week, an

angular aperture, we should imagine, never before approached in so large a telescope. M. Janssen's dictum was so far from endorsing the views we referred to that he spoke of it as most valuable for the purpose, and it is self-evident that the construction of such an instrument would never have been undertaken if the relation of aperture to focal length were a negligeable factor.

Glass Impermeable to Heat.—A German periodical has given the composition of a glass which, it is stated, when only 6·7 mm. thick permits the passage of only from ten to twelve per cent. of the heat impinging upon it from an ordinary coal-gas flame. Should it possess the properties claimed for it, such glass should be invaluable for lantern-projection purposes, either as a special screen or as a component of the condenser. But it should be borne in mind in this regard that heat received, but not transmitted, means a great access of heat to the obstructor, the temperature of which must quickly rise. The formula, upon analysis, is as follows:—

Silica	74·6 per cent.
Alumina	8·4 „
Soda	15·4 „
Lime	0·9 „
Oxide of iron	traces.

While upon the subject of special kinds of glass, we may refer to the liability to error which may occur either in analysis or in delicate manufacturing operations through the use of flasks or other receptacles made of imperfectly manufactured glass. We have before us as we write a half-litre flask, which would be capable of spoiling any sample of emulsion, for instance, exposed to heat in it. This particular vessel, when heated in a water bath, parted with a measurable portion of its surface; and when, afterwards, it was gently heated over a naked flame, the whole of the heated surface—to a fractional extent of thickness, of course—exfoliated, and could be detached in minute flakes upon slightly tapping it. The consequence to an emulsion of being impregnated with a multitude of fine particles, not to speak of possible dissolution of some portion of the glass, does not need to be enlarged upon.

A Record January.—According to *Symons' Monthly Meteorological Magazine*, the meteorological conditions of last month are in every way what it is the fashion to term "record" phenomena. The barometer was almost unprecedentedly high; the mean temperature of the dry-bulb thermometer was higher (by 0·05°) than that of the year 1884, and consequently higher than any previous record; the minimum on the grass and in air 0·6° and 0·5° respectively higher than those of 1875 and 1884, which hitherto have been the highest. The rain, too, was only one third of the average. The conditions should have been most favourable for the prospects of professional photographers.

Remarkable Effect of Ultra-violet Radiations.—At a recent meeting of the Cambridge Philosophical Society, Mr. H. F. Baker described some interesting experiments upon a result of the ultra-violet rays upon air, moist but free from dust. The rays from an electric light were, by means of a quartz lens within a vessel holding such air, brought to a focus. In a few minutes there was produced in the path of the light a bluish fog, which continued visible for hours after the removal of the source of light. Even in air not saturated with moisture the same effect occurred, but requiring the lapse of more time for it to be brought about. It appears that, unlike somewhat similar effects obtained by Tyndall and by Aitken by the action of light upon various vapours, Mr. Baker's fog was due only to the ultra-violet rays.

JOTTINGS.

The event of the year, so far as photography is concerned, will undoubtedly be the Crystal Palace Exhibition, which opens next month, and the fact that the Prince of Wales is to perform the inaugural ceremony must make the dismal prophets of failure wish they had not spoken. A thoroughly successful and representative Exhibition may be anticipated, and, if it be followed up by the publication of a full and independent report upon the exhibits, the information so obtained should be of lasting benefit to photography.

By the way, it has been reserved for a writer in a Manchester paper to say that the chief things shown will be "stacks of dry plates, mammoth cameras, &c. . . . the essential characteristics of a trade show." He adds that "the main feature will not be photography, but the machinery by which photographs are made," and he virtually states that the public will not be shown what photography has done. I should have thought that before penning such nonsense he would, at least, have taken the trouble to read the prospectus of the Exhibition. The writer in question is, I am told by a Manchester correspondent, the editor of a certain London photographic newspaper; and, if that be so, I am puzzled to know how he can reconcile the remark in the Manchester paper that he is sorry the Prince is going to open this "fearfully shoppy affair," with some observations of a totally different character that he has printed in his own paper.

I was hoping I had finished with the Photographic Salon until next autumn, but apparently Mr. Maskell's young men will not have it so. There is a saying that you should go abroad for news of home. I have occasionally tried the experiment in connexion with photography with interesting and amusing results. Until recently the London correspondent of the *Bulletin du Photo-Club de Paris* was Mr. George Davison, who gave his French readers a monthly *résumé* of English photographic doings, which was always written impartially and in good taste. Mr. Davison, having dropped the journalistic pen, has been succeeded as London correspondent of the *Bulletin* by Mr. A. Horsley Hinton, who, in the February number of that publication, does me the overpowering honour of singling me out for mention, although, I fear, at the expense of his own reputation for prudence and discretion. I am the last person in the world to object to criticism if I invoke it, but I can perceive no valid reason why Mr. Hinton should have gone all the way to Paris to print his remarks when he has command of a vehicle of publicity in London.

Under the lame and feeble excuse that the members of the Paris Photo-Club might like to know who are the friends and the enemies of the London Photographic Salon, Mr. Hinton, omitting all mention of that institution's innumerable friends, implies that The British Journal of Photography is among its enemies, on the ground that I recently expressed an intention of one day writing the epitaph of the Salon. He adds that it would be interesting to know why The British Journal of Photography has always opposed the Salon. Anybody with the capacity of understanding the last four or five volumes of the Journal would find no difficulty in supplying the answer to this question.

Mr. Hinton is welcome to make all the capital he can out of his theory that I never heard of "l'éminent écrivain français, M. de Sizeranne," before Mr. Maskell trotted him out to prop up the tottering and superfluous institution, the Photographic Salon. I dare say there are some persons in Paris who have not heard even of Mr. Hinton, though he, of course, is the last person in the world to be blamed for that. Has it not been said that the world knows nothing of its greatest men? A little acquaintance with the photographic history of the last forty-six years would put Mr. Hinton in possession of the useful fact, that greater critics than M. de la Sizeranne have assigned photography a place among the fine arts, only to be laughed at by their contemporaries and ignored by their successors. It will be a long time yet before Mr. Horsley Hinton finds himself asked to a Royal Academy banquet.

Mr. Hinton makes some remarks on newspaper anonymity and proprietorship which he in particular should have omitted, notwithstanding that he was addressing French readers. One of the usefullest sayings to bear in mind is that one which relates to residence in glass houses. *Apropos* of my reference to M. de

Sizeranne, he allows himself to say, "English people of low culture know little of what passes in art and literature outside their own country, and have still less anxiety to know." I have translated freely. There are two kinds of impertinences: (1) Those which invite resentment; (2) Those which provoke amused contempt. I will not insult your readers by saying under which heading I class the one I have quoted. As for the Salon's "friends" and "enemies" in London: the idea that in all Paris there are more than two persons who care a rap about such a stupid matter is too absurd for consideration.

Reverting to the Crystal Palace Exhibition, it is to be hoped that in the proper section we shall see selections from the works of the three persons who in all probability have had the greatest influence for good on pictorial photography. I allude to the late D. O. Hill, the late Mrs. Julia Margaret Cameron, and the still living Dr. P. H. Emerson. Whatever is best in modern photographic portraiture, landscape and figure work, can be distinctly traced back to the productions and teachings of those three photographers. Their pictures were made when printing processes were fewer and less specially adaptable for particular purposes than they now are, and when different styles and methods of mounting and framing prevailed; but, if in these minor respects their photographs could be dated forward, and the results hung side by side with the modern "masterpieces," the boasted advances of the past five or six years would, I fancy, not look so great as they are supposed to be.

I noted, in the report of the lecture given before the Wakefield Society last month on the subject of acetylene, a condemnation of magnesium, on the ground that it gave "soot-and-whitewash effects," and that its "lightning-like intensity produced the most fearful grimaces on sitters." Acetylene, it was said, had none of these drawbacks. Some of the most pleasingly lighted and natural-looking portraits and groups in my possession—I have a fairly large collection—were made by magnesium used in continuous flashes, the light being well diffused. Soot and whitewash and grimaces will not characterise magnesium-lighted photographs if the illuminant be used in this manner. But a bad operator can produce soot, whitewash, grimaces, and all, even in daylight. COSMOS.

PHOTOGRAPHIC HALATION: POSTERIOR AND ANTERIOR.

PART II.—ANTERIOR AND POSTERIOR HALATION.

The remaining portion of this paper will consist of a description and examination, chiefly of the phenomenon of anterior halation contrasted with posterior halation.

An interesting paper appeared in *Photography* in November 1896, entitled the "Spread of the Image," by that indefatigable worker in things pertaining to photography, Captain Abney. No doubt, he is aware that this is an old subject and is brought forward again and again for new discussion in some form or other, either cause or cure, mostly the latter. I do not wish to press myself unduly forward respecting the various phases of this defect; but it is now over thirty-six years since I first drew the attention of the London Society as before stated to these effects and their cure. Of course, it is impossible to read all the photographic literature issued from the press, especially of recent years; but, as Captain Abney's article is the latest in the field, I wish to say a few words once more on the subject.

It will be seen I have not lost interest in the matter. I have examined all put forward as far as I had an opportunity respecting it either as cause or cure, but I do not think there has been much brought to light since then that is new to me, for the facts and theories are fundamentally the same now as they were six-and-thirty years ago. Any one reading the Captain's last communication will notice the minute details he goes into of the mechanical construction of the photographic film. He has dealt mainly with the molecules of the film and their power of reflecting light at varying angles to the incident rays following on them. Allusion to all this was made in the original communication following the reading of the paper at the Society's meeting in a broad and comprehensive manner when answering a question put forward by one of its members after the reading of the paper, by comparing the photographic film to a sheet of ground glass. This is precisely what the Captain has set forth in his most recent contribution to the subject. (In the latter part of the article he seems to divide the phenomenon into two parts.) Since I wrote my first papers photographic matters have much altered. I have been alive to this for some time, and it is these changes which would seem to make my first communications defective in some particulars. These have not been lost sight of. They are, the greater thickness of the film now necessary in order to get a sufficiently strong image, for printing purposes, out of the body of the film itself, instead as of old by deposition of silver on the invisible image from the developer. Now a much thicker deposit of silver bromide and iodide is necessary as compared with the wet film, besides the comparatively lighter colour, I might say whiter colour, of the deposit, hence the greater trouble all things considered. Now, these differences would necessarily contribute to certain defects as far as internal reflection is concerned either in the glass or film. This was the first impression, but certain facts have turned up more recently which have considerably modified these conclusions. A year or two ago I made a few experiments with a view of learning more of the subject I have been in the habit of calling *anterior* halation. They were instituted with the idea of testing the accuracy of a notion I held respecting it. The result was, I considered it was due to atmospheric illumination, both outside and inside the camera, and had no connexion whatever with the film or glass plate. The principal experiment, to be described further on, brought out the fact that the illuminated air outside the camera was the chief delinquent and the air in the camera was responsible for minor defects of the same class. It cannot be questioned that the air or atmosphere becomes illuminated during the passage of light through it, as how should we get what is commonly called diffused daylight at all? This is evidently due to the reflecting power of solid bodies and vapour and motes in the air, which illuminate the sides of bodies not exposed to the direct rays of the sun or sources of artificial light. This atmosphere, of course, so constituted, not only surrounds objects outside the camera, but is also present inside it.

We must in the next place ascertain at least one of the effects due to the illumination of these motes, &c., in the air, and what is the difference in effect due to different directions the light may be travelling in respect to the observer or the camera. It is a well-known fact these motes and vapour are more plainly seen when the light is travelling towards the observer. When the camera is made to take the place of the eye of the observer, it is evident what must take place inside when an image of a window is thrown upon a sensitive plate. Can we expect this to neglect certain defects in the illumination of an interior in the same way as an observer might, and, possibly does, sometimes? We have simply to follow the ray of light traversing this atmosphere so constituted from the window of an interior, and then from its entrance through the window into the camera through the lenses, and during its passage through the latter to the plate, and the effect of impact on the sensitive film. It is evident, then, the light in striking the sensitive film is traversing in the direction most calculated to illuminate the air. Consequently it will also be evident the image falling on a sensitive plate, and especially one excessively sensitive to extremely feeble rays of light, the atmosphere surrounding a brilliant image would be illuminated in a degree in proportion to its luminosity and so add to the effect due to the mote exposure outside the camera. It must not be forgotten that the bright light from a sky is considerably concentrated by the lens, say many times, consequently we must not neglect this circumstance as one of the factors of some consequence, to be attended to during the discussion, contributing to this defect under consideration. It would therefore be very difficult to ascertain how much of the defect may be due to the one or the other. This may be approximated by the following experiment: Place in the camera a black screen that will but just cover the image of a window and entirely prevent any light from striking the film direct. It should be placed as close as possible to the sensitive film, so that there shall be little or no air intervening between the plate and screen. The bright image falling on the black screen, the plate would then be exposed entirely to the illuminated air. This would completely eliminate any question of reflection or dispersion of light by the particles of the sensitive film from any brilliant image falling on the plate, and the question of the spread of the image, hinted at by Captain Abney, would be settled one way or other. By this means we should get to know to what extent the damage done to the picture was effected by the mote exposure, or spread of the light of the trne image in the film itself in conjunction with posterior halation. It was not until after I had completed this arrangement that it struck me I was employing the same principle used in solar photography for getting photographs of the corona of the sun by shading the sun itself by means of a dark disc, in imitation of the moon, during an eclipse of the sun.

That these two defects, the anterior and posterior halos, are totally distinct from each other, the results of these experiments as shown on the table before me are sufficiently clear to exclude the possibility of an atom of cavilling. It will be seem, then, that in the case of anterior halation the best backing of the glass plate in the world will be absolutely useless, as the halo becomes a true part of the scene outside the camera, and, possibly some little inside, and is consequently exaggerated the longer the exposure is continued, in order to get out the details of a badly illuminated interior. It is obvious, then, the chief source of the light illuminating an interior should be coming as much as possible towards the back and sides of the camera. This is a very old experience, even in the open air, sometimes this is is very palpable to the eye. In

the old days of wet-collodion positives you could not get a clear view in one direction of the camera, but, by turning it round in the opposite direction, the shadow would come out as clear as possible.

But this will not exhaust all the defects of this sort. It is astonishing to find, when you look into the camera even when the lens is properly stopped down, what an amount of light gets in, simply from the reflection of light from the illuminating image falling on the ground glass or sensitive plate. The interior of the camera seems pretty well lit up, you can if you continue examining it see almost everything in it; I am persuaded from this fact that in most of the pictures which seem to be over-exposed is due simply to a general exposure to light within the camera as well as from mist in the air outside. The former I designate *camera exposure;* ergo, look to the sides of your camera being well blacked with a good dull black of some kind, and also the insides of some kinds of lenses, as defects from this source will give effects similar to mist outside the camera. These defects are probably more marked now from the fact of the photographic tablet being more sensitive to extremely feeble rays of light than formerly with the wet process. This applies not only to camera exposure, but also to anterior halation, and the reason why these defects more frequently occur arises from the great tendency to over-exposure from the extensive use of rapid plates of the present day.

Of course, we must be on our guard, and not let ourselves fall into a pit or trap by supposing all the damage done by anterior halation is due to this cause. As before remarked, excess of light travelling towards the camera through an opening or window is more dangerous than the reverse direction, as being the best for the illumination of the motes in the air around such a place, and so produce a similar effect.

My first experiments and conclusions were done and conceived on the basis of preventing any error arising from the illuminated motes in the air outside the camera by placing it a very short distance from the window, say, about three yards, though, even at this short distance, with a long exposure, there may have been some damage done from this cause, as the contrast was very great between the sky and the very dark interior. As before stated, any defect from this cause with very violent contrasts we are absolutely powerless to prevent, as it is exterior to the camera and plate.

From these facts we would seem to require three short names for these three mischief-makers, so as to convey clearly to others which we mean, very briefly, which of the three we are alluding to when discussing these matters. One of them we may safely say is "camera diffusion," the other "image diffusion" (these two relate to the inside of the camera); the third and last by "mote diffusion," this last to be considered to refer to the *motes outside* the camera, because these hitherto have been ignored inside the camera; and, when speaking of them as exposures, we may designate them "camera exposure," "image exposure," and "mote exposure." These refer exclusively to anterior halation.

To sum up the matter, then, for posterior halation we have a perfect cure by attending to the proper condition at the posterior surface of the glass plate or of the film itself. Respecting the latter, this was not left unnoticed in my original papers when answering the question concerning the inconstancy of the appearance of the fault by the fact of using the collodion from the same bottle for a series of plates. This would thicken the films of the later ones, and would as a consequence stop more light from passing through it to the posterior surface of the glass; and the importance of this is beginning to be seen at last by the various plate-manufacturers after a lapse of thirty-six years since this matter was first discussed by myself.

Concerning anterior halation, it was our friend and fellow-member, Mr. Iliff, who called my attention seriously to this matter in a picture of an interior from which he had rubbed this halo from the surface and enabled the window to be printed with the rest of the interior of the place. From this time I have directed my attention to get at a solution of the matter, together with a cure of the fault, about which I have given certain conclusions, and about which I purpose making a few more observations further on. Whether right or wrong the future will prove, but I don't think it will be found much wide of the mark. There is another very important consideration which has escaped my notice until now whilst discussing this fault, and that is a question of relation of times between the full exposure for the picture or true image and the time required by the illuminated atmosphere to produce a damaging effect around a brilliant image playing on the sensitive film. I have slightly alluded to this before, but not exactly in the same form—that is to say, the intended picture must be taken in less time than it takes for the production of this damaging effect; *ergo*, the contrasts must not be too great if we are to escape this fault. It is just possible with a given plate freely giving the posterior halo for these two faults to occur at the same time and nearly at the same rate. With a very thinly coated plate the posterior would be in advance of the anterior in proportion to its thickness or thinness; for obvious reasons this must be so.

Much is being said and done at the present time to avoid this posterior trouble. Why so now is not easy to divine, unless extra-sensitiveness has brought on a greater tendency to this fault by rendering the film more transparent to the active light of the image falling on the anterior surface of the film. Plate-makers are now vying with each other which can do it best, proving most conclusively they have become alive at last to the advantage of getting rid of damage done to the picture by transmitted and reflected light or posterior halation. A backing of some sort is obliged to be resorted to either under the sensitive film itself, triple coating, or on the posterior surface of the glass plate.

The optical nature of the gelatine film—that is, its blue colour by transmitted light—together with its great sensitiveness to very feeble rays of light, must make it very liable to both anterior and posterior halation there can be little or no doubt, and to settle this point I have put the gelatine film to the same kind of test as a collodion film, specimens of which are to be seen on the table.

How to deal with anterior halation is a very puzzling problem, therefore we must be on our guard before being positive what to recommend. Pros and cons meet you at every turn; for, if you damp the ardour of the one fault, you raise the spirit of the other; consequently, if any advantage is to be gained by slow or rapid plates, or plates with different degrees of power for development suitable to our purpose, it can only be gained by seeking and obtaining, if there is such a thing, some slight difference in advance of one over the other that will suit our purpose. The experiment seems to show that a film having the ability of giving great density should be avoided in such cases.

From these considerations it would appear there is but little hope of our becoming complete masters of the situation.

There is one important quality the dry-collodion film possesses over the gelatine film that must not by any means be overlooked, and which will elucidate very clearly why these collodion films have a greater immunity from posterior halation than the gelatine film can ever have without backing of the film or glass plate. This is due to the fact of the two films possessing different colours, both by reflected and transmitted light. These collodion films are decidedly yellow by reflected light, whilst the gelatine film is nearly white; the collodion film, by transmitted light, is strongly ruby, whilst the gelatine film is decidedly blue, and it is this blue condition of the gelatine emulsion which is necessary for its high sensitiveness that was hinted at at the beginning of this paper when alluding to the greater trouble from posterior halation of recent years. As before stated in connexion with posterior halation and my first notice of it, that a word to the wise is enough, and that there is no need for us to cudgel our brains to find out the reason why the collodion film should not be considered the superior of the two, at least in respect to posterior halation; but this will not help us over the stile in regard to anterior halation and its cure.

I had almost omitted to state that the present make of collodion dry plates admits of the method adopted for the reduction of the evil in the negative by rubbing the deposit down with spirit and a tuft of cotton-wool with quite as much safety as a gelatine film; in fact, any of the methods may be employed, such as is used with gelatine films, even in the wet state, with suitable appliances and caution, as the collodion is much tougher than in the old days of dry collodion. G. Marlow.

THE MODERN SCHOOL OF PHOTOGRAPHY.

At the meeting of the Edinburgh Photographic Society on Wednesday March 3, Mr. James Patrick (President of the Society) in the chair, Mr. A. Eddington (Vice-President) read a paper on "The Modern School of Photography," in the course of which he said: "What I might almost call a revolution in photographic methods has been silently, swiftly, and surely taking place within the past few years. A decade has not passed since the photographer was content to proceed on the lines laid down for him unconsciously by the pioneers of the art and accepted by the public. He sought and was asked to provide a portrait of a figure study, or the reproduction of a landscape on practically the same lines. Perfect definition was his leading motive, combined with abundance of detail, and it was immaterial whether or not this led to a hard and stilted style, an unreal, and so unnatural, presentment of the subject sought to be reproduced. In particular the high-backed chair, the little round table with a book to suggest literary tastes, though the sitter might not be able to read, a background made up of a fine stretch of palace gardens, these were the requirements needed to fill up the picture. What mattered it whether the sitter were a working man or a prince, there was a delightful democracy in this type of artful art which appealed the stronger the lower the social status of the victim. In landscape work the photographer—I am not speaking of the professional working for trade purposes—spent his holidays taking tourist resorts, and aspiring to the topographical accuracy understood by the world at large. In the rendering of his landscape he worked on pre-Raphaelite lines. How often do we hear even yet of depth of focus and accuracy of definition as the be-all and end-all of the photographic art. The depth of focus resulted in foreground, middle distance, extreme distance, and even sky being forced into the same sharpness of outline. So it came about that the picture was not what the eye beheld, but what the lens saw. It only needs a little consideration to show that this method of looking at nature is false and vicious, except for scientific purposes. Then we should like to pierce the unseen, and recent investigations show that we can do that to some extent.

"The New School of Workers.

"On what lines shall we proceed to attain the greatest possibilities of our art? This is the question that the pupil of the modern school

of photography has put to himself? He looked at what had been achieved in the past, and, grateful though he may be for the progress made, he saw that a period had been put to advancement on the old lines. Then his eyes were opened to the fact of the revolution which I have already indicated, and he became a revolutionist. Now it is no longer the photograph full of detail, sharp in outline, technically perfect, that pleases. What is aimed at is breadth of effect, the subordination of detail to the point where the picture represents the landscape as the artistic eye would see it, the true rendering of the tone values, the preservation of atmosphere, and the avoidance of everything that is hard, unsympathetic, or destructive of the unity of the subject. The composition of a picture is one of the basic virtues without which no picture can be said to exist, and this holds trebly true in photography, where the seductive influence of colour does not come in to fill the eye with its sensuous beauty, and blind it to all else. But the value of good composition is admitted on all hands, and to debate it would be merely a waste of time. Breadth of effect, on the other hand, is little understood among the majority of photographers, and less among the general body of the public.

"The Value of Improvements in Mechanism.

"Taking, therefore, the latest achievements of science to our aid, we should use them to carry out our ideas of art, and I affirm that every improvement in lens, camera, and plate that is worthy of the name will be directly useful in the practice of artistic photography as I have defined it. The question arises, To what extent ought we to carry breadth of effect and suggestion in the photograph? The answer is not easily given, as much depends on the nature of the subject. The portrait of a child or a young girl will not admit of the same treatment as a portrait of old age or a landscape. Sometimes our leading motive is delicacy and softness of outline; at other times we aim at vigour and strength of characterisation. But breadth of effect is not incompatible with these, neither is it the accompaniment of size. The smallest Meissonnier is broader in treatment than many a canvas measured by the yard. It is only the trained eye that can judge the happy mean between a distressingly sharp definition and a disagreeable fuzziness. But it may be laid down as a general principle—here I am thinking especially of landscape and *genre* work—that an attempt should be made to express by the print the leading impressions made on the mind of the observer. Rippling waves must ripple, moving figures must appear to be moving. A standing figure will naturally be more defined to the eye than one in motion, and, should the photographer by a very rapid exposure attempt to make the moving figure perfectly stationary, he will commit an egregious blunder.

"Various Printing Processes.

"We now come to consider the best means for carrying the ideas I have endeavoured to express into practice. The isochromatic plate freshly made is the best to employ, and I leave it to the worker to determine the extent to which he will place his plate out of focus. If he is exposing for direct pictures, he will work for the ultimate result in his exposure, but, if he intends to use his negative for lantern-slide purposes and to enlarge for a picture, he must then make his negative what would be called sharp. By that I mean that the principal plane of interest should be sharp, which does not necessarily mean the foreground. For lantern-slide purposes it is necessary that the slide be of such definition that, when enlarged by the lantern, the optical diffusion of the image will not be such as to make the screen picture disagreeably fuzzy. Presuming that the negative has been a distinct success, what printing method should be employed to ensure the most artistic result? We must discard all forms of silver printing as unsuitable, and we are thus left with three—platinotype, carbon, and gum bichromate. Ordinary platinotype is pretty much out of court because of its cold colour, while sepia platinotype, which produces, perhaps, the finest printing tone of any, is so entirely beyond control as to be a purely mechanical process. With carbon we have, on the other hand, great latitude of development and great variety of the colour; indeed, if people would only take the trouble to make their own film, the range of colour would be much larger. But there is a stage beyond which you cannot proceed. The leathery consistence of the gelatine emulsion will not stand rough handling. Besides, there is a great drawback to the process, in that with double transfer you cannot use papers of rough texture. Now, rough-textured papers are of immense value in artistic work, and any process which permits of their use at once asserts a claim to favourable consideration. It is true that with single transfer we can use rough paper, but in the shadows we have got an absolutely matt surface, and glaze is an offence, more particularly where it is partial. Up to the present the carbon process, having fewest limitations, has been the most generally useful medium that we have been able to obtain, and so far as I can see it will continue to hold this position for some time to come.

"Gum-bichromate Work.

"I should like to direct your attention, however, to one process that, though we are told it is many years old, has recently come to occupy a prominent position. This is what is known as the gum-bichromate or photo-aquatint process. Years ago it appeared in isolated quarters, was tentatively experimented with, and disappeared. It was a little previous, a plant springing up before its season, to wither and die. The resurrection has come, and the photographic world, prepared for it by a gradual evolution of ideas, has given it hearty welcome. The foot-hold obtained gives every promise of permanence, and, as the process will be the medium by which the broad and impressionist school of photographers will in the future give expression to their ideas, it naturally follows that I should endeavour to lay before you its claims to consideration." Mr. Eddington then proceeded to give a description of the process, and concluded as follows:—

"The chemical theory of the process is that each molecule of bichromate has taken up a corresponding portion of gum and colour, and on exposure to light there is, as in the ordinary carbon process, insolubility in various degrees. But the insolubility of gelatine is one thing, and that of gum another. You may over-print your gum bichromate many times, but, if it is steeped in water long enough, it will all dissolve away. This constitutes the great gain of the process over carbon, for it gives the worker the power of varying his image to a degree never heretofore possible. Working from the highest light, which will soon appear, or the deepest dark, he can graduate the tones so as to make the picture express his ideas. Take, for instance, a negative that contains several competing lights of equal intensity. The image can be so developed that gradations of tone will take the place of equality of light, and what is subsidiary will be relegated to its proper position. Even outline can be modified. An objectionable tree, coming in at a certain point to distract attention and disturb the composition, can be softened so as to be merely suggested. It is no longer a false note, an obtrusive object, it blends with the rest of the landscape. The modern school of photography aims not at reproduction, which is a mere mechanical process, suitable only for copying paintings, sculpture, or architecture, where the mind of the artist has already expressed itself, and it is not permissible to modify, but at the expression of the ideas of the worker. Reproduction, except of some existing art, can bring no pleasure to the mind, it makes no call on the imagination. But the truly artistic photograph, that which suggests more than it portrays, pleases the artistic sense and stimulates the imagination. It has thus, though in a lesser degree, the quality which gives permanence of interest to architecture, to sculpture, and to painting, the impress of the mind of the man who produced it."

A CHAT ON ELECTRICITY AND OPTICS.

[Read before the Photographic Club.]

It may at first sight appear rather odd to bring before a purely photographic Society a subject, part of which—namely, electricity—as most of you will think, although interesting enough in itself, is in no way within the range of phenomena which every photographer looks upon as his special domain. Yet, even without looking at the matter from the point of view which I propose taking this evening, there are a good many occasions when the two great departments of physics—electricity and optics—touch common ground, or are supplementary to each other. I only remind you of the application of electric arc and incandescent light in the studio, the process and printing works, and for the lantern, including the kinetoscope. In scientific investigations, electrical and photographic methods are frequently resorted to for the recording of objects in rapid motion, such as flying bullets, when the exposure, respectively the action of the shutter, can only be effected by electrical release, &c. Yet no one will assert that a photographer cannot succeed in his profession unless he applies himself to the study of electrical engineering or even of electricity, whilst the electrical engineer can get on well enough without knowing the film side from the glass side of a photographic plate. Thus is to-day; but the future, and it may be the immediate future, will see a great change wrought, and, when I make the statement that the science of electricity will absorb that of optics, you may find consolation in the thought that, when this absorption has taken place, it will by no means signify that every photographer must turn an electrician, but, on the contrary, that every electrician must join the ranks of photographers.

Well, such a sweeping statement requires to be substantiated, although in making it I am only voicing certain indications of recent experimental research by prominent physicists. To start with, we must ask ourselves the exact meaning of *optics*. I should define it as the study of a certain set of phenomena of the universal ether, of the laws governing vibrations of the ether within a certain range, to wit, visible light. Photography forms one of the practical applications of this science, calling in the aid of certain chemical phenomena in order to produce permanent records of visual impressions.

As regards the definition of electrical science, we must not confine ourselves to electric light, telegraphy, &c., which, like photography, are only some of the practical applications of the science. Electricity in its wider sense comprises the study of a set of ether vibrations also, but within much wider limits. The question, Where is the limit between these two sets of vibration phenomena? leads us to the statement which, as we will presently see, is backed up by absolute experimental proof that no sharp line of demarcation can be drawn; that, in so far as all the different vibrations follow the same laws, these electrical vibrations

of the ether comprise the various phenomena of electrostatic waves, of heat, light, photo-chemical and fluorescent manifestations, and of high vacua radiations, being the same in kind, but differing only in magnitude. Now, as you are all aware, the universally adopted theory of light is the undulatory theory, and this permits of satisfactorily explaining the phenomena of reflection, dispersion, refraction, interference, polarisation, and diffraction. The velocity of light has been found to be 185,000 miles per second. The velocity with which an electric current is propagated has, by experiments, been fixed at 185,530 miles per second, which, as you see, is the same as that for light. Moreover, in 1845, Faraday discovered the first connexion between light and electricity by observing the effect of a powerful magnet of rotating, under certain conditions, the plane of polarisation of a beam of light. These facts led Professor Clerk Maxwell, in 1864, to pronounce his conviction that light and electricity were one and the same thing; that light, radiant heat, and other radiations were electro-magnetic disturbances of the luminiferous ether in the form of waves propagated through the electro-magnetic field. With marvellous mathematical skill Maxwell elaborated his theory, calculating the length of his theoretical electrical waves and their properties, but it was not until 1888 that his deductions were experimentally demonstrated and verified by Professor Hertz.

It would carry me too far to describe in detail Professor Hertz's method of producing and tracing electrical waves, but I may shortly mention that, by reflecting the electrical waves from a metallic surface back upon themselves, he produced stationary waves (just as Professor Lippmann has done in the case of the minute light waves, so that, by experimentally determining the position of the nodal points, he arrived at the wave-lengths.

As in the case of light vibrations, there are a great many different rays which possess various wave-lengths and consequently frequencies. With electric waves we can produce variations in the wave-lengths by selecting suitably dimensioned emitters, so much, in fact, that we have it in our power to generate electrical waves of any size between half an inch and twenty-four yards. Emitters or sources of electric waves are represented by electric discharges, sparks, in short; and amongst these the most powerful emitter is the bright, snappy discharge of a Leyden jar, which sets up a disturbance in the ether, and sends out spherical waves during its oscillatory duration.

Now, wherein consists the similarity between these long electric waves and the exceedingly short wavelets of visible light? Hertz himself, and after him Professors Lodge, Righi, Chunder Bose, and others, have shown that electric waves may be *reflected* from parabolic mirrors, that is, their wave front may be changed to a different curvature; *reflected* with prisms of pitch, may be *polarised*, *diffracted*, &c., so that by every physical test they are proved to be of the same kind as light waves, although, being too long, they cannot be perceived by our eyes.

Some Figures relating to Various Frequencies of Ether and Air Vibrations.

Complete Vibrations per second.	Kind of Radiation.
288,224,000 000,000,000	Röntgen rays (Voller).
3,000,000,000,000,000	Photographic limit of ultra-violet light in vacuo.
1,053,009,000,000,000	Photographic limit of solar spectrum.
281,475,000,000,000	Photographic limit of infra-red light (Abney).
70,369,000,000,000	Heat rays, lowest part of solar spectrum.
8,590,000,000	Electric oscillation in small spheres (Righi).
32,768	Upper limit of sound.
4,096	Highest note of music.
32	Lowest note of music.

Having thus established the identity of electricity and light, it will be of some interest to photographers to touch upon the question of how far electric waves resemble light waves in their effect upon the photographic plate.

It is known to most of you that a latent image can be produced upon the plate besides by light by various other ether phenomena. A coin laid upon the sensitive film and then subjected to electrostatic strain by passing a few sparks from a Wimshurst machine upon it, impresses the plate. Again, a plate which rests on the poles of a powerful electro or permanent magnet, and on which various pieces of iron or nickel are laid, shows on development the outlines of these objects. Lastly, the now familiar X-ray photography, which in some respects is an electric phenomenon, furnishes an additional instance of electro-photographic action.

Of immense interest also is the question whether, in view of the electrical nature of visible light, it will ever be possible to produce light directly by electrical vibrations, that is to say, whether it is within the range of possibility to produce electrical vibration of sufficiently short wave-length, or, what amounts to the same, of sufficiently high frequency to become visible. At present such is not the case, although Nicola Tesla has greatly reduced the gulf between the quickest electrical and the slowest (red) visible waves (frequency of the latter being 395 billions per second, that of Tesla waves, 10 millions per second). The New York correspondent of the *Standard* says that Mr. Tesla announces that his vacuum tubes are now so perfect as to take photographs surpassing flash pictures. Two seconds' exposure was used at a distance of four feet from a tube with a radiating surface of 200 square inches, giving 1000 candlelight from current oscillations of 2,000,000 per second. Mr. Tesla says that his system will give an equivalent light, without heat, from tubes the size of ordinary incandescent bulbs. Once the problem of producing sufficiently rapid electrical oscillations commercially solved, we shall be able to produce light without heat and at such an economic figure that our present methods of producing light by combustion and by the still more indirect way of electric current will be entirely abandoned.

Although not in strictly logical sequence, I may be permitted in this informal chat to refer to a few more interesting phenomena illustrating the intimate relations between electricity and optics, and showing the vast field of research thus opened.

Light Influencing Electrical Phenomena.

Under this heading we have, first, to mention the behaviour of selenium, a metalloid of the sulphur group, the resistance of which to the passage of an electric current becomes greatly reduced whenever light impinges upon its surface, the maximum action taking place just beyond the red end of the spectrum, when the resistance falls in the ratio of three to two; the effect of exposure is instantaneous, whilst the return to the normal state of the selenium takes some time, the light seemingly modifying the molecular structure of the metalloid. Upon this photo-electric property of selenium is based the *Photophone*, the invention of Graham Bell, of telephone fame, which enables us to transmit speech and all sounds to considerable distance by means of light. You see that here we have a kind of telegraphy across space without wires; but for obvious reasons, notably the necessity of avoiding any obstruction to the path of the beam of light, this method has made no headway. This property of selenium, to be an electric eye, has also been made use of for the electric transmission of images to a distance without, however, so far getting beyond the stage of sending mosaic pictures, that is to say, the image must be analysed, similarly to the half-tone process, into separate dots or squares; and, as each square represents a special selenium cell, the number of squares to the square inch cannot be very large, and the mosaic character of the picture becomes very pronounced. Here, again, we have a close resemblance between light and electricity, since, whenever electric waves fall upon a body of similar molecular structure (like, for instance, a tube of iron filings), its resistance sensibly diminishes, we have a coherer such as every system of space telegraphy now employs. Even with waves in the air, sound waves, we notice a similar behaviour upon the electric resistance, and I need not stop to explain to you the principle of the well-known carbon microphone. Light, particularly ultra-violet light, exhibits an analogous effect upon the resistance of air, rarified or under ordinary pressure, towards the passage of electric high-pressure discharges.

A Geissler tube of such exhaustion that, with a given Rhumkorff coil, it will just fail to light up whilst in the dark, will do so as soon as ultra-violet light illuminates it; again, a negatively charged conductor, which is entirely insulated, will lose its charge from the moment ultra-violet, or even diffused daylight impinges upon it. There are several interesting variations of the same phenomenon, which we can only mention here. The most suitable metals for exhibiting this phenomenon are bright fresh surfaces, or, better still, amalgams of K, Na, Zn, Sn. Red glass when interposed, stops the action. On the other hand, if electric sparks are just able to occur between a brass knob and a clean, amalgamated zinc disc, illumination of the latter by ultra-violet light tends to stop sparking.

Elster and Geitel observed that the discharging power of glowing bodies in air was diminished by application of a magnetic field, just as though the temperature was lowered. Another peculiar interdependence of light and electricity is given by the behaviour of certain materials, such as cane sugar, tartrate of potass, and crystals of fluorspar, which, when exposed to the radiation from the sun or the electric light, become electrified; the same electrification takes place when the crystals are crushed or heated, in which case they also emit light.

Though of great theoretical interest to the photographer, I can only briefly summarise the various photo-electrical investigations. If two metal plates in a galvanic cell are unequally exposed to light, an electric current is produced; a suitable cell consists of oxidised copper plates, or copper plates coated with sulphur, chlorine, bromine, iodine, or fluorine. sensibilisation with certain dyes increases the E.M.F. of the current for certain wave-lengths of the spectrum. These photo-electric cells are the most accurate and sensitive actinometers.

Electro-optical Phenomena.—As before mentioned, Faraday in 184 discovered that, when a polarised ray traverses a substance in the direction of the lines of force of a powerful magnetic field, the plane of polarisation is deviated to the right or to the left according to the polarity of the field. Cornu has shown that a luminous ray suffers no influence from a magnetic field unless this field acts directly upon its source, and this modification of the velocity of propagation of light may be explained by assuming that it is influenced by the ether whirls, which according to Maxwell, constitute the magnetic field.

Another remarkable relationship between the two physical departments has been discovered by Dr. Kerr, who found that, when certain dielectrics (commonly called insulators) are subjected to an electrical strain, they develop doubly refringent properties similar to Iceland spar (diagram shown). Polariser and analyser should be placed with their principal axis at 45° to the vertical, and at 90° to each other.

When the glass cell is filled, *i.e.*, with carbon bisulphide, the analyser is rotated until the field, as observed through the slit between the copper plates, is perfectly obscured; a slight rotation of the influence machine produces light in the field, which, with the rise of the static potential, increases to pure white, then changes to straw colour, yellow, orange, brown, red, purple, violet, blue, and green, then ceases until the electric tension becomes too high and sparks leap across. The law, at which Dr. Kerr arrived by many measurements, was, that, for a given thickness of the dielectric, the difference in path between ordinary and extraordinary ray varies directly as the square of the electric strain. It was further observed that, when a pencil of plane polarised light is reflected from the polished surface of the pole of an electro-magnet, it is rotated in a direction contrary to that of the magnetising current.

Recently a remarkable electro-optical phenomenon has greatly exercised the physical world, and is known as the Zeeman effect. Its peculiarity consists in the broadening or splitting up or reversing of certain lines of the emission spectrum under the influence of a magnetic field. According to the relative direction of the magnetic lines of force, various effects may be obtained. Usually the spectra of cadmium and of iron are employed to show the effect, which is explained by the light being circularly and elliptically polarised in the magnetic field, as certain components are not influenced, *i.e.*, those along the magnetic lines, whilst other components undergo an acceleration and retardation respectively.

As above mentioned, these various phenomena all open a most interesting and fruitful field of physical research, which cannot fail to lead to still more important discoveries. Of course, so far, the interest in this work is mainly confined to scientific men and the physical laboratory, but we should keep in mind that these purely philosophical researches are always the forerunners of important discoveries, although it is true that some of the latter owed their conception to spontaneous inspiration.

Before Professor Röntgen published his startling discovery, work on the same lines had been steadily going on for years, though only a comparatively small circle took sufficient interest in it.

Telegraphy across space, or wireless telegraphy, which is the general topic of the day, practically dates from the time of Professor Hertz, and the way for its practical application has been steadily paved by a host of subsequent investigators, whose names and work remain comparatively unknown to the great mass of the people.

Similarly the various photo-electrical and electro-optical intimacies only require to be classified, and the man who will eventually marshal these facts in compliance with Nature's harmonious plan will be the hero of the hour, and his work will at once show the way for practical or commercial exploitation on lines hitherto undreamt of.

A. W. Isenthal.

SOUTH LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The South London Photographic Society is now holding its Ninth Annual Exhibition. It was opened on Saturday evening last, the 5th inst., when Sir Henry Trueman Wood, M.A., F.R.P.S., gave a short address to a large assembly of the members and their friends and of the general public, and will remain open until Saturday next.

We cannot conscientiously say we think the present Exhibition a great advance on that of last year, but still it is undoubtedly a good Exhibition. The 352 pictures which are entered in the members' classes are the work of sixty members, the number exhibiting having therefore sent in nearly six frames each on an average. This statistical fact shows that the Society possesses an uncommonly large proportion of active and industrious members; but, while we congratulate the Society upon the activity of its members, and while we can quite appreciate the anxiety of those who have the management of the Exhibition to make as big a show as possible, we have no hesitation in saying that the Exhibition would gain in interest and even in relative importance, by the adoption of some system of selection. There may be a necessity, for financial reasons, for not refusing anything in the open classes, but, in the interests of the exhibiting members themselves, we will go further, and say for their educational advantage, it would be advisable to weed out that comparatively small number of the exhibits which can only interest those who produce them and their immediate friends. We also make a mild protest against what seems to us a needless multiplication of classes. We can understand that such distinct subjects as portraits and figures, landscapes and architecture, may well be kept separate; we can also understand the philosophy of a beginners' class, and a class for members which have taken prizes here or elsewhere; but why "cyclist pictures" or "excursion pictures" should not be classed in the natural way as figure, landscape, or architecture, we cannot understand. We can only point out that one, if not more, of the best landscapes competes as a "cyclist picture" while some of the figure subjects in the "excursion pictures," would have done something to raise the tone of the very weak class of "portraits and figure studies." A young and struggling society might find some excuse for artificial inducements to its members to compete, but a well-established and strong Society like the South London can well afford to conduct its exhibitions on broader principles.

The Judges were Messrs. A. Horsley Hinton, J. A. Sinclair, F.R.P.S., and E. J. Wall, F.R.P.S. They were empowered to award a silver and a bronze medal in each class, except in the members' Champion Class, where a gold medal was the prize, and in the open Champion Class, in which the highest award was also a gold medal. They were also empowered to withhold awards or give extra awards.

In the members' classes, Class A (Portraiture and Figure Studies, including Animals) was, as we have intimated, by no means a strong class. A silver medal was awarded to Edwin Matthews for *Naomi*, a graceful head, printed in red carbon and trimmed quite square. The framing and mounting is, perhaps, needlessly elaborate; but as the whole is subdued, being in black-stained wood, the general effect is good. *A Trespasser*, by C. W. Walker, receives a bronze medal. It is a pleasing picture of a child in a garden, but capable of being improved by the judicious sunning down of parts, to use a comprehensible, but, perhaps, not strictly accurate, expression when applied to what appears to be a bromide enlargement. There is nothing else in the class that seems to call for special notice, except a series of portraits of considerable size, in broad mounts and silver gilt filagree frames, which reminded us of the methods of framing that were fashionable in the past; and we may here take the opportunity of saying a word in praise of the framing and mounting of the members' pictures, as a general rule. There is, perhaps, a little too slavish a devotion to framing close up to the picture, and sometimes a too lavish or otherwise indiscreet use of gilt slips; but, as a whole, the pictures are well framed.

The Class for Architecture is, as one might expect at the South London Society's Exhibition, a very strong class; but architectural subjects also make a considerable show in some of the other classes. The most striking feature of the show is undoubtedly the work of this description, and we could not help feeling that the Society is inclined to give undue attention to this particular branch of photography, important though it is. The silver medal was awarded to A. E. Allen for *Entrance to South Choir aisle, Winchester*, an admirably chosen view, in which the gradations in tone are perfectly rendered. Edgar R. Bull received the bronze medal for *North Choir-arch, Ely*, which could hardly be improved upon. In *A Quiet Corner, Ely Cathedral*, there is a very picturesque exterior view of the cathedral, in which the cathedral itself forms a prominent but not the only feature. It might be classed either as a landscape or an architectural subject. There are many such subjects to be done, and similarly good pictures to be obtained. Harold Grocock has good interiors of Ely, and G. J. S. Walford of Rochester. W. Howell's *South Aisle, Ely*, is quiet and reposeful H. Goodwin's interiors of St. Saviour's, Southwark, are good; but the *Lady Chapel* is an unpleasantly warm print. E. H. Lamb has some good work, especially *The Choir, Rochester*. W. H. Dawson, whose work we noticed at the recent Woolwich Exhibition, shows to advantage even against his present formidable competitors. Two of C. F. Dickinson's interiors possess a wiry sharpness, which is probably introduced in enlarging. *Choir Aisle, Ely*, is free from this defect, and J. Goddard's interior of Ely is good.

The class which includes landscape, seascape, and river scenery is the largest of the members' classes, but the Judges have only awarded two bronze medals in it. One of these falls to C. W. Walker for *Waning Light*, a simple but charming little upright picture, in which the principal object is a graceful clump of birch trees. We liked almost as well his *Sundown on the Thames*, which has a breadth of effect and atmosphere very pleasing. The second bronze medal was awarded to A. C. Speechley for *Unsted Bridge, Guildford*, an exceedingly unpretentious little picture, hardly larger than a quarter-plate. *The Woodland Path*, by the same, also attracted our attention. H. Goodwin's *Stormy Sunset* and *Misty October* we liked, though we could not discover the appropriateness of title of the former, a view under trees; and his *Backwater, Richmond*, struck us as a rather careless production. F. Mary's *Panorama from Pie a'Arzinol, Switzerland*, deserves notice for the skill shown in combining eight negatives; but it has little pictorial value, and is unsuitably framed. C. Andrews might do better with *Departing Friends* by choosing a more suitable printing process. W. F. Slater's *Homestead on the Heath* seems to be his best work in this class. E. Gauntlett's *Presage of a Coming Storm* is ambitious, but hardly successful—the sky and landscape are not in harmony. G. Brown has two good pictures in *Half-speed Ahead* and *A Forest Pool*. C. Andrews' *Hoar Frost* is good, but a better composition combined the same admirable technique might have obtained recognition by the Judges. G. J. T. Walford's four pictures are all excellent. We admire *The Sun's Uprising* very much. W. C. Boyce has a good thing in *Smoky and Stormy*, and we liked W. Howell's *An Irish Mountain Lake*. We could not admire, however, the bright purple he has chosen for *Carlingford Lough*. We should not omit to mention two frames of enlargements from Pocket Kodak shots by Miss S. Warnerke. It is a pity a selection was not made from them and separately framed.

In the Class for Excursion Pictures a bronze medal was given to E. H. Lamb for *Unsted Bridge, Guildford*—exactly the same subject as that to which a medal was awarded in the Landscape Class, but a larger picture and not so harmonious in tone. C. F. Dickinson and Howard Esler

have some good architecture, and the latter shows a good piece of work in *Dunes by the Sea*.

The Hand Camera class is not a very brilliant one, and even the medalled pictures did not strike us as being far beyond an ordinary average in merit. The silver medal was awarded to G. R. Nicholls for a *Rift in a Cloud*, and a bronze to W. C. Boyce for *Off to the Fishing Grounds*.

In the Class for Cyclists' pictures Howard Esler has a beautiful picture in *A Quiet Pool in Early Spring*, for which a silver medal is given, but the general quality of the work is not satisfactory.

The Beginners' Class is an admirable one. We are safe in saying that it contains as large a proportion of good work as any of the members' classes, except the Architectural and Champion Class. Some of the figure studies will certainly compare favourably with most in the Figure Study Class. *Daddy's Dinner*, by E. R. Collins, and *Puzzled*, by E, P. Bervan, are both capital studies. A bronze medal was awarded to J. A. Price for *Near Tunbridge Wells*, a very good picture, though we preferred its fellow, *Bostal Heath, Evening*.

The Class for Pictures Medalled during the Year, of course, is a good one, and probably all the pictures have been noticed at some time or other in these columns. The gold medal was awarded to Howard Esler for *By the Sylvan Pool*, and a silver medal to G. J. T. Walford for *Winter's Dual Robe*. H. Goodwin, E. H. Lamb, E. Matthews, C. F. Dickinson, W. J. Slater, E. R. Bull, A. Fellows, H. Grocock, B. Lym, W. Howell, and C. H. Oakden are also exhibitors in the Class.

The Champion Class in the open classes contains a greater proportion of interesting work than one usually finds in an open Champion Class. The gold medal was awarded to a head study by Pirie Macdonald, a silver medal to a portrait study by R. S. Webster, and Howard Esler also received a silver medal for the same picture for which he obtained the gold medal in the last-mentioned class. It was entered in both classes. Other prominent exhibitors in the class are Fred Marsh, A. J. Jeffreys, J. H. Gear, F. A. Bolton, G. Field, E. R. Bull, John Stuart, A. Fellows, G. J. T. Walford, G. Cowen. J. S. French, W. J. Byrne, W. Smedley Aston, and T. Fall.

The General Open Class is a large and good one. The silver medal was given to J. Bulbeck for *St. Jacques, Antwerp*, and the bronze to John E. Dumont for *Divided Duties*. Most of the exhibitors in the Champion Class also exhibit here, but in addition we noticed work by J. A Sinclair, W. Rawlings, W. Fenton-Jones, W. A. J. Hensler, H. Dowden, J. Carpenter, Fred Cross, W. E. Inston, H. W. Bennett, S. H. Fry, and W. J. Croall.

In the Trade Section the photographic exhibitors were Messrs. W. F. Slater, J. H. Avery, R. & J. Beck, J. J. Griffin, O. Scholzig, Raithby, Lawrence, & Co., and the Prosser Roberts Company. The last firm received the medal for the most interesting show.

The following awards were also made :—

MEMBERS' CLASS.

Lantern Slides (sets of six).—Bronze medals, W. E. Nicholls and E. R. Bull.

OPEN CLASSES.

Champion Lantern Slides (sets of six).—Bronze medals, E. Marriage and W. Archibald.

General Class.—Silver medal, Graystone Bird; bronze medal, C. H. Oakden.

Stereoscopic Slides.—Silver medal, W. W. Stainthorpe; bronze medal, F. Goddard.

BIRMINGHAM PHOTOGRAPHIC EXHIBITION.

As briefly recorded last week, the Thirteenth Annual Exhibition of the Birmingham Society was declared open by the Lady Mayoress on Monday, February 28, and the Society are to be heartily congratulated on the move they have made in securing the rooms of the Royal Society of Artists for the purpose of their show. The rooms are all well lighted from the top, and are really the only suite in the Midland city really adapted for such a purpose. Further, we congratulate the Society on the admirable collection of pictures gathered together, their adoption of a loan section, and the utilisation of a second room for the lantern displays. There are a few features that perhaps need reform. For instance, we think the classes still too numerous, there being no less than fourteen, five of which are open; and, again, the numbering of the pictures was far from satisfactory. The Judges appointed were Messrs. J. Craig Annan, J. H. Gear, F.R.P.S., and W. J. Morgan, R.B.A., and their awards seem to have given general satisfaction, save and except, perhaps, the premier award in Class I. (Landscape). Here Mr. J. C. Warburg is awarded first place for *Sheep and Shepherd, Provence*, a weak and faulty print of some sheep on a hillside, in which an attempt has been made to render sunlight passing through foliage. The intentions of Mr. Warburg may have been good; but, if so, the result is so far behind the intentions that we join in the chorus of surprise. Mr. Smedley Aston takes second place with *Still Waters*, a work in his well-known style, but we prefer his *Last Beams of Day*. *Birch and Bracken*, by Mr. F. A. Bolton, is a work with rather more definition and contrast than many by which it is surrounded. *In the Land of the Macphersons*, by Mr. A. Geikie, is a fine work so far as foreground is concerned, but marred by a weak sky. *Evening on the Broads*, by Mr. W. J. Greatbatch, is rather broader in treatment than works by this exhibitor usually are. *Sunset on the Avon*, by Mr. Llewellyn Morgan, just misses being a fine thing owing to the sky. *The Shepherds' Home* is by an exhibitor new to us, Mr. G. M. Syred, and is a bold treatment of a cottage upon the hillside.

Class II. (Seascapes).—Although an open class, both awards go to local workers, Mr. Smedley Aston being backed by a fellow-clubman, Mr. C. S. Baynton, the former securing first place with *The Day's Work Done*, a group of fishermen dragging a boat ashore, a fine work indeed. We prefer *Landing the Catch*, by Mr. Baynton, although a trifle heavy, to *The Old Harbour*, with which he scores. Some works by Mr. Inston, though small, are very excellent. *The Breaking Storm* shows excellent "go" in the vessel, but the colour, we think, scarcely suits the subject.

Class III. (*Genre* and Figure Subjects).—A class numerically and otherwise very strong, and offering many difficulties in judging owing to its varied character. The silver medal is awarded to Mr. W. T. Greatbatch for a very successful gum print entitled *At Work*, a narrow upright of a smith at his anvil, in which lighting and pose are alike excellent. A bronze medal is awarded Mr. C. S. Baynton for *The Last Load*, a work conspicuous for the grouping of the figures and horse and cart, but too low in tone for the lighting that prevailed when the exposure was made, and in which the background is too heavy. No. 154, by Mr. Byrne, a portrait in his well-known style, also takes a bronze. Mr. T. Lee Symss takes an award for *Field Labour*, where strong pictorial features have scored over very faulty technical work. Mr. Cruwys Richards gets a mention for a good head, and so does Mr. John Stuart. *The Old Book*, by Mr. George B. Cowen, is strong pictorially, but marred by the colour, and perhaps a more fitting title could be found. A set of a *Roundhead Fisherman* is good, in spite of incongruities. No. 150, by Mr. W. R. Bland, is a gracefully posed girl seated at a Tudor window, perhaps a little sharp according to present fashion. *A Scientist*, by Mr. E. Scamell, is clever, and so, too, are Nos. 224 and 225, by Mr. Grant Murray, but to what extent the work is due to photography is difficult to determine.

Class IV. (Architecture).—A small class but every work excellent. Mr. C. S. Baynton takes first with a bit of Norwich Cathedral, a bold subject well chosen, and of simple material. Edgar Bull scores with *North Aisle, Ely*, a good rendering of this somewhat hackneyed subject. Mr. H. W. Bennett gets a "mention" for the same subject, practically from the same point of view. *A Bit of Old Warwick*, by Mr. G. M. Syred, is very fine, deriving much from the wet pavement; a frame of four works by Mr. G. Bankart shows clean technical work, erring rather on the side of weakness.

Members' Classes.—Class VI. (Home Portraiture).—The silver medal is withheld and the bronze goes to Mr. Cruwys Richards for *Audrey*, a girl's head somewhat quaintly mounted, and thus gaining a somewhat distinctive appearance. Mr. W. S. Aston gets a mention for a portrait of a subject of which we somewhat tire. *Portrait of a Lady*, by Mr. A. G. Mountfort, is unpretentious work of good quality, and the same may be said of Mr. Aston's (No. 437).

Architecture is divided into two Classes, Exterior and Interior—unnecessarily, we think—and for Birmingham especially the classes are weak in numbers. In Exteriors Mr. C. J. Fowler takes first place for a very bold subject, *St. Mary's, Coventry*, a rich carbon print of a colour especially suited to the subject. Mr. Smedley Aston takes second place for one of his *Whitby Slums*, a subject that in almost any other hands would be commonplace. *St. William's College, York*, by Mr. C. F. Gare, is a good subject, well chosen but a trifle weak. *The Ruined Portal*, by Mr. E. Underwood, is also taken from a good point of view.

Class VIII. (Interiors).—First place is taken by a good rendering of an *Elizabethan Fireplace*, by Mr. E. Underwood, and Mr. S. Aston comes second with the *North Choir, Ely*, which reminds one very much of Mr. Harold Baker's last success at the Royal. There is other good work in the class, but the exhibits are not numerous.

Class IX. (Land and Seascapes).—The first place very justly falls to Mr. Smedley Aston — whose numerous successes secure him the Champion cup—for a strong pictorial work, to which the sky contributes a large share of the success. The same remarks apply equally to the same worker's No. 488. The *Approach of the Storm*, by Mr. J. Page Croft—a somewhat wild-looking moorland, with a sky perhaps a trifle heavy—also takes a silver medal; and *A Harvest Scene*, by Mr. G. Wilkes, and *A Brooklet*, by Mr. A. R. Longmore, get mentions.

Class X. (Enlargements).—We think the Hanging Committee might have reduced this class with advantage, as it includes perhaps the weakest work shown in the room. Here, again, Mr. Aston scores, with a quiet Dutch landscape, farm ricks, and outbuildings, seen across a flat expanse on which sheep quietly graze. A path leading into the picture is perhaps a trifle obtrusive, but altogether the work is of high merit, and far more successful than the same worker's No. 526, which shows the abuse of the boulting-cloth dodge. If the monotonous dot of the Meisenbach screen is objectionable, much more so is the larger dot of the coarsest boulting silk. A winter scene of the slenderest materials—just a small bush, a tuft or two of grass, with hoar frost and mist—forms a harmonious whole, which secures for Mr. J. Page Croft second award; and Mr. T. Taylor gets a mention for *A River Bend*. *A Lane Scene*, by

Mr. W. Jones, printed by another method, might be better placed, as the subject is decidedly good. The enlargements by Mr. A. McLucas are quite the "usual thing" for the professional enlarger to turn out.

Class XI. (Flowers).—A tuberose, somewhat inappropriately printed in red chalk, but of very good quality, takes first place, followed closely by *A Grassy Bank*, by Mr. J. P. Croft; *A Bowl of Roses*, by Mr. C. J. Fowler, is good technical work, and secures a mention.

Class XIII. (Half-plate and Under).—Mr. J. Page Croft takes first place for *Ere the Mist had Cleared Away*. The second goes to Mr. P. T. Deakin, and Mr. J. C. Richards gets a mention for one of his head studies. Other good work is shown by Messrs. G. Wilkes and T. Taylor.

A Class for Novices produces some excellent work, especially by the winner, Mr. G. H. Faux. Mr. Lewis Lloyd takes second, and Mr. Max Mossel shows a fine interior taken by artificial light. We did not have an opportunity of seeing the lantern slides, in which class Messrs. Baynton, Cowan, Bankart, and Bull took awards.

Of the Loan Exhibition we cannot deal fully, but it contains excellent examples of the foremost workers of the day Especial care was devoted to the hanging, and they were distinctively and advantageously draped, which gives them additional prominence. A varied programme of entertainments was given each evening, what is known as the long room being especially darkened that afternoon shows might take place. In this was shown the kromskop lantern, the kinematograph, a microscopic lantern with living specimens, and illustrated lantern lectures, while in the large circular room vocal and instrumental concerts were given.

The Exhibition has been the most successful the Society has ever held, and the steadily progressive character of the admissions may be gathered from the fact that the numbers passing the turnstiles were: Monday, 300; Tuesday, 500; Wednesday, 800; Thursday, 950; Friday, 1000; and Saturday, 1500; and the general expectation is that something substantial will be added to the Society's funds.

DEATH OF DR. FERDINAND HURTER.

Our readers will learn with very great regret of the death of Dr. F. Hurter, which took place last week from an affection of the heart. The deceased gentleman had been in indifferent health for some time past. Only a few weeks ago the Royal Photographic Society awarded Dr. Hurter and his colleague, Mr. Driffield, the Society's progress medal for their work on the *Determination of the Speed of Plates*. It is over eight years since those gentlemen published their first communication dealing with this subject, and since then a considerable number of papers have resulted from their joint labours in the study of the photo-chemistry and photometry of sensitive plates, the very latest of them, made public within the last two months, relating to the development of the latent image. It is not too much to say that their work in this direction has constituted one of the most important series of contributions to photographic science that has so far been published.

We are indebted to Mr. Driffield for the following brief biography of Dr. Hurter:—

"Dr. Hurter was born in Schaffhausen, March 15, 1844. He here received his education, up to the age of sixteen, at the State schools and at the Gymnasium. He then went to Winterthur, where he was apprenticed for three years to a dyer. By this time he gave such evidence of capacity and ability that it was deemed desirable that he should pursue his studies further than circumstances had hitherto permitted. With this object he went to the Polytechnic at Zürich, where he studied under Städeler, and from thence he went to Heidelberg, where he completed his studies under Bunsen and Kirchhoff, and where he took his degree of Ph.D. in 1866. In 1867 he came to England, and, on the recommendation of Sir Henry Roscoe, he entered, as chemist, the service of Messrs. Gaskell, Deacon, & Co., alkali manufacturers, Widnes. His marked ability was soon appreciated, and he rapidly gained the confidence of his employers, with whom he remained till the amalgamation of the works took place, when he was appointed, in 1890, head chemist to the United Alkali Company, Ltd., in which capacity he remained till his death. During his business-life he published a large number of papers of the greatest importance bearing upon matters connected with the alkali trade, and he was closely associated with the late Mr. Henry Deacon in the practical working out of the latter's well-known process of manufacturing bleaching powder.

"In 1871, I also entered the service of Messrs. Gaskell, Deacon, & Co., as engineer, and from that moment a friendship commenced between Dr. Hurter and myself which ripened into a deep attachment. I had myself practised photography for eight years prior to this, but it was not till 1876 that I enlisted Dr. Hurter's interest in this subject. It seemed, however, to a mind like his, to be intolerable to practise an art, the operations involved in which were so completely governed by rule-of-thumb, and the underlying principles so little understood. We then agreed that we would together enter into a thorough investigation of the subject, and from then till the day of his death I have had the privilege of working hand in hand with one of the brightest intellects ever brought to bear upon the science of photography. The time at our disposal for these investigations had been necessarily limited, but they have been continued without intermission, till, on Saturday last, his brain and hand were stilled for ever. My part has been a humble one, and whatever merit may be ultimately found in the work bearing the joint names of Dr. Hurter and myself must be mainly attributed to the great intellectual power he was able to bring to bear upon the work we undertook."

The photographic world has sustained a great loss in the removal of Dr. Hurter, from whom, had he been spared, there would probably have emanated, in conjunction with his colleague, Mr. Driffield, much investigation work equally as valuable as that for which photography will ever remain indebted to both gentlemen.

Our Editorial Table.

The Birt Acres Films for Animated Photography.

Manufactured by The Northern Photographic Works, High Barnet.

The Northern Photographic Works of which Mr. Birt Acres is the Managing Director have recently acquired possession of new premises at High Barnet and the building, although not specially erected for the purpose, appeared to us, on a recent visit, exceedingly suitable for the manufacture of sensitive photographic films. It is situated in the highest part of the town, is three stories high, with a basement sixteen feet below the ground level, in which the emulsion-making, coating, development of film negatives and transparencies, &c., is conducted. The upper rooms are large, lofty, and well ventilated, and offer scope for a considerable addition to the manufacturing plant. We may say, on the authority of Mr. Birt Acres, that in future the business of the Company will be chiefly concerned with the preparation of sensitised celluloid films for animated photography, and the development of the negatives and transparencies. We were given facilities for observing the operation of coating in progress, and of satisfying ourselves that an even and homogeneous layer of emulsion is uniformly applied to the celluloid ribbon. To demonstrate to us the rapidity of that emulsion, the following experiment was made: Two plates were exposed in the camera on a view of the town from the second floor of the building, the time being half past three on Thursday, February 24. The sun was in front of the lens, the picture therefore not being well illuminated. At *f*-22 an exposure of $\frac{1}{25}$ of a second was given, and development with a normal pyro soda solution produced, in about eight minutes, negatives having printable detail in the deepest shadows—a result which we certainly did not anticipate and one undoubtedly indicative of the fact that Mr. Acres has succeeded in preparing an emulsion of remarkable rapidity. It must be obvious that for this class of work extreme sensitiveness is a great desideratum, and not only does this apply to exposing for the negative, but also to the making of the positive. Mr. Acres has therefore devoted his attention to the manufacture of a very rapid positive emulsion which he can expose at the rate of about eighty feet in three minutes; this emulsion gives a deposit that is of a black colour and full of vigour—just the kind of image which we are assured is the most suitable for projection. One very great difficulty which Mr. Acres has overcome is to produce a film which does not split or leave the celluloid; the grain of the emulsion also appears to be very fine. Like a wise emulsion-maker, he pays great attention to temperature in the various processes through which the mixture passes, one of the points upon which success in emulsion-making depends.

The demand for sensitive films for animated photography has, we are convinced, assumed a steadiness and certainty which makes it tolerably evident that this branch of work will remain a permanent division of photography, and to cope with that demand the Northern Photographic Works are in a very favourable position, the experience of Mr. Birt Acres in animatography being, of course, unique, while his knowledge of the requirements of the trade and the public is very valuable. Allusion to the fact that Mr. Acres is a very skilful operator in taking animated photographs reminds us not to omit mention that to the branches of their business already mentioned the Northern Photographic Works add that of taking this kind of picture to order, and of supplying the negatives and positives.

Specimens of Portraiture.

By Walter Morice, 213, Lewisham-high-road, S.E.

We are always glad to have the opportunity of examining specimens of work submitted to us for that purpose by our professional readers. Mr. Walter Morice has shown us a great number of portraits done by him which evince undoubted artistic skill in posing and lighting. He appears to be especially successful in photographing ladies and children. In order to afford him the chance of making a good likeness of a difficult sitter, we ourselves sat to him, and the results are pronounced very successful by those most competent to judge. Mr. Morice does his own retouching and printing, in which branches of work he is as proficient as in the artistic, a by no means common case with professional photographers.

Specimens of Phototypic Illustration.

The Graphic Art Society of Geneva, of which Mr. J. R. Gotz, 215, Shaftesbury-avenue, W.C., is the London agent, send us an exquisite little book of specimens of the phototypic work produced at Geneva. These include half-tone, three-colour work, and collotype in various

styles. As specimens, these examples could not be excelled for beauty and finish of block work and printing. We also know that the Geneva house is justly renowned for the care expended on the work that is sent out in large quantities from its establishment.

MESSRS. CARL HENTSCHEL & Co., of 182–184 Fleet-street, E.C., also send us two admirable little books of specimens of their production—the one containing book illustrations in half-tone and line; the other half-tone reproductions of well-known photographs. These blocks were prepared for commercial purposes. It is rather late in the day to compliment Messrs. Hentschel on the excellence of their line and tone work; but the examples before us, nevertheless, extort a word of praise from us, however superfluous it may be.

News and Notes.

ROYAL PHOTOGRAPHIC SOCIETY.—Photo-mechanical Meeting, Tuesday, March 15, at 12, Hanover-square, at eight p.m. "Half-tone Negative-making," by W. H. Lascelles.

MESSRS. GEORGE HOUGHTON & SON, of 89, High Holborn, W.C., have acquired the lease of the adjoining premises, No. 88, having found an extension necessary to cope with their rapidly increasing trade. They have already commenced rebuilding.

DEMONSTRATIONS IN GLASS-BLOWING.—The free demonstrations in glass-working, given by Mr. Thomas Bolas at 6, Farringdon-avenue, E.C., having been so much appreciated, he has consented to close the series by an evening one, to suit those unable to attend during the day, on March 17, at eight o'clock.

THE Fifth Exhibition of the Paris Photographic Salon, organized by the Photo-Club de Paris, will be held from May 3 to May 29 next in the Gallery des Champs Élysées (Avenue des Champs Elysées, 72). Entry forms and particulars are obtainable of the Secretary, Photo-Club de Paris, 44, Rue des Mathurins, Paris.

THE *Photo-Review* is the title of a new American photographic paper. Mr. W. T. Hoxie is editor and proprietor, and the *Review* appeals monthly to professionals and amateurs. The first number contains some admirable articles, original and selected. The Enterprise Publishing Company, Deerfield, Wis., U.S.A., are the publishers.

PHOTOGRAPHIC CLUB.—Wednesday evening, March 16, at eight o'clock, a demonstration of "Lantern-slide Making by the Woodbury Process," by Mr. J. R. Williams. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary, Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E., will be pleased to forward on application.

THE Paget Prize Plate Company recently submitted to us for inspection two prints upon their collodio-chloride paper, which had been exposed in a show-case for eighteen months. The sun shone fully upon the case until eleven a.m., and for the remainder of the day upon the side and back of it. The photographs, however, present no appearance of change, and to us they look as fresh as if they had only just been printed and toned.

A SOCIETY FOR BEDFORD.—At a meeting held on Friday evening, February 25, it was decided to form a photographic club, to be called "The Bedford and District Camera Club." The subscription was fixed at half a guinea, which sum includes the use of a dark room. A committee was appointed to draw up rules to be submitted at a meeting to be called at the earliest possible date. Considering the number of amateur photographers in Bedford, there should be no doubt as to the success of the Club.

A FIRE broke out at eleven o'clock on Friday morning, March 4, at 134, East India Dock-road, upon the premises of Mr. W. Bartier, photographer. The two upper floors became involved from an unknown cause and were blazing fiercely, when the Shadwell and Isle of Dogs firemen arrived. The flames were not subdued until the entire premises had been seriously damaged by fire, heat, smoke, and water. The next-door premises, occupied by a confectioner, also suffered considerably. Mr. Bartier is stated to be insured, as far as the contents and the building are concerned.

LAST week, at the County Hotel, Neville-street, Newcastle, the local butchers gave a complimentary dinner to Mr. G. T. Mazdon. It was arranged that Mr. George R. Morton, photographer, of 140, Northumberland-street, should take a photograph of the assembled company before the dinner commenced, and Mr. Morton duly arrived with his assistant, Mr. Alfred Alex. Paul, who resides at 30, Union-street, Shieldfield. They had just fixed the apparatus in readiness when an alarming explosion occurred—how, no one else appears to know—and the operators were not in a condition to give any information on the point. It is clear, however, that it happened through some misadventure with the chemicals which were required in the process. The two photographers were standing close by, and received the full force of the fire. Every vestige of hair on their faces was burnt off, and the wonder is that they were not totally blinded. The manager of the hotel (Mr. Thompson) at once sent for Dr. R. A. Campbell, who ordered the removal of Mr. Morton and his assistant—both suffering excruciating pain—to the infirmary. Happily, it is not believed that their lives have been endangered by the unfortunate occurrence. No one else was hurt, although the explosion was of so startling a nature that many in the hotel ran outside, fearing that something in the nature of a total wreckage of the premises had occurred. The photographic apparatus was, of course, much damaged.—*Newcastle Chronicle.*

THE NATIONAL PHOTOGRAPHIC AND ALLIED TRADES' EXHIBITION, 1898, Portman Rooms, Baker-street, London, W., April 22–30.—In connexion with the above Exhibition it has been decided to supply secretaries of all photographic societies with admission tickets at special rates, for sale to members of their societies. As these tickets are now ready, early application should be made to the Exhibition Secretary, Arthur C. Brookes, Temple House, Temple-avenue, London, E.C. In addition to the many attractions which have already been announced, Lumière's cinematograph will be shown by Messrs. Fuerst Bros.

DERBY PHOTOGRAPHIC SOCIETY: ANNUAL SOCIAL GATHERING.—The Annual Dinner and Social Gathering in connexion with the Derby Photographic Society was held on Tuesday evening, March 1, and proved most successful. Mr. T. Scotton (Vice-President) was in the chair, and there was a large attendance. An excellent dinner was provided, and the subsequent proceedings were of a very enjoyable nature. A toast list was entirely dispensed with, excepting that members joined heartily in doing honour to the Queen and the Royal Family. Later on, Mr. Fearn proposed the very good health of the popular Vice-President, Mr. Scotton, and seized the opportunity of conveying to him the congratulations of the members of the Society upon his recent marriage. Musical honours were accorded the toast, Mr. Scotton briefly returning thanks. An excellent musical programme was then gone through.

A BIG HAUL OF PHOTOGRAPHIC APPARATUS.—At the Clerkenwell Police Court, on the 4th inst., William Henry Smith, aged twenty-four, and Frank Leslie, aged twenty-two, were charged before Mr. Horace Smith, with breaking into the shop, 353, Upper-street, Islington, and stealing therefrom seventy-three cinematograph films, thirteen projecting lenses, one magic lantern, a bicycle, a typewriter, and other articles, value 200*l.*, the property of Haydon & Urry, Limited. It appeared from the evidence of Mr. George Haydon, Managing Director of the prosecuting firm, that their premises were broken into on the night of February 19, and property of the value of 200*l.* was stolen. On the previous Thursday, in consequence of a communication made to him, he and the manager of the cinematograph department attended at 31, Clerkenwell-green, where the two prisoners were seen to offer for sale a number of lenses and other articles included in the stolen property. Two police officers, who were within easy distance of the shop, were called, and the prisoners were given into their custody. Smith told the magistrate that he and Leslie were general dealers, and that they purchased the articles in the Islington Cattle Market last week. The prisoners were remanded.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

March.	Name of Society.	Subject.
14	Bradford Photo. Society	*Ways and Means.* W. Thomas.
14	Camera Club	Annual General Meeting.—*The A B C of South America: Argentina, Bolivia, and Chili.* William Wethered.
14	North Middlesex	*Portraiture.* Harold Baker.
14	Richmond	*Developers and Development.* W. Ethelbert Henry.
15	Birmingham Photo. Society	Lantern Slides: *The City of Glasgow, the Clyde and its Estuary, and some of the Nearer Highlands.*
15	Brixton and Clapham	Lantern Evening: Members' Holiday-work Slide Competition.
15	Gospel Oak	General Meeting.
15	Hackney	*Photography: Past, Present, and Future.* Thomas Fall
15	Leeds Photo. Society	*A Scamper on the Continent.* J. Ingham Learoyd.
15	Royal Photographic Society	*Half-tone Negative-making.* W. H. Lascelles.
15	Wolverhampton	Annual General Meeting.—*Lantern-slide Making.* J. Gale.
16	Croydon Camera Club	Fifth Annual Rummage Sale.
16	Kingston-on-Thames	Members' Lantern Evening.
16	Leytonstone	*Developers and Development.* W. Ethelbert Henry.
16	Photographic Club	Demonstration: *Lantern slide Making by the Woodbury Process.* J. R. Williams.
16	Polytechnic	Lantern Night.
16	Southport	*Chat about Lenses.* Rev. F. C. Lambert.
16	Woodford	Discussion: *What is the Best Printing Paper?*
17	Bolton Mutual Photo. Society	*Stereoscopic Photography.* J. Phethean.
17	Bradford Camera Club	*Squeegeeing and Mounting.* Mr. Swindon.
17	Camera Club	Gambier Bolton will show some recent Animal Photographs.
17	Leigh	Competition: Spring.
17	Liverpool Amateur	*The History of an African Exploration.* Dr. Stanley Kellett Smith, F.R.C.S.
17	London and Provincial	Lantern Night: *Pompeii.* R. Beckett.
17	Manchester Amateur	*Negative-making.* J. A. Hodges
17	Oldham	*Reminiscences of Wet-plate Photography.* J. Fullalove and J. Hall
17	Putney	Show of Lantern Slides by Members of the Richmond Camera Club.
18	Bootle	*The Camera and the Wheel.* F. O. Bynoe.
18	Croydon Microscopical	*Elementary Optics.* R. Child Bayley.
18	Wakefield	*Portraiture.* Harold Baker.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 3,—Mr. S. Herbert Fry in the chair.

The CHAIRMAN replied to the question asked by Mr. Drage last week as to the alteration of the colour of bromide prints by bleaching with bichromate

and acid, and subjecting to the action of light. The inability of Mr. Drage to get a desirable tone in his prints was due to the fact that bleaching was curtailed. It should have been more thoroughly done, and the remedy was to carry the bleaching in the first place to that complete stage upon which the success of the method relied. Otherwise the image consisted of partially bleached and partially normal portions, and it was the normal colour which destroyed the after-action, and caused the unsatisfactory appearance of which complaint had been made.

Mr. J. E. HODD read a paper, entitled,

HAND-CAMERA CRITICISMS. [This will appear subsequently].

Mr. ROBERT BECKETT said the hand camera was extremely interesting to him, and he agreed with much that had been said. Personally, he did not see how a man could do without a focussing arrangement in his hand camera. It seemed to him an absolute necessity; and, as regards the percentage of success with such an instrument, he had seen from 100 to 150 negatives so made developed with not more than five per cent. of failure. As regards the brilliant finder, he had tried several, but found nothing to beat them, although they had the fault certainly that the view altered as the head was shifted from one point to another. The finder should be fitted in accordance with the method of using the camera. Mr. Beckett was not partial to a twin-lens camera, nor would he have one at a gift. As regards the size of plate, he was an advocate of the 5×4 hand camera.

Mr. THOMAS had always upheld the twin-lens type of hand camera. In his own experience, any successful work he had done had been with such a camera, and there were many subjects which almost made the twin-lens camera indispensable. He related a case in which some photographic work was being done from small boats in a choppy sea, where it was necessary to see what was on the plate at the exact moment of releasing the shutter. Out of several cameras employed in this work, the twin-lens form scored.

Mr. E. H. BAYSTON thought the brilliant finder was unsuitable, and preferred the plano-convex lens with ground-glass screen. With a little practice, however, he could do almost without a finder. Dark slides were more to his taste than the automatic changing devices.

Mr. J. S. TEAPE confessed himself surprised that practical men should depend so much upon finders. He found that in work which required any great rapidity of action, which was the most valuable use to which the hand camera could be put, there was little time to observe the composition of the picture on the finder. His best work had been done without the finder, and with practice it was surprising how accurately the lens could be directed at the desired object. He estimated that he could centre any image within a quarter of an inch at the outside. As regards apertures, his experience about town was that one could not work with a smaller aperture than *f*-11, and this with a fair light. He alluded to figures varying from ten feet to twenty feet away, not the general street views. The grouping of figures seemed to him a most interesting line to follow for hand-camera work, and he would prefer a stand camera for ordinary views, the results by which would be certainly better. The rising front was a useful and quickly adjustable convenience for hand cameras.

Mr. PHILIP EVERITT had found that *f*-16 was quite rapid enough for London street work up to 4 o'clock in the afternoon in August and September; but, of course, it depended very much on the plate used and the rapidity at which the shutter was working. The rising front was very handy. The fault of most hand-camera pictures lay in the excessive foreground. The choice of camera was affected by the purpose for which it was intended. There were conditions which admitted the fixed-focus camera. In a bright light, working at *f*-16 or *f*-22 on shipping or distant objects, and with the lens adjusted for something short of infinity, one would get abundant exposure; but, of course, street and such work required a focussing arrangement. Finders were sometimes very useful, but not indispensable. As regards lens and shutter, he showed a picture taken at *f*-3·8 with focal-plane shutter, showing the tremendous power afforded by such an aperture in rapid work.

Mr. MACKIE spoke of the Premo camera, which had some advantages, and not many disadvantages. Rising fronts were constantly being used, and were as necessary in hand cameras as stand cameras. He spoke against the misleading effect given by using the camera too low.

The CHAIRMAN did not think the lecturer had distinguished sufficiently between the pure hand camerist and the "pot-shotter." Broadly speaking, there appeared to be a balance of advantage in favour of the camera without movements and with fixed focus on account of the larger percentage of successes obtained by the ordinary tyro with this form. With it one's range was limited, and one was not tempted to take the impossible. From his own experience of their capabilities, it was wonderful, he said, what capital pictures could be secured with a camera of this type. He had always connected the brilliant finder with Adams's article, which was an excellent finder. He was disposed to think the advantage of a finder was over-rated, and as an illustration said the best shot was not the man who looked along the barrel of his gun and sighted it, but the man who puts it quickly to his shoulder and hits while looking at his aim. He thought Mr. Thomas had touched the keynote of the discussion when he referred to his use of the twin-lens camera, and it was this, that the camera to which one was accustomed was obviously the best. It was not the perfection of the instrument, but the familiarity of the user, which ensured the good results.

Mr. HODD replied to the comments on his paper. As regards the focussing arrangements which Mr. Beckett thought essential, to avoid the loss of the nearer objects, he reminded him of the "magnifiers," intended to be put in front of the lens, and with which objects at four feet could be taken, although the method was open to criticism. He described some work he had done with such small apertures as *f*-32 and *f*-45 in different parts where the light allowed. The question of plates was something of fancy. He never used the fastest plates, but one of medium speed. Finders could be dispensed with, perhaps, but nevertheless they were looked for on a hand camera. The rising front was not an absolute necessity to the average worker, by whom it was rarely used. Further, he held that the finders and lens should rise or fall together, but such was not the case in nine cases out of ten. As regards exposure, he had frequently held his camera for half a second.

PHOTOGRAPHIC CLUB.

MARCH 2,—Mr. A. Mackie in the chair.

Mr. F. W. DOWELL showed a couple of negatives with a number of spots distributed over the film for which he could not account. The makers of the plates had disclaimed responsibility, and attributed it to his own negligence. The negatives had been intensified, but the spots were there beforehand. It had occurred to him that mildew might account for it, but could not accept the suggestion that bubbles had produced them.

Mr. DUNMORE said it appeared very much like the effect of dust or something on the plate.

Mr. DOWELL added that the spots were visible before fixing, and showed as opaque marks, turning transparent after the plate had been fixed. He had carefully dusted the plates; but the fact that he dusted them after placing them in the sheaths was thought by some to be ill-advised, and to suggest that the dust was not entirely removed, but retained in the rebate of the sheath, from which it was afterwards distributed.

Mr. JAMES BROWN detected a partial image, and thought there was no doubt of some photographic action having taken place in the affected parts.

Mr. E. DUNMORE read a paper on

OLD EXPEDIENTS WORTH REMEMBERING. [This will appear next week.]

The large number of prints and examples added considerably to the interest of the chat, and included many taken with spectacle lenses, and others showing the printing in of natural backgrounds for portraits, and combination printing applied to landscapes, both as regards clouds and more solid objects as trees, foliage, &c.

Mr. F. A. BRIDGE recalled having seen some beautiful effects made by Mr. Van der Weyde on ordinary albumenised prints, in which the background was entirely removed by rubbing away the albumen with pumice mixed with some crayon held on the finger.

Mr. R. P. DRAGE spoke of the cloud negatives introduced by Mr. Dunmore, which were very good, but did not seem to be much used.

This Mr. DUNMORE attributed to the fact that they were generally overprinted, very often some three or four times the correct exposure being given.

Mr. E. W. FOXLEE said that the lecturer found no difference between the chemical and visual foci when using spectacle lenses. There was a difference, but it happened that Mr. Dunmore had corrected it by focussing with the full aperture and then stopping the lens down. He referred to a lens of Steinheil composed of two meniscus lenses which had to be used in a similar way—focussing with full aperture and subsequently stopping down.

Another lens was mentioned composed of two spectacle lenses, with which, after the visual focus was decided, the chemical focus was found by shifting the lens to a place marked on the mount.

Mr. Dunmore, in the course of some remarks on various points, said that a much better picture would be got by giving a full exposure than one barely sufficient, the negative being of a superior printing quality. In mounting the spectacle lenses, he placed the two concave surfaces touching or almost so, with the stop in contact with one of the glasses outside, or else between the two. A developer composed of metol and hydroquinone in his hands was all right if the exposure were well judged.

The CHAIRMAN said here lay the advantage of the pyro-ammonia developer, with which one could compensate for errors in exposure.

Camera Club.—Monday in last week was given up to a paper, entitled

A CORNER OF NORMANDY.

Cinématograph obligato, by Messrs. T. C. and C. M. HEPWORTH, when the members were entertained with a series of pictures of Caen, Dives, Bayeux, Lisieux, &c., the lantern pictures proper being interspersed with animated photographs. The apparatus employed was the Bioscope, which was hinged on to an electric lantern, so that the instrument could be used as a simple lantern, or to show animated pictures at the will of the operator, the change from the one to the other being effected in half a second.

On the following Thursday Mr. CYRIL DAVENPORT discoursed on

MEDIÆVAL AND EMBROIDERED BOOKBINDING,

a subject which, if we mistake not, has already come under the notice of the Society of Arts in the form of "Cantor Lectures," by the same gentleman. It is not often that coloured lantern pictures are seen at the Camera Club, for most of the members have a pious horror of such things, and regard a coloured photograph much in the same way that a bull is supposed to appreciate the textile beauties of a red handkerchief. This is not a matter for wonder, for we all know that the great bulk of painted pictures for the lantern are—well let us say that they would not be admitted to the walls of the Royal Academy as works of art. Mr. Davenport's pictures are, however, of a very different quality to the general run of such slides, and it would have been a distinct disadvantage if the same pictures had been shown plain. In the illustration of the gorgeous bookbindings of two or three centuries back, colour is imperatively called for, and it is interesting to note that Mr. Davenport colours his own slides in order to be quite sure that every book which he has photographed should be honestly and truly represented in the copy. The way in which the lecturer described the evolution of the book, as we now know it, was most interesting. First came the writing on stone, like that on the famous Rosetta stone, which forms one of the chief treasures of the British Museum. Next the cuniform inscriptions, written by scribes, and cut into the stone by ignorant workmen. Following this came the use of bark of trees and palm leaves as writing materials, and with such portable things came the necessity for covers, made either of thicker palm leaves or of ivory or lacquer work. Writings on linen also came into vogue about the same date. The clay tablets of Assyria were impressed with a wedge-shaped stylus, and then baked so thoroughly as to defy most agents of destruction, with the exception of the sledge hammer. Some of these, too, were secured in outer covers. Afterwards the famous papyrus came into use; two films from the inner rind of the reed being stuck together, the one at right angles to the other. Papyrus

was commonly used until about the tenth century, when other materials took its place. The oldest piece of papyrus known is now preserved at Paris, dating from 2500 B.C. Paper was first made in China and Korea, afterwards in Sumatra, and many other places in the East. Vellum was first used as a writing material about 200 B.C., and was used in long rolls, these rolls at a later date being folded for convenience into the paged form. Waxen surfaces for writing upon with a pointed stylus have been found in the ruins of Pompeii, and some of these had outer cases of ivory, very beautifully carved. In the fifth century Byzantine art grew rapidly, and had great influence upon bookbinding up to the twelfth century. Then the beautiful enamels on copper, wrought at Limoges, were much used for binding purposes. Coloured illustrations of all these phases of a beautiful art were shown by the electric lantern, many of them evoking much applause. Most of the books treated with such lavish ornamentation were copies of the gospels, and were intended for altar use. Gold, silver, and precious stones and pearls were abundantly used in the work, and these and the coloured enamels, which so often formed part of the design, were well shown in Mr. Davenport's coloured slides. The rarity of some of these old books may be gauged when it is stated that one of the examples shown, now at South Kensington, was purchased by that museum for no less than 1500*l*. In the second part of his lecture, Mr. Davenport dealt with English bookbinding exclusively, showing, in the first place, specimens of the beautiful embroidered book covers, which were common from the end of the fourteenth to the middle of the seventeenth century. Many of them were small books, measuring but four by two inches or thereabouts. Many of the stitches adopted were peculiar to the work, notably one in which copper wire, covered with coloured silk, was formed into loops upon the face of the work. The button-hole stitch was also employed upon canvas, velvet, silk or satin, as a base. The Tudor period affords the best examples of bookbinding in velvet, and the Stuart period shows the best examples worked upon satin. So numerous are the examples which have been preserved that it would not be unreasonable to regard these works as representing a distinct school of bookbinding. It was interesting to note that on some of these books, and the peculiarity was well shown in the photographs projected upon the screen, centipedes or caterpillars, seemingly, formed part of the ornamentation. Mr. Davenport was at first puzzled to account for these skeleton forms expressed in stitches of thread, but he subsequently discovered that these threads had originally held portions of peacock's feathers, which delicate morsels, being much appreciated by insects, had been eaten away, leaving only the threads which had secured them to the book cover. Many of these ornate bindings were produced in London during the seventeenth century. The usual vote of thanks was accorded to the lecturer for his most interesting discourse on a subject, which, in other hands, and without the coloured illustrations, might have been somewhat dry.

Croydon Camera Club.—March 3.—The chief feature was Mr. F. E. IVES'S experimental lecture upon

COLOUR PHOTOGRAPHY,

and his exhibition of coloured pictures produced by means of a single exposure in a camera taking three negatives, and projected by means of a single optical lantern, which has the power of combining three positive images upon the screen. Mr. Ives, who had come fresh from delivering a similar lecture before the Midland Institute at Birmingham, to an audience of over a thousand, expressly to explain the mysteries involved in colour-projected photographic images, received an attentive hearing, and hearty applause when the baskets of fruit, vases of flowers, &c., shone in all their glory of tint and hue upon the sheet. Mr. Ives's lecture was preceded by a display of members' slides.

Hackney Photographic Society.—March 1, Annual General Meeting, Major Woolmer Williams presiding.—The report and balance-sheet showed a very satisfactory state of affairs; there was a considerable balance to the good, the membership had remained steady, and many valuable lectures and papers had been given during the past year. The result of the election of officers and Council for the incoming year was as follows:—*President:* Mr. E. Puttock.—*Council:* Messrs. A. Barker, F. W. Gosling, W. Rawlings, L. S. Wilks, J. J. Westcott, J. Carpenter, E. Farmer, and Major Woolmer Williams.—*Hon. Lanternist:* Dr. Roland Smith.—*Hon. Librarian:* Mr. A. Dean.—*Hon. Treasurer:* Mr. W. L. Barker.—*Hon. Excursion Secretary:* Mr. W. Selfe.—*Hon. Secretary:* Mr. W. Fenton-Jones.—*Hon. Assistant Secretary:* Mr. A. D. Fort.

Richmond Camera Club.—February 28, Mr. Purcell presiding.—The R.P.S. lecture,

PORTRAITURE,

by Mr. Harold Baker, was read by Mr. RICHARDSON, and was fully up to the high standard of excellence by which these lectures are distinguished. In addition to containing much valuable advice on a difficult but fascinating branch of photography, the lecture might be described as a veritable "dream of fair women," the lantern illustrations consisting for the most part of a series of charming female portrait studies—not introduced capriciously, but all illustrating some principle of lighting or posing dealt with in the text.

Oxford Camera Club.—Dr. MANN (Demonstrator of Physiology in the University) read a paper on

MICRO-PHOTOGRAPHICAL METHODS.

There was a large attendance, Dr. Mann being well known as an expert authority on this subject. After describing the various cameras of Zeiss and the aluminium camera of Fuess, it was pointed out that narrow-angle lenses should be used, especially for magnifications up to fifty diameters, because of their greater depth of focus and flatness of field. When, however, wide-angle lenses must be employed to obtain the best possible definition, then a very small stop must be used to correct the want of definition in the peripheral parts of the image on the screen. For black, brown, or deep red objects or sections, magnesium wire, as first advocated in this country by Mr. Forgan, Edinburgh, may be used, but the best source of light is an incandescent burner, because it possesses relatively more green rays than sunlight (Tavel), and these green rays are especially active on plates orthochromatised with erythrosine or azalia. The choice of plates depends on the colour and thickness of sections, as the colour determines whether to use ordinary or orthochromatic plate, and the thickness of the section ($\frac{1}{20}$ or $\frac{1}{1000}$ of an inch) influences the time of exposure and the choice of a medium or rapid plate. For black, brown, or deep red sections, Ilford ordinary plates are the best; but pale pink, yellow, and blue sections give the best results with Lumière's yellow-green brand. An experience, based on repeated trials of all commercial orthochromatic plates during the past five years confirmed this. Next to Lumière's plates Dr. Mann preferred the Imperial flash plate, treated with strong erythrosine, ammonia solution, and used the day after. Although by the use of coloured screens, orthochromatic effects may be obtained, it is better to treat the plate directly with erythrosine, because the latter, being an iodine compound, combines directly with the silver in the plate, and probably for this reason the exposure is only one-tenth of that necessary when a screen is used. A photograph of a new incandescent burner (*f*·25 and ten seconds' exposure) was shown with the network of the mantle, its reflection in the chimney, and finger marks on the chimney. There was no trace of any so-called atmosphere. The principles of Zattnow's apochromatic and Tavel's fuchsine and methylen blue filters were explained, and magnificent specimens of black, brown, red and yellow, red and blue, violet, and pale blue sections, magnified 200 to 500 diameters, were thrown on the screen, and were greatly admired. Micro-photographs of polarised and opaque sections, taken some years ago by Dr. Carlier, Edinburgh, and by Dr. Mann, were also exhibited.

Sheffield Photographic Society.—March 1.—A lecture entitled,

FOUR MEN IN A BOAT,

was delivered by Mr. SPARHAM CAMP. It was a description of a holiday spent on the rivers and broads of Norfolk last summer by four members of the Society, and was suitably illustrated by a large number of high-class lantern slides, which frequently elicited hearty applause. The starting point of the sail was Wroxham Bridge, a small village about ten miles north of the old cathedral city of Norwich, and the course pursued was along the River Bure to the mouth of the Ant, up Stalham Dyke to Stalham and back, and along the River Thurne to Potter Heigham, all the picturesque broads and places of interest *en route* being visited and a number of good photographs obtained, the slides exhibited being characteristic of the manners and customs of the Norfolk Fen people, and the adaptability of the locality to pictorial photography.

FORTHCOMING EXHIBITIONS.

1898.

March 11, 12 ..... South London Photographic Society. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.

April 22–30 .... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

THE CRYSTAL PALACE EXHIBITION.—Pending final arrangements with H.R.H. the Prince of Wales, the time of his visit to the Crystal Palace on April 25 is not yet known. The Committee of the Exhibition, however, have made arrangements for the issue to Exhibitors, and to Fellows and Members of the Royal Photographic Society, of tickets for the opening day. The arrangements for the exhibitions in most of the sections are now complete. Applications for space not received in the course of the next fortnight will be too late. The Historical Collection promises to be very interesting, including not only specimens and diagrams of almost every form of photographic lens and camera, but collections of books illustrated by photography, portraits of early workers, and specimens of their photographs; specimens by most of the obsolete processes, including a very complete series of illustrations of the photo-mechanical processes and three-colour work, the original slides employed by Clerk Maxwell to illustrate his paper before the Royal Institution on "Colour Vision," and other objects too numerous to mention. In the Pictorial Collection invitations were sent out to some eighty or ninety of the best-known workers, illustrating all schools in photography. These invitations have been accepted almost without exception, one or two foreigners living at considerable distances alone having expressed their inability to contribute. The aim of Section II. is, as far as possible, to make each exhibitor's collections a little "one man show." They will be hung together, and may be taken as representing his or her work to date. Side by side with modern workers will be similar collections of the work of Rejlander, Mrs. Cameron, Colonel Stuart Wortley, B. B. Turner, D. O. Hill, Winfield, &c. Applied photography will also be largely represented. Photographic apparatus and materials, &c., will be left in the hands of the numerous large firms who have taken space; and this important section alone will occupy almost the whole nave of the Palace.

THE late Mr. Francis Frith, whose death we noticed last week, while actively engaged in artistic pursuits, gained many distinctions, including that of being the first person to take a camera up the Nile, where he used it to great purpose.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE METRIC SYSTEM.

To the EDITORS.

GENTLEMEN,—I am glad to note that, like most of those in the vanguard of the chemical and physical fields of science and art, you are seriously tackling the question of metric reform in England. I need offer no further apology for offering a few remarks on that subject for the consideration of your readers. That the French system is far and away the best system at present in use in any part of the world is admitted by all who have given the question any serious study, even by those most backward of inquirers, Royal Commissions. At the same time, I, for one, feel bound to admit, with some of the old school, like Sir Frederick Bramwell, that the French nomenclature will never meet with general acceptance among English-speaking people.

I have myself devoted considerable attention to this aspect of the subject, as the accompanying work (of which I beg you to accept a copy) will show. If Englishmen can deal with foreigners in horses and upholstery without calling them *chevaux* and *tapisserie*, surely they can use metric meaaures without calling them by such uncouth names as centigrammes and kilolitres. It is the measures and not the names that we want. And you would do a real service, not only to photographers and chemists, but to the whole community, if you would familiarise them with the metric system in an English garb; not necessarily the one I offer, but at all events one which is as good, or better.—I am, yours, &c.,

WORDSWORTH DONISTHORPE.

Willows, Kintbury, Berks, March 4, 1898.

P.S.—Chapter IV. sets forth the defects of the French nomenclature; and pages 130 to 161 explain the basis system of nomenclature which, after much eareful study, I would venture to recommend as a substitute for it.—W.D.

[We are very much obliged to Mr. Donisthorpe for the copy of his book on *Measures of Length, Area, Bulk, Weight,* &c. It is a valuable and suggestive work. Having already reviewed it in the JOURNAL of October 29 last, perhaps Mr. Donisthorpe will permit us to deposit the copy he has just sent us in the library of the Royal Photographic Society, where it will, doubtless, be found very useful.—EDS.]

THE INSURANCE COMPANIES AND EXHIBITIONS OF ANIMATED PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—In view of the increasing number of Exhibitions of animated pictures which are being held, you may think it desirable that you readers should know under what conditions Fire Offices allow the use (either temporary or permanent) of cinematographs and similar apparatus, and I therefore enclose a copy of the rules which, after careful consideration, have been adopted by Insurance Companies.—I am, yours, &c.,

CHARLES JACKSON, *Assistant Secretary.*

Royal Insurance Company, Lombard street, London, March 2, 1898.

RULES *re* EXHIBITIONS OF ANIMATED PICTURES.

1. The lantern must be constructed of metal or lined with metal and asbestos.
2. An alum or water bath must be used between the condenser and the film.
3. The apparatus must be fitted with a drop shutter available in case of emergency.
4. If the film does not wind upon a reel or spool immediately after passing through the machine, a metal receptacle with a slot in the metal lid must be provided for receiving it.
5. If electric arc lights are used, the installation must be in accordance with the usual rules, *i.e.*, the choking coils and switch to be securely fixed on incombustible bases, preferably on a brick wall, and d.p. safety fuses to be fitted.
6. If oxyhydrogen gas is used, storage must be in metal cylinders only.
7. The use of an ether saturator is not to be permitted under any circumstances.

Position.—Preferably on an open floor with a space of at least six feet all round railed off. If in a compartment, the compartment to be lined with fire-resisting materials. In any case no drapery or combustible hangings to be within two yards

General.—Fire buckets to be kept filled, and a damp blanket to be provided and placed close at hand.

THE RETURN OF SPECIMENS.

To the EDITORS.

GENTLEMEN,—It looks as though it is becoming a custom among photographers in small provincial towns to return applicants' specimens one short. Twice in a short space of time I have had the same experience, and in both cases the one missing has been the best piece of posing and lighting in the lot sent. Is it carelessness? Perhaps an intimation through the medium of your JOURNAL may induce a little more care on the part of recipients in future, and save much annoyance and inconvenience to operators who have to submit their work in answer to advertisements.—I am, yours, &c.,

OPERATOR.

AN APPEAL.

To the EDITORS.

GENTLEMEN,—May I beg your kind permission to submit this appeal in your JOURNAL on behalf of Mr. Henry Reynolds, a professional photographer, aged 73, a man of the highest respectability who, with his wife, is reduced to the sorest straits owing to a paralytic attack which, coupled with his advanced age, renders him incapable of continuously pursuing his vocation. Without relatives who can render him assistance, and having been unable to make any provision from his modest earnings in the past, I venture to hope that your readers, who are either connected with or interested in the profession, may kindly aid in affording him some little pecuniary relief in his present urgent need.

Amongst other good photographic work in which he has taken a prominent part, I may mention the series of views of the Abbeys of Yorkshire, published by Messrs De la Motte & Cundall; the earlier views of the Crystal Palace at Sydenham, by Messrs. Negretti & Zambra's predecessors; The Art Treasures Exhibition at Manchester; groups of invalided soldiers after the Crimean War for Her Majesty; the Baronial Halls, and other archæological objects of interest in Kent, issued by Messrs. Bedford & Cundall; the splendid series of views, of Mr. Francis Bedford, of North and South Devon, Wales, Warwickshire, Gloucestershire, &c., and the most interesting antiquities in the British Museum. In connexion with astronomical photography, he instructed the staff of gentlemen attached to the Royal Observatory, Greenwich, in relation to the transit of Venus, and visited India to secure negatives of a solar eclipse in the Nicobar Islands. He accompanied Mr. Warren De la Rue, in the year 1860, to Riva Bellosa in Spain, for the purpose of taking views of a total eclipse of the sun, and the extraordinary results then secured formed the subject of that gentleman's Bakerian lecture, and assisted Mr. de la Rue in spectroscopic work, and researches in electricity with vacuum tubes. He has also been connected with many of the leading London photographic houses during a considerable period.

If you will kindly consent to publish this letter, and take charge of any subscriptions, I shall have particular pleasure in sending my mite to help this "good man in adversity."—I am, yours, &c., S. M. CLARK.

Gauden road, Clapham, S.W., March 1, 1898.

[We shall be happy to receive subscriptions on behalf of this evidently deserving case.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

A. J. Moore, 23, Waterloo-road, Ramsey, Isle of Man.—*Four photographs of Ramsey, Isle of Man, showing Pete's Cottage and pier.*

J. F. Tennant (Lieut.-General), 11, Clifton-gardens, Maida Hill, W.—*Photograph of Harvey (or west) window in Folkestone Parish Church.*

E. R. Crippin, Spring Bank, Pemberton, Wigan.—*Photograph of the Rev. Father Freyn, late of St. Joseph's, Wigan.*

T. C. MUZE.—We know of no such book.

W. GIRLING.—Thanks; an oversight, of course.

VELOX.—All except oxalic acid and mercury bichloride.

L. E. WORGE.—Call upon us some morning between eleven and one.

J. A. HOWARTH.—Of Messrs. Adams & Co., 26, Charing Cross-road, W.C. We do not know the price.

T. G. SNOWDON.—Address Messrs. Penrose & Co., Baker-street, Lloyd-square, E.C. They make a speciality of the business.

AMMONIA.—No such information has been published in the JOURNAL. It is a matter upon which we would not take the responsibility of advising.

E. KING.—You must kindly give us the page of the JOURNAL in which the article appeared, as we cannot find it during the month you mention.

COLONEL ST. GEORGE GORE (Dehra Dun).—We are very much obliged to you for your letter. The point shall have attention when the time for preparing the next volume arrives.

E. A. BASCHE.—The safety clip seems novel and ingenious. It has been returned to you, but it is against our rules to notice models. When the device has been put on the market, we shall be pleased to do so.

W. FUSSEY.—We are sorry the matter was overlooked owing to alterations of premises. The lens at *f*-32 covers a 12×12 plate sharp to the corners; at *f*-45, a 15×12. In other respects the instrument appears to be as you found it. We have returned it you.

OPALINES.—CRESCENT says: "I shall be glad if you can inform me how to mount P.O.P. prints as opalines so that they will not peel from the glass when dry."—Nothing is better than a thin solution of gelatine. With that the prints will adhere perfectly well to the glass.

PYRO *v.* THE NEW DEVELOPERS.—A. Z. We think we are quite correct in saying, notwithstanding all the claims of advantages of the many new developers, that by far the larger proportion of professional photographers still use pyrogallic acid, either in conjunction with ammonia or soda.

PERPLEXED.—Difficult to say; but, as the markings are symmetrical and appear in the same place, we should feel inclined to look for some defect in the action of the shutter, if one were used, or lens. As regards the latter, however, the markings are obviously not due to internal reflections.

CRYSTAL PALACE.—VISITOR. If you refer to the regulations of the forthcoming Exhibition, you will see that Messrs. Negretti & Zambra hold the exclusive right of photographing in the Palace and grounds; therefore you will not be allowed to use your hand camera there any more than in any of the public parks and gardens.

STAMP AND MIDGET PORTRAITS.—OXON. Cameras and lenses, specially for taking these portraits, are regular articles of commerce, and are stocked by all large dealers in photographic requisites, such as Marion & Co., Fallowfield, and the like. You will probably find it more economical to purchase the apparatus complete than to make it yourself.

SHIPPER.—We regret to say that we do not give opinions in matters of the kind you mention, and, on the data supplied, we know of no persons whose opinion would be of real value to you. The paper must be judged by much larger quantities, and its keeping capacity can only be ascertained by sending it on a voyage. That was our own method in former years.

FOCUSSING MAGNIFIER.—R. JAMES. A single unmounted lens is scarcely suitable for focussing with. The best form of magnifier is the Ramsden eyepiece form of focussing glass, as sold by all photographic dealers for a few shillings. It must be adjusted for the user's sight, and it is provided with a screw adjustment and set nut for the purpose. It has a flat field, and covers a large surface.

BROKEN NEGATIVE.—S. A. E. If the breakage is due to bad packing, the railway company cannot be held responsible. As broken glass could be heard in the parcel when it was delivered, your best plan would have been to refuse to receive it, and then let the consigners and the railway company settle the matter between them. As it is, we fear you have no redress, except, perhaps, by the consigners.

RESTORING DAGUERREOTYPE.—AJAX says: "Is there any method of restoring a somewhat faded Daguerreotype? and, if so, can you tell me of any one who would undertake such work?"—Yes, and the method has frequently been described in the JOURNAL; but we do not recommend a novice to make the first few attempts with pictures of any value. Any photographer who is familiar with the working of the Daguerreotype process will undertake the work.

THE PHOTOGRAPHIC SOCIETY'S JOURNAL.—A. SKENE asks: "Would you oblige by informing me where to obtain the Royal Photographic Society's *Journal*, and the price, including postage? I am in want of information *re* their standard diaphragms and the use of same. I have enclosed stamped envelope for reply."—The Photographic Society's *Journal* is obtainable at 12, Hanover-square, price 1*s.* per number. We must decline to answer questions through the post.

COPYRIGHT.—R. W. says: "I am getting up a combination picture, and there is a gentleman whose portrait must be included in it, and he is dead, and the only portrait I can get of him is in a group taken by another photographer, which group is copyright. Can I be proceeded against if I copy that portrait only and use it in my picture; it is the entire group that has been copyrighted, and not each individual portrait?"—Certainly you can. You must not pirate any portion of the picture.

LENS.—T. BETTS. Yes, it is quite correct that, if the convex side of a single lens of a combination be placed next the object, that is, the concave or plain side next the ground glass, a sharper image with a large aperture will be obtained than when it is the reverse way, *i. e.*, as usually employed; but it must be borne in mind that that is the case only over a very limited field. When a plate has to be covered of a size larger, or even the same size as that covered by the combination, the best position is with the convex side next the ground glass.

MESSRS. HURTER & DRIFFIELD'S PAPER.—"I have been to great trouble to obtain a copy of Mr. Hurter's recent paper on his further researches into the speed, &c., of photographic plates without success. Mr. Hurter has not condescended to reply to my inquiry, enclosing a stamped addressed envelope. The Editor of the *Amateur Photographer* referred me to Marion's, who kindly sent me reprints of his papers of 1891 and 1893, and for the most recent one referred me to the photographic press. I therefore beg to trouble you, and shall be most glad if you will kindly supply me with the information I seek."—In reply: The paper was reprinted in our last three issues.

REMOVING VARNISH FROM NEGATIVE.—T. WILSON writes: "Is there any method of dissolving the varnish off a negative? If so, how? The negative has been varnished a year or more."—Without knowing the solvent of the resins used in the varnish, it is impossible to say which. In all probability, however, it was alcohol. In that case, soak the negative in methylated spirit for an hour or two. A gentle rubbing with a pledget of cotton-wool will aid matters considerably. If, with this treatment, the varnish is still refractory, a little caustic potash may be added to the spirit. When all the varnish is got off, the plate should be rinsed in two or three changes of spirit.

SPOTS ON PRINTS.—SPOTS asks: "Can you inform me in your columns the cause of spots on enclosed print; my last batch had them on all, more or less. The paper is Paget P.O.P., mauve, and toned with the ordinary sulp. am. bath as given by the makers (not combined). I have never had the same trouble before, and might mention that the bath was fresh made up the day before?"—The spots are due to particles of foreign matter coming in contact with the print while in a moist condition. They are entirely superficial, and can be removed by a penknife, thus showing that they are not *in* the paper. Metallic particles in the water would cause similar spots, so would particles of dust from a coke stove, and from several other sources.

E. A. GRAINGER writes: "1. Will you kindly inform me through the medium of your columns what method is adopted in keeping the water after washing P.O.P. prints for taking out silver? I have a tub to put solution in, but do not know how to act. 2. Will you kindly tell me if it is of any use keeping old toning baths? If so, how shall I proceed? I may add, that during the summer I tone between 300 and 400 prints a week, very often more."—1. Put the washings in the tub and add a little salt occasionally. If the chloride of silver does not subside readily, an ounce or two of nitric acid will help matters. 2. Old toning baths are worth saving. Put them into a large bottle or jar, and, when nearly full, add a little solution of protosulphate of iron; that will precipitate the gold in the metallic state.

VARIOUS.—F. R. W. asks: "1. Can you tell me of any publication or treatise on working up in black-and-white? 2. Can you inform me which is the best air brush to get, and the price? 3. What holidays a principal operator in a high-class business is entitled to every year? 4. What is the best colour for blinds for lighting a sitter in the studio, and the best way of hanging the blinds?"—1. There is such a work, by Mr. Bool, and published by Percy Lund & Co. 2. The aereograph. The price we do not for the moment remember. Write to the Aereograph Company, 30, Memorial Hall, Farringdon-street, E.C. 3. We are not aware that he is *entitled* to any, except they are agreed upon at the time of engaging. They are generally given as a matter of courtesy. 4. Much will depend upon the aspect of the studio. If it is lighted from the north, pale blue or light green is as good as any; but, if the sun has to be stopped out, darker blinds will be necessary.

DEVELOPER.—JOHN H. NIELD asks: "1. Will you please tell me what difference there is in effect in a developer between potassium metabisulphite and sodium metabisulphite? 2. Can they be used, the one for the other, indiscriminately? For instance, you recommended a week or two back the use of potassium metabisulphite in place of the usual normal neutral sulphite with amidol, would the same quantity of *sodium* metabisulphite do as well? It is the cheaper of the two, is it not? B. J. Edwards & Co., I notice, recommend *Boake's* metabisulphite of *soda* for their pyro-soda developer. 3. Would not the omission of sulphite from the developer, as recommended in your columns the other day, February 4, page 77, by Thomas & Co., who use *soda* metabisulphite, stain the film very deeply?"—1. There is not a great deal of difference, though we prefer the former. 2. We have not tried it. The soda salt is the cheaper of the two. 3. No. The metabisulphite is the preventive.

STUDIO.—ALPHA writes: "Herewith you will find plans of three different kinds of studios, and I wish to know: 1. If any of the three would be large enough for general professional work, and if the measurements marked on each plan are proportionally correct. 2. Which of the three would be most suitable to erect in an open space with no high buildings near, studio being lighted from N.E? 3. Could any kind of lighting likely to be required in professional work be easily attained in a studio after plan No. 3 (the so called studio of the future)? 4. Would No. 3 be easy for a beginner to work in and acquire proper control of the lighting, &c.?—In reply: 1. Yes, though it would be better for taking groups if the studio were three or four feet longer. 2. We should prefer No. 3 if the glass at the side were carried down to a foot nearer the floor, and more slope given to the roof, say by making the eaves six inches lower and the ridge a foot higher. 3. Not so easily as in No 1. 4. Not more easy than in No. 1.

*** Owing to exceptional pressure on our space, several articles, papers, and other matter have to be held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1976. Vol. XLV.—MARCH 18, 1898.

Contents.

	PAGE
Ex Cathedrâ	161
Old Ideas in a Modern Light	163
Headerettes:— The Cinematograph and Insurance—A Projected New Poisons Act — The Spectacle-makers' Company—More Expeditions	164
The Diffraction and Pinhole Lens Theories in Half-tone Work.—I. By W. B. Polton	165
In Things in General. By Free Lance	166
The Theory of Three-colour Printing.—II. By A. Freiherrn v. Hübl	167
Some Old Expedients worth Remembering. By E. Dunmore	168
Hand-camera Criticisms. By J. E. Hodd	169
The Thornton-Pickard Manufacturing Company, Limited	170
Our Editorial Table:— The "Avery" Backing — The "Victo" Set of Apparatus — Florentine Frames — Marion's *Practical Guide to Photography*	170
News and Notes	171
Patent News	172
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Camera Club—Gospel Oak Photographic Society — Newcastle-on-Tyne and Northern Counties Photographic Association — York Photographic Society	173
Forthcoming Exhibitions	175
Correspondence:— Halation—The Newcastle Flash-light Accident	176
Answers to Correspondents	176

EX CATHEDRÂ.

The London Stereoscopic Company of 54, Cheapside and 108, Regent-street, W., write us in relation to the recent "Nellie Farren" Testimonial Benefit that, having for many years enjoyed the privilege of photographing Miss Farren and publishing her portraits, they decided to prepare and present to her at the benefit performance a unique souvenir of that memorable and historical occasion. This took the form of a very large and handsome album in an emblazoned cover, which is to contain in addition to photographs of the executive, the programme, cast, list of contributors, &c., specially taken portraits of all the artists assisting at the benefit, together with their autographs. As the work of preparation will necessarily take a considerable time, it was found desirable that the album should be presented in its incomplete form, to be subsequently finished when the photographs have all been taken. The entire cost will be borne by the Company as a contribution to so interesting an event.

* * *

Sir John Lubbock was the guest of the Camera Club at their House Dinner on Wednesday, March 2, when the President, Captain Abney, C.B., F.R.S., took the chair. Sir John, in returning thanks for the toast of the evening, his health, said that he fully recognised the importance of the discoveries made, and its great assistance to science, giving as it does a faithful record, invaluable to all branches, which could be obtained in no other way, and especially so in the case of spectrum analysis of the heavenly bodies—which was one of the most sublime of human discoveries. Photography had developed from a science into an art. Though not a photographer, he might inform the members that he assisted in taking one of the earliest Daguerreotypes ever produced in this country. His memory of notable events in early childhood had reference to three important impressions made on his childish imagination. The first was a caterpillar in a glass case, the second the recollection of the Queen's coronation, and the third that of uncovering the lens in taking a photographic picture by means of an apparatus sent to his father by Daguerre direct from Paris. On the invitation of the Chairman, Sir John Lubbock expressed the pleasure it gave him to join the Club as an honorary member.

* * *

In the prospectus for the forthcoming season which the Directors of the Crystal Palace issued last week prominence is principally given to the announcement of the Royal visit in April next. The Directors observe: "It is with great gratification that the Directors are enabled to announce that His Royal Highness the Prince of Wales has graciously consented to open the great International Photographic Exhibition on Monday, April 25. This splendid show, organized by the Royal Photographic Society, of which the Queen is Patron, and the Earl of Crawford and Balcarres President, will remain open until May 14, and it cannot fail to be of the widest value to the large section of visitors interested in the progress of the camera. The heir apparent and his family have always been practical students of the photographic art, and this fact will undoubtedly enhance the visit of His Royal Highness, who has not honoured the Crystal Palace with his presence since the memorable State visit of the German Emperor and German Empress in 1891." It needs but little effort of the imagination to realise that the opening of the Photographic Exhibition by the Prince of Wales will take high rank in the proceedings of the London season, and that, from the attention and interest thus aroused in the event, photography will assuredly derive no inconsiderable advantage and impetus.

Our attention has been specially directed to the Roll of Ministering Children which was instituted to give support to the Prince of Wales's Hospital Scheme introduced last year. The idea, it appears to us, should be the means of increasing the business of those photographers who are co-operating in its administration. It may be remarked that the object of the roll, according to Sir Henry Burdett, "is to encourage children, and those under twenty-one, to begin to collect the Hospital Stamps that are being brought out yearly in support of the Prince of Wales's Hospital Fund, by forming an historical record of those who first assist in this charitable work. The Great Roll is being compiled by Messrs. F. & R. Speaight, photographers, 178, Regent-street, London, W., and their agents throughout the United Kingdom, and will consist of the portraits and names of the first 100,000 children who possess the Hospital Stamp Album with the 1897 stamps fixed therein."

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"The Stamp Album and stamps may be obtained from Messrs. Speaight or their agents. The Album is a beautiful little book, bound in royal red cloth, with gilt lettering and gilt-edged leaves. It contains portraits of the Queen and Prince of Wales, spaces reserved for ten years' issues of the stamps, and also for the owner's autograph and address. Each year's stamps will be new in design. The second page of the cover is reserved for the collector's photograph, which is taken free by Messrs. Speaight or their agents, a duplicate of which will be inserted in the Prince of Wales's Presentation Album. Each child has to first buy an album, price 6*d.*; and then the hospital stamps. The stamps cost 2*s.* 6*d.* and 1*s.* each." Some hundreds of photographers are already co-operating with Messrs. Speaight in this matter, and we give a first list of them in another part of this week's Journal. As a means of helping the Prince of Wales in his laudable desire to benefit the hospitals, the Roll of Ministering Children is undoubtedly a felicitous idea. From the photographic point of view, the taking of 100,000 portraits of young people, although primarily accomplished in the cause of charity, may also be fairly regarded as having profitable possibilities not nowadays to be despised. We congratulate all concerned in the scheme, which we hope will have a successful result, and shall be pleased to report further progress in the matter.

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The Pittsburg Amateur Photographers' Society recently held, in the Carnegie Library, Pittsburg, its first Annual "Salon" and Exhibition. It was open for nearly a month, and the attendance on the last day was over 2000. It is intended to make the Exhibition a yearly one, and particulars of the 1899 display will shortly be available. We congratulate the photographers of Pittsburg on their activity, but we cannot see why they should have called their Exhibition a "Salon." The use of that word by photographic exhibition executives savours of the ridiculous.

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Last week's *Nature* is full of interesting matter on photographic subjects. Mr. W. W. Watts has an article on "Geological Photographs," illustrated by examples of this kind of camera work. "The Photography of Nebulæ," by Mr. R. A. Gregory, gives an illustrated history of this branch of photography, starting from the work of Dr. Henry Draper in 1880. "Photo-micrography with High Powers" is the title of another illustrated article, by Messrs. J. Edwin Barnard and Thomas A. B. Carver.

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Messrs. Ross, Limited, have recently acquired new premises at 31, Cockspur-street, Charing-cross, where, so soon as the necessary structural alterations have been completed, a branch of the business will be opened. It will be under the management of Mr. James A. Sinclair, whose great abilities as a photographer are well known to our readers. Mr. Sinclair's present address is 111, New Bond-street, W.

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A correspondent favours us with the following suggestion in reference to a form of memorial to the lamented Dr. Hurter, whose death it was our melancholy duty to announce last week: "All photographers interested in the scientific part of the art will feel genuine regret at Dr. Hurter's untimely demise. The sad event must awake increased interest in the monumental work which Mr. Driffield and he have carried out. A difficulty presents itself to one desirous of being thoroughly acquainted with their investigations, viz., their work and the valuable matter written round it by others (notably Messrs. Cadett, Sterry, and Acworth) is spread throughout nearly every photographic publication during the last seven or eight years. It would be very desirable to have Hurter & Driffield's own work and the most valuable communications and writings of others connected with it, published in book form. Such a volume would be a good way by which photographers in general could show their appreciation of the late scientist and his work, which is bound to become classical and more important when men of science (as Dr. Hurter did) come to regard photography, not merely as a handmaiden of science, but worthy of attention for its own sake. Would it not be a suitable labour for the Royal Photographic Society to take in hand? I hope you will exert your powerful support by an appeal for something of the sort." With regard to the publication in book form of the writings of Dr. Hurter and Mr. Driffield, we believe such a step has already been taken into contemplation, but it is obviously a matter that cannot just yet be dealt with by the gentleman most interested. As to the writings of other persons on Messrs. Hurter & Driffield's work, their very voluminousness raises a serious obstacle to the carrying out of our correspondent's idea. Nor do we think the Royal Photographic Society would take up the matter. We shall, however, be pleased to have our correspondent's suggestion further discussed.

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Nature contains the interesting item of information that the Municipal Council of Paris have inserted in the budget for this year the sum of 10,000 francs for the laboratory of photography and radiography at the Salpêtrière. Our contemporary also states that the following grant has recently been made by the Trustees of the Elizabeth Thompson Science Fund:—288 dollars to Professor Carlo Bonacini (Modena), for researches in colour photography.

* * *

The meeting of the Royal Photographic Society, on Tuesday evening next, March 22, will doubtless attract a large attendance. The subject of the paper is the Gum-bichromate Process, and it is to be treated by Monsieur Robert Demachy

who has devoted great attention to the process, and whose results are certainly among the best that have been produced by this method of printing.

* * *

PHOTOGRAPHY suffers perhaps more than any other branch of modern science from the attentions of the newspaper sensation writer, and photographers, therefore, must have a peculiar relish for some remarks on the subject of "Sensationalism not Science," which Professor Mendenhall recently contributed to our contemporary, *Science*. The Professor points out that scientific discoveries have often been so wonderful in character that it ought not to excite surprise to find intelligent people ready to accept, without question, announcements of inventions and discoveries of the most improbable and absurd character. Along this line the evil influence of a sensational press is enormous. It was bad enough ten years ago, but it has been greatly magnified by the recent and, on the whole, unfortunate cheapening of processes of illustration, to the seduction of which nearly every newspaper in the land has yielded. To this has been added the newspaper "syndicate," by which men who know really nothing of science are employed to furnish sensational articles on scientific discoveries, illustrated by sensational pictures, all of which is the more injurious, because often founded upon a slender, microscopic tissue of fact. Unfortunately, some men who may be said to inhabit the fringe of genuine scientific activity lend themselves to this sort of thing, and are made much of accordingly.

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"WHOLE pages of this modern journalism," continues the writer we quote, "are filled with accounts of discoveries that are going to be made, for writers of this class are shrewd in taking advantage of the fact that human interest and human memory are now practically restricted to about twenty-four hours in time. The publication of a broadside describing an alleged improvement of the telescope or microscope, in which there is absolutely nothing new that is true or true that is new, adorned with a series of cuts largely imaginary, and many of which have no relation to the subject-matter, has served the purpose intended when its author has received his pay from the 'syndicate,' and when the syndicate has scored a triumph in what in these days is called 'enterprise.' Even the most conservative among men of science are made to appear as willing purveyors of sensationalism by what ought to be looked upon as an unwarranted and illegitimate use of the results of carefully conducted investigations, often before such results have received final construction and approval at their own hands. If all impressions made by this false popularisation of science were to disappear in twenty-four hours, the evil would be greatly lessened; but, unfortunately, there are many very intelligent and thoughtful people, who ought to constitute the best support of scientific work, upon whom they are more lasting. To such the line separating the genuine accomplishments of honest scholarship from the output of sensationalism, which ought to be clear and sharp, is becoming very nebulous, and there is imminent danger of a revolt against the whole thing."

* * *

COLOUR photography, the photography of sound and thought, the photography of retinal impressions, so-called psychic or spirit photography, and other divisions of the subject have from time to time enlisted the attention of the purveyors of newspaper sensationalism, against which Professor Mendenhall makes such a well-timed protest. We can quite understand that the chief danger of this wholesale promulgation of pseudo-scientific sensations lies in the fact that, as a result of the sure and ultimate discrediting of so many of those spurious discoveries, when a genuine advance is chronicled, its announcement is received with incredulity or doubt. This was forcibly impressed upon us only a few days ago, when we were called upon by a gentleman who, notwithstanding that the process has now been before the world for upwards of eight years, wished to know whether the Lippmann method of interference colour photography was *un fait accompli*, and if results had been produced by it. In this case the inquirer had probably long ago ceased to take notice of the sensation-mongers' announcements of the discovery of photography in natural colours, and had missed the records of a real advance.

OLD IDEAS IN A MODERN LIGHT.

AT the meeting of the Photographic Club on March 2 Mr. E. Dunmore read a paper (see page 168), entitled, "Old Expedients worth Remembering." Examples of some old methods of working, and forgotten styles of pictures, were explained and shown, and the paper generally recalls to mind other styles that have long since been lost sight of; why, it is a little difficult to conceive, unless it be that they involve more trouble, and perhaps skill, in the procedure than in the usual every-day work. Still the results may justify the bestowal of that little extra trouble when something out of the "usual thing" is desired. We have on a former occasion directed attention to some of these forgotten styles and methods, and suggested that, if they were reintroduced, they would become novelties, and probably might be turned to a profitable account, and the reading of Mr. Dunmore's paper once more brings the subject to mind. This it does at an opportune time, as just now many photographers are anxious for something in the form of novelty for the approaching season, and while they have spare time for experimenting.

It may be mentioned here that it is not necessary that a novelty should be really new and original. A thing that may have been forgotten a couple or more decades ago might prove a real novelty if reintroduced afresh now, and, possibly under a new name, turned to some profitable account in some way or other. Pouncy's original carbon process of forty years ago may be taken as an example.

The first of the expedients Mr. Dunmore dealt with was the lenses he uses—spectacle lenses. Now, the use of spectacle lenses in photography is generally associated with pictures of the "fuzzy" order, but Mr. Dunmore uses them to take pictures of the sharpest possible kind. We did not see the pictures shown the other night, but we have seen many produced by that gentleman on previous occasions, and it is not too much to say of them that they were as sharp and crisp as if they had been taken by the most costly instruments. The lenses, however, are not used as single ones, but as combinations. Two periscopic glasses are fastened close together at their edges, the concave sides next each other; thus a pair of twenty-four inches focus forms a combination of twelve inches focus, and such a combination as this is, we believe, that with which the whole-plate pictures shown were taken. The stop is placed close to the front glass, and is of very small aperture,

the sixteenth of an inch, we think. That gives a ratio of, roughly, *f*-200, and, of course, necessitates a proportionately long exposure. This, of course, renders an instrument of this character out of the question for rapid work. Still it is a good expedient when other lenses are not forthcoming of the requisite foci.

One of the expedients described at the Club was the introduction of natural backgrounds in portraiture. The method described was introduced by Mr. T. Edge some thirty or more years ago. We have more than once before referred to this subject, and it might profitably be utilised by portraitists at watering places and other pleasure resorts. The portraits are taken in the studio, and a background, from nature, is introduced of the beauty spots or places of interest in the neighbourhood by double printing. This, now, would, in most places, be a novelty, and very probably prove a remunerative one at the same time. The method of double printing used is simplicity itself. So far as we are aware, this particular style of portraiture has hitherto been almost entirely in the hands of Mr. Edge.

Examples of another style of portraiture, long forgotten, were shown. It was first introduced, over a quarter of a century ago, as a "secret process" by Denier, and was known at the time as the Denier effect. Although Denier's method of working, we believe, was never published by him, the same effects were produced by others. One method is this, and that was the one described by Mr. Dunmore the other night: In the printing, a portion of it is made with the paper in close contact with the negative, and a portion with an intervening medium between them—a plate of thin glass, or two or more thin films of gelatine, for example. The effect in these pictures is somewhat curious, they appear both sharp and of "soft focus" at the same time. They are easy of production, and, now that some of the public do not care for excessive sharpness, these pictures might be well appreciated, and at the same time prove remunerative. It may be mentioned that with these pictures very little retouching is required on the negative.

Here is another obsolete process that was only practised by a few, yet the results were very beautiful. It is the "eburneurn process" of the late Mr. Burgess. The process is this: A collodion positive, from a negative, is made on glass, which has been previously waxed to facilitate the stripping of the film. After the picture is finished, and toned, if necessary, an emulsion compound of gelatine, glycerine and oxide of zinc, tinted or not, sufficient in quantity to yield a film the thickness of an ordinary *carte-de visite* mount when dry, is poured on, allowed to set and dry. When dry, and stripped from the glass, we have a picture which is flexible, and has very much the appearance of being on ivory. Some examples by this process were shown at the Historical Exhibition at the Crystal Palace last year. Such pictures are more easily producible now than by the process of Burgess. Xylonite or celluloid may be had in thin sheets, which is a very close imitation of real ivory. This, if coated with emulsion, such as is employed for opal, would yield admirable results; or a carbon print could be developed upon, or transferred, to it.

There are other forgotten styles and methods that might be referred to, but space will not now permit. However, what has been mentioned may suggest ideas which may prove useful to some of our more modern readers whose work commands a fair price, and which may still further be enhanced by the introduction of something by way of novelty.

The Cinematograph and Insurance.—The letter from the Royal Insurance Company, which we published last week, with regard to the conditions under which the insurance companies allow the use of cinematographs and "similar apparatus," should be noted by all readers who have to deal with them. We presume that the term "similar apparatus" only applies to that for "animated" pictures, and not to the lantern generally. It will be noted that Rule 7 prohibits the use of an ether saturator under any circumstances. Evidently the companies, since the careless use of one which caused that terrible catastrophe in Paris, have looked askance at ether saturators. This is putting a convenient piece of apparatus under a ban, while it is perfectly safe in careful hands. A very useful recommendation is made in the letter, namely that a damp blanket should be kept at hand during an exhibition. A wet blanket is one of the best possible things for stifling a fire at its outbreak, and should always be handy when animated photographs are being shown at home, or when an ether saturator is being used. It may rarely, if ever, be wanted; but, if it is, it is wanted badly.

How far these regulations apply to the use of cinematographs in private dwellings as affecting the fire insurance is not quite clear. It is not so well known amongst insurers that, if one of the conditions of the policy is violated, the policy becomes void, even if no ill results from it; also that a policy that has once become void is always void, and, we believe that the payment of subsequent premiums upon it does not, in law, again make it valid. The only legal way, we believe, is to get a new policy. Such, we are told, is the law on the subject. Now, we imagine that there are few policies amongst photographers that, at one time or other, have not had their conditions infringed in some way, and that is why we again call attention to the subject. However, insurance companies rarely raise quibbles of that kind, unless accident happens at the time, but still the subject should be understood by every insurer.

A Projected New Poisons Act.—It is well known that the Pharmaceutical Society have for some years past been trying to get carbolic acid and other substances used for household and industrial purposes scheduled as poisons, so that its members may secure the monopoly in the sale, and that the Privy Council have not acceded to its wish. One day last week a question was put in the House of Commons on the subject, and the Home Secretary replied as follows: "I understand that the Privy Council, while not thinking it expedient to include carbolic acid in the schedule of poisons are of opinion that regulations should be made with regard to its sale and that of other poisonous substances, and, in accordance with a promise given, they have prepared a Bill on the subject, which will shortly be introduced."

Dealers in, and users of, chemicals of a poisonous nature should look out for this Bill in their own interests, for, if the Pharmaceutical Trades Union obtains further monopolies, the consumer must suffer in the price he will have to pay for his material. At one time one could buy "fly papers" at the oil shop for 6*d.* the dozen; now he has to pay 1*d.* each to the pharmaceutical chemist for the same brand. At this rate, the amateur photographer, instead of paying 1*s.* an ounce to his dealer for his pyro—and that is a thing the Society would like to have a monopoly in—would be charged by the druggist 2*s.* the ounce. At the grocers' or oilmen's, patent medicines, bearing the Government stamp, can be obtained for from 9½*d.* to 10½*d.*; but, if they happen to contain the merest trace of one of the scheduled materials, one has to pay 1*s.* 1½*d.* to the pharmaceutical chemist, though the list prices are the same.

The Spectacle-makers' Company.—Some little time ago we mentioned that this old City Company had decided to follow the example of some of the other City Guilds in furthering the interests of the crafts they are supposed to be associated with. This they will do by granting diplomas and the freedom of the Guild to

such members as practise the art of the optician, and who shall satisfy alike scientific, medical, and expert examiners that they are duly qualified to be so certificated. Last week the names of the examiners that have been appointed by the Company to carry out this certificated scheme were announced, and they are well-known ones to the majority of our readers. Professor Silvanus Thompson is the scientific examiner, Mr. G. Lindsay Johnson the medical one, and Mr. G. Paxton the expert examiner. We fancy that it would have been difficult for the Spectacle-makers' Company to find three better men for the work than the gentlemen named.

At the present time, as a rule, the majority of spectacle-sellers—"opticians"—have little or no knowledge of ophthalmics, and still less of optical science; but now, a few years hence, it is to be expected that only those who hold qualifications will meet with much commercial success. Eyesight is a precious thing, and it has too often been seriously impaired by the ignorance of incompetent spectacle-vendors supplying glasses quite unsuited to the case. The Spectacle-makers' Company deserve the thanks of the community generally for the step they have taken.

This step, we are informed, has been taken by the Company chiefly through the influence of the Lord Mayor, who is Master of the Spectacle-makers' Company. In recognition of his past and present services to the Company, the *City Press* says that the members of the craft connected with the trade intend presenting him with a valuable telescope, which is being "made in London." Our contemporary adds that the Lady Mayoress is also to be the recipient of an appropriate gift at the same time. It is gratifying to note that those connected with the trade so well appreciate the scheme.

More Expeditions.—An exploring expedition, under the auspices of the University of Cambridge, and under the command of Dr. A. Haddon, left Tilbury a few days ago. It is to proceed first to Torres Straits, between Australia and New Guinea, and then to the Province of Barram, in Central Borneo. Afterwards the mainland of New Guinea will be visited, and finally two or three months will be spent in Borneo. The party will be away for about fifteen months. The expedition will be accompanied by many well-known Cambridge and London men, and each will have a particular department to attend to. A phonograph forms an important part of the equipment of the expedition for the record of language and of native music, and a cinematograph for the reproduction at home of native dances and other ceremonies. Photography generally, it is needless to say, is to be another feature in the enterprise.

Captain Svendrup will sail in the *Fram*, about the middle of June, for North Greenland. He will be accompanied by a cartographer and surveyor, a geologist, a zoologist, a botanist, a doctor, and a meteorologist, and, of course, a number of sailors. Here, again, photography will be a feature.

THE DIFFRACTION AND PINHOLE LENS THEORIES IN HALF-TONE WORK.

I.

Although during the last three or four years a great deal has been written on the subject of the formation of the half-tone dot, it is a question whether we are much nearer a complete understanding of the precise action of the screen than we were to start with. Of course, by constant practice, those in the regular habit of using the screen have learnt how to get the results they require, or, at least, are moving in that direction; but these matter-of-fact individuals do not trouble themselves a great deal with considerations of diffraction or of pinhole lenses, or anything else, so long as they know that, with a stop of a certain size and shape and a given separation of screen and plate, they can obtain a calculated result.

In the course of a somewhat extended series of investigations into the action of the screen under very varying conditions as to size, shape, and character of stop, and of distances between the screen and plate and lens respectively, I have been forced to the conclusion that there are probably at least two or three different influences at work independently of one another, and that one or other of these may, under certain circumstances, play the predominant part in the formation of the dot, while, when the conditions are changed, a totally different action may be at work. In other words, in some conditions of working, the dot may be formed by points of light projected *by the lens* through the aperture of the screen, and in others by similar points of light projected by the screen apertures themselves, and consisting of more or less distinct images of the lens opening. As to diffraction, I am at a loss to see what part it plays in the *formation* of the dot, although, as I shall endeavour to show, its influence is severely felt in preventing its formation in a practically useful shape.

In following out these experiments, the simply ocular method, although useful to a certain degree, proves insufficient or imperfect from various causes. In the first place, under high magnification, the illumination is so feeble that it is practically impossible to form a definite judgment of what the eye sees, or how much it sees, and how much it fails to see, while, again, the appearance indicated to the eye is very often altogether different from the effect produced upon the plate, and this is more particularly the case where diffraction effects are concerned. For this reason I have turned my attention more especially to photographing the screen image in various degrees of enlargement, from about seven or eight up to between sixty and seventy diameters; and, though the task is somewhat more tedious than mere ocular inspection with the microscope, the results are infinitely more reliable when obtained.

For the purpose I have fitted up an apparatus consisting practically of a long box camera, carrying at one end the sensitive plate and at the other a lens or lens mount to carry the diaphragm, and, midway between, a lens of short focus in fixed position, and a small ruled screen capable of adjustment at different distances from the enlarging lens. When this is directed towards a clear sky—or, as I prefer to work, towards a lantern condenser—the image formed of or by the screen is caught up by the enlarging lens, whose shorter conjugate focal plane takes the place of the sensitive plate in ordinary work, and by it thrown in a more or less magnified form on the focussing screen at the extremity of the apparatus, where it can be studied, either visually, or, as I have already said, preferably by photographing it.

It will be observed that the front of the instrument is fitted with a lens or *lens mount*. As we are not concerned in photographing anything but the dot itself, a lens in that position is a superfluity, except so far as it is a convenience in holding the diaphragm, and for special purposes when using a stop too large for the lens mount. I simply tack on to the front of the camera, instead of the lens flange, a piece of tin with the desired-shape aperture cut in it. The only advantage there is in using the lens, if it be one, is that it illuminates a large area more evenly; but, when I point out that, using a one-half inch power, a circle of barely one-tenth of an inch of the screen is utilised, or with one of two and a half inches about half an inch, the importance of a wide area of illumination is not very manifest.

For the enlarging lens, after trying microscopic objectives of various kinds, I have fallen back upon ordinary photographic lenses of short focus as being in every way preferable. The want of achromatic correction for photographic purposes of the former objectives would not in itself be objectionable, as it could be allowed for, but I found it impossible to photograph just what I wanted. As the object to be photographed is simply the aerial image of the screen, more or less out of focus, the non-achromatic lens will "pick up" an image that is entirely different from that shown on the screen, and though it may be rendered quite as well as if specially focussed for with a properly corrected lens, it is inconvenient and misleading. But the chief objection to the microscope objective is the inordinately long exposures necessary in enlarging direct in one operation. With an extra rapid gelatine plate and duplex lamp and condenser to

enlarge up to forty-five diameters, the highest degree of direct amplification I have tried requires exposures of about two hours with stops of ordinary dimensions, and much longer with small ones.

But, with an ordinary photographic lens of three inches focus, a preliminary enlargement can be made direct from the feebly illuminated screen image up to, say, eight diameters, in a few minutes, and then in the same apparatus, substituting that enlargement for the screen, it can be further enlarged another eight times, with the advantage of much better illumination and far better definition in the final result than would be obtained with the micro-objective direct. Working in this manner, I have, with between sixty and seventy diameters' enlargement, obtained results in which the diffraction lines are still sharp, although the individual "dots" are half an inch apart centre from centre, the original being 133 lines to the inch ruling.

It will be clear to those familiar with the use of the screen that with this arrangement it is possible to study the effects produced at a much closer screen distance than is possible with the ordinary sealed screen. In fact, we may commence with the sharply focussed image of the screen itself, and note every minute change that occurs as it is slowly moved further and further away from the enlarging lens. And it is in these very early stages of the screen's motion that we shall find closely mixed up together, not only diffraction effects, but also pinhole lens images as well as the dots projected by the lens itself or the source of light.

Starting with the screen in sharp focus, and with a moderately small circular diaphragm in the lens mount—say, one of three-sixteenths of an inch at a distance of twenty inches from the screen—the first change is, of course, one of slight loss of sharpness. But, before this has proceeded far, it will be noticed that the light spaces between the screen lines have become unevenly illuminated, but the eye, either from insufficient illumination on the one hand or want of adequate amplification on the other, is quite unable to resolve these marking into their line character. But the photograph reveals that each of the bright dots or spaces has running through it four lines parallel with the lines of the screen that are brighter than the rest of the space, and the "dot," when magnified, takes the form of an Oxford frame with crossed corners, the central space being less dense than the lines themselves. At a further distance between screen and lens, the square dot is cut evenly into four by a dark cross, or, in the negative, four small black squares filling the angles of a bright central cross.

These and other effects of pure diffraction occur before the screen has moved sufficiently to destroy the square configuration of the outlines of the dots; but presently they gradually assume a circular shape, and become more and more "fuzzy," until, at a certain distance, varying in inverse ratio to the size of the stop, the dot is lost altogether. This I take it to be the dot formed by the light projected through the screen apertures, for it occurs at distances too close for the screen to have the chance to form any definite "pinhole image," that is, one of any sharpness, and, with stops above a certain size in relation to their distance from the screen before a sufficient distance is reached to enable the formation of a pinhole image, the individual images from adjacent apertures have become large enough to overlap, and so obliterate, the screen altogether.

But, when a small stop is used, especially if it be a *very* small one, the gradual change to a circular form takes place in the same way; but in this case the "fuzziness" of dot is succeeded by increased sharpness as the projected image gradually merges into the pinhole form, for this is really what occurs. In the closer positions of the screen to the plate the dot is formed by projection *through* the screen, but, as the distance increases, this dot becomes gradually less sharp, while that projected *by* the screen increases in sharpness until, with a sufficiently small stop, it assumes a definite form and a clearness of outline that do not, under any circumstances, mark the first-mentioned dot.

I have spoken only of a circular diaphragm, and this intentionally, to show that, so far as the diffraction effects are concerned, it is the shape of the *screen aperture, and not of the diaphragm,* that produces the result. I was of the contrary opinion until I employed in my micro-enlarging apparatus a screen purposely composed of circular apertures, when, to my surprise, the diffraction effects described were either altogether lost, or were of such an indefinite character as to be barely recognisable; but, if for this circular stop a square one be substituted, while precisely the same effects of diffraction occur, the gradual change from the projected to the pinhole image is much more readily followed owing to the change of shape of the dot. With the multiple stop it is even more easily followed still.

I mentioned in the early part of this article that diffraction interferes with the formation of the dot, but to explain this I shall have to refer to another phase of the changes. W. B. Bolton.

ON THINGS IN GENERAL.

The pages of this Journal have been exceptionally rich, during the last few weeks, in papers of real value, first and foremost naturally coming that of Messrs. Hurter & Driffield, on "The Latent Image and its Development." I am sure every reader will join me in offering Mr. Driffield sympathetic condolences at the loss of his *confrère,* Dr. Hurter, so soon, too, after their united contribution was read at the Royal Photographic Society. This paper, containing as it does such a mass of well-ordered facts, such a wealth of experimental data, is one to be thought over and dwelt upon before any criticism of value can be offered, or before a true idea of its teaching can be formed. Just as in what might be termed their epoch-making paper on speed determination, published in 1890, many of its assertions will be considered debatable, many of its conclusions controverted. The discussions inevitable to its consideration will probably be heated, but *magna est veritas et prevalebit.* It may perhaps be not out of place to call attention to some aspects of the subject that might with advantage have been dealt with in the paper itself. The first thought that strikes one, in view of the very technical and theoretical standpoint taken in drawing conclusions from thermochemical data is that the substance under discussion should have been a strictly defined chemical compound. But so far is this from being the case, that, while the experiments generally have dealt with commercial dry plates, the calculations made, and the conclusions drawn, have reference to pure bromide of silver. Now every one knows that the commercial dry plate of to-day is by no means a simple inert dried film containing bromide in suspension—the iodides and chlorides usually, also, present have a naturally important bearing on the arguments, not to speak of these silver haloids in chemical combination with organic matter, whether dissolved in the film or mechanically suspended, all of these possible various conditions being governing factors in maing correct deductions. It is well to draw attention to these omissions, in view of the perhaps necessary, but none the less conspicuous, *ex cathedrâ* air which the paper possesses. Many of its dicta have at first glance an exceedingly positive aspect, yet similar ones have on a former occasion been shown to be capable of possessing an esoteric signification, not appreciated by the general reader. Thus we find in the paper recently published the statement, "The table clearly indicates that a fast plate is one which is rich in silver, and reflects a minimum of light." Then, in the discussion, Mr. Driffield says, with regard to a certain condition, as though in emphasis of the position just quoted, ". . . the mere thickness of the film would not be a factor which would affect the speed, and I do not quite see why it should, if the thickness were constituted of gelatine. *If it were silver, of course it would* (the italics are mine, F. L.), because you saw from the formulæ what an influence the amount of silver in the plate has." This would seem positive enough; yet that it is an esoteric proposition is evident from the apparently contradictory statement in Mr. Driffield's note which runs, ". . . a plate may be very rich in silver, yet very slow; it depends upon the physical condition of the silver. . . ." Here the physical condition is the factor governing rapidity, but in the paper it is the richness of silver. This may sound querulous, but it is not so. Experiments treated from a mathematical standpoint must be criticised in the same manner.

It is possible that one result of this paper may be a revivification of the old discussion, which was very warmly carried on, as will be well remembered by old students of photography of, say, a quarter of a century ago, on the question whether the effect of light was to

produce chemical decomposition or only mechanical or molecular alteration.

Referring to Messrs. Hurter & Driffield's contention that bromide of silver undergoes no chemical decomposition by the action of light for the brief time needed to produce a developable impression, it is worth while quoting Dr. H. Vogel, who, writing in 1871, says: "It has been proved that, by the decomposition" (by light, F. L.) "of bromide of silver and chloride of silver, sub-chloride and sub-bromide of silver is formed." And, though he does not refer to the destruction of an image on a bromide film, he shows how a misunderstanding between himself and Dr. Schnauss as to destructibility of an iodide image by iodide of potassium is explained by the fact that, when the iodide is formed so as to contain organic matter, the image is not destroyed, while with pure iodide it is destroyed. Similar arguments might apply to bromide images.

It was rather late in the day to raise a discussion on the greater or less solubility of the silver in a dry plate in saturated hypo as compared with a weaker solution. If I remember right, Mr. Henderson pointed out, many years ago, that saturated hypo cleared the plate less quickly than a weaker solution. It is obvious that, to a slight extent, the difference between a dry and a previously wetted plate would slightly affect the comparison, as, for a while, a weak solution would be produced. But it would only be for a brief period, for the osmotic action of hypo is very strong, and this salt has the property of driving water out through a colloid at a quick rate. Moreover, more hypo goes in than water comes out.

With regard to the question of standard light for this or other purposes, it seems remarkable that a simple and ingenious standard light, the invention of Sir W. Crookes, who, as is well known, once filled the editorial chair of this JOURNAL, does not ever now appear to be made use of. It was described in a paper presented to the Royal Society, June 27, 1868, and I append an extract in Sir W. Crookes' own words:—

"A glass lamp is taken of about two ounces capacity, the aperture in the neck being 0·25 inch in diameter. Another aperture in the side allows the liquid fuel to be introduced. This consists of alcohol of specific gravity 0·805, and pure benzole, boiling at 81° C., which are mixed together in the proportion of five volumes of the former to one of the latter. The wick-holder consists of a platinum tube, and the wick is made of fifty-two pieces of platinum wire, each 0·01 inch in diameter. The flame of this lamp forms a perfectly shaped cone, the extremity being sharp, and having no tendency to smoke. Without flicker or movement of any kind, it burns, when protected from currents of air, at a uniform rate of 136 grains per hour. There is no doubt that this flame is very much more uniform than that of the sperm candle sold for photometric purposes. Tested against a candle, considerable variations in relative illuminating power have been observed; but, on placing two of these lamps in opposition, no such variations have been detected."

One of the papers I referred to was read at the Gospel Oak Society last month by Mr. Raynor. He spoke of it as being partially a lecture on elementary optics as applied to photography, but it contained just that elementary information of a practical nature which it would be difficult to know where else to look for. The simple formulæ he gives for finding the focus of a spectacle lens needed to lengthen or to shorten the focus of a combination are very interesting, and, from the tendency that now exists, as shown in many hand-cameras, to alter the focus by such means in lieu of a series of photographic lenses, will be exceedingly useful.

Then, again, for real practical information as to the working with Röntgen radiations, nothing could well be better than Mr. Isenthal's paper, read at the Royal, and given in abstract on page 124 of this JOURNAL. None but those who have tried it have any idea of the exceedingly critical nature of this kind of work, and many hints of great value may be gathered from the paper I refer to.

I should like, too, to call attention to the translation (see page 85 of THE BRITISH JOURNAL OF PHOTOGRAPHY) of Dr. Andresen's paper upon the characteristic reactions of well-known developing agents. It represents a vast amount of labour expended, and, in view of the existent rage for new developers, should be very useful.

FREE LANCE.

THE THEORY OF THREE-COLOUR PRINTING.

II.

IF only one definite kind of ray is to take part in the formation of the photographic image, two methods of procedure may be adopted.

1. A plate is used which is equally sensitive to all rays, then there must be used for the yellow-printing plate a blue-violet filter, for the red-printing plate a yellowish-green filter, for the blue-printing plate an orange-red filter.

It will be seen from this that the fundamental basis is a filter complementary to the printing colours, which was established by Cros and Ducos du Hauron, and has lately been adopted mostly as the leading principle. It will, however, be frequently seen that this "filter theory" can only be satisfied if the above-cited assumption of the plate sensitiveness, which is very difficult to do practically, is also fulfilled. Moreover, the use of the complementary filters is only warranted with the theoretically correct fundamental colours, whilst with any other selection of colours variations in the colours of the filters are necessary when as favourable results as possible are striven for. It is therefore not permissible simply to enunciate the law, "The filter must be complementary to the printing ink," and to choose any one printing ink without consideration of the others, for, as the above explanations show, in the choice of the rays which produce the image the other two fundamental colours must always be taken into account.

2. Three photographic plates are used, each of which is only sensitive for one of the above-mentioned group of rays. For the negative for the yellow printing plate a blue-violet sensitive plate, for the red printing plate a yellowish-green sensitive plate, and for the blue printing plate an orange-red sensitive plate must be used.

For this purpose the plates must be sensitised with dyes which must be complementary to the colour of the active rays. The plate for yellow printing must be sensitised with yellow, for the red printing with red, for the blue printing with blue.

In this way we arrive at Dr. H. W. Vogel's "sensitising theory," "The optical sensitiser forms the printing ink for the plate obtained with that negative."

It will thus be seen that the "filter" and "sensitising theory" are theoretically the same.

The sensitising with a yellow dye may be omitted, since the ordinary photographic plate is in itself sensitive to blue-violet. It is therefore superfluous to use the blue-violet filter required by the partisans of the filter theory; whilst no one used the idea of sensitising a plate with a yellow dye for the blue-violet, the necessity of the violet filter has always been advanced.

The requirements set up by the sensitising theory are more precise, and they may be easily fulfilled; whilst the requirements of the filter theory, since complementary colours may show a very different spectrum behaviour, are undetermined and very difficult to fulfil in practice.

Of exceptional importance is always the sensitising of the plates; the filter is only a means of correction to narrow the zone of sensitiveness. When making the exposure for the red-printing plate a red sensitiser must necessarily be used, whilst a yellow screen is sufficient in order to protect the plate against the action of the blue rays. For the blue printing negative is under every condition a blue sensitiser to be used, whilst a yellow screen will again be sufficient if plates of sufficient orange sensitiveness are used.

The above-mentioned theories are incomplete, since they leave us in doubt as to the breadth of the sensitising band or the limits of the filter. This deficiency may be helped by completing the law, "Any two colours must act like white, and the third like black," by the addition of "the compound colours lying midway between, the two fundamental colours should also act like a grey compounded of equal parts of black and white."

We thus obtain a very good prescription, which satisfies practical work, for the preparation of the three negatives. The plates must be sensitised with dyes in accordance with Vogel's theory, which, as far as possible, are similar to the printing inks. On a sheet of paper the printing inks and the compounded intermediate colours, which I have called control colours, should be spread, and the action of the colours on the sensitised plates tested by an exposure.

If the negative does not satisfy the above requirements, "two fundamental colours must act like white, the third like black, and the two intermediate colours like a mean grey," correction filters must be used, and these altered in their intensity and colour till the desired result is approximately obtained.

It must be noted that, if a dingy printing ink—for instance, carmine

lake—be used, not this, but a pigment of the same tint or colour, must be considered as a fundamental colour. For instance, eosine corresponds to the printing ink carmine lake. In order to obtain a more certain decision as to the action of the control colours, a strip of grey paper, the brightness of which is intermediate between black and white, may be placed side by side with the colours. The control colours should then show in the negative the same opacities as this grey.

This simple procedure for the determination of the filters appears to me to be so certain that I have recommended it in preference to the spectrographic method for determining the sensitiveness of the plates and behaviour of the filters.

If this method is adopted, gross faults in the choice of the filters cannot possibly happen. Convinced of the complete correctness of the filter theory, one uses now, for instance, an intense yellow green filter for the red printing plate when using carmine lake and Paris blue as printing inks. Such a negative shows blue pigments—for instance, ultramarine—quite bare glass, with the result that in the composite print violet will be obtained instead of blue.

A test with the control colour violet teaches us that we have to use a very bright picric acid filter, for only with this could a violet be obtained half covered.

A third theory for the splitting up of a coloured original by means of photography into three monochrome images is deduced from the law of colour mixtures. Under the assumption that the spectrum is composed of mixed lines closely crowded together, we can, starting from the general law of colour mixture, set up the sensitising curves for the three plates. Prospectively suitable sensitisers should be chosen, the plates tested in the spectrograph, and their sensitiveness zones corrected by corresponding films. I have worked this theory out in my book.

The sensitising curves give more certain conclusions as to the necessary behaviour of the plates, and permit a much finer working of the photographic processes. Thus, for instance, the curve for the plate for the yellow part of the image shows that it is advisable to lengthen the region of sensitiveness of the collodion emulsion plate on both sides, and I have therefore recommended acridine and chlorophyl; thus an orange and green dye.

The sensitising is in the most complete accord with Vogel's theory, since orange + green = yellow; thus a yellow dye is used.

Since, however, the acridine sensitises too far towards green, the region of sensitiveness must be curtailed by a violet filter, which, however, has obviously here the purpose of curtailing the activity of the green pigments.

The test with the control colours teaches, however, that not much is gained by this complicated procedure; therefore, for all practical purposes, an ordinary plate without a filter is used.

After these statements, which are possibly sufficient to clear up somewhat the existing views of the theory of three-colour printing, the actual causes of the unsatisfactory results of this process should be explained.

An important cause of failure lies, as has already been mentioned, in the use of three printing inks which do not correspond to the theory. The imperfections produced by this circumstance are still more increased that in the preparation of the negatives no notice is taken of the actual printing inks. The existing formulæ and the commercial filters are suited to the correct fundamental colour system, yellow, blue-green, and purple, whilst the printing inks show quite another tone.

In the practice of three-colour printing, however, all the imperfections of the photo-mechanical processes come very strongly into play.

Thus the process requires first three negatives of absolutely equal quality, an essential which, in spite of all possible care, can hardly be fulfilled. Whoever has reproduced a grey, or a photographic print in grey, will know the difficulties which stand in the way of a correct reproduction of the half-tones. It is not the troublesome grain of the paper to which one, as a rule, ascribes the blame of the unsatisfactory result, but the tendency which is self-existent in photography itself, dependent on the behaviour of the plate, the intensity of the light, the time of exposure, the mode of developing, which has a tendency to the displacement of half-tones. Sometimes the negative is too hard, at others too soft; if the lights are satisfactory, the shadows are wanting; if these are faultless, the gradation of the original from dark to light is wanting, and so on.

It is, indeed, clear that it is very difficult, under such different conditions, to obtain negatives of equal character such as three-colour printing requires, and, in order to obviate this fault as far as possible, I have recommended to be photographed, side by side with the original, a grey scale. Its use must undoubtedly cause an advance in three-colour printing.

To these deficiencies existent in the negatives are added the failures of the printing surface, the collotype plate, or the block. In their production again appears a shifting of half-tones, whereby the failure in gradations of the negatives is still further intensified.

When printing in black these failures trouble us but little; the correct form is always obtained, and whether the gradations are sometimes softer, another time harder—whether a general tint covers the whole picture or the high lights are a little too broad, whether the shadow details are more or less plainly visible—hurts but little the general impression of the reproduction.

In three-colour printing, however, the gradations are essential for the correctness of the colour, and we find it extremely troublesome if, for instance, the sky appears green and the brown tree trunks show violet shadows.

Especially troublesome is the want of pure grey. With regard to this our eyes are very sensitive, and even a very slight excess of one of the three colours will be at once recognised in the grey mixture. How shall we, however, obtain pure shades of grey when the tones in the printing plate are shifted? If, for instance, the blue plate shows a vigorous gradation in the deep tones, therefore, however, a flat gradation to the lights, and we print so that the bright grey appears pure, there will appear in place of black a blackish green; if, however, the colours combine to make black, the result will be a smutty orange in place of the bright grey. Still there are the so-called faults in superposition which are caused by the want of transparency in the colour films, and finally the irregularities in the intensities of the individual pulls due to the printing press.

All these failures do not lie in the principle of three-colour printing, but are due to the general deficiencies of the photo-mechanical process.

If, however, the various sources of failure are not kept strictly apart, the influence of the incorrectly chosen printing inks, the deficient equality of the printing plates, &c., are not known, then will the causes of the unsatisfactory results be sought for in the wrong places and impossibilities are demanded of photography, and any dodge is used, as I have tried to point out above.

The large number of different circumstances which influence three-colour printing are the causes why the correctness of a theory was so difficult to realise. Obviously whoever will argue from the final print as to the splitting up of the colours by photography may err only too easily, since alteration of plate-sensitising, the filter, and the printing ink, cannot be noticeable or not have an improvement of the results. Other very important faults will also be obtained, or new ones be formed, which will conceal the advantages obtained. A. Freiherrn v. Hübl.

SOME OLD EXPEDIENTS WORTH REMEMBERING.

[Paper read before the Photographic Club, March 2, 1898.]

At the present time the attention of photographers is more directed to the development of the art-science of photography, in the direction of colour printing and photo-mechanical processes, than the preparation of negatives and prints in the old-fashioned manner, by which I mean the simple negative and print from it, which at the same time I think will never quite become obsolete; but, at any rate, for years past, this phase of photography has been practically at a standstill.

Negatives are no better, developers are no better, and prints are no better, than they have been for years past, from a *manipulatory* point of view; it is true the number of our developing agents has increased, and new papers of excellent quality have been introduced, our appliances have been improved in many respects, ingenious inventions have also made it more easy for the photographer to carry on his profession, but a good negative twenty years ago is a good negative now, and can hold its own with any modern one developed with the latest developer on any plate. Manipulatory excellence attained perfection years ago, and no matter what new plans are introduced, with perhaps the exception of making good results more easy to attain, no improvement has been made in the negative itself, or is, I fancy, ever likely to be. Of course the old negatives were made suitable for the paper on which they had to be printed, and would now, for our modern papers, prove too dense; but that can scarcely be termed a fault, they were suitable for the condition imposed, and what more are those of the present day? A good deal is said about *the* perfect negative, as if one kind should be the standard for all, when no two dissimilar printing processes require the same kind of negative in order to evolve the best results, with the exception that all kinds require to have a certain, if small, amount of clear glass, perfect opacity and good gradation.

Many modern plates are undoubtedly better exponents of colour, and in special cases this is a *decided* advantage; but, generally speaking, old wet-collodion negatives could be, and were, made to give as correct representations of ordinary landscapes, at any rate as the gelatine ones do now.

Nobody will dispute the wonderful convenience of our modern methods of working compared with the old plans; but the *finished* results of one equal that of the other in all respects, and, with all due credit to modern processes, often better. It will be said we have much better pictures now than formerly, and every year shows an advance in this direction. So we have, but the increasing excellence is in the artistic treatments of the subject, not in the negative being better in itself. In artistic treatment there is *no finality*, and every year may be expected to be an improvement on previous ones.

Whatever successes may be achieved, they are in all instances facilitated by a thorough knowledge of making the negative, and in this matter we should not rest until we can as easily get the effects we require by having all our apparatus and chemical reactions as much under control as our pens in letter-writing, or our brushes in painting. Those who are most perfect in this preliminary work and knowledge will succeed best in the advanced stages of photography, when tools are forgotten as means to an end, and the resulting picture is alone thought of. It is some of the old-fashioned but useful plans I propose talking of this evening; not that they are altogether out of date even now, but such that were in frequent use a quarter of a century ago, or even more. Retrospective glimpses into the long past are occasionally useful in the present, and there are but very few old hands that will not recognise in some much-lauded new process or invention some old friend with a new name, that for some reason or other has fallen into desuetude, or has been temporarily lost sight of or forgotten altogether. It may be asked, If a thing was worth anything, why was it dropped? The answer is not hard to give. Formerly, any new dodge or invention, valuable or otherwise, was guarded with great secrecy, and scores of things were forgotten when the inventor joined the majority, as nothing was left more tangible than results, their means of production having been communicated to few persons, or perhaps to no one at all, who cared to retain the knowledge, and, as a natural consequence, they lapsed into obscurity.

I can call to mind several excellent processes, judging by the results, that have never been made public, but now, in the light of modern experience, were, in all probability, achieved by the use of an emulsion of the silver haloids in gelatine. This plan would at least produce similar work, but, in those days, gelatine photography was not more than experimentally known, and not much of that. As the goal attempted has been the same, namely, a good print, it is quite reasonable to expect—we know it for a fact—that experiments would run in very similar grooves, and several persons might hit on the same process without any communication with each other, each thinking they were the sole inventors, there were no weekly meetings in those days, and those that did occasionally take place were rather formal, unsociable affairs, at which some novelty might be shown, but very meagre information about its production. Any apparently good thing was financed as a secret process, and did not benefit photography at large. Now this is all changed. More liberal ideas prevail, and this Club, which is an offshoot of the only social photographic society of that date, may flatter itself that it was one of the first, if not the very first, where photographers could and did exchange ideas freely, for their mutual benefit, without the hampering influence of what was to be got out of it. On all sides we see the results of this unselfish manner of treating things. Clubs and societies, without number, have sprung into existence, and photography has been popularised; new trades have been created, and occupation and amusement found for thousands of people, the root of it all being the free, untrammelled exchange of ideas fostered by such societies as this Club. There is an undoubted tendency to making every process as automatic as possible. Less trouble seems to be the ruling idea. There are many who consider trouble out of place in pursuing an amusement; but in photography, as in most other things, perfection is not attainable without trouble, and a good deal of it. E. Dunmore.

(*To be continued.*)

HAND-CAMERA CRITICISMS.

[Paper read before the London and Provincial Photographic Association.]

In selecting the above subject for my contribution to the Society's programme I have been influenced by the fact that the present is the time when most of us are contemplating additions to our apparatus in the way of new hand cameras, which shall be as complete and up to date as possible. I have therefore ventured to think that a few criticisms on the points of existing patterns would not be out of place. The increase in popularity of amateur photography has been almost entirely brought about by the introduction of the hand camera, which, in its turn, has probably caused a greater expenditure of inventive ingenuity on the part of the various camera-designers than all other scientific amusements put together. One has but to consider how universal is the practice of the art of photography amongst all classes to understand the necessity that has arisen for the multitude of different patterns that are now on the market. For instance, there is the man of leisure who, when contemplating a Continental trip, is suddenly fired with a desire to bring back some reminders of his trip, and is inspired with the necessary confidence in his own photographic powers by the alluring advertisements of the camera-makers, who intimate that all *he* has to do *is to press the button*, and they will do the rest. This class of amateur very rarely does anything to further the cause of photography, but has indirectly been of great service to the enthusiastic amateur, who invariably does all his own work and practises photography for the love of it. It was probably the man of leisure who awoke the camera-maker to the necessity for extreme portability, concentration of working parts, and facility in using, which are now prominent features in all up-to-date apparatus. On the other hand, the enthusiastic amateur, who had, prior to the hand-camera era, been in the habit of undertaking his photographic work encumbered with an apparatus weighing anything up to twenty pounds, was not at first so much attracted by portability, but insisted that a hand camera, to meet his requirements would have to do all that his old tripod apparatus was capable of doing. Hence a further batch of patterns, which include rising and cross fronts, swing back, horizontal and vertical focussing movements, &c. The schoolboy amateur has also been instrumental in adding to the variety of patterns; but, as he has not arrived at years of discrimination, he is perfectly satisfied with fixed-focus, simple instruments that have that most important element to him of cheapness.

Having now discussed some of the probable reasons for the introduction of so much variety in hand-camera construction, I will proceed to criticise various individual features. Probably the first question that arises in the purchase of a hand camera is, as to whether it shall have a magazine or dark slides. Old workers are undoubtedly inclined to favour dark slides, firstly, because they know how to use them to the best advantage; secondly, because they look with suspicion on the possibilities of failure on the part of the changing mechanism of the magazine. The objections to dark slides are that greater length of time is taken in changing the exposed plate. The camera, if made to take a set of three slides holding six plates only, has to be more bulky than a magazine instrument for twelve plates. If slides are carried separately, either a case has to be made for them, or one has to put up with the inconvenience of pocketing them, and, if as well made as they ought to be, they are expensive. Slides are frequently fitted with light-tight traps for the unwary amateur to fall into, for, should he insert the sheath the least bit out of the straight, he will promptly discover more fog than image on his plate. In addition, unless most carefully made, the trap will frequently fail to close on withdrawal of the sheath. To sum up, the advantages of dark slides lie in the fact that changing the plates is a certainty, it is easily possible to vary the change of plates to suit any emergency, and to know the locality of any particular plate. The camera is lighter in the hand when fitted for slides, and the plates do not get so dusty, neither do they stand so much risk of scratching.

Magazine-changing, when properly worked out, has many advantages, among which may be enumerated greater carrying capacity in smaller space, rapidity of changing, facility of reloading, unobtrusiveness, &c. Points to be noted with regard to magazines are that the method of changing must be as simple as possible, more than *one* movement should be unnecessary; all mechanism should be so arranged as to be readily got at for repairs or inspection, and should be free from any suspicion of complication. The camera should not have to be tilted to any particular angle to ensure successful changing. Systems that require the plate to slide into any particular groove, or that require the plates to be loaded in any particular order, should be avoided, as one must not forget that what can be readily done in daylight or at the dealer's counter is not so easy to carry out in a dark room. A further and important point is that it should be easy to remove all exposed plates without in any way disturbing those not yet exposed.

Bag-changing boxes have met with considerable favour, but are not so expeditious in changing as one could wish; the bag soon shows signs of wear, and gets leaky, and is also prone to holding dust, which in its turn is a fruitful source of pinholes, for which the unfortunate plate-maker is too often blamed. Other types of bag-changing magazines have recently come upon the market, which have the advantage of being independent of any lever mechanism to change the plates, these in one form of magazine being passed into the bag by the pushing home of the slide. In another type the plates are so arranged that the front one can be readily raised into the bag by the fingers. A frequent fault with magazine changers, in which the plates are pressed forward in rotation for exposure, is the creeping of the light past the first plate, with consequent fogging of the edges of those immediately in the rear; this is frequently noticeable when giving time exposures. Bag-changing magazines are practically free from this fault, owing to the sheath being pressed home against a supporting face on at least three sides. There are many other points of comparison between the competing changing systems which I might perhaps touch upon but that the object of my paper is rather to criticise than to recommend.

The next, and perhaps almost equally important, point in a hand camera is the type of lens usually fitted. There is not, however, so much room for criticism here, as this matter usually resolves itself into a question of outlay. The principal point to be noted is that the largest working aperture should never be less than *f*-11, and as much more as is possible. The newer types of anastigmatic lenses are undoubtedly the best lenses to use, owing to their perfect definition at full aperture, which in the case of a lens recently introduced has been increased to as much as *f*-3·8. There is, however, a theoretical objection to the large circle of

illumination that is usually found in anastigmatic lenses, which it is assumed by some to cause deterioration in the brilliancy of the image owing to surface reflection in the body of the camera. Constant use in one of my quarter-plate hand cameras of a five-inch anastigmat that is capable of illuminating a whole plate, has proved to my satisfaction that theory in this instance can be disregarded. Should there, however, be a suspicion still lurking in the mind of the user of an anastigmatic lens on this point, I would suggest that the difficulty might be readily surmounted by the use of a cap attachment to the back combination of the lens, placed at a suitable distance from the same, with an accurately calculated rectangular opening therein which would cut off all inefficient rays.

Having satisfied ourselves that the lens selected is suitable on the point of aperture, the next and most important feature is to see the shutter of our hand camera is capable of utilising in full the benefits of this aperture. Unfortunately with the majority of cameras I have seen this is by far the weakest point. Most makers adopt the fly-across system of shutter, with a small aperture cut in a sector of metal. In some cases that have come under my notice this aperture has been actually smaller than the working aperture of the lens. The efficiency of this type of shutter is undoubtedly very bad, the lens aperture being fully uncovered for an infinitesimal portion only of the total movement of the shutter, the remainder of the time being occupied by the sector in approaching and passing the aperture. In fact, with certain types of cheap hand cameras, mostly, however, of foreign manufacture, a fully timed plate would be a practical impossibility, excepting in the bright sunshine with which we are favoured for a few months in the year only. A further fault with the type of hand camera above referred to is the absurd speed at which the shutter is made to work. This speed is very rarely variable, for the simple reason that the mechanical parts of the shutter are so roughly turned out that, unless strong springs are used, the shutter simply refuses to work at all. The diaphragm of the lens, or as near to it as possible, is undoubtedly the best place to fit the shutter, especially for high-speed work, as at this point a shutter can be readily made to work with high efficiency; all parts of the image are exposed simultaneously, and there is no distortion, In my opinion that form of shutter in which the sectors open rapidly from the centre, and remain open during practically the whole length of the exposure, closing equally as quickly, is the best type of shutter. A theoretical objection that is often made to this type of shutter is that the centre of the plate, which would in any case be best illuminated by the lens owing to the shorter length of the central rays of light, is the part on which the shutter first opens, and should therefore show evidence of longer exposure than the margins of the plate. I have, however, in actual practice found that this theoretical objection may be disregarded. Blind shutters have many good points, not the least of which is their constancy of exposure and freedom from vibration. The makers up to the present have, however, never apparently studied the requirements of the hand camerist to any great extent in designing these shutters, all the working parts and adjustments being most difficult to attend to when the shutter is boxed up inside the hand camera. The winding-up spindle is never long enough to be brought outside the camera, where it would be most useful; the release has always to be adapted by the builder of the camera; a speed indicator, when fitted, can rarely be seen; the dangling setting cord has a most obnoxious habit of catching up in anything and everything it can, nipping many a prospective prize picture in the bud. There is, however, a pattern made in which the setting cord flies back into the shutter after same is set, but I have not found this so reliable; and, further, the fact that one does not know by the position of the cord whether the shutter is set or not frequently leads to disastrous experimental pressures on the release in order to make sure. For very high-speed work the focal plane shutter becomes a necessity, although, for general work, it cannot be recommended. It is noisy in working, troublesome in adjustment of the slit, and not infrequently passes right round the edges of the blind after the pressure of the spring is released. Variable speeds are an absolute necessity to a practical worker, and are undoubtedly most reliable when controlled by the action of a pneumatic brake. Unfortunately the variation in speed as marked on many a shutter on the market exists only in the imagination of the maker, and such speeds are Quixotic in their conception, especially when the efficiency of the said shutter is also taken into consideration. I am of opinion that an exposure as low as half a second would be more generally useful in a hand camera than extremes of speed in the other direction. Constancy in speed is also another important point, and it is in this important feature that the air brake scores most heavily. Friction brakes vary considerably, especially if the shutter has been out of use for some little time, and any combination in which the lengthening or shortening of springs controls the speed is bound to be affected by change of temperature.

J. E. Hodd.

(To be continued.)

THE THORNTON-PICKARD MANUFACTURING COMPANY, LIMITED.

The First Ordinary General Meeting of the shareholders of the above Company was held at the Registered Offices, Altrincham, on Monday, February 28, 1898. Mr. G. A. Pickard occupied the chair, and, in opening the meeting, said he felt sure that they would all feel regret at the absence of Mr. Thornton, who had been obliged to take a little rest, and was therefore enjoying a short holiday on the south coast. He assured the shareholders that the past twelve months had been a year of very considerable strain on the Directors of the Company. In the first place, the formation of the Company itself and the changes it introduced occupied much time and attention. In addition, the shareholders were aware that, soon after its formation, the Company lost one of its founders, the late Mr. Edgar Pickard, whose death entailed anxious thought and effort upon the officers and staff of the Company. Notwithstanding these drawbacks, he was pleased to be able to submit to the meeting such a report as the one that had been posted to the shareholders, which, with the consent of the meeting, he would take as read. In proceeding to move its adoption, it gave him great pleasure to announce that, as far as the business of the Company was concerned, it was in a very satisfactory condition. The turnover during the last year had very considerably increased, also the sales of shutters and cameras. Respecting the developments of the business, those who had taken an interest in the question, and had received the new catalogue, would probably know that they had introduced three novelties, which the Directors believed to be of great value, and likely to produce very good effects upon the fortunes of the Company. In the first place, with a view to meeting the demand for a cheaper shutter than the standard pattern, they had introduced a shutter, the box of which was made of aluminium. A considerable number of these aluminium shutters were already on order, and they were expecting a very large demand for them. They were quoted at a lower price than those made of mahogany, and the Directors believed they would supply an existing want. Then, they had brought out a film-carrier, which, by a little ingenious idea, enabled films to be used in taking photographs without the addition of any cardboard packing to strengthen the carrier. The increasing sales of these indicated their popularity. The third item was the introduction of the use of aluminium in making the shutters of their patent plate-holders. This change was likely to be a great improvement, and would make the plate-holders superior to those hitherto in use. He had great pleasure in stating that the three items in question were very largely the result of Mr. Thornton's energy and foresight, and would help them to keep in the forefront of the photographic trade, and materially conduce to the prosperity of the Company. Their business was of a world-wide character, and their *clientèle* was to be found in every civilised community. The Company had supplied two or three of their shutters for use by Sir Norman Lockyer's Expedition to India in taking photographs of the eclipse of the sun, and they sent an outfit some time ago to an officer engaged in the fighting which recently took place in the Swat Valley, Northern India. He dared say that the shareholders would have noticed in the report that the stock had increased, and was perhaps, they might think, rather large. He could assure them, however, that it was absolutely necessary to have a large stock so that they might be in a position to execute orders quickly, punctuality being a very necessary attribute if unqualified satisfaction was to be given to customers.

After remarks by Mr. Berra and Mr. Ferguson, the adoption of the report and accounts for the past year was put to the meeting and carried unanimously.

The next business, the Chairman said, was to sanction the dividend on the ordinary shares recommended in the report. Mr. Berra moved that a dividend of ten per cent. on the ordinary shares for the past half-year, making with the five per cent. interim dividend a total of seven and a half per cent. for the year, be declared. In doing so he did not know that the resolution called for any remarks beyond the fact that the dividend had been well earned. They had carried 1000*l.* to the reserve fund, had written off 943*l.* 19*s.* 9*d.* from goodwill and patents, and had made provision for bad and doubtful debts. After allowing for these two items and after the proposed dividend was paid, there still remained a balance of 1345*l.* to carry forward. The resolution was seconded by Mr. Ferguson and unanimously carried. Mr. Ferguson proposed, and Mr. Sanderson seconded, that the sum of 400 guineas be voted to the Directors for their services during the past year, which was carried unanimously.

Our Editorial Table.

The "Avery" Backing.

London Agents: Henry Lamplough, Limited, 166–167, Strand, W.C.

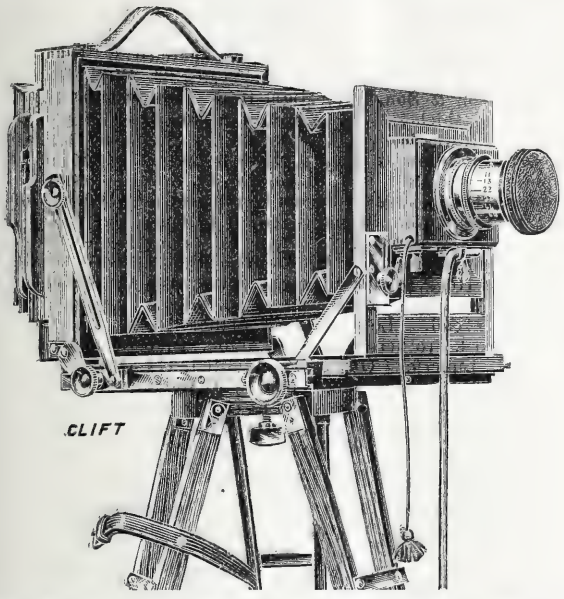
This backing mixture is prepared by Mr. John H. Avery, one of our most expert architectural photographers, whose knowledge of what is required to obviate halation in negatives has been utilised to excellent advantage. The medium is a red-coloured viscous body, which is best applied to the back of the plate by being evenly spread with a pad of flannel or similar material. In this manner a smooth, even film is obtained, and the deposit dries hard in a very few minutes. In the dry state the backing apparently does not chip or flake off. As a preventive of halation in difficult subjects we find upon trial that the Avery backing behaves admirably; and it is easily removable from the plate before, during, or after development by

neans of a moistened pledget of cotton-wool. We have not found a more leanly working or satisfactory backing than Mr. Avery's, which we can ordially recommend to photographers.

The "Victo" Set of Apparatus.

George Houghton & Son, 88-89 High Holborn, W.C.

This is a new camera set for amateur work that has just been introduced by Messrs. Houghton. It is of excellent value and workmanship. The amera is made of best polished mahogany. It is fitted with all the ssential movements, viz.: long extension (16 inches), rising front,



eversing frame, double swing back, so arranged that it can be pushed rward and clamped in any position. When closed the camera measures nly two inches in thickness. The double dark slides are book form with pecial light-tight joints and spring catches. The lens is a rapid rectilinear with iris diaphragms and removable hood. The shutter is of the hornton-Pickard make, fitted behind the lens and attached to front of amera. The tripod stand is with threefold special top.

Florentine Frames.

Frost & Reed, 8 Clare-street, Bristol.

Messrs. Frost & Reed have submitted to us a sample of their Florentine ames. These are carved in wood to a very elegant design, and are beautfully gilt and varnished. The frames are specially recommended for opals nd enlargements on white or tinted grounds, no mounts being required, nd they should answer admirably, for they are undeniably good and steful, and can be strongly recommended to our readers.

Marion's Practical Guide to Photography.

Published by Marion & Co., Soho-square, W.

new edition of this useful book has been issued, bringing it into the ghteenth thousand. It now consists of 288 pages, forty pages of matter ving been added. The book throughout is a safe and sound guide to odern photography, evidently written by a competent hand. It deals th all the usual branches of the subject, including enlarging, reuching, combination printing, vignetting, portraiture in an ordinary om, &c. Theoretically and practically, the book is an excellent e.

Hints for Photographers is the title of a little book of photographic nts compiled and issued by Messrs. R. Field & Co., 142, Suffolk-street, rmingham. Many of these hints refer to the use of the Watkins' ter, and all of them are sound, useful, and informative.

Messrs. Beechings, Limited, 174, Strand, W.C., are issuing a new series illustrated post cards, of English design and English printing. The ustrations consist of half-tone portraits of pretty and popular actresses, e photographs having been taken by the ablest theatrical photographer at we have, Mr. Alfred Ellis, of Upper Baker-street, W. Admirers of e stage and its chief ornaments will assuredly be pleased with these st cards which, bearing penny stamps, may be used for transmission road.

News and Notes.

Royal Photographic Society.—Technical Meeting, Tuesday, March 22, at eight p.m. "The Gum-bichromate Process," by Mr. Robert Demachy.

The Reynolds Fund.—The following contributions have reached us:—Mr. G. Anthony Beales, 1*l.* 1*s.*; Mr. S. Clark, 1*l*; Mr. F. G. O. Stuart, 5*s.*

The Austin Edwards Monthly Film-negative Competition.—The prize camera for the current month has been awarded to Master N. H. Brandon, 8, Lansdowne-road, Tottenham, for his negative, *Swans at Bruce Castle.*

We are pleased to learn that the South London Photographic Society's Exhibition closed on Saturday last with a larger attendance than on any previous occasion. Lady Maple attended and presented the awards made by the Judges.

Mr. T. A. Scotton writes: I have recently changed my residence to Temple Villa, Western-road, Derby, and, as my correspondence is continually getting astray, I should esteem it a favour if you would kindly find space in your valuable Journal to insert the address.

Putney Photographic Society.—At a Council meeting held on March 10 Dr. W. J. Sheppard was unanimously elected President of the Society, to fill the position occupied by the late Hon. Baron Pollock, and Mr. L. S. Zachariassen was elected a Vice-President in the place of Dr. Sheppard.

Photographic Club.—Wednesday evening, March 23, at eight o'clock, a demonstration of "Glass Blowing for Amateurs and Experimentalists," by Mr. T. Bolas, F.C.S., F.I.C. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary, Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E., will be pleased to forward on application.

Under the auspices of the Polytechnic Photographic Society, 309, Regent-street, W., a popular lecture, entitled "The Camera and the Wheel," illustrated by lantern slides, will be given by Mr. F. O. Bynoe, in the great hall of the Polytechnic Institution, on Friday, March 25, at 8.15 p.m. Admission is by ticket, obtainable of the Hon. Secretaries, Messrs. F. W. Parker, 76, Patshull-road, N.W., and H. A. Baxter, 309, Regent-street, W. The hall holds 1200 persons.

For cleaning lenses, the *Allgem. I. f. Uhrmacherkunst* recommends vegetable pith. For this purpose the medulla of rushes, elders, or sun flowers, is cut out, the pieces dried, and pasted singly alongside of one another upon a piece of cork, whereby a brushlike apparatus is obtained, which is passed over the surface of the lens. For very small lenses, pointed pieces of elder pith are employed. To dip dirty and greasy lenses into oil of turpentine or ether, and rubbing them with a linen rag, as proposed by the above journal, seems hazardous, because the Canada balsam, with which the lenses are cemented, might become dissolved. One had better carefully wipe off the lenses with a soft linen rag dipped in oil of turpentine, &c.

The North Middlesex Photographic Society's Annual Dinner was held at the Holborn Restaurant on Saturday, March 12. The President (Mr. J. C. S. Mummery) occupied the chair, and was supported by a large attendance of members and visitors, the latter including Rev. F. C. Lambert, Mr. Horsley Hinton, Mr. Debenham, Mr. P. Everitt, Mr. Bedding, Mr. Wall, and others. Two of the principal features of the evening were the distribution by Rev. F. C. Lambert of the certificates awarded at the recent exhibition of members' work, and the presentation to Mr. W. Taylor, the retiring Hon. Secretary, of a hand camera in recognition of his services to the Society. The principal toasts were "The Society," given by Mr. Wall, and "The Officers," proposed by Mr. R. Child Bayley. A pleasant evening terminated at a late hour by the singing of "Auld Lang Syne."

John Killock, aged forty-four, a photographic canvasser, was indicted at the Derby Assizes, before Mr. Justice Hawkins, for obtaining the sum of 2*s.* 6*d.* on November 30, and four other sums of 1*s.* each on various other dates in December, from Mary Ann Roe, by false pretences at Chesterfield. The evidence was to the effect that prisoner called upon people and represented that he was a canvasser for a firm of photographers, and by that means obtained deposits, when people gave him orders. Prisoner admitted having received the money, but denied that he had any fraudulent intent. Another indictment was not entered into. Prisoner, in reply to his Lordship, admitted that he had been twice previously convicted of embezzlement since 1892, but urged that those convictions were in respect of very small sums. Prisoner was sent to gaol for one month.

The Thornton-Pickard Manufacturing Company inform us that at the forthcoming Photographic Exhibition at the Portman Rooms, which opens on April 22, they have taken Stand No. 8 (adjoining the orchestra) for exhibiting the various articles of their manufacture. They intend to make a display which will consist of some half dozen specimens of their different photographic outfits, including both Amber and Ruby cameras. These outfits will be placed in such a manner as to show at a glance all the different articles included in them. They will also have on view a good number of their cameras, of different sizes and construction; a large supply of their patent roller-blind shutters, including the time and instantaneous standard pattern, snap-shot pattern, stereoscopic, self-capping blind, special, silent, studio, and focal-plane shutters. Several items which have been introduced during the last twelve months will be shown, as follows: New patent aluminium shutters; patent plate-holder, with new patent light trap and aluminium shutter; new patent film-carriers. In addition to the above they will show specimens of their other photographic accessories, viz., patent three-fold and two-fold stands; patent tripod top, with folding screw; patent double dark-slide recorders; patent rubber moulding for adapting different sizes of lenses to the same shutter; balls and tubes; plumb indicators, &c. To illustrate what has been done, and what can be done, by using their photographic apparatus, they will have on view a good selection of photographs taken with them.

Re John Orme (trading as J. Orme & Co.), Optician and Scientific Apparatus Manufacturer, Cross-street, Finsbury, E.C., and residing at Stratford. An application was made at the London Bankruptcy Court on March 11, before Mr. Registrar Brougham, for the discharge of the above-named bankrupt. It appeared from the Official Receiver's report that the receiving order was made in November last, on the debtor's own petition, and the statement of affairs filed thereunder showed liabilities amounting to 1769*l.* 13*s.* 9*d.*, and assets expected to realise 150*l.*, or sufficient to pay a dividend of about 1*s.* in the £ to the unsecured creditors. The bankrupt in 1879 purchased the business carried on at 65, Barbican, by Mr. M. Jackson, his employer, who died in that year. He was joined in the business by a partner, and they carried on the concern together until 1881, when the partner retired and the debtor traded alone until September last, when the bulk of his stock and effects were sold under a distraint for rent. The debtor then removed to Cross-street, Finsbury, where he continued to carry on business until the petition in bankruptcy was filed. The immediate cause of debtor filing his petition was in consequence of an execution having been levied on his goods at the instance of a creditor. The debtor had made an arrangement with his creditors on a previous occasion, viz., in 1891, and under that arrangement he agreed to pay his creditors a composition of 7*s.* 6*d.* in the £. As a matter of fact, he was unable to carry that arrangement through, and a portion of those debts were included in the present bankruptcy. The debtor alleged his failure to have been caused through the excessive amount he agreed to pay his partner when he retired from the business, to the heavy strain on the resources of the business caused by the liabilities incurred in connexion with an electric fog signal that he patented, and to the subsequent stoppage of the business, and consequent loss, through the distraint and execution. The offences alleged against the debtor, by the Official Receiver, were: that the assets were not sufficient to pay a dividend of 10*s.* in the £ to the unsecured creditors; that the debtor had not kept his books in such a manner as was necessary to show his business transactions and financial position at specified intervals; that he had continued to carry on business after becoming aware of his insolvent position; and, lastly, that he had executed a private arrangement with his creditors on a previous occasion. The Registrar, after reviewing the case, suspended the discharge for two and a half years.

A CASE of some considerable interest to photographers occupied the attention of Judge Bagshawe at the sitting of the Bedford County Court on Thursday, February 17. Mr. Drury Stowe, a Bedford photographer of many years' standing, sued the father of a former apprentice for compensation in respect to breaking off the contract. Defendant's son was a youth of eighteen, and arrangements were made whereby he went to Mr. Stowe's as an outdoor apprentice; his father is a High-street tradesman. Plaintiff's son was directed to teach the apprentice the art of printing, print-cutting, burnishing, and such minor arts connected with the photographic profession, and it was said he seemed to make fair progress. Plaintiff's son then left to go to another firm, and the apprentice was employed in the studio. Here, plaintiff alleged, the apprentice spoilt several plates by not putting the dark slide in the camera correctly. Many prints were wasted through the youth putting the prints in to wash "pell-mell." Sitters had to come again. In fact, the youth, it was said, was grossly careless, and it was alleged that he made mistakes maliciously. On one occasion plaintiff found that some particular kind of paper was missing. Defendant's son had access to the place where it was stored. He, however, denied all knowledge as to how the paper had disappeared. Plaintiff said he must know. Then there was a scene, defendant's son saying that the plaintiff implied that he was a thief. Plaintiff would not allow the youth to have a holiday when he asked for one, remarking that he would be only too pleased to give him one when he deserved it. That, plaintiff said, was the only pressure he had over the boy. A series of letters were written between defendant and the plaintiff respecting the son's conduct, the father resenting Mr. Stowe's action in not giving his son a holiday when he asked for one. The boy absented himself without leave, and Mr. Stowe had to obtain an assistant for two weeks, and before he left altogether he was very insolent. When the youth returned, after absenting himself, he was placed under the assistant. Mr. Stowe offered to reinstate him if he paid 2*l.* 2*s.*, being the expense he was put to in obtaining an assistant for two weeks. The defendant, in his evidence, denied that the mistakes he had made were committed wilfully, and said that Mr. Stowe bullied and worried him. He also denied that he put the prints into the bath in batches. Mr. Stowe once asked him to clean the front window whilst he was engaged in printing. He told him that he did not think that there was anything relating to window-cleaning in the indentures. With respect to the disappearance of the paper, he did not know what had become of it; it was no use to him. Judge Bagshawe, in delivering judgment, awarded the plaintiff 13*l.* damages on his claim, and dismissed the counter claim. The counter claim was for an alleged breach of covenant on plaintiff's part. The costs of both claim and counter claim are to be on the 50*l.* scale. Payment in four weeks.

THE ROLL OF MINISTERING CHILDREN.—The following photographers have signified their intention of helping the Prince of Wales's Hospital Fund by taking free photographs of those children in their various districts who are desirous of being included in the Roll. Particulars from the under-mentioned firms or from Messrs. Speaight, 178, Regent-street, London:—Aberdare: Lendon Barry, & Co., 47, Commercial-street. Arbroath: James Milne, St. Ruth's. Aldershot: R. W. Elliott, 93, High-street. Ayr: Bara, Fort Studio. Aberdeen: W. B. Anderson, 26, Union-terrace. Addlestone: N. T. Bates. Ashford: H. Penfold, 100, High-street. Altrincham: Bradshaw & Co., Church-street. Aintree: F. N. Eaton, Higher-lane. Bournemouth: Debenham & Gould, Glen View Studio. Brighton: P. C. Mora, 127, Western-road. Bury St. Edmunds: J. P. Clarke, Abbey-hill House. Barnstaple: Major, Darkie, & Loraine, 78, High-street. Belfast: W. Abernethy, 29, High-street. Bedford: Blake & Edgar, 38, High-street. Burton-on-Trent: Pollard Graham, 113A, Station-street. Berwick-on-Tweed: W. Green, 9, Castle-gate. Bromley and Beckenham: E. D. Lavender. Burnley: Barcroft & Crabtree, 4, Pratt-street, Colne-road. Bacup: Barcroft & Crabtree, Pippin Bank. Blackheath: H. Wayland, Rembrandt House. Bradford: A. & G. Taylor. Beddington: French & Co. Bangor: Mills Brothers, North Wales Art Studio. Birkenhead: F. A. Cooper, 32, Hamilton-square. Blackpool: E. E. Hindley, 86, Talbot-road. Chatham: Honey & Co., 114, High-street. Cork: Guy & Co., Limited, 70, Patrick-street. Chippenham: J. R. Singer, High-street. Coventry: W. H. Gough, 4 Burges-street. Chelmsford: Duyshart & Co., 75, Duke-street. Chertsey: W. Bates, East-street. Chester: G. W. Webster, 33, Bridge Street-row. Camborne: J. C. Burrow, 37, Trelowarren-street. Cowes: Debenham & Sons, 72, High-street. Cambridge: J. P. Clarke, Post Office-terrace. Carnarvon: J. Kinsley, North-road. Cardiff: A. Freke, 12, Duke-street. Carshalton: French & Co. Derby: W. W. Winter, Alexander Rooms, Midland-road. Dorking: W. Usherwood, Shrub House, High-street. Dewsbury: A. & G. Taylor, 3, Bond-street, Northgate. Dover: Lambert Weston, & Son, 18, Waterloo-crescent. Dublin: Stanley, 22, Westmoreland-street. Dumfries: Alexander's Studio, 48 English-street. Eastbourne: A. H. Pestel, 49, Terminus-road. Ebbw Vale: Eastman & Son, Armoury-terrace. Ewell and Epsom: French & Co. Faversham: F. Barns, The Borough Studio. Folkestone: Lambert, Western, & Son, 23, Sandgate-road. Gravesend: F. C. Gould, 10, Harmer-street. Greenock: W. Fergus, 36, West Blackhall-street. Guildford: Robinson & Son, 147, High-street. Grantham: H. J. Bliss, 1, London-road. Galashiels: J. B. McNair, Abbotsford Villa. Halifax: T. Illingworth, 41, Crown-street. Harrowgate: M. Stephens, 1, James-street. High Wycombe: Findlow & Co., 5, Easton-street. Hyde: S. Searle, 2, Clarendon-place. Hastings: J. H. Bloomfield, 44, Robertson-street. Hitchin: T. B. Latchmore, Brand-street. Hemel Hempstead: F. Downer (of Watford, Hednesford: Thomas Owen, Station-street. Ipswich: J. White, 18, Brook-street. Inverness: Watson & Senior, 6, Church-street. Kidderminster: Thomas Ball, 7, Comberton-hill. King's Lynn: Smith & Sons, 60, High-street. Kendal: J. Henry Hogg, Stricklandgate. Kettering: C. Speight, 10, Broadway. Lancaster: J. Davis, Market-street Chambers. Lowestoft: Boughton & Sons, London-road. Londonderry: James Glass, 65, Carlisle-road. Leamington: Bullock Brothers, 138, The Parade. Lincoln: Harrison Brothers, 168, High-street. Limerick: Guy & Co., Limited, 114, George-street. Leeds: Eddison, Limited, 61, Albion-street. Louth: J. Matthews, Alexandria Studio. Luton: Anderson & Co., Wellington-street. Lewisham: Dalby. London: A. W. Wilson, 13F, Dalston-lane, Kingsland; A. Beales, 62, George-street, Croydon; G. Ridsdale Cleare, 97, Lower Clapton-road, N.E.; F. Kingsbury, 16, Belle Vue-road, Wandsworth Common, and 120, Fulham-road, S.W.; Mrs. C. Henwood, 359, High-road, Chiswick; E. H. Goodwin, 63, Anerley-road, S.E.; A. England, Triangle, New Barnet; J. Crowhurst, 50, London-road, Forest Hill; H. & J. Rigden, 105, Myddleton-road, Bowes Park, N. Macclesfield: Bullock Brothers, Hibel-road. Montrose: J. G. Brown, 14, High-street. Merthyr Tydfil: Harris, Son, & Co., Pontmorlis. Montgomeryshire: J. Owen (of Newtown). Margate: G. E. Houghton, Fort-hill. Maidenhead: W. Plumbe, 76, High-street. Newtown: J. Owen, 49, Broad-street. Newark: H. J. Bliss, Photographic Studio. Newport (Mon.): Siedle Brothers, 29, High-street. Nottingham: W. Baker, 8, Derby-road. Newbury: J. W. Righton, 42, Northbrook-street. Northampton: Draycott, 11, Gold-street. Norwich: A. E. Coe, 32, London-street. Newcastle (Staffs.): Harrison & Son, 77, Liverpool-road. Nelson: Barcroft & Crabtree, Cross-street. Newcastle-on-Tyne: J. Dickinson, City Portrait Gallery. Oswestry: J. Maclardy, Church-street. Oakengates: J. J. P. Bowler, Oxford-street. Pontypool: Jones & Co., Excelsior Studio, Osborne-road. Preston: Thomas Garth, Garstang-road. Perth: C. S. Ireland, St. Methven-street. Peterborough: H. Marriott, Eastmed Studio. Ryde (Isle of Wight): A. Debenham, 28, Union-street. Ramsgate: F. T. Palmer, Granville Marine Studio. Reading: S. V. White & Co., Blagrave-street. Rugby: J. J. Hensman, 29, High-street. Redhill: Robinson & Son, Rembrandt Studio. Rochester: J. J. Eastmead, Eastgate. Southport: Saville, 281, Lord-street. Sherborne: Cole & Son, The Parade. Southsea: Debenham & Co., 69, Palmerston-road. St. Albans: H. Andrée, Alma-road Studios. Southampton: Debenham & Smith, 1, Sussex-place. Stroud: J. H. Elliot, 10, Russell-street. Sevenoaks: C Essenhigh Corke, 39, London-road. Swansea: J. H. Goldie, 1, Northampton-place. Scarborough: Sarony & Co., Sarony-square. Shepperton: S. T. Bates (of Chertsey): Shaftesbury: Cole & Son, High-street. Spalding: Beales & Sons, New-road. South Shields: Downey & Son, 17, Eldon-street. Staines St. T. Bates (of Chertsey). Southend: F. Parsons, 3, Queen Anne-villas High-street. Salisbury: Witcomb & Son, 8, Catherine-street. Tonbridge T. A. Hemons, 141, High-street. Tredegar: Eastment & Sons. Tunstall: Addison & Co., 58, King-street. Taunton: H. Montague Cooper, 29, East-street. Tunbridge Wells: G. Glanville, The Broadway. Torquay: J. C. Dinham, 34, Union-street. Ulverston: J. Hargreaves, Lightburn Studio. Wakefield: G. & J. Hall, 9, Westgate. Weston-super-Mare: Miss Ethe Hopwood, The Grove Art Studio. Wolverhampton: Bennett Clark, 74 Darlington-street. Worcester: Bennett & Sons, 8, Broad-street. Welling borough: Simco & Holme, Midland-road. Winchester: H. W. Salmon, 771 High-street. Wisbech: J. Kenerell, 7, York-row. Warrington: T. Birtles Legh House. Walsall: Draycott, Leicester-square. Weybridge, Walton, and Woking: U. T. Bates. Wellington (Salop): J. J. P. Bowler, 10, New-street Watford: F. Downer, 110, High-sireet. Whitehaven: J. Bellman, 79 Lowther-street. Waterford: A. H. Poole, 34, Mall. Wimbledon: Russell Sons, 28, Hill-road. Woolwich: H. J. Dalby, 82, Wellington-street. Wallington: French & Co., 1. Railway-terrace. York: Debenham & Co., Clifford-street. Yarmouth: Mrs. E. Miller, 14, King-street.

Patent News.

THE following applications for Patents were made between February 28 and March 5, 1898:—

CINEMATOGRAPHS.—No. 4942. "Improvements in the Mechanism of Cinematographic Apparatus." T. J. GOUGH.

FILMS.—No. 4955. "Improvements in connexion with Photographic Films and in the Mounting, Storing, and Using of same and in the Storage Cases and Apparatus connected therewith." J. E. THORNTON.

CAMERAS.—No. 5045. "Improvements in Photographic Cameras." Complete specification. A. ANGEL and L. V. ANGEL.

CAMERAS.—No. 5108. "Improvements relating to Photographic Cameras." W. J. LANCASTER.

PHOTO-MECHANICAL ENGRAVING.—No. 5197. "Improvement in Photo-mechanical Engraving." E. S. PADMORE.

X-RAY LAMPS.—No. 5252. "Portable Exploring X-ray Lamp." A. E. DEAN.

X-RAY BLOCK PRINTING.—No. 5294. "The X-block Printing by means of the X Rays." Complete specification. G. IZAMBARD.

PHOTOGRAPH WRAPPERS.—No. 5299. "Postal Wrapper for Photographs or Letters or like articles." H. W. BOUGHTON.

DIAPHRAGM AND SHUTTER.—No. 5320. "A Combined Diaphragm and Shutter for Photographic Cameras." J. STARK.

STANDS.—No. 5331. "Improvements in Cycle Stands applicable also for Cameras and Telescopes." J. PUMPHREY.

PROJECTION APPARATUS.—No. 5410. "Improvements in Animated Photograph Projectors." H. W. JOY and W. BAINTON.

PROJECTION APPARATUS.—No. 5485. "Improvements in Photographic Projecting Machines." Complete specification. W. V. MILLER, G. P. RICE, and E. B. DUNN.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

March.	Name of Society.	Subject.
21	Bradford Photo. Society	*Printing, Toning, and Fixing P.O.P.* W. T. Wilkinson.
21	Camera Club	*Travels in Kashmere and Little Tibet.* Dr. Arthur Neve, F.R.C.S., and Mr. Millais.
21	North Middlesex	*The Use of the Camera.* F. W. Cox.
21	Richmond	Demonstration: *The Carbon Process.* T. Coysh.
21	Stafford Photo. Society	*Photographic Dodges.* C. M. Hepworth.
22	Birmingham Photo. Society	*Portraiture.* Harold Baker.
22	Brixton and Clapham	*Concerning Cameras and Shutters.* Mr. Scott.
22	Hackney	*A Recent Trip to the States.* Mrs. C. Weed Ward.
22	Isle of Thanet	*Practical Enlarging.* J. H. Forwalk.
22	Royal Photographic Society	*The Gum-bichromate Process* Robert Demachy.
23	Croydon Camera Club	Experiments with the Optical Lantern. A. E. Isaac.
23	Darwen	Prize Slides.
23	Kingston-on-Thames	*What I Saw in India.* Victor Robinson.
23	Leytonstone	Open Evening.
23	Photographic Club	Demonstration: *Glass-blowing for Amateurs and Experimentalists.* Thomas Bolas, F.C.S., F.I.C.
23	Polytechnic	*Safety Developers.* Howard Farmer.
23	Southport	*Wet-plate Photography.* George Cross.
24	Bradford Camera Club	*Photo-aquatint.* Dr. Clark.
24	Camera Club	*Photographic Engraving in Intaglio.* Colonel Waterhouse.
24	Ireland	*The Making and Faking of Lantern Slides.* A. M. Geddis.
24	Liverpool Amateur	Practical Demonstration: *Carbon Printing.* F. Anyon.
24	London and Provincial	Trade Night: Thornton-Pickard Manufacturing Company.
24	Shropshire	*Development.* W. Heath.
24	Woolwich Photo. Society	*Mounting and Framing Up.* William F. Slater.
25	Croydon Microscopical	Photographic Chat.
25	Polytechnic	*The Camera and the Wheel.* F. O. Bynoe.
25	West London	Members' Lantern Night.
26	Hackney	Excursion: Whipps' Cross. Leader, L. S. Wilks.

ROYAL PHOTOGRAPHIC SOCIETY.

MARCH 8,—Ordinary Meeting,—the Earl of Crawford, K.T., F.R.S. (President), in the chair.

DEATH OF DR. HURTER.

The PRESIDENT announced that a letter had been received from Mr. V. C. Driffield, stating that Dr. F. Hurter, his friend and colleague for twenty-seven years, died suddenly on the 5th instant. The President said that the Council of the Society had passed a resolution, upon the motion of Captain Abney, seconded by Mr. A. Cowan, as follows: "That the Council of the Royal Photographic Society have heard with the deepest regret of the decease of Dr. Ferdinand Hurter, some of whose contributions to science have been of the greatest interest and importance to photography; and that this resolution be communicated to Mr. Driffield with a request that he will hand the same to Dr. Hurter's relatives."

NEW MEMBERS, &C.

Six new members were elected, and four candidates were nominated. It was announced that the Gloucestershire Photographic Society had been admitted to affiliation, and that Messrs. G. Ewing and H. T. Malby had been elected as Fellows.

THE SOLAR ECLIPSE.

The Hon. Secretary (Colonel Waterhouse) showed a photograph, taken by Mr. Pope, of the Surveyor-General's Office, Calcutta, of the corona of the recent eclipse. The print was enlarged three diameters from a negative taken with an exposure of five seconds, extending from the twelfth to the sixteenth second of totality, and the PRESIDENT said it showed an extension of the corona certainly 800,000 miles away from the sun.

PHOTOGRAPHIC CHEMICALS AND GELATINE.

Mr. A. HADDON read a paper, entitled "The Passage of a few Salts used in Photography through Gelatine Septa." He commenced by remarking that the literature of the subject is very scanty, the only information of recent date being given in a paper by Dr. Gaedicke, of which a translation was published in THE BRITISH JOURNAL OF PHOTOGRAPHY in May 1897, and in which there was described a series of experiments made on the passage of hyposulphite of soda through gelatine. Reference was also made to the researches of the late Professor Graham, published in the *Philosophical Transactions* for 1850 and 1862, in which the diffusion and dialysis of salts were most admirably worked out. It appeared, from Professor Graham's experiments, that the statement frequently made that papers and plates need not be washed as long in summer as in winter, was not quite borne out; taking the minimum time for washing paper in running water in summer as ten minutes, at the freezing point of water the washing would only require to be prolonged to fourteen minutes at the outside. About two years ago, in a paper read before the London and Provincial Photographic Association, the lecturer expressed the opinion that reversal was probably due to the non-passage of the active constituents of a developer through those portions of the gelatine that corresponded to the over-exposed parts of the plate. He argued that the action of light on the bromide of silver was to set free a certain amount of bromine, that this was taken up by the gelatine, and that, in consequence of the affinity of gelatine for bromine, gelatino-bromide emulsion was more rapid than collodio-bromide emulsion. When the developer came into contact with the plate, the bromised gelatine, water, and pyrogallic acid reacted so as to produce oxidised pyrogallic acid and hydrobromic acid, and the oxidised pyrogallic acid combined with the gelatine and the hydrobromic acid formed a bromide with the alkali present; the compound formed by the combination of oxidised pyrogallic acid and gelatine was less absorbent of water, and less pervious to the salts, than was the unaltered gelatine, hence the non-development of those portions of the image. Shortly after the expression of this opinion he was told that the bromide of silver under the developed and undeveloped portions fixed at the same rate, and that therefore his views could not be correct; and it was with a view to throw a little light on the subject that he undertook a series of experiments to determine the rates at which salts passed through gelatine in different states of hardness. The lecturer then proceeded to explain in detail the methods which he had adopted for the preparation of the gelatine septa, and for estimating the quantity of the salt left in the septum at the end of a given interval of time, the salts used in the course of his investigations having been hyposulphite of soda, bromide of potassium, carbonate of soda, sulphite of soda, bichloride of mercury, and pyrogallic acid. He found that hypo dialysed more rapidly through a septum tanned with oxidised pyro than through plain gelatine, and that gelatine hardened with chrome alum allowed very little of the salt to pass through; bromide of potassium passed at the same rate whatever the state of the gelatine; the results with carbonate of soda were akin to those with hypo; sulphite of soda passed most rapidly through plain gelatine; mercuric chloride passed most readily through a septum soaked in oxidised pyro; and pyro passed more readily through plain gelatine than through gelatine combined with oxidised pyro, but most rapidly through gelatine hardened with chrome alum—a result which would hardly have been expected. Mr. Haddon regarded the results as of sufficient interest to encourage him to pursue the subject further, for he thought that in the solution of the problem would be found the cause of reversal. Assuming that the action of light on bromide of silver caused a liberation of bromine, the bromine thus liberated would combine with the gelatine, and, when the developer came in contact with it, oxidised pyro would be produced by the action of the pyro, bromine, and water; in this manner each separate grain of bromide of silver would be surrounded by a coating of tanned gelatine less pervious to the solution than other parts which had only received the correct exposure, and which would be surrounded by a less thick skin. If this were not the true cause of reversal, how was it that it was possible to prevent reversal by soaking the plate in solutions of certain reagents? Those bodies which prevented reversal were more powerful absorbers of bromine than was gelatine, and therefore the tanning did not take place to the same extent, and development of the image was possible.

Mr. CHAPMAN JONES suggested that Mr. Haddon should ascertain the rates of passage through two films, one of which had been exposed sufficiently to produce reversal, while the other had received only a normal exposure; also that he should endeavour to show that the amount of bromine liberated really did produce an effect. Personally, he could not help thinking that this matter really had very little to do with reversal. If reversal was caused in the manner suggested, how was it that a film containing iodide of silver, in addition to bromide, gave practically no reversal?

After a few remarks by Mr. BOLAS and Mr. SPILLER,

Mr. HADDON briefly replied. With regard to the fact that no reversal arose in plates containing a large proportion of iodine, he said chlorine and bromine produced compounds with gelatine, but iodine did not, so that, as the iodine did not act on the gelatine, the developer would have an unimpeded passage through the film.

MARCH 15,—Photo-mechanical Meeting,—the Earl of Crawford, K.T., F.R.S. (President), in the chair.

NEGATIVE-MAKING FOR PROCESS WORK.

Mr. T. W. LASCELLES read a paper with this title, in which he described his method of making half-tone negatives on dry plates. He said he agreed with Mr. Max Levy that some considerable improvement was still to be made both in screens and dry plates; but he believed that a good negative could now be

made upon a dry plate, and that it would hold more tones than a wet-plate negative, and would also be comparatively free from that "tinnyness" which was the chief characteristic of the latter, while he was of opinion that it gave more individuality to the different artists' works. The screen he recommended was the Max Levy cross-lined screen, ruled diagonally, and he used Ross's symmetrical lenses; the camera should have screen adjustment gear, a reversing mirror, and the camera and copyboard should both be on the same bed. Every make of dry plate required a different exposure, as they varied not only in rapidity, but also in the difference of time with the separate stops. The stops should be a X, with each of the eight points touching the edge of the aperture of the *f*-16 of the Ross lens, a cross-star adapted to the *f*-11, and a square stop equal to *f*-16; he did not use all these on one negative, but there was much difference in screens possessing the same number of lines to the inch, and a stop should be selected suitable to the screen. The focussing screen should be ruled with two diagonal lines crossing in the centre. The method of focussing and trial of the three stops above mentioned was fully explained and illustrated by diagrams showing the results obtained by the use of each, together with the edging and backing of the plate preparatory to exposure, the latter operation being described as follows: Supposing the copy to be a wash drawing to be reproduced the same size, and the screen a Max Levy, 120 to the inch, the copy is illuminated by two arc lamps of 2000 candle power each, in semi-cylindrical reflectors painted white inside. Having put in the dark slide, insert the cross stop, and give three minutes' exposure (with Ilford process plate), and then fifteen minutes' with *f*-32, capping the lens when changing the stop; lastly, hang a sheet of white paper over the copy and expose for four minutes with *f*-64, which forces the dots right through the gelatine film and does not spoil the detail in the shadows. With an Ilford half-tone plate the exposures would be, with the stops mentioned, 1½ minutes, 1 minute, and ½ minute respectively. The developer he used for both plates differed from that recommended by the makers and was as follows:—

No. 1.

Hydroquinone	1¾ ounces.
Sulphite of soda	8 ,,
Water	80 ,,

No. 2.

Soda hydrate	2¾ ounces.
Water	80 ,,

For use take equal parts of each solution. After development and fixing the negative required to be reduced with ferricyanide and hypo, an operation which he regarded as the most difficult piece of work of the whole business, considerable experience being necessary in order to avoid uneven action and to determine the precise point at which to stop. Intensification with mercury and ammonia was recommended when necessary. The paper dealt in the fullest detail with the subject, and Mr. Lascelles stated that, by the method he described, over 18,000 negatives had been produced in his studio—all on dry plates—during the past three years. He exhibited several negatives and prints, made principally for the *Illustrated London News*.

Mr. W. Gamble remarked that success in working dry plates for process negatives depended largely on the brilliant lighting of the subject, and it was peculiar that a brilliant light gave a much stronger and sharper dot than could be obtained with a weaker light and longer exposure. After applying the ferricyanide reducer, a sort of bloom was left on the plate, and this could be removed by a weak solution of cyanide, which would also sharpen the dots and give a wet-plate appearance to the negative.

A general conversation ensued, in the course of which the President said that an excellent focussing screen for all purposes could be obtained by coating coarse ground glass with celluloid varnish.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 10,—Mr. E. J. Wall in the chair.

Colour Screens.

The Chairman reopened the question asked by Mr. Rapson some weeks ago as to the cause of his failure to get sharp focus when using a yellow screen. There were three possible causes where the screen was used behind or any where near the lens. First, the glass may be absolutely unsuitable owing to the presence of striæ; secondly, in the case of gelatine screens, the gelatine may get in a peculiar condition, charged with microbes, which produce growths, the direct effect of which is the diffusion of the focus; and, thirdly, the dye may crystallise out, owing to its strength. He passed round screens of different colours coated upon thin white patent plate with gelatine solution, 10 c. c. to the 4 × 4 plate. In one or two, owing to imperfect drying, the centre was of a different density to the margins, and the definition would be thereby somewhat impaired; but, in an undamaged condition, these screens acted perfectly. Two others, cemented with Canada balsam, gave, when made, critical definition. As regards screen-making, he mentioned the use of what are known as "pebble flats," in other words, the little pieces used for spectacles, and showed some roughly edged which he employed. They were not flats, four placed together having a focus of ·25 of a diopter. Used singly there was but a slight effect on the definition when put in the diaphragm slot. He showed two or three of these flats made into screens with suitable dyes. The destruction of definition of which Mr. Rapson complained was not to do with the lens when using a pale yellow screen. It might with some colours, owing to the lens being imperfectly corrected, but Mr. Rapson must look to the preparation of his screen for the cause. With the thinnest and whitest patent plate there was no difficulty in making perfect screens, nor need gelatine be used exclusively, collodion forming an admirable vehicle. Pieces of dyed collodion film, stripped from the waxed plate glass for use as screens, were shown, and it was said that they were made with celloidine and cetone. The Chairman also showed on the screen a fine specimen of the Joly colour process. The effect of the lines, which are essential to the process, was reduced to a minimum by throwing the image slightly out of focus.

Photo-micrography.

Dr. E. J. Spitta gave a lecture, illustrated with slides, upon photo-micrography. This branch of photography, he said, has risen in importance very much of recent years, owing principally to the greater perfection of the lenses now to be met with. Another factor is, that the means of reproduction have been so much improved by the introduction and perfection of the excellent collotype process, that publishers are able to use photo-micrography now for book illustration much more than was formerly the case. The subject was best dealt with in two parts, high-power and low-power work, the reason for this being that the microscope is not of any use for low-power work owing to its limited field. For small magnifications, then, the microscope is dispensed with, and an ordinary camera and lens made to answer the requirements. A diagram showing the arrangement of the apparatus was thrown upon the screen. First is the source of illumination—limelight, next the condenser, which it is imperative should be large, then comes the support carrying the specimen for enlargement, the lens, and the camera. An ordinary photographic objective may be used, but at the same time the circumstances under which it is used are totally different to those for which it is made. In ordinary photography the long conjugate focus is occupied by the field of view to be taken, and the short conjugate focus is that impinging on the plate. This order is reversed in the present case. There is a difficulty here with lenses of five-inch or even smaller focus, the extension of the camera making it hard to focus. To overcome this, Dr. Spitta got Dallmeyer to construct him a lens of very short focus, and found it answered admirably. It was a small rapid rectilinear of special construction. The effect of using an ordinary lens for this work was shown by a photograph which, though made with a Goerz lens, was not absolutely sharp. With the Dallmeyer lens, however, that beautiful sharpness of definition necessary in a photo-micrograph was perfectly given. The subject of this photograph was a section of the spinal cord cut by Dr. Buckmaster. The new Planar lens of 35 mm. and 75 mm. was a beautiful lens, working with the enormous aperture of *f*-4, and the latter was the most suitable, being provided with diaphragms. At this point a section of the œsophagus of a cat, showing the corrugations highly charged with arteries, was exhibited in the lantern. It served to explain the difficulty many have of swallowing a bolus, which is on account of its smallness, the job being to sufficiently pinch the throat to grasp the pill and carry it down. A photograph of a spider (which, by the way, is an animal and not an insect, resembling the human animal in its possession of heart, lungs, &c.) demonstrated the capabilities of the Planar lens mentioned before, the definition being particularly fine. The entire house fly forms a very difficult subject by reason of its denseness. Dr. Spitta had succeeded best with the Planar lens. The next few slides went to show the superiority in the rendering of minute detail possessed by the Planar over other lenses, and the lecturer saw in it a great achievement of Dr. Rudolph. Another branch of low-power work was the photography of culture tubes of bacteria, and formed by no means the easiest on account of the reflections from the tube, which were difficult to avoid. He got over it by placing the tube in a water bath, and other dodges according to circumstances. The process of making these cultures by stabbing the tube was explained, and slides of cholera, anthrax, the bubonic plague, &c., with their distinctive features were shown. Coming to the consideration of high-power work, diagrams of the essentials in the way of apparatus were shown. There were several patterns, but it was only to make clear the principle of the thing, and not that one was better than another. In this work it was of the highest importance that the object should not be moved, and it was necessary to provide for the taking up of the heat from the lime light which was sufficient to affect the object and ruin the enlarged picture, the slightest movement, of course, being greatly magnified at the other end. The different forms of upright apparatus for special work were described. Van Heurck's was probably the best instrument. In practice, it is necessary first to find the exact spot to be photographed, which is usually done with a low power, a high power being afterwards substituted. In the old way nose pieces are used, but there is often a difficulty in getting these to take the exact position required. Zeiss had introduced a changing device which ensures the absolute centering of the objective in a very simple way, and this Dr. Spitta has adopted. The condenser forms one of the greatest troubles to the photo-micrographer. There are very few which really give an achromatic cone. Nelson's quasi-achromatic is useful to a certain extent, but it is not perfect. Those of Zeiss, and Powell and Lealand are very good. For absolute perfection, he named the condenser made by Conradi, and so with his objectives, based on an entirely new principle. The focus of the condenser should be exactly on the object, thus ensuring critical light. Dr. Spitta then discussed the question of numerical aperture in the objective, a question which was of much importance. The achromatic lens and the apochromat were compared, to the distinct advantage of the last-named, and slides were shown explaining the effect of using high and low numerical aperture with these apochromats. In photographing bacilli it is sometimes hard to get contrast. This is best produced by colour screens, and not by monochromatic light. A very interesting collection of diatoms, and sections and parts of animals was projected upon the screen, embracing work from the smallest to very high degrees of magnification.

A vote of thanks was passed to Dr. Spitta, and to his son, who was responsible for the very excellent slides.

PHOTOGRAPHIC CLUB.

March 9,—Mr. R. Child Bayley in the chair.

Mr. E. W. Foxlee read an advertisement in an issue of *Photographic Notes* dated November 15, 1856, offering for sale a camera for plates 21×19. He mentioned this to show that the very common idea that plates of large size had only been comparatively recently made use of was by no means correct.

The Chairman added, that he had recently seen a photograph, made by Stuart Wortley's uranium dry-plate process, which certainly measured twenty-four inches in one direction.

Slides were shown by Mr. Keith, Mr. Vivian Hyde, Mr. Medland, and Mr. Dowell. They included some Japanese landscapes and street scenes, English andscapes, and views of the Jubilee procession. Mr. Medland's pictures of uildings in Moscow and St. Petersburg, and his experiences with the Russian olice while photographing, were out of the common; and with these were hown some views of the Czar's coronation festivities, by Miss Beck, who was articularly fortunate in avoiding the eye of the authorities, and in getting ictures of so interesting an event.

MANCHESTER PHOTOGRAPHIC SOCIETY.

MARCH 10.—Mr. HARRY WADE gave a demonstration on

THE GUM-BICHROMATE PROCESS,

n old process recently revived. Mr. Wade said the it had been thought at ne time that there was no process of pigment-printing without the use of ransfer either single or double, but by the revival of the gum-bichromate rocess this theory is now knocked on the head. The process is not a simple ne, and is useless to any photographer who has not thoroughly mastered at east the rudiments of the art. It is no use where minute details or sharpness s aimed at in the resulting picture. Many pictures produced by this process nay easily be mistaken for chalk or crayon drawings. The process is briefly s follows: Suitable paper, sensitised in a solution of potassium bichromate nd dried, is coated with a mixture of gum and the pigment required, again ried and printed in the usual way under a negative. The print so btained exhibits a very faint image, if any at all, and must then be de-eloped with both hot and cold water, afterwards being fixed, to free it of all hromic salts. After a short washing the print is hung up to dry. The first uestion is, What paper is the most suitable to use? Mr. Wade found that, of ll he had tried, Michallet paper, which has a coarse-grained surface, was the est. Whatman's rough or smooth drawing paper also gave good results. The sensitising solution is made by dissolving 1 ounce of potassium bichromate n 10 ounces of water, which makes an almost saturated solution. Pour the olution into a deep porcelain dish, and, taking a sheet of the selected paper, mmerse fully, and have a hog's-hair brush at hand to remove all air-bells. Turn the paper face down, and proceed with as many sheets as it is intended o sensitise, then take the bottom sheet (the first immersed) and draw it lowly from the dish, pinning it to a lath or hanging it up by clips o dry. Two minutes is sufficient time for the sensitising, except when very heavy paper is being used, when a longer time should be allowed. The sensitising can be done in daylight, but the drying and after-opera-ions of coating must be done in yellow light. Gum arabic is the most atisfactory to use, and it should be obtained in clear lumps and powdered. Then dissolve 4 parts of this powdered gum in 10 parts of water, strain through muslin, and keep in a well-corked bottle. With regard to the colour, this depends on the taste of the worker, some preferring black, others Venetian ed, indigo, burnt sienna, Vandyke brown, sepia, or Indian ink. These colours hould be obtained in the form of powder, as they are then more convenient to weigh. To mix the gum with pigment, take, if the colour is to be black, 12 grains exactly of vegetable black, and mix ½ ounce of gum solution with ½ ounce of water. Place the pigment on a sheet of glass, and add a little of the diluted gum solution, and with a palette knife carefully grind and mix. When ground quite fine, take the mixture up with the knife and place in a measure. Pour more gum solution on the glass, and repeat the operation until the glass is quite clean. The coating is next, and for this the paper is pinned on to a drawing board or other suitable support, and with a brush full of colour mixture paint the surface evenly and thinly, then take a broad camel's-hair brush and soften any lines or ridges which may appear. As Mr. Packham said in his lecture, many of the failures are due to the use of too much pigment. Only 12 grains of black to the ounce are required, whilst burnt umber needs 20 grains, and Venetian red 40 grains to the ounce. The exposure may be judged by an actinometer. The most suitable negatives are thin ones. After exposure, the print is immersed for five minutes in a dish of water, then place it on a sheet of glass or pin to a board, and with a large sponge dipped in cold water press out the water so that a stream runs over the surface, but does not fall on it. Should the image not appear with repeated washings, then use hot water, and continue in the same manner. When fully developed, the print must be fixed in hypo, alum, sodium sulphite, or sodium bisulphite, and after a short wash the process is complete. Some of the results, made upon various papers and in various tints, which were shown, were well appreciated by the members and their friends, of whom there was a good attendance, and also by a few members of local societies who had been invited to the demonstration.

Camera Club.—Mr. CADETT is well known both as a plate-manufacturer and as a scientific man whose words are invariably worth attention, and it was therefore no cause for wonder that a large audience assembled on Thursday last at the Camera Club to hear his discourse on

THE PHOTOGRAPHIC PLATE OF THE FUTURE.

He began his remarks with an apology for not showing the lantern pictures with which he intended to illustrate his lecture; he had left his camera and its appurtenances in a railway carriage and had not seen them since, hence he was robbed of all means to illustrate the lecture in the usual manner. He next pleaded the indulgence of his audience in the position which he occupied, not as a professor who was free to impart all the knowledge which he possessed, but as a chemical engineer beset on all sides with the consideration due to what are known as "trade secrets," and with the necessity of respecting that fierce competition which is such a marked feature of present-day commerce. These trade secrets permeate the manufacturing trade of the world very largely, and one has to be very careful not to divulge them, albeit he had been more than once taken to task for being reticent in regard to such matters. He had intended to partly illustrate his paper with experiments in colour photography, but the subject had lately been so exhaustively dealt with by the President of the Club, Captain Abney, who occupied the chair on this occasion, and others, that he had refrained from what must obviously be a repetition of the same matter. With this introduction, Mr. Cadett commenced his paper, which was certainly an interesting one, but somewhat more discursive than the title promised; indeed, he had a great deal to say about photographic matters generally and very little about the ideal plate of the future. He did not claim to be an artist, he could neither draw nor paint. That part of photography he must leave to others; he was concerned only with the scientific aspects of this form of picture-making, and more especially with photographic plates and their capabilities. By means of characteristic curves we were able to learn much of the peculiarities of plates as they exist at the present time. During the past ten years great progress had been made in the manufacture of these plates, and they were now procurable of different speeds and with various other qualities. The manufacturer has many difficulties to contend with; he can produce a slow plate having a fine grain and giving great latitude of exposure, but, when rapid plates are produced, the latitude diminishes in a most marked degree. A slow plate will give printing density with no straining of development; but with a rapid plate, unless it receive the exact amount of exposure necessary, the image must be developed right through the film to secure such density. As an instance of the latitude with regard to exposure possible with a slow plate, he might quote an instance which was recently brought under his notice. Two negatives were taken on the same plate, a slow one of the photo-mechanical type, one receiving an exposure of ten seconds and the other fifty. Both were developed in the same dish, with the same developer, and, when ultimately printed from, the most careful scrutiny could not perceive any difference between the positives obtained; but one of them required an enormous time of exposure in the printing frame. It was certainly against his interests to say anything in disparagement of rapid plates, but he could not shut his eyes to the fact that the fine grain of a slow plate is capable of yielding density much sooner and giving far more latitude of exposure than a quick one. This latitude with a slow plate ranged from 10 to 1, while with a rapid plate it was only from 1 to 1½. Thus with rapid plates shutters and exposure meters come into necessary prominence. After detailing some interesting experiments in tentative development, the addition of extra water, bromide, &c., Mr. Cadett dealt with orthochromatic plates. He considers that they have a great future before them, and that, in process of time, photographers will use none other. We have accustomed ourselves to judge of the quality of a negative from an altogether erroneous standpoint, and in the future we shall have much to unlearn. We shall then pay far more attention to the correct translation of colour than we think of doing now, and approved negatives will have quite a different appearance to those which we regard now as perfect of their kind. Mr. Cadett's concluding remarks were with reference to the theory of colour and its bearing upon the three-colour printing process, to which so many were now turning their attention. He believed that there was a great future in store for this phase of photography, and that in time the poor householder would be provided with copies of works of art to which no one could take exception, while his richer brethren retained the originals. He gave Mr. Ives credit for having done more to forward success in this direction than any of his contemporaries. After an interesting discussion, in which Mr. IVES, Captain ABNEY, and others took prominent part, the meeting closed with the usual vote of thanks.

Gospel Oak Photographic Society.—The Annual Exhibition of members' work was held on Tuesday, March 1. There was a very large attendance of members and their friends, who were very much interested in the fine display of photographs which had been arranged by the Committee. The competitions proved more attractive than last year, and out of a very fine collection the Judge (Mr. Croal) awarded the medals as follows:—Enlargements: Mr. Kellow. Direct Prints: first prize, Mr. Smith; second, Mr. Waring. Lantern Slides: no award. In this latter class the medal for the best set of lantern slides wentto Mr. Kellow; but, as the rules of the competition were that no competitor should receive more than one award, the Committee withheld the medal, as the Judge did not consider the other sets of a sufficient degree of excellence.

Newcastle-on-Tyne and Northern Counties Photographic Association.—March 9, Mr. W. Parry (President) in the chair. Mr. James Brown and Mr. John Watson were appointed representatives on the Affiliation Committee of the Royal Photographic Society. Mr. Parry read a lecture on "Portraiture," by Mr. Harold Baker, lent by the Affiliation Committee of the Royal Photographic Society. This lecture was one of the most interesting of the series which have come from the Committee, and by far the best illustrated. One of the most striking of the lantern slides showed the various effects which occurred when backgrounds of different shades were used in taking a portrait, lighting and other conditions being the same. The variation in the tones of the face were so great as to be almost incredible, but Mr. Parry, who read the paper, stated that the day before he had carried out a similar experiment with like results. The paper was full of most useful and valuable information, although many of the members were inclined to question one or two of Mr. Baker's theories, especially did they resent the term "antiquated" being applied to their old and trusty friend "pyro and ammonia."

York Photographic Society.—March 9.—The officers for the current year were elected, viz., *President:* Mr. Thomas Hunter.—*Vice-President:* Mr. W. Weatherill.—*Council:* Messrs. Brown, Hardcastle, Hirst, and Saville.—*Lanternist:* Mr. R. Relpath.—*Hon. Secretary:* Mr. Frederic G. P. Benson, 50, Scott-street, York.

FORTHCOMING EXHIBITIONS.

1898.

April 22–30 ..... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

" 25–May 14..... International Photographic Exhibition (Crystal Palace). R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

HALATION.

To the EDITORS.

GENTLEMEN,—In Mr. Marlow's letter in your issue of the 4th inst., on page 139, he remarks on what he calls a curious fact, viz., that my late brother, Major Russell, "should have a paper inserted" in your JOURNAL, adjourning the report of his own paper read before the London Photographic Society. As he was not the editor, he could not arrange the contents, and, as he explained in a letter published in your JOURNAL for October 21, 1864, page 417, he knew nothing of Mr. Marlow's paper at that time. Further, in the note referred to, my brother had no thought of curing halation by backing, as he says that the difficulty can be entirely avoided by using more acid in the developer, which remedy he repeats in your JOURNAL of March 1, 1862, and he appears to have published his method of backing dry plates with gum and pigment September 2, 1864, when, on hearing of Mr. Marlow's claim, he at once gave him credit for priority of publication. Apologising for troubling you by pointing out an apparent insinuation of unfairness on my late brother's part, I am, yours, &c., J. A. C. BRANFILL.

25 *Rosendale-road, West Dulwich, March* 14, 1898.

THE NEWCASTLE FLASHLIGHT ACCIDENT.

To the EDITORS.

GENTLEMEN,—To those of us who frequently work by flashlight it would be a subject for thankfulness if in your columns more light could be thrown upon the sad accident which has just happened to our brother-workers, Mr. G. R. Morton and Mr. A. Paul, of Newcastle. "To be fore-warned is to be fore-armed," and, though personally I have never had an accident yet in my practice, still, knowing full well how the difficulties of each flashlight job are accentuated by hurry, I should feel grateful for a fuller information than your paragraph contains.—I am, yours, &c., A. H. FRY.

Royal Pavilion Studio, 68, *East-street, Brighton, March* 12, 1898.

[We have no further particulars than those already given.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

J. H. Wilson, 13, High-street, Kirkcaldy.—*Three photographs of a pneumatic road skate, with steel leg support, and brake attachment combined.*

F. JONES.—Yes, it would be better.

NQUISITIVE.—We should decidedly say that you were not liable.

ACETONE.—1. Yes, you can proceed against him. 2. No. 3. We believe it is illegal.

AJAX.—Thanks for your reminder. We will attend to the matter in an early number.

J. F. HOWLETT.—If the lens was unbroken when sent to be repaired, we should think that you ought not to be called upon to pay the cost of supplying a new glass.

T. H. WILLWAY.—Your best plan will be to procure and consult the book on Studio Construction by Mr. Bolas, published by Messrs. Marion & Co., Soho-square. We do not answer questions through the post.

H. T. LAWSON.—1. Several formulæ have at times been published, but none work so satisfactorily as toning before fixing. Try the sulphocyanide bath. 2. Write to Mr. J. A. Sinclair, c/o Ross & Co., 111, New Bond-street; he will, doubtless, give you the desired information. He is a worker of the process.

COPYRIGHT ACT.—X. says: "Will you kindly let me know the exact title of the Copyright Act as applied to photography. Messrs. Harrison & Sons inform me that the International Copyright Act of 1886 has been out of print some time."—In reply: It is called the Copyright (Works of Art) Act (1862), and it is given at page 630 of our ALMANAC for 1898.

ALBUMEN PRINT.—E. T. F. asks: "Can you kindly advise me in the JOURNAL as to the reason of the albumen perishing as it has on the enclosed print? It is Three Star paper sensitised fresh daily."—We cannot say, unless the sensitising bath was out of order, or the print was subjected to an alkali. That is all we can say, as no details of working are given.

WIDE ANGLE.—The "distortion," or rather violent perspective, is only what must be expected when using a nine-inch focus lens to cover a 15 × 12 plate at such close quarters. The remedy is to use a longer-focus lens and get further away from the subject. If that cannot be done, the violent perspective must be put up with. Considering that the lens is only a whole-plate one, its performance is admirable.

LENS.—J. HAMILTON. The lens, by its description and the maker's name, is one we know very well. It is one introduced by its maker many years ago, but it is evidently incomplete as you have it. There should be two additional lenses to go between the combination as occasion may require, one to shorten the focus and the other to lengthen it. The instrument never had a very large sale in this country.

STUDIO FERROTYPE.—W. TAYLOR writes: "I shall be obliged if you will answer two questions. 1. Can you tell me where I can get a studio built on wheels? 2. Also the address of the Automatic Ferrotype Machine-makers, for taking photos at the seaside, with finishing attached to the camera?"—1. Any builder of showman's caravans would build one to design. No one makes a speciality of that kind of studio. 2. Fallowfield, Charing Cross-road, supplies the necessaries.

TRIMMING PRINTS.—R. A. J. asks: "Do you happen to know whether set squares are made in glass? I would think if, instead of having rectangular cutting shapes, they were diagonally cut in half, it would be convenient, as prints could be cut in any desired size then. Probably such set squares are already made. If not, do you think it would be worth patenting?"—In reply: We are not aware if such things are articles of commerce, but they are easily made by cutting a square of glass across diagonally.

WATER VARNISH.—PERPLEXED says: "I should feel very much obliged if you would kindly give me a recipe in your next edition of THE BRITISH JOURNAL OF PHOTOGRAPHY for a good shellac water varnish. I have had a great difficulty with this sort of varnish, and should like to get a recipe for a really good varnish."—Boil a pound and a quarter of shellac in half a gallon of water, to which a quarter of a pound of borax has been added; when dissolved, strain. The varnish can be diluted to suit requirements.

CONVERTING LENS.—J. McI. writes: "I have a portrait lens, 5½-inches diameter, which I do not now require for its purpose, and am desirous of converting it into an astronomical telescope, and would feel obliged if you give a hint or two as to how I should do the work—placing a lens between those of the combination to lengthen the focus (present equivalent focus 32½ inches) and procuring the necessary eyepiece, or what?"—Perhaps some reader who has converted a large portrait combination into an astronomical telescope will give us the result and his procedure. The front lens can, of course, be applied as an object-glass, but that, we presume, is not what our correspondent has in view.

REMOVAL OF VARNISH.—W. S. writes: "Please excuse me writing with regard to your answer to T. Wilson. I think if you add a little liq. ammoniæ to some spirit and flow over the plate two or three times, the varnish will come off quite easily by washing under the tap. I have always found it work. Mr. Webster, of Chester, many years ago said to me 'Don't you know ammonia with spirit will make the varnish mix with water?' I am sure you will agree with me that it is not in great things that many fail, but in a lot of small details that one is apt to think of no consequence."—The action of the ammonia is the same as that of the potash. Shellac is soluble in all the alkalies, and when so dissolved may be mixed with water to any extent.

COPYRIGHT.—G. E. W. writes: "In replying to your correspondent R. W., in last week's JOURNAL, you state that he can be proceeded against for copying a figure out of a copyright group. In the case of Guggenheim and another *versus* Leng & Co. (1896), 12 *Times* L.R. 492, it was held by Cave and Wills, J.J., that the publication by defendants in a paper of theirs of the likeness of some of a football team taken from a copyright was no infringement of the plaintiff's copyright, for the effect of such appropriation was certainly not to injure or supersede the sale of the original work. As this seems to differ from the opinion expressed by you, I should be glad to know whether there are any other cases dealing with the matter."—In reply: We are not aware of any other.

STUDIO.—BEGINNER says he will be greatly obliged for answers to following questions: "1. Will studio (enclosed plan) be right for professional work? 2. Is there sufficient space (thirty feet) between house and studio? 3. Will dark room be large enough (6 × 6). 4. Is it placed right end of studio? 5. Is studio high enough?"—In reply: The sketch is not quite so explicit as it might be, but in reply we may say 1. The size will do very well. 2. It would be better to build it further away, if possible. 3. A little confined if much work is done in it. 4. It would be better if built outside the studio, then a background could be used at both ends. 5. No height is shown on the sketch; but we should recommend that some glass should be used in the side, say, to within four feet of the floor for general work.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1977. Vol. XLV.—MARCH 25, 1898.

Contents.

PAGE

CATHEDRÂ 177
PTH OF FOCUS IN HAND-CAMERA ENSES 178
ADERETTES:— hotographic Printing upon Glass, &c.— The Effect of Light on a Mixture of Bromine and Hydrogen — Liquid Air by the Gallon — Fundamental Colour Sensations 180
ONTRIBUTION TO THE THEORY OF HEMICAL DEVELOPMENT. By R. d. Liesegang..... 180
REIGN NEWS AND NOTES:— he Colour of Silver Prints — Diogen — Bacteria and the X Rays — Flashlight Photography —Affiliation—Colouring Brass— Competitions—A Record 181
E TELECTROSCOPE — ELECTRICAL RANSMISSION OF PHOTOGRAPHS, C. 182
EOPTICAL APPARATUS 184
E OLD EXPEDIENTS WORTH EMEMBERING. By E. Dunmore 184
MAL PHOTOGRAPHY 185
ND-CAMERA CRITICISMS. By R. Hodd..... 186

PAGE

THE PHOTOGRAPHIC CONVENTION ... 187
RICHMOND'S IMPROVEMENTS IN MIRROR BOXES FOR PHOTOGRAPHIC CAMERAS 187
OUR EDITORIAL TABLE:— *Architectural Photography — Sun Pictures of the Norfolk Broads*— The Duplex Ferrotype Portrait Camera—Gum-bichromate Paper—The "Perfectus" Albumenised Paper 188
NEWS AND NOTES 189
PATENT NEWS 189
MEETINGS OF SOCIETIES:— Royal Photographic Society—London and Provincial Photographic Association—Gospel Oak Photographic Society—Hackney Photographic Society—West Surrey Photographic Society — Leeds Photographic Society — Plymouth Photographic Society ... 190
FORTHCOMING EXHIBITIONS 191
CORRESPONDENCE:— Lenses for Astronomical Work — Photographers' Apprentices — Photographers' Trade Cards — The Roll of Ministering Children 191
ANSWERS TO CORRESPONDENTS 192

EX CATHEDRA.

E understand that the sole right and concession to photograph e Grand National Steeplechase run to-day at Aintree, near verpool, has been secured to Captain J. A. Turner, who has ained the photographic services of Mr. W. I. Chadwick, of nchester. We believe that Mr. Chadwick has made arrangents with Mr. Philip Wolff, of London, to employ twelve ematographic cameras and operators distributed at various nts of interest along the course. It is expected that about 000 negatives will be secured.

* * *

MR. AUBREY BEARDSLEY, the eccentric black-and-white artist, d last week. There are not wanting those who affect to see certain recent photographic tendencies some sign of a lective influence in camera work that may be traced to Mr. ardsley's extraordinarily grotesque productions. Be that as may, it is of interest to know what so prominent a critic as . Joseph Pennell thought of the dead artist's work. "Of the illustrators I have ever met," says Mr. Pennell, "he knew more, and cared more, about his work than any. And yet, it might be said, he was merely an illustrator, merely a pen draughtsman. He has had more influence on his form of art than any one in his own generation, anywhere in the world. I do not know but that he has had more influence than any one since Blake. If Blake saw visions, so did Beardsley; and, though Beardsley was probably younger this morning than Blake when he commenced his great series of books, we know that Blake at no period of his life, nor Rossetti either, ever expressed himself in the perfect fashion of this young artist in his drawings. Though these drawings have proved, as all great art work proves, the sport of the ignorant and the vulgar, to artists—and I have heard the most distinguished men of the century discuss them—they were amazing, astounding, almost unbelievable. Though they have been a mine for the witless, and a haven of refuge for the incompetent, to some of us they have been a solace and a delight." It remains to be seen whether posterity will endorse this very flattering verdict. Outside a limited circle Mr. Beardsley was mostly regarded as an eccentricity rather than as a genius.

* * *

THE Paris correspondent of the *Standard* last week telegraphed that at a sitting of the Academy of Sciences on Monday, March 14, M. Mascart presented a series of photographs in colours, taken by MM. Auguste and Louis Lumière, of Lyons. "Though perhaps not perfect, he added, they seem to show that the problem of colour photography, if not already solved, is nearing solution (*sic*). Among the colour photographs shown at the Academy of Sciences were a basket of cut flowers, a lady wearing an elegant costume of tender-coloured silk, a bed of flowers, a jeweller's show window, a group of officers in bright-coloured uniforms, &c. M. Mascart explained the process used for the production of these colour photographs. It is a perfection of the indirect method indicated by M. Cros and M. Ducos du Hauron. Several negatives are employed. The length of exposure no longer exceeds one minute." However excellent the results may have been, we doubt if there is anything very new in the process by which they were produced. In our ALMANAC for 1897 (page 827) appears a description of the process employed by Messrs. Lumière. This, in brief, consists of the adaptation of bichromated gelatine printing to three-colour positive work.

At the meeting of the Royal Meteorological Society, held on Wednesday evening, the 16th inst, at the Institution of Civil Engineers, a lecture on "Photographing Meteorological Phenomena" was delivered by Mr. A. W. Clayden, M.A., Principal of the new College at Exeter, who gave details of his experiences as Secretary of a Committee of the British Association. After referring to the extreme value of photographic methods of recording the movements of instruments, the lecturer spoke of the real importance of preserving photographic records of all sorts of unusual meteorological phenomena, and emphasised the necessity of companion photographs showing the same scene under normal conditions. It was suggested that meteorologists throughout the country should co-operate with the Royal Meteorological Society in securing such records. The phenomena of the lightning discharge, as distinguished from those of a single flash, were next described and illustrated by a number of lantern slides. Some of the puzzles offered by lightning photographs were next alluded to, and the lecturer stated that he had repeatedly found that a single discharge lasted several seconds. Mr. Clayden then spoke of the "black" flashes shown in photographs, and described the steps by which, some years ago, he was led to the proof that they were merely a photographic phenomenon, but one which still remains unexplained. Passing on to a consideration of cloud photography, the various methods in use were explained, and a large number of lantern slides were exhibited, in some of which the clouds were shown on a background of blue sky in nearly their natural colours, a result obtained by the employment of suitable developers on a specially prepared plate. The method employed at Exeter by the lecturer for the measurement of cloud altitudes was fully described. This differs from all other methods in using the sun as a reference point. Mr. Clayden then spoke of the difficulty in getting good pictures of cirrus clouds, and described the methods dependent on the polarisation of the blue light of the sky, but expressed a conviction that polarisation had nothing to do with their efficiency, which was really due to a general lessening of brightness, which enabled the exposure to be properly judged.

* * *

Telectroscopy has recently formed the subject of several communications to the London newspapers from their Vienna correspondents. Herr Szczepanik, a Galician, has been credited with a method of electrically transmitting pictures and photographs to any distance, and, if we do not misunderstand the purport of the original statement, of enabling actual scenes to be reproduced to the eyes of persons very remotely situated therefrom, let us say some miles. Only last week we remarked that newspaper sensationalism in scientific matters is responsible for much of the scepticism with which many modern discoveries are at first received, and it is not surprising that the statements concerning Herr Szczepanik's alleged invention should have provoked a certain amount of incredulity when it is borne in mind that the newspapers have so often misled the public in matters of this kind.

* * *

The latest information to hand is to the effect that Herr Szczepanik will introduce his discovery in the course of the next few days to a select circle of scientific men and journalists. In contradicting certain remarks in the press, according to which the telectroscope has been described by experts as a discovery which at present has no practical utility, Herr Szczepanik declares that the telectroscope possesses far greater practical importance and possibilities of usefulness than is supposed. The apparatus, he avers, not only can produce pictures from a long distance, but will make the entire system of telegraphy as it now exists superfluous. Then, as well as portraying real proceedings in the shape of pictures, the telectroscope will also show copies of manuscripts and prints at the remotest distances in a moment of time, and "fix at one stroke photographic facsimiles of the same on a sensitive plate or sensitive paper." This transmission will extend, as regards distance, as far as will the telephone. Respecting this telegraphy of the future, Herr Szczepanik declares that it is possible, for example, to place a copy of a newspaper in the apparatus which has been prepared by him and is now ready for use, and within a few seconds, at such a distance, say, as from Vienna to Berlin, a photographic facsimile of this newspaper would be yielded.

* * *

But, fortunately, something more than the necessarily imperfect particulars vouchsafed by the newspapers is at hand upon which an opinion as to the probable practicability of Herr Szczepanik's invention may be based. That gentleman has patented his idea in this country, and in another part of the Journal we give a full description of it. There also appears from a correspondent, Mr. C. A. Lee, a description of a somewhat similar system, which he claims to have worked out. So far as can be deduced from the particulars given of both systems, telectroscopy as a practical idea is quite feasible. Of course, Amstutz and others have already achieved very promising results in the electrical transmission of photographs in dot and line; but the two gentlemen whose methods we give this week claim to go a step further, by transmitting what may be termed a lenticular image of an original.

* * *

Sir George Newnes, with apparently unlimited journalistic energy, has recently commenced the issue of two new publications. The first of these is the *Ladies' World*, a beautifully illustrated and printed production, far above the average in quality of the many publications that now appeal to the fair sex. It aims high, and therefore deserves to succeed. The other new-comer is a monthly, the *Wide World Magazine*. It is devoted to true stories of adventure and wonder, and may be best described as a budget of well-illustrated, authenticated sensationalism. In the pictorial section photography, of course, plays a strong hand; and the editor of the Magazine invites travellers, explorers, naval and military officers, tourists, and others whose business or pleasure has taken them into interesting parts of the world, to send in any curious or remarkable photographs they may have. For these, and for true stories of adventure—personal narratives, &c.—payment will be made according to the value of the material.

DEPTH OF FOCUS IN HAND-CAMERA LENSES.

It is not necessary to explain to the average photographer what is meant by the term "depth of focus," although, accurately speaking, it is a property that does not exist in a perfect optical instrument, and, in a sense, its presence may be taken as indicative of inferiority. Thus, a lens that will render objects at considerably different distances all in equally good

cus does so rather because it is incapable of rendering any ne plane sufficiently sharp to mark it out from the rest than ecause it possesses any special quality. In this sense it will e readily intelligible that, while in an astronomical objective epth of focus would be distinctly a defect, in a photographic ns it is, on the contrary, a quality to some extent desirable.

A perfect lens can only render objects in one plane perctly sharp at the same time, and the more perfect the strument, that is, the finer its defining power in that one lane, the more readily will the absence of "depth" be oticeable, as the slightest departure from *absolute* focus will e thus rendered more appreciable. But in photographic rocesses the power of microscopic definition is not necessary, ecause our films are as incapable of reproducing it as the eye f recognising it, and thus it happens that any degree of neness beyond a certain point is lost in the photograph, lthough the lens may be capable of giving it. In speaking, herefore, of depth of focus, it must be understood that we re dealing with a degree of sharpness that the plate is apable of rendering, and the printing surface of presenting o the eye, in a form that the latter accepts as quite sharp nough to satisfy it. In actual practice this degree of harpness, or rather the want of absolute sharpness perissible without offending the eye, is usually measured by aking the limits between which the focal plane may be ifted without causing what should be a theoretical "point" o assume larger proportions than the one-hundredth of an nch, or before the crossing rays exhibit, to use the technical hrase, a circle of confusion measuring one-hundredth of n inch.

The depth of focus of any lens quite regardless of its haracter and construction can be easily calculated, as it epends entirely upon its focal length and angular aperture, nd not in any way upon its curvature or the number of its ombinations. Although a rapid rectilinear lens would in all robability cover a larger area than a single plano-convex lens f the same focus used with the same sized stop, it would have o advantage whatever over the latter in the matter of depth f focus, and in this respect the most modern lenses of anastigatic construction are on the same terms, unless, indeed, their nore perfect definition in other respects does not render their ant of "depth" more noticeable by contrast.

The usual mode of describing the depth of focus of a lens, nore particularly applied of late years to hand-camera lenses, to state the distance beyond which all objects are in pparently equally good focus; and the ordinary process by hich this is arrived at is by multiplying the square of the ocal length by 100 and dividing the product by the diameter f the stop. To find the distance beyond which all objects are n focus using a 5-inch lens at *f*·8, we have the formula $\times 5 \times 100 = 2500$, and then $2500 \div 8 = 312{\cdot}5$ inches, which, reuced to feet, represents 26 feet and half an inch. This is practially near enough for all purposes; but, as it is based on the alculation that the absolute focus of the nearest object does ot vary from the equivalent focus or infinity by more than the ne-hundredth of an inch, it is obvious that a more correct lan would be to fix the absolute focus midway between the istance and foreground. This, however, would necessitate a ttle more calculation without any very tangible advantage.

It will thus be seen that, the depth of focus being proporionate to the focal length of the lens, it exists—in the mited sense we have spoken of—to a greater degree in short-focussed lenses than in long. Thus, if we perform the same calculation as that given above with lenses of 3 and 8-inch focus, respectively, we shall find that the distances, in either case, beyond which all objects are in relatively equal focus will be 9 feet and 66 feet.

Now, the practical bearing of this upon hand-camera work is just this: If the results are required simply for mounting in an album or scrap book, the definition obtainable by this method of calculation is all that can be required, assuming, as has been done, that the eye, or the printing surface, or both, are incapable of discriminating beyond the one-hundredth part of an inch. But, if the negatives are required for lantern slides, or, as is nowadays very frequently the case, for subsequent enlargement, an entirely different condition of things arises. The depth of focus will be altogether altered if the same equality of definition is required.

For instance, taking the calculation in connexion with the 5-inch lens, and assuming, as would actually be the case, that, in the foreground objects, the diffusion of focus had reached its full permissible limit, namely the one-hundredth of an inch, clearly, if this negative be enlarged to, say, four diameters, the dimensions of that "point" would be further increased to the one-twenty-fifth of an inch, a size that would come very appreciably if not disagreeably within the discriminating powers of the eye. In order, therefore, to keep within the allowable limits of departure from absolute focus, it is necessary, for purposes of enlargement, that the "circle of confusion" in the original negative, be made proportionably smaller, that, in fact, it should not exceed the one-four-hundredth part of an inch. To ensure this, either a proportionately smaller stop must be used, or else the foreground must be cut away to a greater distance, either of which remedies may be resorted to, according to convenience.

Still keeping to the 5-inch lens, and assuming that the results are required to bear enlargement to four diameters without offending the eye by passing the one-hundreth of an inch limit, we find by calculation that we may either reduce the aperture from *f*·8 to *f*·32 and retain the minimum distance of foreground objects at twenty-six feet; or, if for the sake of rapidity of exposure the aperture of *f*·8 is necessary, then we must be content to limit our subject to objects no nearer than 104 feet away from the camera.

For the sake of the argument we are assuming that the one-hundredth of an inch standard must be adhered to; but, obviously, as far as actual use is concerned, that is a matter that can be departed from if the operator so will. Whatever the individual opinion may be on the subject of diffusion of focus and "fuzziness" in focussing, it is perhaps scarcely likely that the degree of sharpness involved in the standard alluded to will be, or need be, slavishly adhered to in the case of an enlargement of a quarter-plate up to four diameters, or 15×12. But it is a growing practice to employ lenses of extremely short focus, and very small plates, on purpose for subsequent enlargement, and, when the definition obtainable with lenses of the newest type is utilised to its utmost extent the results will bear enlargement to very wide dimensions. In such cases it is, of course, necessary to adhere strictly to the system of calculation we have laid down.

But it may be urged that, in view of the necessity for making this allowance in cases of enlargement, the apparent advantage of lenses of short focus in the matter of depth of focus disappears. This is far from being the case, for the

increase of size of image in proportion to the focal length of the lens increases by *simple multiples*, while the depth of focus decreases by the square of those multiples. Thus, take a 3-inch and a 11-inch focus lens respectively and enlarge the result obtained by the former up to four diameters. The former will give a result which will show equally fine definition when worked at *f*-8 as the direct picture when the lens is used with a stop of *f*-32, the nearest objects in either case being $37\frac{1}{2}$ feet distance; or, with the same sized stop as the 12-inch lens, it will define sharply in the enlargement object up to nine feet four inches from the camera.

Photographic Printing upon Glass, &c.—M. Lécutowics, manager of an ironworks in France, has recently invented an ingenious method of direct printing upon glass and similar surfaces, founded upon a principle somewhat analogous to Woodburytype. Upon an occasion, when intensifying a weak negative with mercury, he noted that the surface was in relief. Having miscalculated the weight of the bichloride used, he attempted another intensificant, and noticed again this relief appearance, which further experiment showed to vary directly with the strength of the bichloride used. Upon this discovery he devised his new process. The intensified film is lifted from its support and transferred, still moist, to a block of fine plaster with a smooth, flat surface, slightly moistened, care being taken to avoid air bubbles. After a few moments the excess of water is soaked up by the plaster, and the film remains flat attached to the surface, the relief side facing the operator, being then ready to have a cast taken from it, from which, by a galvano-plastic process, another casting is produced, or relief mould, that can be put to a variety of uses. Thus it can be printed from on to glass for engraving, or photographs from nature, in printing ink, or upon porcelain, pottery, enamel, &c. M. Henrivaux, writing upon the subject in *La Nature*, states that he has had before him the films, their reproduction in plaster, the galvano-plastic mould, the proof printed by the latter, and he has been struck with the fineness of detail obtained, and he thinks particulars of the process should be conveyed to all manufactories where it could be made available.

The Effect of Light on a Mixture of Bromine and Hydrogen.—It has long been known, and indeed a process for finding the intensity of a particular light has been founded on the fact, that a mixture of chlorine and hydrogen is caused to combine by the action of daylight, but hitherto it has been held that a corresponding combination does not take place when the chlorine is replaced by bromine, at any rate at ordinary temperatures. Messrs. Castle and Beatty have, however, shown that it is a matter of temperature only. The chlorine mixture at a temperature of $-12°$ C., for example, does not combine, even in sunlight. The bromine mixture at a temperature of 196° (that particular point being chosen to allow of the use of boiling toluidine vapour for heating the containing apparatus) combines in the sunlight in from an hour to an hour and a half when partially purified hydrogen is used, and in half an hour with specially purified hydrogen, the actual amount of change being directly proportional to the duration of exposure to the light. Further experiments are to be made to get data for the exact rate of change, and, beyond this, a similar investigation is to be made with iodine instead of bromine.

Liquid Air by the Gallon.—Though there is no definite use for liquefied air in photography, the production, on account of its alliance with compressed gases generally, is interesting. Professor Dewar, for some time past, has exhibited this liquid often at the Royal Institution, but Mr. Charles E. Tripler has produced, and shown it in public, in two-gallon tins. At a recent lecture in the Stevens Institute of Technology he had a quantity brought from the works in open two-gallon tins, surrounded with hair felting, and carried in a wooden bucket. It was brought in this open vessel and ladled out in tin ladles like milk from a can. Wrought iron dipped into it became, through the intense coldness of the liquid, quite brittle, while such things as eggs, &c., when thoroughly cooled, broke in the hands like so many biscuits. Mercury was frozen so hard as to be capable of being hammered out like lead. One curious experiment was to place some of the liquid air in a kettle and boil it by placing a piece of ice against the kettle containing the liquid. A mass of felt dipped in the liquid and lit with a match boiled fervently.

Fundamental Colour Sensations.—With an important bearing upon the recent discussions upon colour printing, a most interesting and suggestive paper was read at a meeting of the Royal Society on the 17th inst., the title of the paper being "On Artificial Temporary Colour Blindness, with an Examination of the Colour Sensations of 100 Persons," by George J. Burch, M.A. It has, of course, long been known that the eye can be fatigued for a particular colour by directing the gaze upon it for a length of time, the effect being the partial suppression of perceptive power for that particular colour for a time. Mr. Burch carried his tiring to great lengths, the eye, for example, being exposed to bright sunlight in the focus of a burning glass behind a red screen. A species of temporary blindness ensued, the blindness to red being so complete that a scarlet geranium appeared as black, and red roses as blue. Green and violet blindness were produced in a similar way. He then systematically examined the spectrum, and found that the red, from A to B, the green near E, the blue half way between F and G, and the violet at and beyond, produce defined and characteristic results indicating that each of these colours corresponds to a definite colour sensation. In each case all direct sensation of the colour used for fatiguing the eye was lost, though all other colours were modified by the effects of a sort of after-effect of the suppressed colour. Any two or three of the colour sensations can be so destroyed simultaneously or successively. Mr. Burch thinks that the facts fit in best with the Young-Helmholtz theory rather than that of Koenig, but they imply the existence of a fourth—a blue—sensation, while the former theory predicates three only.

A CONTRIBUTION TO THE THEORY OF CHEMICAL DEVELOPMENT.

A FINISHED negative on a gelatino-bromide plate was coated in the dark room with collodio-bromide emulsion and allowed to stand for a few minutes. The plate was then rinsed and immersed in a normal alkaline hydroquinone developer. A second negative was produced. The bromide of silver in the new film of emulsion was reduced in those parts corresponding to the opacities in the original negative, whilst the other parts remained unaffected.

The process may be considered as a species of intensification, but cannot be regarded as of much practical value. It has, however, the recommendation, that the original negative remains unchanged and can be restored to its primary condition by dissolving the collodion film.

Various opinions may be formed as to the cause of this phenomenon. Since Röntgen's discovery there has been some inclination to speak of invisible radiations when a sensitive plate is affected by substances in such a manner. But both films are in immediate contact in this case, and the probability of direct chemical action seems to be nearer the mark. However, there is much to be considered. In the first place, the individual particles of metallic silver forming the negative do not lie unprotected upon the surface. Each of them is probably surrounded with a covering of gelatine, even though this may be thin.

If we disregard this objection, the chemical process may be thus represented:—

$$2Ag + 2AgBr = 2Ag_2Br.$$

Consequently the silver on the surface of the negative would unite with the bromide of silver at the under side of the pellicle, and form sub-bromide of silver (still a hypothetical substance). If we now pour the developer upon the plate, the sub-bromide is reduced to metallic silver.

The development begins actually at the under surface of the film, but the development does not cease when this necessarily very weak image is produced. The image continues to grow in strength, and the reduction proceeds until it reaches the upper surface.

A few years ago the contradictoriness of two photographic theories curred to me. One refers to development, and asserts "that light duces silver bromide to silver sub-bromide, and the developer reduces e silver sub-bromide to metallic silver." The second theory refers to e fixing of silver chloride prints, and asserts "that the hyposulphite of da reduces the silver sub-chloride to metallic silver and silver chloride, d dissolves the latter." The last observation may also be transferred om silver sub-chloride to silver sub-bromide. According to these ews the silver sub-bromide is decomposed as follows in development:—

$$Ag_2Br = 2Ag + Br,$$

d in fixing,

$$Ag_2Br = AgBr + Ag.$$

This would mean, that a latent bromide of silver image, placed in the xing bath without previous development, should yield a picture of half e strength of one that is developed. The proposition is untrue, for it well known that such a plate would appear quite transparent to the e. One of the conditions is, consequently, false; but which? The eory of fixation is not wholly improbable. If such a fixed out plate be oroughly washed and then immersed in a solution of silver nitrate and idified hydroquinone, an image may be developed. Consequently the lm must contain particles of metallic silver.* More silver must there- re be reduced by development in the film of gelatino-bromide of silver an would correspond with the amount of silver sub-bromide. For this rpose I have formulated a working hypothesis. It is well known that, the preparation of gelatino-bromide emulsions, a large number of olecules of bromide of silver are allowed to aggregate into grains ipening). The finished dry plate, consequently, has a more or less anular film. These aggregations are reduced on one side upon exposure. n the side that faced the light we find molecules of impoverished omide; perhaps the sub-bromide; in the middle, and on the other des of the aggregation, unaltered silver bromide. The light was unable penetrate further. Molecules of silver bromide and sub-bromide are nsequently situate in very close proximity to each other. To a certain tent such an aggregation forms a chemical unit, and would act quite fferently from a mere mixture. (In response to external influences it ould react similarly to the living cell, which is only an aggregate of olecules). Such a structure may also constitute the peculiarities of arey Lea's photo-salts. Perhaps galvanic processes also play a part in ese aggregations when they are exposed. But it is not necessary to ssume this. A purely chemical theory may enable us to understand the rocess of reduction, which, like a process of fermentation, is trans- itted from the exposed to the unexposed molecules of silver bromide. he alkaline developer acts in the following manner upon the aggre- ation, which we symbolise by the formula—

$$Ag_2Br - AgBr - AgBr.$$

he bromine is withdrawn from the first molecule of silver sub-bromide, nd two atoms of silver are set free. One atom of silver in the nascent tate may now unite with the adjacent molecule of silver bromide, and orm a molecule of silver sub-bromide. We should then have the mole- ular combination—

$$Ag - Ag_2Br - AgBr.$$

he developer again reduces in a similar manner the molecule Ag_2Br, hich has just been formed, producing—

$$Ag - Ag - Ag_2Br,$$

nd so on, until the entire aggregation is reduced to metallic silver.†

I draw attention to this working hypothesis, as the experiment I have escribed seems to prove the possibility of continuous reduction bearing ome similarity to fermentation; but, if the chemical process is, in fact, uite different from what we have assumed, there is, nevertheless, some ction of the developer upon the molecules of silver bromide, which ould not have been reduced had the particles of silver been absent. Moreover, the action begins in the presence of old particles of silver, hich are certainly very much less active than nascent silver would be.

R. Ed. Liesegang.

* *Photographisches Archiv*, 1893, No. 712.
† *Photo-chemische Studien*, No. 2, p. 9.

FOREIGN NEWS AND NOTES.

The Colour of Silver Prints.—Dr. R. E. Liesegang gives a short contribution in the *Photographische Correspondenz* on the variations in colour of silver. In negatives and bromide paper the colour tends to black, in developed chloride paper it ranges from greenish black to brown, whilst in P.O.P. it is yellowish-brown. The latter requires toning, and the thin deposit of gold of a blue colour modifies the tone to the ordinary photographic shades. Whence these differences? Silver reduced from bromide is usually black, and from chloride generally red. But it would be misleading to base a chemical hypothesis upon such a generalisation, as Gaedicke has shown that red tones may be obtained from bromide if the emulsion is not allowed to ripen and the grain kept very fine. It would thus appear that the cause is physical, black tones being produced from coarser, and red from finer-grained emulsions. This is confirmed by the fact that, the greater the quantity of free silver in a printing-out paper, the redder the tone and the finer the grain. Moreover, if ammonia or hyposulphite of soda (both solvents of silver bromide) are added to the developer for bromide prints, red fog is very prone to appear. Dr. Liesegang finds further confirmation of his hypothesis in some recent experiments. If a slightly printed chloride image is developed with gallic acid, it soon acquires full density. This arises from the fact that silver nitrate is reduced slowly by gallic acid, and the particles of silver then deposit themselves upon the exposed particles of chloride. The latter increase in size the longer the print remains in the developer. After fixing, such a print is greenish-black. If taken too soon from the developer, the print fixes red. Long exposure also gives red tones, as the particles of silver are then smaller than in prints requiring long development.

Diogen.—This new developer, recently put upon the market by the Actiengesellschaft für Anilinfabrikation, Berlin, is reported upon by P. Hanneke in the *Photographische Mittheilungen*. The trials were made in the studio, and gave very clean negatives of a well-modulated, transparent character and pure black colour. A series of plates to which identical exposures had been given were developed simultaneously with diogen and pyrogallic acid. The image appeared sooner with pyro, but the full period of development was the same for both pyro and diogen.

Bacteria and the X Rays.—We also learn from the *Photographische Mittheilungen* that Dr. Rieder has instituted a series of experiments to ascertain the influence of the Röntgen rays upon bacteria. These comprised Cholera bacilli, the Coli bacterium, Diphtheria bacilli, Staphylococci, and Streptococci. The coil gave a spark of thirty cm. The interruptions numbered 300 per minute. The vacuum tubes were placed thirty cm. above the objects, and the exposures varied between one and three hours. Both fresh and old cultures were used, and they were exposed in small shallow vessels covered with perforated sheets of lead, which metal is impervious to the rays. The perforations were covered with opaque black paper to exclude light. Dr. Rieder has come to the conclusion that the Röntgen rays, like light, have a retarding action upon bacteria, but in a much higher degree. He concludes his report by saying: "The experiments give much encouragement to pursue the investigations further with animals, as well as clinically. It is by no means necessary that the Röntgen rays should kill the bacteria within the human body. It is probably sufficient that they should be merely checked in their development, leaving to the natural protective arrangements of the organism the work of further annihilation of the pathogenic germs by means of the blood. In looking to the Röntgen rays as a healing power, it would be rather as a means of assisting the organism in its battle with these dangerous little intruders, the bacteria, than to effect their total extermination."

Flashlight Photography.—In a paper read before the Munich Photographic Club upon the use of orthochromatic plates, Herr Traut recommended the admixture of saltpetre with magnesium for flashlight photography. This imparts a yellow colour to the light. The proportions recommended by Herr Traut are 6 grammes of saltpetre to 1 gramme of magnesium.

Affiliation.—The Société Française de Photographie has decided upon a step which should prove of considerable value to photographic societies in France. Members of other societies may become affiliated to the Société Française upon payment of a yearly subscription of five francs, and will then enjoy the same privileges as ordinary members (excepting the right to vote and a free copy of the Society's paper, the *Bulletin*). They may attend the parent Society's meetings, *soirées*, excursions, &c., and may use its rooms, library, laboratory, &c. The affiliated members of each society, however, are required to form sections in their own societies, which shall bear the joint name of the parent and affiliated societies. They may frame their own rules and elect their own officers, and

the parent society is willing to give any assistance in its power, either administratively or at meetings. These centres are required to be affiliated to the parent society by a special delegate, who shall be a fully acredited member of the Société Française. If requested, the affiliated societies shall give similar advantages to members of the parent society.

Colouring Brass.—The *Photographische Chronik* gives the following useful collection of receipts. To colour brass a blue-black steel colour, the articles should be well cleaned and immersed in a boiling solution of chloride of arsenic. If very carefully cleaned, the articles may be coloured azure blue by immersion in a concentrated solution of sulphite of soda. A deep blue-black may be produced by immersion in a solution of carbonate of copper and ammonia, and subsequent exposure to air. But hyposulphite of lead and soda will give many variations of colour. To 100 c. c. of a ten per cent. solution of hyposulphite of soda 5 to 6 grammes of sugar of lead are added. Dissolve by heat, filter, and heat again to 70° C. When first plunged in this solution, brass assumes a golden colour, and then passes through various shades of orange, vermilion, scarlet, and violet, at last to azure blue. Further action will change the blue to a silver-grey colour. A matt black may be produced by immersing brass in a weak solution of chloride of platinum and nitrate of tin; bronze colour, by immersion in a boiling solution of sulphate of copper and alum. A golden colour may also be given, by treatment with 4 parts of caustic soda, 4 parts of milk sugar, and 100 parts of water. In all cases, as soon as the requisite colour is attained, the articles are at once transferred to clean water and rinsed. After drying, they should be coated with celluloid varnish.

Competitions.—Our Continental friends seem to appreciate photography as a means of attracting business, for we read of two competitions for prizes of considerable value. The Grands Magasins du Louvre are organizing a photographic Exhibition, and offer ten prizes, ranging in value from 4*l.* to 20*l.*, with medals of bronze, silver, and gold, according to order of merit. Pictures must be sent in between May 2 and 7 next.

The Société des Bains de Mer de Monaco is still more lavish in the value of the prizes they are offering for a photographic competition of a somewhat local character. There are three principal classes: Monaco, the Coast, and Monaco life. The prizes range from bronze medals to sums of 20*l.*, 40*l.*, and 80*l.* The competition closed on March 10, and the prizes will be awarded on March 25.

A Record.—We suppose Marie Lehmann may boast that she has been more frequently photographed than any other person. On February 1, the tenth anniversary of her employment as model at the plate factory of Messrs. Unger & Hoffmann was celebrated. During these ten years she has sat at least ten times each day as model for the trial of fresh batches of emulsion. Reckoning 300 working days to the year, Marie Lehmann may proudly say that she has been photographed at least 30,000 times.

THE TELECTROSCOPE—ELECTRICAL TRANSMISSION OF PHOTOGRAPHS, &c.

Messrs. Jan Szczepanik and Ludwig Kleinberg's invention is described as follows:—The picture that is to be rendered visible at a distance is broken up into a number of points, and the several rays corresponding to these points are combined together again to form a picture by means of two pairs of mirrors placed at the transmitting and receiving stations and oscillating synchronously, for the purpose of transmission, the differences of light of the rays of light passing from the picture points obtained by breaking up being first converted into differences of current, and the latter being then transmitted through the line conductor to the receiving station and there reconverted into differences of light.

The conversion of the light rays into electrical current impulses can be effected in various known ways. If the conversion of the several points of the picture that is to be rendered visible take place in sufficiently rapid succession, the eye of the observer will receive the impression of the entire picture, and if the picture to be reproduced be repeated in sufficiently rapid succession, the observer will receive the impression of a permanent picture, the subject of which may appear to be at rest or in motion according to the nature of the successive pictures thus "telelectroscoped."

A suitable arrangement of apparatus for carrying out this method comprises, therefore, two main portions—viz. the transmitting device and the receiving device, which are connected together by conducting wires or, it may be, by a single wire only.

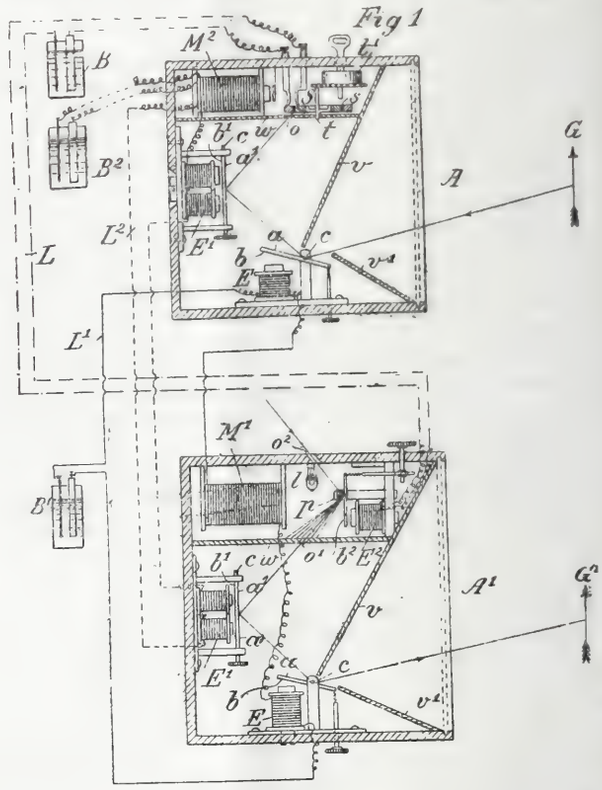
In each of the two devices there are arranged two oscillating mirrors which are moved synchronously by means of electro-magnets. As, in transmitting the picture by means of a single conducting wire, only one point of the picture situated at the transmitting station can be sent at a time, therefore the mirrors must be so arranged that, in any position and any instant, they will reflect only one of the picture points and thus bring each time a ray of definite property or quality into operation in that portion of the apparatus which converts the differences of light into differences of electric current.

This portion of the apparatus may be variously constructed according as the conversion is effected by (*a*) the variation of the conductivity in consequence of exposure to light (by using selenium, sulphur, tellurium, soot, or lamp-black or other substance having this property); (*b*), photo-electricity; (*c*), thermo-electricity; (*d*), radiophonic action; (*e*), variation of magnetism by exposure to light; or by other causes.

The rays, which are converted into electric currents of various strengths according to the colour of the light emitted from the several picture points, produce at the receiving station a corresponding energising of an electro-magnet and the consequent movement of a prism in such a manner that only a ray of similar kind of the light falling, from a source of light on to the prism and becoming decomposed thereby, can reach the synchronously oscillating mirrors at the receiving station. The reflecting action of these mirrors is such as to cause the picture point transmitted to the eye of the observer to be visible to him at the place and in the colour corresponding to the point at the transmitting station.

Fig. 1 illustrates the general arrangement of the apparatus (transmitting station and receiving station); fig. 2 shows one of the oscillating mirrors; fig. 3 shows the electro-magnet for moving the mirror; figs. 4 and 5 illustrate, in plan and in vertical section respectively, the selenium cell employed; and figs. 6 to 9 inclusive are diagrams showing different ways of breaking up the picture that is to be telegraphed.

Fig 1



Each of the four mirrors, *a*, *a*, a^1, a^1, is made by coating the reflecting surface of the mirror with an opaque mass, and by making, by means of a pointed or sharp-edged tool (needle or knife), a straight scratch or cut, so as to produce a reflecting surface in the form of a very narrow linear strip. By means of a mirror of this kind only one line of the object, G, under observation is rendered visible, because, if the eye is stationary, only those rays can reach the eye which are reflected at an angle that is equal to the angle of incidence at which the rays projected from a line of the picture in the same plane fall upon the mirror.

The mirror is fixed to an iron plate, *b*, which forms the armature of an electro-magnet, E, and is provided with pivots, *c*.

By means of the attraction of the armature, *b*, in consequence of the action of the electro-magnet, E, the mirror, *a*, is caused to vibrate or oscillate, and consequently continually changing lines of the picture under observation become visible, because the angle of the incident rays, and therefore also of the reflected rays, is continually being changed thereby.

Now, for the purpose of breaking up those lines into points, the other mirror, a^1, of the transmitting apparatus, A, which is likewise operated by an electro-magnet, E^1, is arranged on the armature, b^1, in such a manner that the reflecting lines of the two mirrors are situated in planes

at right angles to each other. Then, in a given mutual position of the two mirrors, only a determined point of the reflecting line of the first mirror will appear in the second mirror, and therefore only the reflected ray corresponding to this point will be reflected by the second mirror.

When the two mirrors vibrate on their pivots, *c*, the double reflection causes rays of different points of the object to fall successively upon a determined part of a wall, *w*, provided in the transmitting apparatus, A, and in this manner an endless line can be formed of the successive points of the picture.

Figs. 6, 7, and 8 illustrate diagrammatically different ways of breaking up the picture into points, *k*, which follow one another so as to form an endless line, K. The abscissæ, *x*, of the points, *k*, determine the motion of the first mirror, which oscillates about a horizontal axis, and the ordinates, *y*, of the said points determine the alteration of position of the second mirror, which oscillates about a vertical axis.

The results of the motion of these two mirrors are the endless lines, K, of which the one shown in fig. 8 is the longest, because the difference between the movements of the two mirrors is greatest. The greater or less closeness of the succession of the points, *k*, in the line, K, is dependent on this said difference, which, therefore, also serves to determine the accuracy of the reproduction of the decomposed picture.

By this means, during the motion of the mirrors, continually changing

Fig. 2

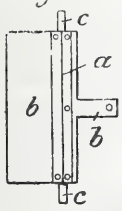


Fig 6.

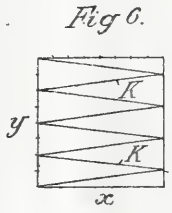


Fig 7

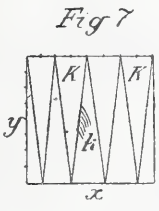


Fig 3.

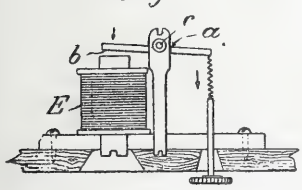


Fig 4

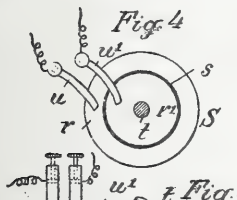


Fig. 5.

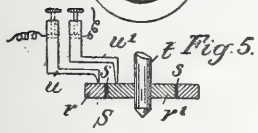


Fig 8.

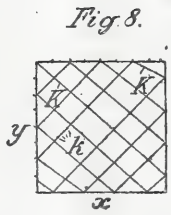
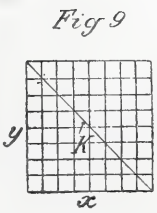


Fig 9



rays of light emitted from the picture are thrown on to a definite spot on the wall, *w*, which rays differ from one another as regards intensity and also colour.

These differences of light have now to be converted into differences of current, in order to ensure their reproduction at a distant place.

This is, in the example of apparatus shown, advantageously effected with the aid of a selenium cell, s, the conductivity of which, as is well known, is considerably increased by exposure to light, and is also varied in different degrees by the action of rays of different colours. This selenium cell is arranged behind an aperture, *o*, provided at the place in the wall, *w*, where the ray falls that is reflected from the second mirror, a^1, of the transmitting apparatus. The cell, s, is included together with a battery, B, in a circuit, L, which leads to the receiving apparatus, A^1, and is there connected to an electro-magnet, E^2, and also to a small incandescence lamp, *l*, which is located on a branch connected to a switch actuated by the armature, b^2, of the electro-magnet, E^2.

When the selenium cell, s, is not exposed to light, no current passes in the circuit, L, because selenium has a very great resistance in the dark; but, as soon as a reflected ray of light falls through the aperture, *o*, upon the selenium, this resistance becomes at once diminished to such an extent that a current flows from the battery through the circuit, energising the electro-magnet, E^2, and rendering the filament of the lamp, *l*, incandescent. As the action of the several rays varies according to their colour, various degrees of conductivity of the selenium are produced, and consequently battery currents of various strengths are sent into the circuit, L.

For the purpose of converting the differences of current thus produced back again into differences of light, there is arranged on the armature, b^2, of the electro-magnet, E^2, a prism, *p*, and in the wall, w^1, there is provided an aperture, o^1, such that, of the light emitted from the incandescence lamp and decomposed by the prism, there can pass through the aperture only the portion that corresponds in colour to the ray to which the selenium cell of the transmitting apparatus is exposed at the same moment, and which produces a current of a definite strength corresponding to its colour, and thus brings about a corresponding movement of the armature towards the energised electro-magnet, and consequently a change of position of the prism, *p*.

Instead of the light of the incandescence lamp, *l*, direct sunlight may be employed, which will then enter through a slit, o^2, in the casing, and be decomposed by the prism.

The ray passing through the aperture, o^1, of the receiving apparatus—for instance, a blue ray when the selenium cell is exposed to a blue ray—undergoes, in the same manner but in the opposite direction, a double reflection, by means of two mirrors, a^1 *a*, which also oscillate on their pivots, *c*, under the action of electro-magnets, E^1 E, and thereby effect the composition of the several successive rays so as to form a picture or image, G^1.

For this purpose all that is necessary is, that the mirrors of the two apparatus, A and A^1, move in perfect synchronism. With this object, the two electro-magnets, E E, of the mirrors that oscillate about horizontal axes, are connected with a battery, B^1, by means of a lead, L^1, whilst the electro-magnets, E^1 E^1, of the mirrors that oscillate about vertical axes are connected with a battery, B^2, by means of a lead, L^2; and in each of these battery circuits there is arranged a current-interrupting device, an induction apparatus, a microphone, or some other device, M^1 or M^2, by means of which the current is constantly interrupted or varied in strength.

As the light emitted from the object, G, into the transmitting apparatus, A, acts only at one point, in consequence of the operation and position of the mirrors, the use of an objective may be dispensed with.

In front of the receiving apparatus, A^1, there may be arranged a photographic plate, upon which the object situated in front of the transmitting apparatus will appear after a certain time, or the eye itself may be employed as a photographic camera, in which case the several light rays are rendered visible upon the retina. The impressions of images upon the same are, however, of very short duration, and disappear after 0·1 to 0·5 of a second. Consequently, if the whole of the points of the original picture be telelectroscoped, the observer will, from this succession of photographs produced in the eye, have the consciousness of seeing the entire picture, just as if the whole of the points of the picture were transmitted simultaneously.

If, before the complete disappearance of the picture, a second, third, and so on repetition of the picture be transmitted in the same way, the eye will receive the impression of a permanent picture. If the successively transmitted pictures correspond to different phases of motion of the object, the impression of a moving picture can be made on the retina of the eye, exactly as in the case of the stroboscope, kinematograph, and the like.

The employment of an objective is of advantage if a large picture is to be transmitted, or if it is to be projected or observed directly to a large scale.

As will be seen, in the apparatus described, three batteries, B, B^1, and B^2, and three conductors, L, L^1, and L^2, are necessary, in order to render its operation possible, the conductor, L, with its battery, B, serving for transmitting the picture, and the electro-magnet conductors, L^1 and L^2, with their batteries, serving for moving the mirrors synchronously.

For great distances between the transmitting and receiving places, it is, however, desirable, on account of the great cost of plurality of conductors, to do away with two of them, so that the seeing from a distance and the synchronous movement of the mirrors can be effected with a single wire.

This is, as regards the one electro-magnet conductor, effected by connecting two corresponding ones of the electro-magnets with the conductor, L, that serves for transmitting the differences of light converted into electric currents.

The two other electro-magnets cannot, however, be directly connected with the main conductor, as otherwise the two mirrors of the transmitting or the receiving apparatus would execute a uniform movement, which would have as a result that there would always be reflected only a single limited line, K, in the direction of the diagonal (as shown in fig. 9), and there would consequently be transmitted only this line, and not the entire picture. Therefore, with the line conductor, L, there are connected two like apparatus (inductors, transformers), and into the secondary conductors thereof there are inserted the two electro-magnets acting on the mirror; thereby the number of the current oscillations is changed uniformly, and the electro-magnets of each part, A and A^1, of the apparatus, will produce oscillations differing in number, but proceeding synchronously in the two apparatus.

When employing three conductors, the electro-magnets, E E^1, can be used as microphones acting independently of one another as soon as they are suitably connected with telephones, the mechanical action on the microphones that takes place in the case of the ordinary telephone apparatus being, of course, omitted. The signal bell may be put into circuit in a manner similar to that of the latter apparatus, and the entire

apparatus be accordingly used simultaneously for seeing from a distance, and for speaking from a distance. If one or both of the electro-magnet conductors be omitted, the microphone will be omitted in one or both of the parts of the apparatus (transmitting or receiving station).

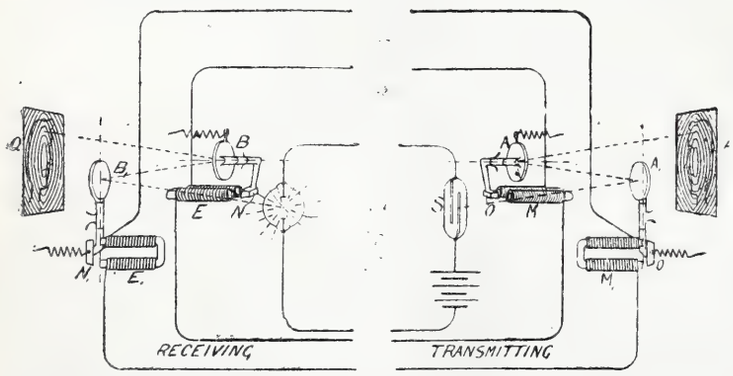
To ensure certainty in the operation of the arrangement for a long time, it is essential to remove the drawback attaching to the hitherto known selenium cells serving for different purposes, and consisting in that with constant illumination the selenium loses in sensitiveness to light.

This is attained by using the construction of selenium cell shown in figs. 4 and 5.

This consists of two concentric brass rings, $r\ r^1$, between which there is put, as a lining, a thin annular layer, s, of selenium, so that a disc is produced; this can be displaced in slow rotation about its axis, t, by means of a clockwork, t^1 (fig. 1). On the brass rings rest two contact-makers, $u\ u^1$, which are connected with the battery, B, or with the line-conductor, L. The disc is placed in a part of the apparatus shut off from the interior by the wall, w, so that during its rotation only a small portion of the selenium ring, s, can be struck by the ray passing in through the opening, o, whilst the remaining selenium remains unilluminated. The object of the walls or plates, $v\ v^1$, which shut off the boxes of the transmitting and receiving devices, A and A^1, as regards the object or as regards the eye or the photographic camera, and which leave free only a small slit for the passage in and out of the rays that are to be or have been transmitted, is to protect particular parts of the apparatus from other rays injurious to its proper operation.

TELEOPTICAL APPARATUS.

Mr. C. A. Lee, of 43, Poulton's-square, S.W., writes: I notice a paragraph in The British Journal of Photography of March 4 about a new teleoptical apparatus having been invented by Herr Szczepanik. The description is naturally rather unintelligible, it having evidently been translated from a foreign language, and the main facts being kept secret; but I can just identify in it the principles which form the basis of my own investigations. I send you a description and outline drawing of my apparatus, which might be of interest to some of your readers, and you will, no doubt, perceive that the description which appeared in your paper may be construed as a similar apparatus.



Description: In the figure, P is the picture at the transmitting end of the circuit which it is required to reproduce at the receiving end. Every point on the picture, P, is successively traversed by the two vibrating mirrors, AA_1, in a continuous path. These two mirrors vibrate on axes at right angles to one another (A, in the figure, being represented with a horizontal axis, and A_1 with a vertical axis). S represents a cell sensitive to light; a selenium cell is probably the most suitable. This latter, as is well known, has the properties of diminishing or increasing its electrical resistance in proportion as the light falling upon it is of greater or less intensity. Each successive point in the picture is caused by the two vibrating mirrors, AA_1, to fall upon the selenium (one or both of the mirrors may be concave so as to focus each point on the selenium cell). This cell is in circuit with a battery or other source of electric current, and, at the receiving end, with a lamp, L, preferably a vacuum lamp. This lamp is more or less illuminated in proportion as the electrical resistance of the circuit is diminished or increased by the action of the selenium cell (at the transmitting end), or in proportion as the light falling upon the latter is of more or less intensity. A pencil of rays from the lamp, L (passed through a slit or otherwise), falls on two vibrating mirrors, BB_1, similar to those at the transmitting end (B_1 having a vertical axis and B a horizontal axis), and thence on to a ground-glass screen or sensitive photographic plate, Q. Consequently the pencil of rays from the lamp, L, is caused to traverse in rapid succession every point on the screen. Now, the mirrors, BB_1, at the receiving end, are each caused to vibrate exactly in unison with each of the mirrors, AA, respectively. This is accomplished by the aid of two small electro-magnets, EE_1, each in circuit with two similar ones, MM, respectively, at the transmitting end. These may be on separate circuits, as shown, or may, under certain conditions, be coupled to the circuit containing the lamp and selenium cell. An intermittent current is made to flow through these, causing them to attract (each pair in synchronism) armatures, NN_1, MM_1, attached to each of the vibrating mirrors, BB_1, AA_1, respectively, which are returned to their original positions by springs, as shown. The current is also caused to diminish to *nil* and increase alternately, so as to diminish and increase the amplitude of the vibrations of the mirrors, and the paths described by them on the screens may be circles of varying diameter. (To achieve this it is necessary that not only the mirrors vibrate on axes at right angles to one another, but also that their motions are complementary, so to speak, that is, when one is at one of its extreme positions, the other is at its central position.) Moreover, every successive grade of illumination on the picture, P, at the transmitting end, is faithfully reproduced on the screen, Q, in its correct position, since exactly similar paths are traversed at each end, and for each point on the path, the illumination is proportionate at either end. It is evident that this system may be extended for reproductions, not only of stationary pictures, but that, if in place of the picture, P, we project a real image of an object by means of a lens, this will also be reproduced at the receiving end; also, that, if we could make the mirror vibrations of sufficient frequency, it might be possible to produce an image on a distant screen in all its correct motions by reason of persistence of vision.

SOME OLD EXPEDIENTS WORTH REMEMBERING.*

So far I have said little or nothing about expedients. One of the most useful I ever came across was the construction of a workable lens from a pair of spectacles. Spectacle lenses had long before been pressed into the service of the photographer, but as far as I know were used singly, and required a long extension of the camera. I remember, when this Club was first started, Mr. Radcliffe showed a print of St. Michael's Mount, taken from his hotel window at Falmouth with a single spectacle lens, which was on a half-plate and well defined all over, and was highly thought of at that time. I think there is a copy of it in our Club album; at any rate, it was an unusual production, and excited considerable interest. Some time afterwards I was experimenting in this same line, and found that, by placing two spectacle lenses close together, I could get any focus I required, and absolute rectilinearity and definition without excessively long exposure; in fact, the pictures produced by them possessed very pleasant perspective, and quite sufficient definition for ordinary outdoor work. A small stop was a necessity, I found, when the exposure was computed according to accepted rules, as the diameter of aperture to focal length. I invariably considerably over-exposed. Why, it is rather difficult to say, unless the extreme thinness of the lens and freedom from colour (they were pebble lenses) absorbed less light, the image becoming more active in consequence. At any rate, exposure from five to ten seconds, with a one-eighth or one-sixteenth inch stop, and a focal length of twelve inches or five and a half inches proved quite enough, and on this estimate I have taken a fair number of pictures on Ilford Ordinary plates, so you must draw your own conclusions. The photographs I now pass round were taken under these conditions by either one or the other combinations, and are, I think, sufficiently well defined for ordinary landscape work, and, unless moving figures are included in the foreground, sufficiently rapid. It must not be supposed I prefer these lenses to those of the orthodox kind, especially the more modern ones, working with large apertures, for the greatest drawback to them (the spectacle lenses) is the little light that is apparently admitted, making focussing somewhat a trouble; but, to counteract this, I arrange my picture without a stop, putting it in before exposure. Practically the difference between the visual and actinic foci is unnoticeable, and I usually focus on the distance (and with these lenses there is considerable latitude in focussing); the pictures come out fairly sharp. I may call your attention to the view of the church tower, taken very near, so that the camera had to be tipped and the back swung to its utmost extent. The combination was five and a half inches. The upper part is not quite sharp, but passable, and I fancy the subject would try most whole-plate lenses to produce with perfect definition all over. You will also notice there is no distortion in the foreground, or unnatural enlargement, although the nearest objects were but a few feet distant. In the interior view of a room the same obtains, the gaselier being not more than about six feet away. As spectacles can be procured in most places, the fact of being able to convert them into photographic lenses is certainly useful knowledge. Another item of quite a different character is the production of a matt or grained surface on an enamelled print, especially cabinet portraits or smaller sizes, so that the portrait retains its smoothness, whilst the margin is grained or matt. We proceed in this manner. After the print is enamelled and mounted, it is placed in contact with a mask of sand paper or other hard-grained surface, and passed through a rolling press. If the portrait is raised, it is sufficient to mount the sand paper on stout cardboard in order to preserve the convexity of the centre. Of course, designs might be engraved on metal, which would impress itself on the enamelled surface with equal facility. Very artistic effects are producible

* Concluded from page 169.

by this means, the slightest inequality producing its mark. These few prints have been made twenty-seven years or thereabouts.

Landscapes are undoubtedly improved by clouds, natural ones, if possible. Should they exist at the time the landscape is taken, they may frequently be secured by the use of a sky shade fixed to the front of the lens mount, and gradually turned down over the lens, thus giving more exposure to the ground than the sky. A more elaborate plan is to fix a piece of brown paper to a strip of wood at the bottom of the camera, a little distance from the plate, to avoid sharp edges, and sloping the edge torn to roughly match the landscape, judging the effect by examining the image on the focussing screen. Expose the landscape part first, cap the lens, close the slide, and remove the paper; then reinsert the slide, and expose momentarily for the sky. Of course, the camera must not be moved between the two exposures, which can be reversed if desired—clouds first and landscape afterwards. Clouds may also be painted on the back of the negative with any opaque colour. I prefer Indian ink, taking care to paint the clouds in *proportionate density to the sky of the negative judged by daylight; this is very important.* Dense clouds painted on a thin sky will always appear unnatural and patchy, very faint indications being sufficient; but, supposing the sky very dense, rather sharp markings with black varnish are better; they will even then barely show. If the sky is very dense indeed, it is best to reduce it by chemical means, using a brush and dilute perchloride of iron solution, followed by the hypo bath, or print in natural clouds from another negative.

There are very few negatives that cannot be improved by papering on the back, over the thinnest portions, parts that print too deeply. Sometimes two or more thicknesses of paper are required; a little paraffin oil rubbed on will modify the density. This is a good plan for equalising two halves of a stereoscopic negative which are of slightly different printing density and paper; without being oiled it often adds rather too much density.

When the slides or shutters stick, as they are apt to do in damp weather, the application of a soft lead-pencil (which can be kept in the pocket for the purpose) will improve matters.

A piece of thin, waterproof mackintosh to throw over the apparatus in showery weather will be found useful to keep off damp, and in dusty weather, wrapped round the slides, will help to keep out the dust.

A hood attached to the front of the camera, to prevent stray light interfering with the brilliancy of the image, is a very old plan, and when exposures used to range from minutes to hours was almost a necessity. Even now the quality of the image is vastly improved by its adoption. A thin, bent piece of brass wire, whose two ends are fastened or pivoted to the sides of the camera front, and covered with black silk, allowing two curtains, as it were, to fall down on each side of the lens like a shop blind, is all that is wanted. It is easily pushed out of the way if not required, and adds very little to either the weight or bulk of the apparatus.

Another method of adding brilliancy to the image is to have black screens inside the camera to prevent any reflections from the bellows more especially; when lenses are used covering a much larger plate than that being exposed, these internal screens are of great use.

In copying stained glass it has been found that much better results are obtained if the stained glass is illuminated by *reflected as well as by transmitted* light at the time of copying. When the lights are *in situ*, a time of day should be chosen to get as much reflected light on them as possible. The expedient of burning a little magnesium is useful as a substitute for daylight. When they are brought to the studio to be copied, there is not much difficulty in the matter, as the different lighting can be easily managed; this double method of illumination causes the resulting negative to be much more harmonious than when transmitted light wholly is used.

Natural backgrounds to portraits are seldom seen now, unless the portraits are taken out of doors; then, perhaps, a plain background would be better. The backgrounds to which I allude are those printed from a separate negative and taken expressly for the purpose. Those issued by Mr. T. Edge many years ago, and unknown to most of the present generation, were, to my thinking, little gems. The process is simple. A foreground is made up in the studio, using a plain graduated background, darker towards the bottoms, but, on the whole, lightish. The portrait is taken, the pose being suitable to the background proposed to be used. All we have to do in printing is to mask the portrait, in any way that may be convenient, before laying it on the landscape negative. Lighter objects, such as blades of grass, detached bits of foliage, &c., are painted over on the print itself with thick gamboge, and allowed to dry, the principal parts being masked by an untoned and unfixed print roughly cut out, and, attached to a piece of glass, used as a screen. The background subjects must in all cases be lightly printed; the shaded background will keep the added landscape from being too prominent. Interiors may be added in a similar manner. I will pass round a few made after this plan, but, as they are very old, they have lost some of their freshness, as well as not being particularly good examples to start with. Any way, you will perceive how the idea works out. I have now exhausted the subjects that have occurred to me, and, I hope, made the Hon. Secretary more comfortable in his mind, and have not taxed your patience altogether past bearing.

E. Dunmore.

ANIMAL PHOTOGRAPHY.

Mr. Gambier Bolton's paper, dealing with his recent adventures among the fast-disappearing fauna of South Africa, formed the subject of last week's lecture at the Camera Club, and gave much satisfaction to the large audience which assembled to listen to his remarks.

The photographer of animals has very great reason to feel grateful for the introduction of dry plates, for without them his operations would be limited to a very narrow circle indeed. We were reminded of this when looking at one of Mr. Gambier Bolton's recent pictures—a group of flamingoes, whose queer spindle legs were in every variety of position. Some were supported on two legs like respectable bipeds; some had only one, and were apparently trying to look like Chelsea pensioners; while still others had one leg in the air, as if undetermined as to what should be done with it. These varied positions were patiently waited for, and, when the supreme moment arrived, the button was pressed, and the picture secured. With the dry plates a man may bide his time; but how different was it in the days of silver bath and wet plate! All the more credit, then, to those early workers in the same interesting field—Mr. Haes, the late Mr. Dixon, and others—who brought animal photography a quarter of a century ago to such wonderful perfection.

Mr. Gambier Bolton gave the premier place to the king of beasts, and showed a number of pictures of lions, taken in Antwerp and other places, which possessed much beauty. One lion—Hannibal the Second—was photographed as he sat in his tunnel-like den at Clifton, near Bristol, and the lecturer pointed to it as the typical "artists' lion." The artist, indeed, is dependent upon caged specimens of Mr. Leo, and always portrays him with a luxurious mane. This mane grows apace in captivity, for there is nothing else for the lion to do; but in a natural state the mane is short and stubbly, for a bit of it is torn off in every thicket and undergrowth, and Mr. and Mrs. Leo will sometimes have a difference of opinion as to the interpretation of the married woman's property act in the matter of bones, which leads to a further denudation of mane. "This," says Mr. Gambier Bolton, "may be called artists' licence, with an accent on the 'li.'"

From the lecturer's remarks it would seem that there are many persons abroad who know not the difference between *meum and tuum* in the matter of copyright of photographs, and the profession generally should feel that they owe him something for the way in which he invariably "goes" for such dishonest folk. Entering a popular place of amusement one day lately, he found on the programme a picture of a lion which he at once recognised as one of his own photographs, but with some one else's name to it. A solicitor's letter reached the proprietors of the show the next morning, and ultimately they paid seventy-five guineas to stop further proceedings. Another of Mr. Bolton's photographs was turned by an enterprising draughtsman to pecuniary profit in one of the illustrated papers, but the photographer was at once down upon the publishers, and their refusal to recognise his rights cost them the neat little sum of two hundred pounds. How many poor photographers will pray when they hear this that some cadger will sneak round and treat their effusions to the same flattering distinction!

We learnt several things about the lion and his little ways. He has a curious nail-like projection in the middle of the bush of hair which terminates his tail, but no naturalist has yet found out what possible use that nail can have. We are not naturalists ourselves, but we venture to point out that nature has here provided the animal with a most effective means of scratching himself, and one which the average human being, not alone Scotchmen, will at once appreciate. A lion likes his game high, not to say putrid, and when wounded will sometimes in his agony bite through one of his limbs with force enough to crush the bones. We were reminded, too, that the noble British lion is no myth, and that, although his foot is upon his native heath no more, his dug-up skull testifies to his presence in these latitudes in the bygone past.

Next came some masterly photographs of tigers, which, however, gave little notion of the enormous size of this powerful beast. The specimens to be seen at the Zoo and in other European collections are but counterfeit presentments of the real article. The colours of the striped hide are most gorgeous, and are really a protection to the animal, for they resemble most closely the colours of the jungle foliage. It is a common idea that tigers, like the smaller members of the cat tribe with which most of us are more familiar, do not like water. This is wrong, and an instance was given by the lecturer of a tiger caught in a net and drowned, and the fishermen the next morning marvelled greatly at the strange fish which was caught in the night.

Mr. Gambier Bolton seems to have visited every quarter of the globe in his quest of wild beasts, and tells us that the dealers in such wares are the men who make all the money without stirring from their chairs. They will not bear any of the risk, but will buy rare animals if brought to their doors, that is, if they can see their way to make a big profit upon them. On one occasion a small animal was offered to Mr. Bolton for seven pounds, but he was unable to burden himself with it. Eventually it found its way to London, and was sold by a dealer for twenty times that sum. The most vicious creature of all the cat tribe is the black leopard, which never yet has been tamed; and the curious part of the thing is that the beast is only a variety of the spotted leopard, one and the same litter often comprising a number of each. In this case the devil is quite as black as he is painted.

The photographs of sea lions in their natural state, disporting themselves by the hundred on the rocks, were most effective. Wily creatures are these, who will swim in the water submerged all but their snouts. Down come the sea birds in an inquiring spirit to find out what the floating lump is, when, with a spring, the sea lion snaps his jaws, and the bird's zoological studies are closed for ever. The sea lions are sometimes regarded as seals, but no one would make this mistake who would take the trouble to glance at the structure of the hind limbs. In the sea lion these limbs are adapted for walking, but in the seal they are more like fins, and are all but useless for ambulatory purposes. This is rendered most clear when the two skeletons are compared side by side.

Next in order came several most interesting photographs of elephants, which, as everybody knows, play the part of "horny-handed sons of toil," without any striking for increased wages and reduced hours, in our great Eastern dependency. These pictures were of certain elephants employed in the timber yards at Rangoon (Burma), and it was most interesting to see how the huge beasts "handled" with tusks and trunk the heavy logs of teak, which it was their work to move from place to place, and to pile into stacks. This is done with most wonderful dexterity, and the stacks are made as neatly as a mason would build a wall. There is a tradition, indeed, that these elephants, in laying the sleepers of a railway, will occasionally pause in their work, put head on one side, shut an eye, and look along the track critically in order to see that the line is being laid straight. There are differences between the African and Indian pachyderm, which are easily recognised when you know what to look for, The Indian elephant has a single lip at the end of his trunk, while he of Africa has two lips, very large ears, and a much rougher coat. The elephant is the only animal which can kneel with his hind legs extended backwards, and, although the action looks awkward, the animal can rise to his feet with far greater facility than can a horse.

We have not space to even name the vast variety of animals whose portraits were thrown upon the screen by Mr. Bolton. The greatest interest is naturally attached to those which, through the rapacity of mankind, are fast becoming extinct. All the South African animals are disappearing, but some are going faster than others. The bisons have all but disappeared from the American continent, and one of the photographs shown, representing acres of bones and skulls of this much-lamented beast, gave a better idea than anything else could do of the vast slaughter which must have at one time taken place. Mr. Bolton was able to call to mind an occasion in which the Indians drove a herd of 4000 bisons over the edge of a precipice, in order that they might secure a plentiful store of smoked tongues for breakfast.

The giraffe at the Zoo, the only one at present in this country, was next shown, together with the travelling box by which it was brought by rail to London. This box was telescopic, so that it could be shut down whenever a railway bridge was encountered, and, as such bridges are somewhat frequent obstructions, the work of attending to this long-necked traveller was by no means a sinecure.

The lecturer's visit to the penguin islands secured for him many photographs of those comical birds. The landing here in a heavy surf swarming with sharks was no enviable task, but an earnest photographer feels himself repaid for all dangers if he only secures plenty of good negatives. This certainly was Mr. Bolton's happy lot. The duckbill platypus, and his brother, the echidna, both of Australia, aroused much interest, as being the only mammals who produce eggs. The lecture concluded with a sportive poem called "An 'Owling Tragedy," in which the pictures of several owlets were introduced with humorous effect.

HAND-CAMERA CRITICISMS.*

The best method of release for the shutter has always been a vexed question. For very unsteady workers the pneumatic release would probably prove most suitable, although, in my opinion, it is open to many objections. It has, in the first place, to be stowed away in the body of the camera when out of use, and is often too sensitive, going off with the slightest pressure; it is also perishable, and prone to spring a leak at a critical moment. The method of release by which a small button is pressed into the body of the camera is one that is frequently employed, but is open to the objection that the pressure required to release the shutter is frequently conveyed to the body of the camera itself, causing blurring of the image; it may also be accidentally knocked against the person in carrying the camera, and release itself. I am inclined to favour a sliding form of release—especially one in which there is a certain amount of travel before the actual firing of the shutter takes place. This should invariably be on the right-hand side of the camera; it is then always visible, whether it is required for horizontal or vertical exposures. In some cameras, where the release is placed at the bottom of the camera, and is consequently not in sight, in feeling about for it to make an exposure it is apt to get prematurely fired off.

A most important point in the proper equipment of the hand camera is a satisfactory method of locating the object to be photographed. For this purpose it is usual to fit a pair of so-called finders to the camera. These are really cameras on a diminutive scale, and the image they give in miniature should coincide with the image given by the lens of the camera to which they are fitted. But how often do they, as many of us know to our cost? We have perhaps taken a snap-shot at a ship in full sail, and have carefully balanced it on the finder, in order to get as large an image as possible on our plate, only to find on developing that there is but half a ship on the plate and twice the foreground showing that we had calculated for, and the masts are well out of sight on their way to higher sphere. This is the usual thing, and better cannot be expected when one sees the same size finders being fitted indiscriminately into cameras with lenses of five inches, five and a half inches, and six inches focus respectively, totally regardless of the fact that either of these lenses will give a different amount of image on the plate to any of its fellows. Neither is any attempt, in the majority of cases, made to ensure that the centres of finder and plate are coincident. There are three independent types of finders usually fitted, one with biconcave lens and mirror, the so-called brilliant finder; another with biconvex lens and mirror and ground-glass screen, and another and more recent introduction, in which a combination of lenses is used. The brilliant finder is undoubtedly the worst of these three types, as the image is absolutely uncertain in both centering and angle of view. To prove this point, you have only to look a little to the right or left, or directly over or behind this type of finder to get a totally different view in either position. There is, however, a type of concave finder the centre of which is marked, and to which, at a short distance away, is attached a metal pointer. On holding this up to the level of the eye, so that the pointer coincides with the mark on the centre of the finder, it is possible to get the image accurate provided the correct distance away to suit the focus of the camera lens is found and always adhered to. The most popular type of finder is the second type above mentioned, consisting of biconvex lens, mirror, and ground glass screen. The image in this type does not vary at all, and can be readily made to agree with that given by the lens. The principal objection to it is that, unless well shielded, it cannot readily be seen in a strong light. This is, however, nearly always the maker's fault, as he will persist in using a lens with a working aperture much too small for the work, consequently the screen gets very poorly illuminated. The ground glass used should be much finer than that of a focussing screen as the image to be seen upon it is a very diminutive one. The silvering mirror should also be as thin as possible in order to avoid double images. In addition, the focussing should be very accurate, instead of which I frequently find that our finder image is thrown right out of focus on the screen which is as coarse as a piece of sand paper. Properly made and well hooded, this type of finder will continue to have a good innings in spite of the third type I have previously drawn attention to, viz., the triple-lens type. This is an undoubtedly fine type of finder, and not to be in any way compared to the biconcave brilliant finder. The image is not appreciably variable, and can be seen distinctly without shading even in direct sunlight. In some forms of this finder, however, there is a duplication of image, owing to the number of refracting surfaces, and also some curvilinear distortion, and the image given is somewhat inclined to dazzle.

Now that I am on the subject of finders, I had perhaps better mention the twin-lens type of camera, the *raison-d'être* for which is merely a desire to have something as large as possible in the way of a finder. This type of camera had a big boom last year, when it was procurable at prices ranging from 1*l.* 1*s.* to 40*l.* It would be interesting to find out from purchasers who have had a season's use of the twin-lens type what their private opinion of the system is. Theoretically, it seems very nice to be able to see the image full size and focus same right up to the moment of exposure; but, in practice, this is a typical instance of what occurs. You are out with your latest pattern twin-lens camera on the seashore, light grand, yacht just coming in, great excitement on shore. You decide this would make a fine snap-shot. The yacht is just a little to your right or left, as the case may be; circumstances are decidedly favourable. You open up the hood of your twin-lens finder and proceed to business. Yacht approaching steadily, not quite in focus; sun streaming over your shoulder right on your large finder bothers you a lot, almost obliterating the image. You wish you had a focussing cloth (same as is always required to critically examine the photographic image on a ground-glass screen under all other circumstances than when used as the finder of a twin-lens hand camera). You try and dodge the light, and make another effort to focus up the yacht which has all this time been rapidly coming towards you, and finally your dismay that it has grown too tall for the horizontal way of your plate, and your focussing, twin-lens camera can't take vertical pictures, so you decide to shut it up and go home and read up the advantages laid down in that advertisement, again. On a stand, no doubt, the twin-lens camera would be more useful than the usual type of hand camera. There is, of course, no uncertainty about the coincidence of the image you can but see it, and let it be noted that in some of this year's patterns elaborate erections in the way of hoods, with very small sight-holes, being fitted round the finders, thus acknowledging the difficulty. I say nothing as to the expense of building this type of camera proper, nor is there any necessity to discuss its weight and bulk, both of which must of necessity be greater than in a single-lens camera of the same calibre.

There remains still another type of full-size finder which requires notice, and that is the type obtained by using the same lens for

* Concluded from page 170.

der as is used in producing the photograph. The system by which is is done is well known to all, but is open to a few objections, the incipal one of which is that the mirror, being of necessity contained in e body of the camera, has to be moved out of the way before exposure, using a constant stirring up of dust in the camera, and some delay in aking the exposure. Additional mechanism is also required for carrying out this movement. A further objection is that, should it be found cessary to stop down the lens for any particular exposure, the visiity of the image in the finder is correspondingly affected.

Having now discussed the four principal items which are absolutely cessary in the composition of a hand camera, viz, the changing echanism, lens, shutter, and finder, I will proceed to consider the rious et-ceteras. The most important of these is probably the focussing ovement. That this movement is of immense utility, under certain cirmstances, cannot be denied; it has, however, at least one drawback. It is e forgetful man who will appreciate this drawback the most, as nothing easier than to forget to replace the focus to infinity, after one has, me little time before, exposed on an object at some intermediate stance, with the consequent result that the object is out of focus, and other good plate goes to join the great majority. In fact, for the class work which hand cameras are mostly called upon to perform, it is a batable point whether a focussing movement, with its increased outlay d liability to error, is one that can be advised as an absolute necessity, cepting in the hands of an expert. The same remark applies to rising d cross fronts, swing backs, &c., all of which are desirable under certain nditions. These, however, do not often apply on hand-camera work, d I think that, if the opinions of purchasers of hand cameras so fitted uld be obtained, it would be interesting to know how many times these ovements had been pressed into service with success. In the first place, three movements necessitate a considerable reserve of covering power the lens, which is not often obtained without a corresponding sacrifice the aperture, which, in its turn, compels an increase in exposure with e contingent risk of movement. Other points to be noted regarding ese movements are that they usually entail extra bulk, extra weight, tra outlay, and further mechanical complications.

A type of hand camera which is being considerably used, especially the fair sex, is the folding type. Here, of course, portability is the imary consideration, and the amount of machinery which the manucturer manages to condense into so small a space is nothing short of arvellous. Many of these instruments are fitted with horizontal and rtical swing backs, rising and cross fronts, rack-and-pinion focussing ovements, double extension bellows and focussing screen. The obctions to this type of camera are palpable, the most important ne being that the camera, as carried, is never ready for use, but has to opened out, focussed up, and generally adjusted, before an exposure possible. Undesirable attention is often drawn to the photographer hen using this type of camera, and we all know how unnerving it is to the centre of attraction to the inevitable group of small boys, which ems to spring up from nowhere, and always evince the keenest interest the doings of a photographer.

Into the advantages of rollable or other film cameras as compared with ate instruments I do not propose to enter, as, practically, all the points on which I have touched are embodied in one or other type of film mera. There is no doubt that the introduction of the cartridge system, applied to these cameras, has brought an immense number of recruits the ranks of amateur photographers, and to those to whom the cost of rking material is not a very important item this system has many vantages. Its principal disadvantage seems to me that it is neither sy nor economical to develop a portion only of a cartridge spool, and I ve known the white numbers that are used to denominate each exsure on the back of the black covering leave their impress on the ulsion. This fault occurs but seldom, and I do not propose here to ter into the chemical reasons for its existence.

A prominent feature in many hand cameras — especially those of rtain foreign makers—are the large number of projecting parts. In e particular camera that I can call to mind, I distinctly remember ving counted no less than ten projections, although I regret to have to d that I do not recall that there were ten corresponding advantages in working. There should be no necessity for more than three or four jecting fittings at the most, as the less we have to look after in s way the more likelihood there is of our doing good work.

Of course, no camera of the magazine type is complete without a satistory automatic plate register and two bushes for attachment to a pod. These bushes, it should be noted, should be specially made for e purpose, with solid ends, cast in one piece. I have known bushes to improvised from the usual thing by soldering a dead end to them, ich end I have also known to be unwittingly pushed out by the tripod ew, with the result that a large and quite unexpected light leakage urred on withdrawing the screen again.

One further point, and I have done; that is, avoid all odd sizes as you uld poison. In conclusion, I should like to place on record my opinion that very debatable question as to "What is a *hand* camera?" and uld answer in Scotch fashion by asking another question, viz., "When a camera *not* a hand camera?" which, to my way of thinking, admits only one answer, and that is, whenever its source of support is other than that of the individual who is using it.

J. E. Hodd.

THE PHOTOGRAPHIC CONVENTION.

Respecting the forthcoming meeting of the Photographic Convention of the United Kingdom, to be held at Glasgow, July 4 to July 9, the following preliminary announcements have been issued:—

The spacious galleries of the Royal Glasgow Institute of Fine Arts have been secured for the meeting, and it is anticipated that at the official reception, the Executive will be supported by most of the influential residents of the city.

Several important papers will be read at the evening meetings. The lantern arrangements have been entrusted to a special committee, and it is expected that the trade exhibits of apparatus, pictures, &c., will be unusually numerous.

A most attractive programme of excursions has been arranged. The places to be visited including Loch Lomond, Loch Long, Gareloch, Rothesay, the Kyles of Bute, Millport, Largs, Stirling, the Forth Bridge, Edinburgh, Ayr, Alloway, Brig o' Doon, &c. A special steamer has been engaged for yacht race day (July 7), which will follow the competing vessels during a portion of the contest.

Permission will be obtained to photograph the principal buildings in Glasgow, and members of the local committee will be pleased to conduct Conventioners to the many attractive spots in the city. A visit will also be arranged to the ship-yards of the Clyde.

Reduced tariffs have been obtained at several of the principal hotels, and at the Windsor (head quarters), a large room will be reserved for the sole use of members of Convention.

The Annual Dinner and Smoking Concert, to which Ladies are welcome, will take place at this hotel, the grand dining room of which is capable of accommodating nearly 300 guests.

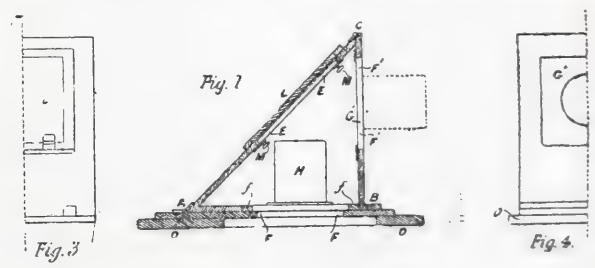
Railway Arrangements.—The London & North Western, Great Northern and Midland Railway Companies will, in all probability, run excursion trains, leaving London on Friday evening, July 1. Return tickets, available for eleven days, 25*s.*; or, to return any day within sixteen days, 33*s.* Tickets at reduced rates will also, doubtless, be obtainable from many of the principal towns.

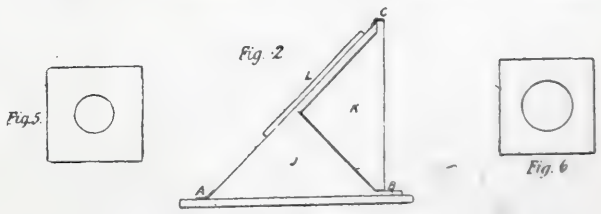
The privileges of membership include invitations to the official receptions, admission to all the meetings, to the Exhibition of Pictures and Apparatus, with special rates for excursions, &c. The Annual Subscription is Five Shillings.

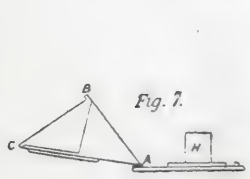
Applications for membership should be made through the Honorary Secretary, F. A. Bridge, East Lodge, Dalston-lane, London, N.E.; or the Local Hon. Secretary, Wm. Goodwin, 3, Lynedoch-street, Glasgow.

RICHMOND'S IMPROVEMENTS IN MIRROR BOXES FOR PHOTOGRAPHIC CAMERAS.

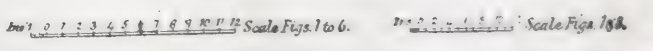
"To make clear the understanding of these improvements, let it be supposed," says Mr. W. D. Richmond, "that the object to be copied, when this mirror box is used, be hung, or stands in a vertical position; then, in











the drawing hereunto annexed, fig. 1 will represent a horizontal section of the apparatus, and, as the other figures have the same reference

etters for similar parts, the construction will be easily followed. The camera front is represented by the board, D D, to which is attached the mirror box, A B C, by means of a board having an opening, F F, in it. To this board is permanently attached the shallow frame, *f f*, forming a rebate for the lens-holder, G, which is shown again in figs. 5 and 6, there being a separate holder for each lens used. The front, C F^1 F^1 B, which is shown in half elevation in fig. 4, has a similar opening for a like purpose. The opening in the side, A B, fits over the frame shown in section at *f f*. This side is hinged at A, and is secured by a button (not shown) at B, so that the whole of the mirror box can be turned back when it is not required for reversing the picture, as shown in fig. 7. It will be seen from this description that the lens, H, by means of the holder to which it is attached, can be inserted either in the recess at F F or in that at F^1 F^1, both positions having advantages. In both positions the photographic picture can be reversed as regards right and left, but the position at F is more convenient for great reductions and for including wide angles, while that at F^1 F^1 is more suitable for working near same size and for enlargements.

"When it is required to include a wide angle of subject the front may be found to be in the way, and I, therefore, make it removable by hinging it at C, so that it can be turned out of the way, as shown in fig. 8. It will be seen that it carries with it a portion of the top, K. The under side is made similar, so that really a portion of top and of bottom is put out of the way at the same time. This removes all obstruction when it is desirable to include the largest angle of which the apparatus is capable, and which cannot be done in mirror boxes of the usual construction.

"At the back of the apparatus is the place of the mirror, E E, which in this invention is put in from the back instead of from the front, as is the usual practice. The back is shown in half view in fig. 3. By opening the door, L, which has a light spring on the inside to keep the mirror properly pressed against its seat, the mirror can be lowered into its recess, and may then rest on adjusting screws as shown at M M.

"It will be seen, on inspecting the drawings hereunto attached, that the back, A C, of the box is united to the side, A B, by means of the piece, J, so that the portion, K, can be made removable, as indicated at fig. 8."

Our Editorial Table.

Architectural Photography.

By G. A. T. Middleton, A.R.I.B.A. London: Hazell, Watson, & Viney, 1, Creed-lane, E.C.

Mr. Middleton's architectural knowledge evidently qualifies him for telling his photographic readers how architecture should be studied from a pictorial point of view, and the chapters of his little book, in which he endeavours to carry out his purpose, are full of decidedly useful hints. He deals with, among other divisions of his subject, distant views, exteriors, interiors, detail and ornament, and street views. An introductory chapter is devoted to photographic hints to beginners, but the advice given is fragmentary, and not always so precise as it might be. Thus: "For architectural work a half-plate lens should be used for a quarter-plate camera." It has escaped Mr. Middleton's notice, we suppose, that in recent years the term "half-plate lens" has been entirely robbed of its former significance. It is not nowadays at all necessary to use lenses of greater focal length in order to get a small-size plate perfectly covered. Mr. Middleton's illustrations show him to be a very good practical photographer, but the half-tone reproductions of his photographs that are given in his book are mostly about as bad as they could be. Still the book, on the whole, will be found very useful by those taking up architectural photography.

Sun Pictures of the Norfolk Broads.

By Payne Jennings. Letter-press description by E. R. Suffling. Ashtead: The Studio, Art Photo Works.

A third edition of this book, which is issued under the auspices of the Great Eastern Railway Company, has just been published. The production shows the photographer at his best. About a hundred of Mr. Payne Jennings' views of the Norfolk Broads and rivers, the neighbouring villages, and characteristic scenes of angling and sailing life are given. Personally we owe Mr. Jennings a debt of gratitude for his many beautiful reminders of a unique and reposeful corner of England, of which we first made the acquaintance many years ago. Mr. Jennings' views are well chosen, and, in many cases, touch a very high level of artistic quality. They are admirably reproduced in half-tone, and, above all, are well printed. Mr. Suffling's descriptive notes are brief, pointed, and informative, and materially add to the value of the book as a pictorial guide to the Broads. With Easter in sight, the holiday spirit once more takes hold of large numbers of people, and, if we mistake not, many eyes will turn eastward, attracted thither by Mr. Payne Jennings' tempting photographs and the enterprise of the Great Eastern Railway Company in taking the fullest advantage of the camera for making known the beauty, the reposeful charm, and the quiet fascination of the land of English lagoons.

The Duplex Ferrotype Portrait Camera.

Manufacturers: The Duplex Photographic Co., 2, Avenue-road, Hammersmith, W.

This ingenious little camera is the outcome of previous inventions designed to take and deliver finished ferrotype portraits in a short space of time, and in its present form may be fairly regarded as well-nigh perfect. The size of the picture is $2 \times 2\frac{1}{2}$ inches. The ferrotype plates, coated with a dry-collodion emulsion, are contained in a reservoir on the top of the camera, no sheaths or backing pieces being required. By pneumatic means a plate is lifted from the reservoir, and, the sitter having been focussed through a ruby-coloured glass, a simple movement places the plate in the focus of the lens, and the exposure is made. After exposure, the plate drops into a small vertical developing tray fitted at the rear of the camera, and thence, after a brief washing, into the fixing bath. Drying over a small spirit lamp ends the procedure, the whole of which is completed in less time than it has taken us to pen these lines. The entire apparatus, exclusive of stand, fits into a box measuring $16 \times 11 \times 8$, and the outside dimensions of the camera itself are only $7 \times 6 \times 5$. For outdoor work in open spaces this little camera renders the ferrotype process a matter of the greatest ease. A skilful operator can take forty or fifty portraits in an hour. We ourselves sat for our portrait and received three framed specimens in about as many minutes, notwithstanding that it was a March afternoon, and in shadow, when the exposures were made. We also made a trial exposure which turned out a success. The Duplex Ferrotype Portrait Camera is ingenious, compact, and effective, and the whole system has been reduced to the greatest simplicity, so that outdoor photographers should find it a decided acquisition.

Gum-bichromate Paper.

Manufacturers: The Gum-bichromate Paper Co., 61, Battersea-rise, S.W.

Mr. G. H. James writes us: "It may interest you to know that sensitive gum-bichromate paper is being supplied commercially by my friend, Mr. Herbert Saxon. It has been issued privately during the past month, and was sold publicly for the first time on Wednesday, March 16. About three months ago I succeeded in perfecting a method of coating the paper by machinery, and at the same time introducing into it keeping qualities considerably better than those yet publicly announced in the photographic press. Development is also considerably quicker with this paper and the gradation much improved. It is these improvements which have induced Mr. Saxon to place the paper upon the market. You will notice that ten days is the stated time for keeping the paper. For the most delicate portrait the paper should not be more than ten days old, it is true, but for landscapes three weeks may elapse, and the paper will still give good results. This paper, I think I am justified in saying, will render prints as perfect in detail and gradation as the single-transfer method of carbon printing, while the simplicity of printing and developing is very much greater."

The following are the working instructions for the paper: "*Exposure.*—Place the pigmented or coloured side of the paper against the film side of the negative and expose in a printing frame to daylight until the most prominent outlines of the photograph show slightly darker than the surrounding colour.

"*Development.* — The undeveloped print should be immersed face downwards in a dish of cold water and allowed to soak for a minute or two to allow the paper to become limp. It should then be turned over, and while being held under the water a soft camel or sable hair brush should be drawn gently over the surface, first down and then across. This will carry away all the unexposed colour. Development should be complete in three or four minutes if the exposure has been approximately correct. The size of the brush is immaterial. No brush marks will result if the brush contains no hard bristles and the print has been sufficiently exposed. If the yellow stain from the sensitising mixture has disappeared during development, as is frequently the case, the print may at once be hung up to dry. Should the stain still show, the print must be immersed in a weak solution of alum—one part alum to twenty parts water—and then passed rapidly two or three times through clean water and dried, when it will be ready for mounting.

"*Under-Exposure.—Development.*—When there is any doubt concerning the sufficiency of exposure, the undeveloped print should be first placed in the cold water and shaken gently for a few minutes. It may then be examined, and, if development appears to be proceeding rapidly, the print should simply be allowed to soak face downwards. The colour will gradually dissolve out, and development will automatically take place. The brush may be resorted to at any stage at which it appears necessary.

"*Redevelopment.*—If the print, when dry, is found to be too dark, it may again be soaked in water and development continued, provided it has not, meanwhile, been soaked in the alum bath or exposed to strong daylight.

"*Useful Hints.*—The ideal exposure is that in which development is complete after the brush has been drawn down and across the surface two or three times only. Aim at a full exposure; it allows greater latitude in development. Excessive exposure can be corrected by using tepid or warm water, or a prolonged soaking in cold water

lways start development in cold water; use tepid or warm water nly where this has failed. Failures through exposures should be unnown. The only cases where correction is impossible are extreme nder-exposure, *i.e.*, where no darkening has taken place, and extreme ver-exposure, *i.e.*, where every detail of the print is visible and the arkest parts of the negative have plainly printed through. Soaking r twenty-four hours will often correct excessive over-exposure. evelopment may be conducted in daylight without risk of fog, proided the print is immersed in the water immediately it is taken om the printing frame or storing envelope. Prints may be developed ny time within a week after exposure. Brush marks result with this aper only in cases of under-exposure or where a hard brush has een improperly used. In cases of over-exposure the resulting prints, developed in hot water, are not so good as those developed by a rolonged soaking in cold water. Reduce the exposure when the rints are to be developed by soaking in water only, without the applicaon of the brush. Do not press the brush so hard on the surface of the rint that the part of the hair near the ferrule is used—use the end f the brush, and let each stroke slightly overlap the last."

Mr. James has been good enough to place before us several specimen rints on the new paper. These were in sepia, red chalk, black, and rown, and they exhibited all the best characteristics of this method f printing. Several undeveloped prints, showing the depth to which rinting should be carried, were also exhibited to us. The fact that n actinometer may be dispensed with in printing should help to ake this gum-bichromate paper exceedingly popular among lovers f the distinctive effects which it yields.

The "Perfectus" Albumenised Paper.

Manufactured by the "Perfectus" Sensitised Paper Company, 60, London-road, Croydon.

LBUMEN paper has been many times "killed" during the past twenty ears, but it still survives, a by no means to be despised printing proess. The physical strength of the film renders albumen prints leasant to handle, and a properly toned photograph on the surface is lways satisfying to the eye. The "Perfectus" Sensitised Paper ompany have sent us for use some samples of the albumen paper hat they prepare. This appears to have been well and carefully ade and liberally silvered. The results it yields are in every respect s good as could be wished for, and we have no hesitation in recomending the paper.

ESSRS. John Done & Co., Trade Printers, of New Barnet, send us their test price-list. They undertake gelatine and albumen printing, bromide nd platinotype, developing, intensifying, mounting, copying, retouching, nlarging, &c. Their prices appear to be moderate.

News and Notes.

The Warwick Dry-plate Competition.—The following are the names of e March winners in this competition: 1st prize, 20*l*., Mr. Chas. F. Inston, , South John-street, Liverpool; 2nd prize, 10*l*., Mr. A. J. Jeffreys, Bridge ouse, Chelmsford; 3rd prize, 5*l*., Mr. W. Fisher Ward, Bawtry, Yorkshire.

We understand that the Queen has been pleased to accept a copy of Mr. Kearton's recently published book, *With Nature and a Camera*, which ntains, amongst other things, a full account of the daily life and surroundgs of Her Majesty's most isolated subjects in the British Isles, viz., the inbitants of St. Kilda.

At the forthcoming Crystal Palace Exhibition Messrs. R. and J. Beck, Limited, ll have a large exhibition of their specialities and an extensive display of rk done with the Frena camera. They will show upwards of 400 enlargeents and prints made with the Frena, and we understand that some of the largements will be of colossal size.

Röntgen Society.—The next General Meeting of this Society will be held 11, Chandos-street, Cavendish-square, W., on April 5 next, at 8 p.m. A per will be read by Mr. James Wimshurst, upon "The Influence Machine d its Advantages for Lighting X-ray Tubes," to be followed by a discussion. ntributions of interest are invited from members. Each member is entitled introduce a friend.

Mr. George Hanmer, of 2, Dudley-road, Wolverhampton, writes: "As u have on many occasions shown much kindness in connexion with the nouncements and reports of the proceedings of the Wolverhampton Photoaphic Society, it becomes my duty to inform you that the Society ceased to st from the 15th, the reason assigned being the lack of interest shown by e members in the Society's proceedings."

Photographic Club.—Wednesday evening, March 30, at eight o'clock, avellers' Night. "The Royal Palaces of England," including the Royal l State apartments, by Mr. Horatio Nelson King, architectural photographer the Queen. Visitors are admitted to the meetings of the Club on the rsonal introduction of a member, or by invitation cards. which the Hon. cretary, Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E., will be pleased forward on application.

How not to Manage an Exhibition.—Mr. C. J. Berg writes in *Camera Notes* (New York): "Might not a few words be said in your valuable journal about the methods of the London Salon, even if they be not in praise? So much has been said commendatory of the Salon, that perhaps a complaint may come with no little surprise. The American exhibits have just been returned, and the utter carelessness in handling is evinced on every exhibit, both on frame and picture. It might be argued that this is due to the shipping agents either before or after the Exhibition, and one might be inclined to think so were it not for the damaging evidence made manifest in the manner of numbering for the catalogue. Would it be believed that numbers were pasted on the prints themselves, while there was every opportunity to place them on mat or frame? Yet this is what we find, to say nothing of the broken, scratched, and besmeared frames and mats, and exhibits missing entirely, and in one instance a frame is returned without a picture. Another peculiarity of the Salon or Linked Ring is the gracious way in which they notify an exhibitor, just before the Exhibition is opened, 'that the Committee regret that the space at their disposal will not permit the acceptance of the following numbers on your entry form' (here specifying, as in case of writer, two out of seven sent). The natural supposition, therefore, would be that the balance were favourably received. This, however, is dispelled after a review of the catalogue, where but two are indexed. What, then, has become of the others? Have they been retained for an exhibition of the Holy of Holies, for which no catalogue is issued? It was found upon inquiry that these errors of omission and commission were not alone experienced by the writer." "Americans sending their work to the Exhibitions abroad," adds the editor of *Camera Notes*, "do so under great disadvantages, and, as a rule, at a great expense. Unless their prints and frames be handled with reasonable care in the future, Americans will cease to show their pictures in the important European exhibitions. As it is, our own Custom House methods are such as to scare out all but the greatest enthusiasts from sending abroad, but even the enthusiasm of these has its limits."

Rotherham Photographic Society's Exhibition.—On Thursday, Friday, and Saturday of last week (March 17, 18, and 19), the Rotherham Photographic Society held its Annual Exhibition (the ninth) in the Rotherham Drill Hall. There was ample justification for the selection of the largest building in the town for the fixture, the principal advantages being improved lighting and increased accommodation. The Affiliation of Photographic Societies' Circulating Exhibition was well displayed in front of the stage, where room was also found for a choice collection of work kindly lent by Mr. Alexander Keighley, F.R.P.S. (President of the Bradford Photographic Society); Mr. C. B. Keene, F.R.P.S., Derby; the Autotype Company, London; and Messrs. West & Son, Southsea. Conspicuous amongst Mr. Keighley's examples were *The Signal Box*, *Early Spring*, and *The Old Lych Gate*. Mr. Keene's list included *Picture Gallery—Hardwick Hall* and *The Mermaids' Pool*. Messrs. West were represented by three large carbon enlargements of yachts in full sail. The reproductions of the Autotype Company were much admired. Members' work was in some respects above that of last year in point of merit. Altogether there were about 330 prints arranged. As to processes, carbon was absent, and platinotypes were few in number, but the gelatino-chloride method had been largely used. There were also a few bromides, chiefly enlargements. Progress in regard to cloud introduction had not been very marked, and a number of the prints would have been much improved by attention to this matter. The exhibitors were Miss Mary A. B. Crossley, Dr. F. B. Judge Baldwin (President), Messrs. J. Caseldine, J. C. Cox, J. Clarke, Wm. Firth, W. E. Garsed, H. C. Hemmingway (Hon. Secretary), R. H. Law, J. Leadbeater (Vice-President), A. S. Lyth (Hon. Treasurer), Wm. Mason, F. Moore, F. Oldham, C. E. Parkin (Assistant Hon. Secretary), G. T. Rackstraw, W. Rider, Chas. H. Sutton, Percy Turner, and James Turner (Vice-President). A feature of the Exhibition was the display of 300 prints forming part of the photographic survey of the district. Of this number Mr. Leadbeater sent 231 examples, Mr. R. H. Law sixty-three, Mr. A. S. Lyth three, and Mr. W. Rider three. Other prints intended for photographic survey purposes found places amongst the general exhibits of members. The collection was amply illustrative of the excellent material worth recording by means of the camera. A number of choice pen-and-ink sketches by Mr. W. G. Fox, a member, found a place, and photographic reproductions from the same were on view. The inaugural ceremony on Thursday afternoon was performed by the Vicar of Rotherham (the Rev. W. Ruthven Pym, M.A.), and he was supported by several leading townsmen. The President (Dr. Baldwin) occupied the chair. The attractions each evening proved very popular. The Eastwood Orchestral Band played selections, and vocal music was rendered by Mrs. McMullen (Sheffield), Mr. T. Lally (Sheffield), and Master Louis Ripley. Miss Turner officiated at the piano. A lantern show came midway in the proceedings, members' slides being supplemented by a series of Jubilee views. Mr. Leadbeater was the lanternist, and also demonstrated the X rays and exhibited the kromskop. On the Saturday evening the Rotherham Borough Temperance String Band played three selections. Altogether the latest venture of the Rotherham Society has been a successful affair.

Patent News.

The following applications for Patents were made between March 7 and March 12, 1898:—

Changing Boxes.—No. 5545. "Improvements in Photographic Changing Boxes." H. Posen.

Jet.—No. 5519. "An Improved Limelight Jet." W. Maddison and A. Frew.

Electric Lamps.—No. 5644. "Improvements in Electric Lamps for Photographic and Similar Purposes." W. C. Cubbin and G. E. Johnston.

Relief Photographs.—No. 5721. "Process for the Production of Relief Photographs." C. Pietzner.

HAND CAMERAS.—No. 5900. "Improvements in Hand Cameras." J. NOBLE.

PHOTOGRAPHY IN NATURAL COLOURS.—No. 5988. 'Improvements in Processes for Photography in Natural Colours." P. E. B. JOURDAIN.

PRINTING FRAMES.—No 6041. "Improvements in Photographic Printing Frames." J. E. CROOKS.

EXPOSURE INDICATING.—No. 6116. "Improvements in Indicators for Photographic Cameras." W. STANBURY.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

March.	Name of Society.	Subject.
28	Bradford Photo. Society	*Making of Transparencies.* Charles Grayson.
28	Camera Club	*Alpine Snow and Cloud Effects.* H. Speyer.
28	North Middlesex	*Gum-bichromate.* J. C. S. Mummery.
28	Richmond	*Enlarging.* J. H. Gear.
29	Birmingham Photo. Society	*Recent Advances in the Application of the Röntgen Rays.* J. F. Hall-Edwards, L.R.C.P.
29	Brixton and Clapham	Question-box Evening.
29	Hackney	*Constable, and Constable's Country.* W. Rawlings.
30	Croydon Camera Club	Eighth Annual Dinner.
30	Kingston-on-Thames	Annual Exhibition.
30	Leigh	Prize Slides.
30	Leytonstone	*A Holiday on the North Coast of Cornwall.* A. P. Wire.
30	Photographic Club	*The Royal Palaces of England.* Horatio Nelson King.
30	Polytechnic	*Practical Development.* F. Parker.
30	Southport	Portrait and Landscape Competitions.
31	Bradford Camera Club	Exhibition of Competition Prints, &c.
31	Camera Club	*Professor Joly's System of Colour Photography* Captain Abney, C.B., F.R.S.
31	Darwen	Lecture: *Negative-making.*
31	Liverpool Amateur	*A Trip to Chester.* G. Watmough Webster, F.C.S., F.R.P.S.
31	London and Provincial	Lecture. J. S. Teape.
31	Manchester Amateur	*Composition, Light and Shade.* G. E. Mellor.
31	Oldham	*En Velo in the Pyrenees.* H. Mortimer.
April.		
1	Croydon Microscopical	Photographic Chat.
1	Wakefield	Lantern Slides.
2	Croydon Microscopical	Excursion: Kew Gardens. Conductor, J. H. Baldock.
2	Hackney	Excursion: Wanstead Park. Leader, F. W. Gosling.

ROYAL PHOTOGRAPHIC SOCIETY.

MARCH 22,—Technical Meeting,—the Earl of Crawford, K.T., F.R.S. (President), in the chair.

A NEW CAMERA.

Mr. Kidd showed two specimens of Teed's special camera, the peculiarity of which was that the lens was fixed on a universal joint, the centre of which was the centre of the focal plane, so that the lens always covered the plate, whatever the extent to which the camera was tilted. It was stated that the arrangement rendered it possible to photograph objects at a very considerable elevation, quite beyond the capacity of an ordinary camera, and to take two pictures on different scales with the same lens and from the same standpoint. Mr. KIDD said the principle involved was not one of optics, but was simply a question of geometrical projection.

The PRESIDENT said it sounded a little queer, but was, no doubt, quite right.

RADIOGRAPHY.

Dr. MACKENZIE DAVIDSON showed several new X-ray tubes with osmium and iridium cathodes, and explained that, by a series of experiments, he had been enabled to secure tubes with which the X rays proceeded from a very fine point, and gave exceedingly good definition.

THE GUM-BICHROMATE PROCESS.

M. Robert Demachy forwarded a paper on "The Gum-bichromate Process," which was read by Mr. A. HORSLEY HINTON, and in which the advantages claimed for this method of printing were discussed and directions for working it were detailed. The author admitted that gum bichromate was not a process destined to take the place of other photographic printing methods, for not only was it a process of some difficulty, but it necessitated the coating of one's own paper, a rather delicate operation; the accurate exposure was not easily determined, and the extreme delicacy of the pigmentary image under development made it almost an impossibility to obtain a perfect duplicate of an existing print. The beauty of the process lay in the fact that, without painting in, stippling, and exhaustive retouching, it was possible, by different degrees of insolubilisation and appropriate development, to obtain effects that could not be secured by other photographic means. If some of these effects had been said to be imitations of water colours, it was probably because they had effectively been produced with water colours, and that, for the class of superficial observers, materials only caught the eye and technique passed unheeded. Proceeding to a description of the process, M. Demachy said good results could be obtained on any sort of paper provided it was sufficiently sized; the paper should be kept as dry as possible, and must on no account be sponged before applying the pigmented coating. Any variety of gum was suitable, and stale gum as a rule worked as fresh, if not better, owing to the fact that its acidity permitted slower development. He preferred to make his gum solution by adding two parts of cold water to one part of gum, measuring by the eye only; for pigments he recommended tubes of moist water colours, and for sensitising a saturated solution of bichromate of potash, although a five per cent. solution of chromic acid gave a still more resistant surface specially adapted to development by friction with a brush. The most rapid method of coating was to paint the dry paper with a sensitive and coloured mixture of gum, bichromate, and pigment, another plan being to sensitise first by soaking the paper for a minute in a saturated solution of bichromate of potash, but the results of both methods were identical. He never measured or weighed his materials, but was guided entirely by the depth of colour, the feel of the mixture under the brush, and the way in which it spread on a piece of waste paper. Culinary artists did not follow closely the directions of the cookery books, and their dishes were none the worse for it, and why should not photographers adopt a similar contempt for weights and measures? At any rate, by employing proportions that were not always identical, they would secure varied effects and avoid monotony. However, as an assistance to beginners, M. Demarchy recapitulated the formulæ of Mr. Packham. Development by different methods was dealt with very fully in the paper, including simple soaking, face downwards, in cold or tepid water, and local treatment with water of varying temperature by means of brushes and sponge, emphasis being laid upon the fact that the light and shade and general effects of the picture could be moderated and controlled according to the taste and education of the operator. The developed print should be dried face upwards on blotting-paper, and must on no account be heated. The author concluded by saying that the gum-bichromate process was interesting for pictorial purposes only, and a good print was perfect only when it fully rendered the effect intended, not when it was perfect from a chemical point of view. It afforded liberty of action and variety of effects, and formulæ and weights and measures were always the enemies of freedom and originality.

A large collection of prints was exhibited to illustrate the result of errors of manipulation, and also some examples of successful results.

The Rev. F. C. LAMBERT said he might be considered the great enemy of the process in this country, for he had carried out an extended series of experiments for the purpose of arriving at some definite procedure and formulæ. He considered it as well, from the low scientific point of view, to know as much as possible of what one was doing, and he did not at all appreciate the charm of uncertainty. He did not agree with some parts of the lecture; for instance, he preferred to accelerate the drying of the paper by means of heat, and he dried the finished print by suspending it from one corner, a course which obviated the smudginess which in his experience occurred if the print was dried flat on blotting-paper. Prints of various papers and prepared by different methods were passed round for inspection. Any kind of negative could be made to yield a good result if the sensitive compound was suitably mixed and coated on paper of proper character.

Mr. HINTON read a letter from M. Demachy in which it was said that, although satisfactory prints could be obtained from any negative, thin, transparent negatives were the easiest and best to work. He added that Mr. G. H. James had succeeded in reducing the process to something like a definite basis, and had handed over his formulæ to a commercial firm, who were about to place the prepared paper upon the market.

Mr. BERGHEIM said he had heard of an American lady who was asked whether her charming daughter was not "rather delicate," and who replied, in great surprise, "Oh, dear, no, she is the most indelicate girl I know!" The gum-bichromate process, he said, was the most indelicate process he knew—one could do anything with it, and would nearly always be right; it was by far the easiest of printing methods, but, as a worshipper at the shrine of photography as a science, what he disliked about it was that it opened the door to an immense amount of fraud.

Mr. H. W. BENNETT said the lecturer dwelt upon the necessity for control over the result in artistic work, but, on the other hand, it was admitted to be practically impossible to get two prints alike by this process; the print therefore, was in his opinion not so much the outcome of the control and judgment exercised by the artist as of chance arising from imperfect mixing of ingredients or from the many uncertainties attaching to the process.

Messrs. Mummery, Warnerke, and Packham also took part in the discussion, and the President expressed the thanks of the Society to M. Demachy for his most interesting and valuable paper, and to Mr. A. Horsley Hinton for undertaking to read it to the meeting.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 17,—Mr. J. Walker in the chair.

Mr. A. HADDON showed a negative which had been developed with a formula in which acetone figured in place of the usual alkali, pyro and sulphite of soda forming the other constituents. He had not had much experience with the method, the negative in question was the first he had developed; but he thought he could say that equally good negatives were to be made with the alkali formula. As regards the action of acetone, this was probably to form a bisulphite with the sulphite of soda, setting free carbonate of soda. The image began to appear in about twelve seconds.

Mr. S. J. BECKETT was deputed by his father to deliver his promised lecture upon Pompeii. As Mr. Robert Beckett pointed out, the lecturer was very familiar with his subject, having gone over the ground many times. The lecture was divided into two sections, the first including the neighbourhood of Naples and its suburbs, while the second portion was restricted to the ascent of Vesuvius and the exploration of the ruined city of Pompeii. The slides constituted an excellent introduction to the life and customs of the Neapolitans, their architecture and the general formation of the country. Those relating to the partly reclaimed city of Pompeii, and the revelations which the long series of excavations have brought about were most interesting, which Mr. Beckett's lucid description formed a very valuable addition.

Gospel Oak Photographic Society.—Annual General Meeting, March 15, he Vice-President in the chair.—The Secretary presented his report on the ear's working, in which, after recapitulating the work of the Society during the ast twelve months, he expressed satisfaction at the state of the finances, and slight improvement in the number of members, which, in spite of several esignations, showed an improvement of two as compared with the same date ast year. He concluded by hoping that the Society would continue to ourish, and that, when next he had the pleasure of reading to them the nnual report, it would show even a better record than that which he had the onour of presenting to them. The report of the Hon. Treasurer (Mr. J. E. ayner) was listened to with great interest. The balance-sheet, he said, owed a balance on the right side, and, as compared with last year, was a arked improvement. Having explained several of the items, he concluded y moving that the balance-sheet be adopted. This was agreed to unani- ously. The election of officers and Committee for service during the year 898–99 then took place. The officers were returned unopposed as follows, z.: *President:* Rev. H. Le Pla.—*Vice-President:* Mr. F. H. Hall.— *on. Treasurer:* Mr. J. E. Rayner.—*Hon. Secretary:* Mr. W. A. Palmer.— *ssistant Hon. Secretary:* Mr. H. Billingsley. There was some competition r service on the Committee, and the following gentlemen were duly elected that capacity, viz. : Messrs. W. Beyer, J. Gittens, J. Hingston, W. H. arrison, and R. H. Smith.

Hackney Photographic Society.—March 15, Mr. R. Beckett in the chair. The feature of the evening was a lecture by Mr. Thos. FALL on the subject "Photography in the Past and Present," in the course of which he gave his xperiences of the old processes, and showed a large number of examples of ork done by them. It would appear that some processes of the present day e not at all superior to those of the past. In the case of albumen paper, r. Fall showed many beautiful prints on this, which had been taken many ears ago. He expressed the opinion that no albumen paper of the present me was equal to that of the old days. A most interesting discourse was ncluded by a display of lantern slides of animal subjects, particularly of a mber of different species of deer.

West Surrey Photographic Society.—March 16, Mr. GEORGE H. JAMES ve a demonstration of a new gum-bichromate paper, machine-coated by process of his own devising. Mr. James claims for his paper that it is icker than hand-coated—about five minutes to fifteen minutes; that it is rfectly evenly coated; that it requires no actinometer, exposure being con- ued till image is just visible; that the development is most easily effected simple immersion in cold water and very slight brushing with a good but ry soft brush, sable for preference; that the control is complete and the nge of tones ample. All this was shown by actual examples, using negatives nt by members, not specially prepared ones, and by developing four pictures about twelve minutes. In cases of great over-exposure the paper might ve much longer soaking, it would stand twenty-four hours of it, or more gorous brushing, or the use of warm water. For local treatment finer ushes might be used, and the small high lights picked out with a hog's-hair ush. The paper, he said, which would only be issued sensitised, would keep rfectly for ten days, and might be good for fourteen days, and would be aced on the market at once by a company he had formed, with offices at , Battersea-rise, S.W. The colours were varied, and the surfaces and alities of the papers they would offer were many. Several samples in dinary black, in Indian ink, and red chalk were exhibited and much mired, some from negatives by Treble, of figures, being particularly effec- ve: The principal feature of the treatment was a light touch, and Mr. James commended longer exposure where much control was wanted, the amount of hich was a matter of experiment. He claimed that, as the paper was more gularly covered, the results could more confidently be arranged for, and the most scope was allowed for individual expression.

Leeds Photographic Society.—March 12, a sub-committee of the Society spected Kirkstall Abbey in connexion with the proposed photographic rvey of Leeds and neighbourhood. Their object was to form an estimate of e number of views and details of an ornamental character which it would be visable to record photographically whilst the ruins are unencumbered by any ergrowth of ivy, &c. It was decided it would be necessary to expose cor- ctly about 250 plates, and a report laid before the Committee of the Society, ggesting the work should be taken up by the members and divided amongst em, under the leadership of two professional members, who are deeply in- rested in the work and willing to devote as much time to the subject as it mands. The Committee decided to send out a circular to each member king for volunteers, and suggesting a date for meeting to arrange the section work to be undertaken by each. They also selected twelve lantern trans- rencies to represent the Leeds Photographic Society in the Affiliation up at the Royal Photographic Society International Exhibition, to be ened at the Crystal Palace next month. The mid-monthly meeting was ld the same evening. Mr. J. INGHAM LEAROYD, of Halifax, gave his lecture titled "A Scamper on the Continent," illustrating it with an excellent lection of lantern transparencies from plates exposed on his journey up the ine, through Switzerland, &c., good both in selection of subject and from hotographer's point of view also. At the next monthly meeting, on April Mr. John H. Walker, one of the ex-Presidents, will give a "Practical monstration of Bromide Printing," and the Committee hope to be able to sent to the members on that date a definite plan in connexion with the vey scheme before alluded to.

Plymouth Photographic Society.—March 18, the President (Mr. E. H. cklewood) occupied the chair.—This Society met for the first time in its v home, "The Athenæum," and the President congratulated the members having at last found an admirable habitation which promised to be per- nent, the Council of the Plymouth Institution having met them with every sideration. Mr. F. JOHNSON then greatly entertained a large company with

AN EVENING AMONG PAINTERS AND PHOTOGRAPHERS,

object being to indicate the chief points to aim at in securing artistic nposition and the extent to which photographers can avail themselves of the principles. As his examples, he chose Turner's best-known works, including *Crossing the Brook*, a view on the River Tamar a few miles above Calstock, Wilkie's two most popular works, and pictures by W. R. Macbeth and Paul Marney. For further illustration, Mr. Johnson was greatly indebted to several members who specially prepared slides of pictures, foreign and local scenes. He urged the necessity of photographers attempting pictorial work becoming fully acquainted with the rules of good and artistic composition, and concluded with the expression of the hope that a contemplation of the works of the great masters would stimulate members in their picture-seeking efforts with the camera, and in a full appreciation of the beauties of nature. On the motion of Mr. H. S. Hill, seconded by Mr. J. H. Hissett, Mr. Johnson was heartily thanked. The Annual Exhibition is fixed for Tuesday and Wednesday, 29th and 30th inst., when, in addition to members' works, the permanent collection of the Royal Photographic Society will be shown.

FORTHCOMING EXHIBITIONS.

1898.
April 22–30 ..... National Photographic and Allied Trades Exhibition, A. C. Brookes, Temple House, Temple-avenue, E.C.
" 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

LENSES FOR ASTRONOMICAL WORK.

To the EDITORS.

GENTLEMEN,—With reference to your reply in the current number of the JOURNAL to J. McL. on the subject of converting a lens, would you allow me strongly to advise your correspondent to sell his lens and purchase an astronomical telescope if he wants one. He would certainly get a much better one for 5*l.*, either new or second-hand, than anything he will make by using the lenses of his portrait combination.

The object to be gained in such a lens as J. McL. has is quite different from that in a telescope, and the curves given to the glasses are correspondingly different when anything like performance is sought. If your correspondent only desires to be able to say that he has done the thing *somehow*, he has only to put his lens unaltered at one end of a suitable tube, and a focussing glass at the other, and he will have a telescope of a sort.—I am, yours, &c., J. F. T.

PHOTOGRAPHERS' APPRENTICES.

To the EDITORS.

GENTLEMEN,—The report some one has sent you of the case in which I was plaintiff is evidently intended as a summary of what was in itself a condensed report in one of the local papers. There are some inaccuracies in it, more particularly as to the evidence given by the defendant's son, *not* by the Defendant, who did not see fit to go into the witness-box at all. One detail may be useful to your readers: The boy was not told to clean the front window, but to hold some high steps while the errand-boy cleaned the facia, and, though he had done it times before, he flatly refused, and the Judge censured this conduct.

The points of interest as an outcome of this case to those photographers who take apprentices are, I think, these: That where there is no stipulation as to holidays in the indenture the master is legally justified in refusing them; that where a boy by gross or wilful carelessness causes serious loss, the master is justified in putting him back into a subordinate position; that even where a boy is practically useless to the master he cannot break the covenant without being answerable in damages. I may perhaps add, that before this action was commenced I myself offered to accept 10*l.* from the defendant, and was so wishful to avoid it that I instructed my solicitor before taking action to write and offer to settle for that sum. I am, yours, DRURY STOWE.

Bedford, March 21, 1898.

PHOTOGRAPHERS' TRADE CARDS.

To the EDITORS.

GENTLEMEN.—Referring to the applications of photography for business purposes, I send you specimen of my trade (or professional) card, which I have found an effective announcement; you may be quite sure that it is not at once thrown aside or used for a direction card. For your own

nformation, I may say that the writing, &c., is my own work, and that the face which looks out of the initial P is that of yours truly,

Clare, March 18, 1898. THOMAS STOKOE.

[The card is a mounted print from a negative, the design consisting of a floral border enclosing a view of Mr. Stokoe's premises, and ornamental lettering setting forth the nature of his business. The idea has been neatly carried out.—EDS.]

THE ROLL OF MINISTERING CHILDREN.

To the EDITORS.

GENTLEMEN,—I enclose a notice I received this morning from Messrs. Simpkin, Marshall, Hamilton, Kent, & Co., Limited.

Once again the poor photographer is asked to take a photograph, free of charge, of any one who has subscribed 3*s.* 6*d.* to the Prince of Wales's Hospital Fund. Messrs. Simpkin, Marshall, Hamilton, Kent, & Co. also state that already 250 of the *best* photographers throughout the kingdom have agreed to do so.

Truly we photographers must be a generous body of men; we not only give our photographs away, but ourselves as well.—I am, yours, &c., FRANK R. MOFFAT.

125, *Princes-street, Edinburgh, March* 18, 1898.

[The circular Mr. Moffat encloses relates to a book which is to contain a facsimile letter from the Princess of Wales. We have from time to time animadverted upon sundry schemes promoted with the idea of inducing photographers to take photographs for nothing, to the aggrandisement of some astute man of business; but, in the present case, the element of charity disarms objection.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

James Keaveny, 1, Bank-street, Lincoln.—*Two photographs of lady on bicycle in cycling costume.*

F. Preece, 24A, Commercial-street, Hereford.—*Photograph of crowd watching a Punch and Judy show.*

Charles Treasurer, 61, Innes-street, Inverness.—*Photograph of Inverness entitled "Inverness—Winter."*

Joseph Nickelson, 19, Craven-steet, Newbury, Berks.—*Photograph of the late Rev. Edgar Allen, Tiverton, Devon.*

J. P. Milnes, 64, Hanover-street, Stranraer.—*Photograph of s.s. "Bathori" ashore in Larbrax Bay, near Port Patrick.*

A. Rogers, 98, High-street, Lanark.—*Two photographs of the late Rev. Thomas Little, Bachelor of Divinity, Minister of the parish of Lanark.*

J. H. HIELD.—In our next.

A. HUNT; FILM.—In our next.

PROFESSIONAL.—Address Messrs. L. Trapp & Co., 29, Budge-row, E.C.

TAX.—Yes, there is an *ad valorem* duty on such articles, forty-five per cent., we believe.

C. SKELTON.—Several articles on the subject have appeared from time to time in our columns. To which particular one do you refer?

SELF-TONED PAPER.—LIMITED says: "I should feel grateful if you could inform me where I can purchase ready-toned sensitised paper."—In reply: Of Messrs. Rivot & Co., Willesden Green.

ADDRESS WANTED.—F. B. J. says: "Will you kindly furnish me with the address of the Artistic Touring (Photographic) Company?"—In reply: Perhaps some reader will supply the desired information.

RESIDUES.—S. W. It is quite against our rule to recommend any particular manufacture or firm. Consult the advertisement columns of the JOURNAL and the ALMANAC. We have never heard of such a firm as that named, or of such a system of doing business.

ROGO.—1. Expose a slow plate in contact with the negative in an ordinary printing frame to diffused daylight. Development will give a negative. A few experimental trials will put you in the way of giving the correct exposure. 2. It is called boulting cloth. Inquire of a draper.

OPALINES.—A. THOMAS. The glasses, with bevelled edges and gold margins, may be had of all the large dealers in photographic requisites. It is usual to print the title on the picture before mounting it. That is done by writing, or "stamping," it on the negative so that it prints with print.

THE SALON.—C. W. We have heard rumours to the same effect, but we have no authoritative information that an Exhibition will not be held this year. We have not heard the rumour that, if it is, the exhibits will be confined to the "gum process." That would be very unlikely indeed. Probably the rumour got afloat from the fact that some of the Salon's early supporters have since deserted it.

CAPTAIN.—It is the opinion of a very successful photographer of such subjects that there are two distinct faults in the photographs you left with us: 1. The shutter is not quick enough. He would not expect to get satisfactory results from a small boat with exposures of under one-two-hundredth of a second. 2. The camera is too low down, including too much of the foreground. If these hints are not serviceable, write us again.

SHELLAC VARNISH.—A. MCINTOSH. So far as we are aware, white lac, that will dissolve in alcohol without leaving "the muddy sediment" of which you complain, is not an article of commerce in this country. We know that some of the kind is "made in Germany," or rather prepared there. We also know that the price charged for it there is double the price charged for bleached lac here, if it is not, indeed, more. It is the cost of its preparation, we believe, that deters English lac-bleachers from preparing it in the same way, and the limited sale it would from its price probably have.

PRINT.—HAMILTON FOYNE asks Would you kindly let me know: 1. How to obtain the tone of the enclosed print? 2. Is it a P.O.P. or collodio-chloride? 3. How is the gloss obtained? Should be glad to learn your esteemed opinion, as several of my photographic friends have such different views on the subject."—1. Tone in the ordinary way, but stop at a very early stage. If such very warm tones are desired, it will be well to immerse the prints in a dilute solution of salt and water prior to toning. 2. Either paper, as well as albumen, would give similar results provided a vigorous negative be used. 3. By squeegeeing down on glass.

TADROUS HANNA.—1. Messrs. Marion & Co., of Soho-square, London, publish a book on retouching by Robert Johnson, price 2*s.* 2. Messrs. Spooner & Co., Strand. 3.

Ordinary office gum	1 ounce.
Caramel	1 ,,
Burnt sienna ground in water	2 ounces.

Mix and add—

Alcohol	2 ounces.

It is advisable, but not necessary for studio work.

ENLARGING.—E. L. BRIDGE says: "1. Please tell me what are the best means for taking or making enlargements by artificial light without a condenser, and what would be the best light to use to get them equal to those that are taken with a condenser? 2. If there is any way of timing enlargements by artificial light without using trial piece?"—1. There are several ways. The best, perhaps, for general work is to place behind the negative, and a few inches from it, a piece of ground glass and burn a piece of magnesium ribbon behind it, keeping it moving about the while. 2 Experience will be the best guide. If you intend working by artificial light, we should advise you to work with a condenser.

STUDIO NORE asks: "Will you kindly advise which would be the best form of studio to build, from the enclosed rough sketches? I want to get a good light all over it, so as to get group evenly illuminated. Also, would you advise ground glass for the glazing of same. Would it add to the exposure very much in the dull weather?"—For general work we should recommend No. 2 form in preference to either of the others. As to the use of ground glass we cannot offer a decided opinion, as the aspect of the studio and its dimensions are not given by the sketches. It may probably be advisable to have the roof ground and the side plain glass. Under these conditions the exposure would not be materially lengthened in dull weather.

NITRO-CELLUDIN writes: "Will you kindly answer the queries at foot. 1. May one use methylated ether and spirit for collodion for the wet-plate process without any bad effect? 2. What book on process work—chiefly collotype, half-tone copper blocks, and zincography—would you recommend to one with a good knowledge, both theoretical and practical, of carbon printing? 3. Which is the best house to obtain the plant and material from? Or would you rather mention two or three names to select from?" In reply: 1. Methylated ether will do quite well, but not methylated spirit. 2. Wilkinson's book gives information on all the processes named. 3. Penrose & Co. make a speciality of materials for all the processes of photo-mechanical printing.

ENLARGING.—BEGONIA says: "1. I have a French make of camera, 9×12 centimetres, and on one side of the focussing rack are the enclosed measures. I cannot make out what they are for; will you kindly explain their use. 2. I am trying to enlarge on Ilford bromide paper and developing with ferrous oxalate, please tell me what is wrong with enclosed photo; another exposed for the same number of seconds came out fairly well, would it be that my bath was worn out? I used four ounces for, say, two whole-plates? 3. I enlarge by daylight, and find the focussing very difficult; would it become sharper if I used a small stop instead of *f*-6 or *f*-11? 4. Can bromide enlargements be mounted as opalines, and how can I fasten them securely to the glass as they are not sticky like P.O.P.?"—1. The measure seems intended for centimetres, but no two are alike. They were evidently put upon the camera for some purpose by the previous owner. 2. It seems over exposed and fogged. Use fresh developer for each picture. 3. A smaller stop will add to the definition. 4. Yes. Mount them with gelatine in the same way as albumen prints are mounted.

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Contents.

	PAGE
Ex Cathedrâ	193
On the Gum-bichromate Process and its Alleged Uncertainty	194
Leaderettes:— Lunar and Planetary Photography — A Large Telescope Mirror — Röntgen-ray Work with a Frictional Electricity Machine — Heat of Incandescent Electric Lights — Radio-stereoscopy — Hampstead Heath and the County Council — South Kensington Museum — High Prices for Engravings	195
The Computation of Exposure under Abnormal Conditions. By Hector Maclean	197
Trimming and Mounting Photographs. By Roland C. Whiting	197
The Eclipse at Sahdol	200
At the Camera Club	201
Genre Studies. By Cte. d'Assche	201
How to Increase Profits. By John A. Randall	202
Colouring Photographs: Von Bentivegni's Process	203
Photographic Developers	204
Kinematographing the Grand National	204
Our Editorial Table:— *Radiography and the X Rays in Practice and Theory* — The Benton Printing-out Papers	204
News and Notes	204
Patent News	205
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club — Newcastle on-Tyne and Northern Counties Photographic Association	206
Forthcoming Exhibitions	207
Correspondence:— Sulphite of Soda and Metabisulphite of Potash—Telelectroscopy —Teed's Camera: A Correction	207
Answers to Correspondents	208

EX CATHEDRÂ.

We are very frequently asked by photographers to tell them of a town or city in which no photographic business already exists, so that one might be started there. Such a place has been brought to our notice this week by Mr. George L. Trustrum of the Falcon's Nest Hotel, Port Erin, Isle of Man, who writes us as follows: "Your Journal being devoted to the interests of photographers, I think perhaps you would acquaint your numerous professional readers of the fact that there is a good opening for a photographer in the popular and rapidly improving seaside resort, Port Erin, Isle of Man. At present there is not one in the neighbourhood. I will be pleased to reply to any inquiries on the subject." We are confident Port Erin will not now long remain without a photographer.

* * *

The correspondent who wrote us a fortnight ago in reference to a suggested memorial to Dr. Hurter thus further addresses us: "In suggesting a memorial volume of Hurter & Driffield's works, I did not intend to enter into any discussion the question might give rise to. But perhaps it would be better to make clear my reasons for the suggestion. No one will deny that, interesting as Hurter & Driffield's papers are in themselves, the interest is greatly increased by the side lights thrown on them by intelligent criticism. Thus, to start at the beginning, the description and theory of their photometer in the original paper was, I think, made considerably clearer by the discussion that took place with Abney afterwards. Again, several important papers (to the practical man at least) on the calculation of exposures in bromide printing have been published by Mr. Driffield alone. For such reasons I suggested the inclusion of the more important work of others. Work connected with Hurter & Driffield's investigations is so distinctive that it may well be classed by itself. Of course, Mr. Driffield is the person best able to write on Hurter & Driffield topics, but, in spite of his modest assurances, it would be ungracious to admit that he was merely a 'sleeping partner,' so to speak, in the firm of Hurter & Driffield. If the volume were to be written in memory of the departed scientist, it would be to a certain extent eulogistic of their work (they have had plenty of hard knocks from photographers in the past), and therefore more appropriately edited by a committee of such a representative body as the Royal Photographic Society."

* * *

On the other hand, a gentleman who for some years has been very much interested in Messrs. Hurter & Driffield's work writes us as follows: "My idea of a real memorial to Dr. Hurter would be to give Mr. Driffield an efficient young assistant, who could carry through experiments under his direction, and facilitate the carrying out of Dr. Hurter's and Mr. Driffield's idea of their work in a complete book form. Mr. Driffield's ordinary duties are heavy, and his time much occupied. Gathering together all that has been written upon their work certainly would be worse than useless. Very little, for instance, of what I have written is original, but merely the reassertion of their points, simply to combat opponents of the system." We fear that neither of the ideas specified are practicable, but we are glad to publish them, in virtue of the fact that they show there exists a very deep appreciation of the services rendered to photographic science by the late Dr. Hurter and his surviving colleague, Mr. Driffield.

* * *

So much attention is just now being excited by various methods of colouring photographs that possibly the following very simple process available with albumen prints, described in

a foreign contemporary, may be of service to many of our readers: "The photograph to be coloured must not be mounted on cardboard. It is held against the window pane, so that the albumen layer touches the glass. This transparent photograph is then hatched on the back with a lead pencil, sketching the plainly visible outlines of the different parts which are to be painted with different colours. Then lay the albumen side of the photograph upon a blotter, and simply apply the desired colours on the back of the picture into the sketched contours, which will hardly require much skill. After that, prepare a mixture of ten parts benzine and one part vaseline, which pour over the photograph, rubbing it thoroughly into the paper with the finger. After first the back and then the face of the picture have been treated in this manner, it has become transparent, and may be dried with a cloth after one to two hours and mounted on cardboard. The colours appear distinctly and are well visible." The process is, of course, a slight variation of an old method, but it may be none the less welcome on that account, the more especially as secret processes of colouring photographs that are no more difficult or effective are just now being extensively exploited.

* * *

At a Council Meeting of the National Photographic Record Association, held March 23, the President (Sir J. Benjamin Stone) in the chair, a proposed scheme for organizing the systematic survey work of the Association was discussed, and ordered to be printed and circulated, inviting the assistance of photographic and other societies. Arrangements were made for sending a selection of photographs to the Exhibition of the Royal Photographic Society about to be held at the Crystal Palace, and for an Exhibition at the Society of Antiquaries during their annual Congress.

* * *

The Pennsylvania Academy of the Fine Arts makes the preliminary announcement that it proposes to hold, under joint management with the Photographic Society of Philadelphia, during the autumn of 1898, an exhibition of pictorial photography, to be known as the Philadelphia Photographic Salon. Only such pictures will be hung as may be approved by a jury of selection composed of well-known artists and artistic photographers, whose certificate of acceptance will be the only award. The Exhibition will be held in the galleries of the Academy, from October 24 to November 12, 1898. A circular, with full details, entry form, &c., will be issued at an early date.

* * *

The British Astronomical Association will hold a *Conversazione* at Sion College, Victoria Embankment, on Tuesday, April 19, from 7.30 to 10.30 p.m. The principal object of the gathering is to signalise the return of the Eclipse Expedition, and during the evening there will be an address by Mr. E. Walter Maunder, F.R.A.S., on the work of the eclipse party stationed at Talni; an address by Dr. Isaac Roberts, F.R.S., on "The Evolution of Stellar Systems, as illustrated by his Astronomical Photographs;" and also an address by the Rev. J. M. Bacon, M.A., F.R.A.S., on the work of the eclipse party stationed at Buxar. These will be illustrated by the lantern, and it is hoped that Mr. Bacon will be able to exhibit the Eclipse kinematograph. In the intervals between the addresses a number of astronomical photographs and drawings will be on exhibition.

Professor Silvanus P. Thompson has published some comments on Herr Szcepanik's method of telectroscopy, which we fully described last week, that are not favourable to the invention. The Professor is of opinion that the complicated mechanical contrivances suggested cannot be made to work as rapidly as is necessary without some amazing skill in construction. A process block, he adds, looks spotty unless its line structure is much finer than the fineness of 100 lines to the inch; or, in other words, unless the square inch contains 10,000 points. Now, as the duration of luminous impressions on the eye to give continuity is of the order of only one-twelfth of a second, (kinematograph views are bad unless more than twelve pictures a second are made to succeed one another), it follows that to transmit pictures only one square inch in area will require that the whole of these 10,000 points shall be successively imaged within about one-twelfth of a second. Now, there is no known electric mechanism which will oscillate a mirror or prism with precision at a frequency of 120,000 a second, even though the electric line is only a few yards long. To talk of doing this through a line a thousand miles long is, in the present state of mechanical and electrical knowledge, sheer nonsense according to Professor Thompson.

* * *

With reference to the Crystal Palace Exhibition, we are asked to state that, for the convenience of those who wish to deliver their exhibits by hand, they will be received at 12, Hanover-square, or at the Crystal Palace itself, any time between the hours of 10 a.m. and 5 p.m. during Monday, Tuesday, Wednesday, and Thursday, April 4 to 7 inclusive, and on Tuesday and Wednesday, April 12 and 13. The latter two days apply to the Palace only. The Secretary's office at the Palace immediately adjoins the high-level (L. C. & D. R.) station entrance, and all inquiries should be made there.

ON THE GUM-BICHROMATE PROCESS AND ITS ALLEGED UNCERTAINTY.

If the gum-bichromate process—otherwise Pouncy's carbo process of forty years ago—does not become popularised, it will not be from the lack of prominence it is now receiving. Papers on, and demonstrations of, its working have been given before societies galore of late. On most of these occasions however, an apology for its shortcomings has been made, and it has generally been explained that it is not suited for every day work. That was also the case at the last meeting of the Royal Photographic Society, when Mr. Robert Demachy's paper on the process was read. In that paper the author candidly explained that the gum-bichromate process was not destined to take the place of other photographic methods, saying, at the same time, that it was a difficult one to work, that accurate exposure was not easily determined, and that the extreme delicacy of the pigmentary image under development made it almost an impossibility to obtain a perfect duplicate of an existing print.

Such a statement as this by one of its chief apostles is certainly not a great recommendation of the process, neither does it commend it to any one who desires uniform results from the negatives he has been at great pains to secure. The process is said, however, to possess charms to some, one being that of its uncertainty, as one does not know what one is going to get till the work is finished—rather a novel charm, it must

admitted. If the process, or its inventor, the late Mr. John Pouncy, could speak, the exclamation would be, "Save me from my friends." Perhaps some day, to meet such charms, we may have enterprising manufacturers putting upon the market plates and other material possessing every element of uncertainty.

Is, however, this old exhumed process of Pouncy's really the uncertain one that some would have us believe? also, is it not possible to obtain technically good results by it? The latter question is fully answered by the results produced by the late Mr. Pouncy in the fifties, and, also, by those shown recently by Mr. Jas. Packham, and equally as good may be obtained by any one else. As to the former question, we deny that the gum-bichromate is an uncertain process. The synonym of uncertainty, in any process, is want of skill, and lack of knowledge of the principles which govern it on the part of the worker. If one good result is possible by any process, others equally as good can always be obtained if worked under precisely similar conditions; but they must be fulfilled, and fulfilled exactly, to obtain them.

In the process now under consideration the actions of chromic salts on colloid matters are the chief things to be studied, and these seem to have been quite ignored by the modern workers of it. Different papers have been recommended, but nothing has been said as to the materials with which they are sized, and that is an important factor in the case, particularly when the paper is sensitised before the pigmented gum is applied.

But we notice, in Mr. Demachy's paper, that that gentleman prefers to work by the method first published by Pouncy—that is, by adding the bichromate to the pigmented gum solution—thus saving the double operation. Still there is the sizing matter in the paper which will be acted upon by the chromic salt, and it will have its influence; hence papers sized with different materials must not be expected to yield identical results, unless their treatment is modified to meet the case. Different pigments act differently with the bichromated colloids; and then there is the vehicle, not always the same, in which they are ground, in the case of tube colours, to be considered. Then, again, there is the gum.

There is gum and gum, and it was said the other night that any sort of gum, acid or otherwise, is suitable; yet, however, they all differ in their characteristics. Even "office gum" has been recommended; yet some samples of that, though excellent as stickatives, are quite innocent of any kind of gum whatever, some being nothing more than acidified solutions of gelatine; in some instances common glue only. One must well expect when working with such indefinite materials as these that the results will have the charm, if charm it be, of uncertainty, but most photographers—unless, indeed, they be "Salonites"—want to get what they aim at.

Mr. Demachy says he does not weigh or measure his materials—indeed he expresses quite a contempt for weights and measures in connexion with photography. Mr. Packham, on the contrary, prefers to work differently and to weigh and measure everything, as he explained when he demonstrated the process before the Photographic Club some little while back. There is yet another matter that has to be considered; different negatives will require a modification in the preparation of the paper and its manipulation to get uniform results from them. Pouncy found that thin negatives suited the process best. Mr. Demachy and Mr. Packham have found the same.

Now, notwithstanding all that has been said about the uncertainty of the gum-bichromate process, we affirm that it is quite as certain as any other photographic process when the necessary conditions are fulfilled to make it so, though this fact seems to be entirely ignored by modern workers of the method.

By the way, the other night Mr. Packham was referred to as being the father of the gum-bichromate process in this country. Naturally he will repudiate the paternity attempted to be foisted upon him. The late Mr. Pouncy is the father of the process in this and all countries, and to him must be credited the invention, and to no one else.

Lunar and Planetary Photography.—At the last meeting of the British Astronomical Association a valuable paper on this subject was read by Mr. J. M. Offord, describing in full detail the method he had adopted in a large amount of work in this direction, with also descriptions of his telescopes and cameras. He had arrived at the conclusion that, with a telescope of short focal length and large aperture, the finest photographs could be obtained by using enlarging lenses, confining the field to one portion of the moon alone, and keeping the camera within a reasonable length, say fifteen inches. He had taken the whole of the moon at one exposure, using a low-power enlarging lens with a sufficiently flat field; but he had not been satisfied with the sharpness obtained by that method. There was also another difficulty, which would scarcely have occurred to any one until experiment had brought the fact home, the varying amount of luminosity of different portions of the moon's surface. Naturally he has found the usual difficulty, the atmospheric element, very trying at times, the best kind of nights having been when there was a strong wind, south-west gales, in fact, the photographs being taken through the occasional breaks in the clouds.

A Large Telescope Mirror.—The American papers tell us that at last the large mirror, figured by the Rev. John Peate, of Glenville, Pennsylvania, is now ready for silvering. This mirror is sixty-one inches in diameter, and, as the *English Mechanic* sarcastically observes, "the mammoth glass speculum," as it is called, seems a long while in getting its coat of silver. The same journal remarks upon the fact that Dr. Common's reflector, which is only one inch less in diameter, was ground silvered, and, what is more, tested before hardly anything was said about it.

Röntgen-ray Work with a Frictional Electricity Machine.—There are perhaps many more of this type of electricity-producer in existence than there are of intensity coils, but so far they have been little used in radiography, owing mainly to the difficulty experienced by the scintillating effect on the fluorescent screen exhibited when plate machines are employed, but Dr. Destot has devised an arrangement which, according to *La Nature*, as improved upon by M. Rossetti, enables a steady illumination to be obtained from a machine with an eighteen-inch plate and a spark as long as would be produced with a six-inch coil. The apparatus is described on page 224 of that journal, and consists mainly of a spark-interruptor, made of two metallic spheres, which is placed in each conducting wire. He finds the best results are obtained with a bianodic focus tube.

Heat of Incandescent Electric Lights.—We have on many occasions pointed out the fallacy of the popular idea that the small incandescent electric lights give off no heat, and quite recently the *Lancet*, taking the same ground, has given some experimental results bearing upon the matter. It is a very important matter to keep this matter well in mind, for photographers have to pay a rate to the insurance companies of from 200 to 400 per cent. in excess of

the ordinary insurer. As a measure of the actual heat produced, the *Lancet* placed a sixteen-candle-power lamp (100 volt pressure) in half a pint of water, and within half a hour the water was made to boil. Then one of these lamps was surrounded with cotton-wool, and the current turned on. The result was that eventually the cotton burst into flame; in another similar experiment a loud report, due to the breaking of the lamp, occurred. Then, again, one experiment having a most important bearing upon photography, was with celluloid. A portion of this material was placed touching the lamp itself while illuminated; the result was the ignition of the celluloid in less than five minutes. Here is a possible danger for unenclosed cinematograph films, if one were to accidentally remain in contact with an incandescent electric light. Few exhibitors, prior to this warning, would have had the slightest idea of the danger they were courting by permitting the lamp and film to remain more than an instant so closely contiguous.

Radio-stereoscopy.—The vast and undeniable advantages to surgery brought about by the use of the Röntgen rays are yet capable of being increased, and the method described by Dr. Hedley seems to point to the right direction in which to work. His plan is, in effect, the taking of a stereoscopic view instead of a single picture of the *locale* which it is desired to explore or to treat. To obtain two different views, so as to obtain relief, it is found that the best plan is to displace the object laterally in a direction parallel to the plane of the sensitive plate. The point then arises, Given a certain distance of the positive electrode from the object, and also its thickness, what amount of displacement is desirable? Dr. Hedley obtained the amount of the displacement by a system of trial and error, and obtained good results. He, however, describes MM. Marie & Ribaut's calculations for obtaining the measurement at once to the obvious saving of much time and material. The calculations he quotes may be given here, and photographers will know how to apply the formula, Δ being the relative displacement of tube and object, D distance of tube from object, and T the thickness of the object; then

$$\Delta = D\left(\frac{D+J}{50\,T}\right).$$

Dr. Hedley goes on to say: "I have lately worked on these lines, and have been able fully to verify the accuracy of the method. . . . . It appears to me that radio-stereoscopy is destined to play an important part."

Hampstead Heath and the County Council.—The County Council seem, according to the ideas of the Hampstead Heath Protection Society, determined to ruin the picturesqueness of the Heath. The Council have planted a number of trees on the Heath near the Willow-road and the Spaniards-road against the protest of the local residents. At its last meeting, the report of the Parks Committee on the protests of the residents was that the planting of the trees was necessary, and it was moved that the views of the Committee should be confirmed. This was opposed by Mr. E. Bond, M.P., who moved that, "in the opinion of the Council, it was desirable that the trees should be removed; and that the Parks Committee should be requested to report further as to the reason which rendered it, in their judgment, inadvisable to comply with the wishes of the Hampstead Heath Protection Society as expressed in the letter of Mr. Ernest Lake." He also pointed out that, when this thoroughly inappropriate row of trees reached maturity, they would deprive the public of one of the most charming walks on the Heath. After some discussion, the report was, we are pleased to see, referred back.

THE thanks of painters, photographers, and of the public generally are certainly due to the Hampstead Heath Protection Society for their efforts to prevent the County Council from despoiling the beauties of the Heath and robbing it of its chief attractions, and in this direction it has already done good work. Evidently, from its previous work, the County Council's idea of the picturesque is straight and more or less well-kept gravel walks, flower beds, &c., and not the rugged paths of nature, with its furze bushes and their brilliant yellow blossoms. But it is pleasant to see that there are members on the Council who have more artistic tastes, and that they will do their best on behalf of the public to prevent the spoliation of the greatest beauty spots around London.

ALTHOUGH Hampstead Heath has always been the happy hunting ground of artists, and many very fine pictures have been painted from it, several by Constable and others of equal renown, it seems to be, considering its beauties and food for the camera, much neglected by photographers. This is the more surprising seeing that it is so easily comeatable from all parts of London. For example, one can go from Holborn direct to the Heath by tramcar for two pence, return ticket three pence; so we can from Tottenham Court-road or the Angel, Islington, for the same fare. It may be mentioned that permission to use a camera on the Heath is, at present, necessary, as it is on some other open spaces under the control of the County Council.

South Kensington Museum.—Included in the sum of two and a half millions, asked for by the House of Commons on Friday week for public buildings, was 800,000*l.* for the completion of the buildings at South Kensington connected with science and art. In connexion with this proposed expenditure, the *Standard* says that "a question has, we believe, arisen between the Museum Committee and the Office of Works as to whether the Committee ought not to be informed as to the manner in which the money is to be expended. The Office of Works holds that the matter is outside the province of the Committee, but this opinion is not accepted, and steps will, if necessary, be taken to raise the question in the House of Commons." This looks like a nice little squabble. It is to be hoped, however, that nothing definite as regards the future will be decided upon until we get the report of the Select Committee appointed last year, and reappointed this year, to inquire into the general administration of the Science and Art Department. This Department has for years past been subject to rumours of "jobbery," "a nice family party," &c. These should be cleared up without delay. Any how, new buildings, and safe ones, to contain the treasures of the Museum, are imperative.

High Prices for Engravings.—There is no question that fine-line engravings and rich mezzotints are highly appreciated though, it is to be regretted, there is little, if any, modern work in this direction forthcoming. This makes the old work all the more valuable. At an auction sale recently a fine proof of *Henrietta Countess of Warwick*, by J. R. Smith, realised 210*l.* This is a record price for this engraving, as it has never before reached that figure at auction. *Lady Charlotte Grenville*, a brilliant mezzotint, printed in colours, realised 82*l.*; *Mrs. Fitzherbert*, after Cosway, by Conde made 19 guineas; while *Winter*, after Wheatley, by Bartolozzi, printed in colours, was sold for 36*l.* Several small engravings, after Angelica Kauffman, were sold for from 6 to 8 guineas each. It will be noted that in this sale the major number of the prints were simply portraits. Photogravure is generally credited with being the cause of the decline of line and mezzotint engraving. That, however, requires qualification. Long before photogravure assumed its present proportions line and mezzotint engraving was on the wane, the old workers were dying off, and there were no young ones brought up to take their places, and the more is the pity, for excellent as photogravures now are, they are far short of good line or fine mezzotints.

WHILE on the subject of engraving it may be mentioned that the Queen has approved of the change of the title of the Royal Society of Painter-etchers to the Royal Society of Painter-etchers and Engravers.

THE COMPUTATION OF EXPOSURE UNDER ABNORMAL CONDITIONS.

me hints given and comments made at a recent meeting of the Croydon mera Club suggest that a few words of guidance to your readers, upon uging with reasonable correctness the exposure which, under an abrmal condition, should be given to a dry plate, will be appreciated.

In ordinary studio work, despite daily and hourly variations in the insity and quality of outside light, the photographer, having all, or arly all, the inside conditions practically constant, and working with but v intervals of complete intermission, does not meet with much difficulty hitting off a sufficiently correct exposure. His task is all the easier, at any error which is likely to arise will needs be only in one direction, ., that of under-exposure, wherefore all risk of hopelessly light stricken ates is absent.

Not so, however, with the outdoor, all-round practitioner, who is not rely continually meeting with puzzling subjects, and with widely fering intensities of lighting, but is constantly threatened by the chance gross over-exposure; to obviate which calamity many ingenious, and large measure efficacious, exposure meters have been devised, of which considerable proportion depend for their action upon the darkening ich ensues when silver bromide or chloride or other silver-sensitised per is exposed to the light which it is desired to test. I am not now ncerned with the many arguments which have at times been adduced ainst, the principle of employing automatic or semi-automatic exsure calculators, as opposed to relying upon the required experience, dgment, and "inspiration" of the practitioner, except that, for my own rt, I incline to the occasional use of such memory aids and ready koners as Cadett's exposure card or Hurter & Driffield's actinograph.

But beyond the users of such instruments there are, without doubt, ny thousands who habitually depend upon the darkening of sensitised per in order to obtain the determining factor whereby the duration of e exposure is calculated. All such will do well to ponder over the ults of some experiments and experiences which Mr. S. H. Wratten d others detailed at the Croydon Camera Club on February 16.

Using a meter working upon the system last referred to, the instrument, a recent occasion, gave as a correct exposure eight seconds. The ate was a rapid one (Wratten's drop shutter); the subject a half-open ndscape; light overcast, inclined to mistiness; stop *f*-50; time about .30. Eight seconds being considerably in excess of what his experience dicated; a fresh exposure of the meter, by another person, and a reful recalculation by means of the tables were made, the reading sulting, however, in the same.

Assured that that this could not be right, Mr. Wratten, having exposed plate for eight seconds as indicated by the meter, followed it up by mediately, exposing other plates for four, two, and one second pectively with the result that the best negative was obtained with shortest exposure (viz., one second), the negative which had eight onds being badly over-exposed. Subsequently another experiment s made by using the actinometer to gauge the exposure of a plate posed in a dwelling room. Here, again, the instrument indicated an posure as being needful which proved to be many times more than rect. Another gentleman, whose evidence, on account of his gthy and continuous photographic experience, deserves attention r. A. E. Isaac), testified how that, whenever, from any cause, light was usually weak in its action—either through being small in quantity or energetic in quality—he had noticed that the paper refused to darken even reasonable proportions to the increased exposure which should given to a dry plate. On one occasion in the evening he had subtted the instrument to the light, and, finding, after a reasonable time, sign of discolouration, had uncovered the lens for what he, from perience, judged to be right, viz., five minutes. Meanwhile the paper he meter remained exposed, and was so left until night came on, with- complete tinting ensuing. The negative developed correctly.

The foregoing testimonies, which might be considerably multiplied, pled with the fruits of my own experiences, indicate that considerable tion and judgment are called for in the use of a light meter.

Nor is it difficult to see why this should be the case, for, apart from lihood of failure due to the deterioration of the sensitive material, s well known that, notwithstanding, the product of intensity of light, ltiplied by duration of exposure, may, in the two hypothetical cases ich follow, be the same, the prolonged action, upon a dry plate of y weak light, does not equal in effect the short action of a strong ht.

Similarly I may deduce that, if the amount of weak light acting on o materials is identical, and the sensitised surfaces vary in sensiteness, then the surface possessing the greater sensitiveness will be more impressed than is expressed by the difference in sensitiveness between the two when tested with normal light. This, in practice, is found to be the case.

Another disturbing factor is that of the *quality* of the light. It is, or should be, common knowledge that, with most, if not all, silver-sensitised print-out papers, the main darkening effect is made by light rays emanating from the violet portion of the spectrum, I, whilst the silver bromide ordinary dry plate is near its highest sensitiveness between G and F, verging on blue-green, and is affected by a relatively larger proportion of green and yellow than is the silver paper.

Where we are dealing with colour-sensitive ortho or isochromatic plates, the discrepancies in the range of sensitiveness between the meter paper and the dry plates becomes even more noticeable. Take a plate stained with eosine, and it will be found that it possesses a considerable sensitiveness to yellow and orange, which, compared with the sensitiveness of the silver paper is almost *nil*.

From all the foregoing your readers will conclude that (1) no print-out silver paper is to be relied upon to give, under all conditions of light, a measure of the exposure called for by a given dry plate, and (2) such a silver paper will not, even under the most favourable circumstance of light, accurately gauge the correct exposures needful for all varieties of plates; variations in speed and in range of colour sensitiveness materially disturbing the ratio between the change effected by light in the paper and the plate.

From which it may be further deduced that those who have been accustomed to rely upon such aids as exposure meters had best distrust their readings whenever the light is (*a*) weak in intensity, (*b*) late in the day, (*c*) during winter, (*d*) whenever the light is inclined to be yellow, (*e*) whenever a plate of abnormal character is used, particularly when it is of great speed or of unusual sensitiveness to the orange and red of the spectrum.

I am not forgetting that in some cases an attempt has been made to get over the difficulty of corelating the sensitiveness of silver print-out paper with that of the ordinary dry plate by preparing a paper coated with silver bromide and silver nitrate and by other devices of manufacture. Even so the difficulties dwelt upon, especially that produced by the difference in effect of weak light on lowly as compared with highly sensitised films, are not thus by any means overcome.

The above experiences of Mr. Wratten relate to instances where over-exposures result. It should not, however, be forgotten that there are certain conditions of daylight, as with the unusual clearness that sometimes precedes rain, when some kinds of silver paper seem to be relatively more sensitive than is the dry plate, whereby it results that a meter *may* occasionally indicate an under-exposure. This is, although instances are not unknown to me, comparatively rare.

HECTOR MACLEAN.

TRIMMING AND MOUNTING PHOTOGRAPHS.

[Paper read before the Brixton and Clapham Camera Club.]

THE most difficult matter in the production of a successful photographic picture is sometimes not experienced until the final operations of trimming and mounting are arrived at. This at first may seem a somewhat advanced statement; but, when the pictures which have been exhibited during the past twelve months are called to mind, the number which have either been marred or positively spoilt by injudicious or careless trimming and immoderate or unsuitable mounting are seen at once to be unreasonably large. This, of course, is opposite to what should be, and it is intended to here point out some of the pitfalls which lay in the way of the photographer and how they may be avoided.

I do not feel that any apology is due from me for having brought this subject before you, as it is one of such vital importance, and many a picture which contains much that is good is rendered imperfect from this cause alone. The reasons of these failures are not far to seek. The operator has spent any amount of time in the artistic details of the work, and exerted a great deal of energy in correct manipulation, and eventually obtains a picture more or less perfect. Of course it is produced on a standard sized plate, and the print follows the same dimensions. It does not strike him that an alteration in its shape may do so much to improve its quality, or render perfect a faulty composition, and the mount is only looked upon as a means of support instead of playing a great part in the picture itself. These same remarks may also be applied to the framing, and even to the surroundings when the picture hangs on the wall, but this would carry us too far into the subject to treat thoroughly in one evening, so this part of the subject must unavoidably be ignored.

It may be interesting to you to know why the margins and surroundings of a picture play such importance in the completeness of the whole. It is easily explained. When we gaze upon the wondrous beauty of nature,

in all elaborate complication of organic form and colour, the eyes each perceive a circular picture which, combined, produce a view that is something of an oval in shape, but no sense of limitation is experienced. The combined images gradually fade away around the edges of the scene, the limits of which are absolute blackness, and yet presence of this black surrounding is unobserved. In other words, the view fills the total angle of vision. Now, when we look upon a picture, be it photograph, engraving, or painting, the view does not by any means fill up the total amount seen by the eyes, but we observe that which is around it. Whether we wish it or not, this superfluous matter forces itself upon us, and we are bound to recognise its presence, and, as in nature, the whole scene before the eyes is taken note of. It is thus that the space surrounding a picture plays such an important part in the sensation which it produces upon us, and it is therefore necessary that its action upon the whole should be taken into account when composing the picture and when presenting the same to the gaze. We will now discuss some of the points which have this influence upon the picture, and see what means can be taken to turn them to good account.

The Horizon Line.

The first subject which claims our attention, then, is the height of the horizon, and this is not such an unimportant matter as it sometimes seems to be thought. It has always been a matter of great dispute, and is largely dependent upon the feelings of the person looking at it. Perhaps I had better explain that by the horizon is meant that line which is produced where the sky and sea or land on the sea level meet together. When land rises above the sea level, the line where sky and land meet is best described as the sky line. The horizon will then be the distant, though invisible, sea level. This distinction is absolutely necessary in questions relating to perspective.

There is an old adage which says that the horizon should never be exactly in the centre of the picture, and some adhere to this rule with a most unswerving tenacity; but it must be remembered that no rule in art is absolutely binding, and may be disobeyed if the artist has sufficient ablility to do so without offending the eye. Now, this rule must not be looked upon as binding in every case. If the horizon is represented as a straight line, such as the juncture of sea and sky present, it is, of course, against good taste to allow it to equally divide the picture, because the interest in the picture is divided, the sky claims an equal amount of interest with the landscape, and the eye and mind tire in trying to establish a sense of repose. In the pictures of the Dutch school we find the horizon very low, in some cases abnormally so, and great effort has been exerted to produce a sky which in itself is a picture, but which, by a most subtle craft, has been made quite subordnate to the landscape.

If we ascend to a great height, such as up a mountain, we are enabled to see to a greater distance than if we remain on a level with the sea. The landscape stretches out before us, and the horizon apparently rises as the line of vision is heightened. Not only the foreground, but the middle distance, is broadened out, and, *together with the alteration of the perspective angle*, produces the idea of space. I wish you to note particularly this last statement, as its influence upon my next remark is of great importance.

If a picture is made from a low level, and the horizon is placed high up, an effect of distance, and consequently height, is produced, but the angle of perspective has not been altered, neither has the middle distance been broadened out. Now, our organs of vision, though oft maligned and much abused, are a great deal more truthful than ourselves, and they at once take note of the changed state of affairs, and are not slow to observe—even though we are not able to point out the cause—that the whole of the conditions attendant upon the raised horizon have not been complied with, and so a conflicting feeling is induced, and the truthful eye is unsatisfied and offended.

The treatment of the low horizon requires similar comments, but in a more modified degree, for it is not so great an offence to place it too low as it is too high. This is because the distant perspective contains ines of such small dimensions that they are not so readily discerned as when more foreground is shown, and, of course, the same rule applies to the mid distance. It will thus be seen from these remarks that it is better to cut away the base of the picture than the top, but it is still better not to err at all. In general practice, from a a quarter to one-third the height of picture will be the best height to place the horizon, and, with care and a trained eye, it is mostly possible to get that line "where earth and sky melt into one" in the place best fitted for it when making the negative.

Cutting Away.

In architectural and portrait subjects we have another principle which, although having connexion with that of height, is really more of an optical illusion than anything else, and can be turned to good account. It will be at once understood when I call to your mind the fact that the eye always judges the size and consequently the height of objects by comparison. The idea produced, however, is not always a truthful one, and therefore care must be taken not to violate its use. If a building is high, the nearer the top of it comes to the top of the mount the higher will it appear, and the same may be said of a portrait. It is therefore obvious that it is possible to make a man, or some other tower of strength, to appear much more majestic than is really the ca But in instances where attention is desired to be called to the tower height of a building, or where the appearance of importance and co mand, or majesty and power, are desired to be expressed in a man, it well to place the top of the subject well up toward the top of the p ture. A large amount of head room dwarfs a subject. In the ea days of portrait photography it was advanced as a theory that whe portrait of a person was to be represented in two positions, one sitt and one standing, the sitting position should occupy no more room th if the man standing had sat down on a chair just where he was sta ing. Thus, whilst the feet remained the same distance from the bas the picture in both cases, the sitting posture would have an extra amo of head room. When put into practice, the sitting figure thus appea very small, because the space above the head seemed to overpower subject, and to cause it to appear insignificant. This will show t great care is required in determining what amount to cut away from length of the picture.

Now, just as the adding to, or cutting away from, the top or bottom the picture is capable of meaning so much to the finished result, so li wise will the width require the same attention. In every picture th should be one spot which is occupied by the principal object, which the chief point of attention, from which the picture receives its title, to which the eye is ever and anon returning, finding fresh interest pleasure. It need not be large, it may be small, but, owing to general arrangement of the composition, its lighting, and its *position*, the very keynote and germ of the whole scheme. The position of t object may do much to make or mar the effect, and upon it mu depends the correct reading of the tale which the picture tells. Sho this particular object be placed too near to one side, it will look as tho it were entering or leaving the picture, according to which directio appears to progress. On the other hand, should it be too cent except in rare cases, it will lose interest and power. This applies m particularly to portraiture. I have sometimes seen the figure so pla that it is nearest to that side which it faces, with the result that it lea an impression that the person depicted was about to leave the print. is better if the figure does not occupy the central position, to put it w the back nearest to the margin. This will give the idea of arres motion.

I may here mention that the moment preceding the critical poin any movement is the best to show when movement is to be represent Thus, with an object which is apparently passing the spectator, the b impression of movement will be the moment before the centre of picture is reached; of a rising and falling billow, the moment just bef the highest point is arrived at; of a boy throwing a ball, the mom just before the hand reaches its greatest distance from the bo The ancient Greeks were extremely happy in the portraying of mo ment, as instance the statue of Discobolus. In all pictorial work th must be a perfect rhythm, which must be as evident as in poetry music, a rhythm which is insensibly felt, but which is none the l powerful in filling the picture with that which makes it give pleasure its perusal. This rhythm is produced by the proper arrangement of li and by the just subordination of its various parts to those objects wh give the picture its title. The lines should be so arranged that the ey led from one object to another, back to the principal object, and again and again over the scene until the eye becomes perfectly fami with all its details, until it learns it all by heart, as it were. Then, not till then, will the eye become satiated with the mystic pleasure wh the examining of a good picture yields.

Arrangements of Lines, &c.

In trimming a print care should be taken that all these conduc lines should be so placed that the best effect and value are given to th This will not be the case if too much space is devoted to any partic part of the picture, and often this may be corrected by trimming off so of the superabundant print. It is by exercise of care in the arra ment of these lines that the eye is led to forget that there is a margi the picture, and they should therefore lead away from it to the princi object. To do this, the arrangement of these lines must of necessi y somewhat concentric, and where they are large, that is to say, when t are near the outside of the picture, care must be taken that they co near its edges, or, in other words, are not made too central. To m this matter more clear, imagine the picture to represent a view a country church seen through the trees. On the right is a large t whose trunk and bough produce a line which leads up parallel, or nea so, with the side of the picture, ending in the bough, which tra round the top and finally droops towards the church. A very promin line is thus produced. Supposing, now, that on the right there is c siderable space devoted to objects of less importance. The result will that the tree will be too much central, and the balance will be disturb If, now, some of this space is trimmed away, the tree will be brou nearer to the edge, and balance will be restored.

In cutting down in this way, it must be observed that it is possibl go too far and produce the effect of overcrowding. I have seen w was described as "a portrait" which was so cut away that only the f was left. I concluded that the operator was not very accomplished print-trimming, and had had to keep cutting away because he was

le to cut true. Knives will jag. I have also seen portraits of which e feet had been cut away at the toes. Perhaps the person portrayed d very large feet. Such cutting down cannot possibly be of any use, d can only disturb the effect of the subjects pictured.

A case of over-trimming, which is very much seen, and which, whilst t so evident, is none the less to be discountenanced, is the case in ich some beautifully rounded cloud forms are cut down from the top, such a manner that the symmetry of the line is broken. Thus, a line ich carries the eye upwards to the summit of a beautiful floating ountain of cloud, and which would ultimately lead the eye gently and sensibly back into the picture, is arrested by coming into contact with e upper margin of the picture. The same also applies to the cutting of the tops of trees in a like manner, and which should also be oided, unless the trees are very large.

There is one great point which must be observed, no matter what else ay suffer thereby, and that is, no trimming must be done which will terfere with the balance of the picture. The balance and support of erything depicted must be maintained at all costs. Thus, an arch, no atter of what description, whether it be a door, window, or bridge, ust not be trimmed off in such a manner that it is left without some-ing to support it. It is better to cut through the centre of the pier or ong the doorpost, as by so doing the support of the arch is shown. he same sometimes applies to trees when situated near the margin of e print. It is all very well to say the imagination will supply the ficiency, but no amount of imagination will counteract the feeling of eakness and instability which the neglect of this rule admits.

Shapes of Photographs.

It will be seen from the foregoing remarks that two great points must borne in mind when shaping our pictures, previous to placing them on their final supports. The first is, that the print is so trimmed as ll best centre the interest upon the chief object, and find undisturbed easure in the perusal thereof; and the second is, that in conjunction th this the balance and harmony of the whole is adjusted and main-ined. No sense of overcrowding must be felt, and if trimming can do all objects which are not requisite to the subject pictured should be moved. I have frequently met with pictures that would be vastly proved were they cut in half and made two pictures of.

There is no more irritating thing than to see a picture wherein the terest is divided between two subjects; where the eye is left in doubt as which it is expected to regard as the predominant object. It is better produce two perfect pictures, though small ones, than to make one mbined larger, but more disconnected and uncertain thing, which ems divided against itself.

There is one point I have not yet touched upon. I have sometimes en asked, Which is the better to produce, an upright or an oblong ture? Now, this is only to be answered after first seeing the material th which the proposed picture is to be built. This, however, can be rne in mind, a horizontal shape gives breadth and great stability, ilst an upright form tends to majestic appearance and atmospheric ect. It is, however, very difficult to prearrange the shape the picture to be, and it is better not to be bound to a definite form, but rather to ake the dimensions be those which will best carry out the artistic alities of the conception.

I think it will now be seen that too much consideration cannot be ven to the shaping up of the print, it being so very important that the ture be presented in its best form if the fullest amount of pleasure is be derived from the viewing of it. I have not, of course, by any means hausted the subject, but I trust sufficient has been said to ensure more easing productions in the future. It now remains for me to say a few rds regarding mounting.

A precious gem, no matter how well it is cut and polished, loses its parent quality if it is not handsomely set and suitably mounted. Now, e mount is to the picture what the setting is to the gem. It is there-e required that great attention be given to this subject, for no matter w well a picture is composed and finished, it will not show to vantage, and may appear to its detriment, upon an unsuitable mount. m not going to speak upon technical details, because perfection in nipulation is, of course, neeessary in all photographic work; but on the artistic side of the question I feel that we are not sufficiently ll educated, and that often we submit work which is of the worst sible taste.

Mounts and Mounting.

Before we proceed to the operation of mounting, we must first decide important and often-neglected point. We must first of all answer e question as to whether our work is to be looked at simply as a ture—a thing to be regarded for itself alone, or whether it is to be t of the decorative scheme of the wall upon which it is to be hung. is, at first, seems an unimportant point, but it is really a very great estion. It means that, if it is to be considered a picture, its surround-gs must be adapted to suit it the best; but, if, on the other hand, it is be looked on as a decorative effect, then it must itself be constructed harmonise with its surroundings. In either case the mount, together h its frame, must be made the connecting link between the two. hink you will agree with me that, if the mounting was always looked upon this light, some very different results would be presented to the world.

Of the ordinary professional cabinet mount I have nothing to say, as, at best, it is only a vehicle on which to carry the print until it is placed in the album or other receptacle; but all other work requires a great deal of consideration. At the commencement must be decided the size of mount to be employed. This, though largely a matter of taste, must be selected with discretion. It must be remembered that, if the picture contains a mass of small work, or does not contain large masses of light and shade broadly displayed, a very large mount will cause it to look very insignificant. On the other hand, the larger the mount, the less the eye is troubled with the wall around it, but a large mount tends to give prominence to the margins of the print. Should the work contain small masses of light and shade, or is weak in construction, a narrow mount will be found the most in keeping. I do not, however, advise the extreme in either direction, as I consider both to be only evidences of affectation.

I suppose this is the best moment to discuss the merits of the mount as regards width of margin. If decorative effect has not to be considered, it will be found that its effect upon the picture is very considerable. Where the picture very much approaches the equilateral rectangular form, the addition of a little extra width of mount at the ends, or at the top and bottom, will increase the apparent length or width of the picture. In all cases the increased size of the mount should be in keeping with the dimensions of the print. Thus, if the picture is longer than wide, the largest portion of the mount should be at the ends, and, of course, the reverse applies to it when the greatest dimension of the picture is from top to bottom. I think, however, that, in general, it will be found to be the most pleasing and artistic to give equal width at top and sides, whilst the bottom should be half as wide again as either the top or side. Of course, where decorative effect is only aimed at, a much greater licence can be taken.

The depth of tone and the colour of mounts is a very important consideration, either in pictorial or in decorative appearance.

It will be found that both in theory and in practice that depth of tone which comes about mid-way between the highest lights and the deepest shadows in the picture will give the greatest value to the whole effect; but it will be evident to every person that considerable power is herein placed in the artist's hands, for, where it is desired to emphasise any particular note of half-tone, the depth of the mount will greatly assist in so doing.

I can, however, only just call this fact to mind, as time will not suffice to lay the whole subject before you to-night.

Colour of Mount.

As for colour, a very great deal might be said, for it plays a most important part in the decorative scheme, whilst in pictorial effect the result is none the less seen.

For decorative work great range of colour is available; but, if the colour chosen is not of the same hue as the picture, it should be complementary to it, or of such a tint as will produce the best harmony between the picture and the wall. Thus, to give an example: Suppose the picture chosen is in red-chalk carbon, and it is to hang upon a wall whose predominating hue is green. I should mount the picture on a buff-coloured mount, unless I desired to emphasise the colour of the print, in which case I should choose a green mount of such a tone as would produce the effect without making itself too prominent.

A perfect knowledge of colour harmony is requisite in mounting pictures for decorative purposes, and on this point I do not wish to act as an authority. In mounting for pictorial effect, white, toned, or grey are tints which are safe to use, and have each their special advantages. If the print has a tendency to hardness, it should only be mounted on a pure white board, because a toned mount has the effect of cooling the whites of the picture, which increases the apparent hardness; it will, therefore, be properly inferred that a toned board will best suit a somewhat weak print; also a deeply toned board is good to use with a print whose whites are yellowed with age.

Of the grey board much may be said, since, if the proper depth is chosen, the picture is sure to be shown to the greatest advantage. The depth of tone should be that which is just below the highest lights in the print. I do not care, as a rule, for dark grey mounts, but the kind I have described are really useful and serviceable. All other mounts of glaring and gaudy colours, and all fancy and superabundantly ornamental mounts, are to be avoided for pictorial effect. They only succeed in ruining the appearance of the picture, and may be taken as evidence of a painful want of good taste and artistic refinement. The results of some of these experiments have been shown during the past, and as experiments only all well and good, but I do hope that some of these experiments will not be performed again—at least, in public. One time of day it was a very frequent thing to bind the edges of the cut-out mount with gold. This, for decorative effect, may be all very well; but, as a rule, it will be found that the plain edge is much more effective and artistic. Where a gold edge is desirable, it is much better, although more expensive, to have it gilded with gold leaf. It may be necessary, and is sometimes very beneficial, to tone down the whiteness of the edge with a wash of colour in cases where the intensity of the edge clashes with the lights of the picture.

Plate-sunk Mounts.

There is one kind of mount which is very much in vogue at the present day. It is a very effective and refined style of mounting, and is very superior in appearance, but it is not compatible with artistic taste. I refer to the plate-sunk India-tint mount, and my remarks anent its artistic qualities may cause some surprise, but I think I can clearly show that what I say is true. The plate-sunk India-tint mount does not belong to photography at all, but is the acknowledged property of the engraver. The tint he has invented himself, and the plate mark is inseparable from the process of printing. It is practically a defect in the technicalities of his work, but his artistic instinct has led him to take advantage of the defect and turn it to true artistic account. Sometimes the water-colour artist has availed himself of the tint, but never to my knowledge has he used the plate mark in any of his productions. And why? Because the plate impressing does not enter into any of his proceedings. It is for this reason that it is entirely out of place in a photograph, for in no part of the work is a plate used in such a way as to cause an impression. It is meaningless, and therefore inartistic.

It may be urged, if the water-colour artist may use the tint judiciously, so may the photographer. Just so; but it must be remembered that, when a painting is made on it, the colour of the tint pervades the whole picture, as in an engraving, and the tint produces a mellowness of effect which is very pleasing; but in the photograph the tint is only round the edge, and therefore at best is only a weak imitation of an engraving. If this tint is necessary, a toned board should be used instead. I do not feel that photographers are justified in trying to emulate the work of other artists who make a speciality of other branches of art. Surely a photograph in itself is a most beautiful thing, and I see no reason why the fact that it is a photograph should be disguised, therefore any attempt at imitation is undoubtedly weak and degrading.

It is such practices as this which lower our art in the eyes of painter artists, and bring ridicule from all who profess good taste. Rather let us emphasise the fact that our pictures are photographs, and then the beauty which they possess will receive the recognition which they deserve. A pale grey mount, with a white paste-down centre, is a very effective form of mounting if the picture is made on white paper. It is truly a photographic mount, and I do not think it has ever been used for any other purpose. In using this mount some regard must be given to the general character of the print, for, if it is rather a dark subject, the white paste-down becomes very aggressive in appearance. With such a description of print the white paste-down should be very narrow, almost, in some cases, to a single line in width.

A great improvement would be to have the paste-down of such a tint that it would be just off a pure white, so that, when the picture is laid on it, the whites would appear just a trifle brighter than the paste-down itself. A grey mount with a white Oxford line, and about half an inch from it, makes an exceedingly effective finish, and is quite permissible. On a white or toned mount the line should be very pale. As a rule, these lines are made much too strong for good taste.

I have not spoken of veneered or of gold mounts, as these are really only extensions of the frame, and must be treated only as such. There is one more subject which I must speak of before I conclude, and in a somewhat feeling manner, as it is a very personal affair, and one which must apply itself to everybody, I refer to the signing of names upon the print or mount.

Signed Photographs.

There are some workers who are evidently impressed with the idea that the most important object in the picture is their own especial signature. They write it big in a flourishing style, sometimes in red or white letters across the corner of the print. When you look at the picture the first thing that catches your eye is Murillo Fitz-Jones, or whatever the name may be. The eye travels thence to—Murillo Fitz-Jones, and after being excited and dismayed, hypnotised and enthralled with the all-important and self-asserting cognomen, desires to see something more of the picture, but an irresistible spell seems to hold it back until, by the triumphant power of mind over matter, it tears itself away, and, with one bold master-stroke, looks with doubtful satisfaction upon the principal object—Murillo Fitz-Jones. Further comment is needless, and I do not think I have very much exaggerated the matter, for I have seen frequently pictures with their makers' names thus boldly written upon them. Of course, I do not say that they should not be signed, but it is a difficult matter to settle.

The Japanese, with all their beautiful art productions, are mostly content to let their work go forth into the world without so much as a single letter of authority upon them. They are a very modest people. But I think a man should not be ashamed to own up to his work, and to stand by its merits, but it is only a sign of self-conceit and arrogance to sign a print in such a manner that whenever it is looked at the name must be read. No! modesty in art is above all things to be esteemed, and is a most pleasing trait in many of the greatest artists of the day. The name should undoubtedly appear, and it is better either to write it small and pale in the same colour as the picture itself at any suitable place thereon; or, better still, in pencil in the artist's own handwriting, lightly written upon the mount.

Roland C. Whiting.

THE ECLIPSE AT SAHDOL.

By a Non-scientific Observer.

It may interest some of your readers if I detail my personal experiences of the eclipse of 1898, since they contain the record of an attempt to photograph the corona by ordinary apparatus, an attempt which I think has been successful when the apparatus used is taken into consideration.

The general interest taken in this important event was evidenced by the large numbers of all classes that travelled from various parts. Those who went to Sahdol, where the Astronomer Royal, the Madras Astronomer, and others were encamped, deserved a reward for the inconvenience they suffered. The inconvenient running of the trains caused us to be two nights out, and one night we had to spend under trees, some in railway carriages certainly, but only the most favoured ones. The reward was ours, for a more awe-inspiring sight it would be difficult to conceive. There was a humorous side too—in fact, it was a mixture of the inconvenient, the ludicrous, and the sublime. It was very funny, as the time drew near, to see such a number of people making earnest efforts to smoke glasses of telescopes, bits of ordinary glass, field glasses, &c. They burnt their fingers and covered their hands and faces with lamp-black. Some held field glasses bodily over a great flame of burning camphor, then up they went to the eyes to see if they were all right, with the result that the eyes, nose, and cheeks were blackened in a way that would allow one to imagine they were preparing for a Christy Minstrel performance. Now and then one would hear an exclamation that was not a blessing. A fellow would spend ten minutes in very carefully blacking the eyepiece of his telescope, and then, when he had got it just right, he would push is too close to his eye, and the lashes would brush off the deposit. Here and there were individuals with camp tables, large sheets of paper, drawing instruments, and suchlike. Like automatons, they popped the glasses to their eyes, dropped them, made notes with a rapidity that astonished one, and caused one to wonder what they found to record of such—apparently—vital interest. This while the shadow was slowly covering up the sun. Knowing the enormous advantage photographic records have over eye observations, I thought it a fearful waste of energy, even during totality, while prior to the "total" phase I should say that there is nothing visible to the eye that called for record.

I had never before seen a total eclipse of the sun, so hardly knew what to expect. I had made a special camera with a changing back that would enable me to make six exposures on a half-plate. This camera I hope to describe later on when I have more time at my disposal, but I may say that it was focussed and screwed up quite rigid some days before, and two small aperture sights adjusted on the back and front, so that any objects aligned in the sights would have its image exactly in the centre of that part of the plate opposite the aperture in the camera back. Thus, with the camera on the tilting table, I was enabled to put in the slide and draw the shutter ready for the first flash of the corona, keeping the sun's image exactly in position by means of the sights. Of course, I protected my eyes by means of dark-coloured glasses, which I had made still more protective by smoking them. While the merest fraction of the sun's edge remained visible, nothing could be seen but this bright bit. But suddenly there was a magical change. The shadow shot across my eyes, and the marvellous beauty of the corona was revealed as though by a magician's wand. Almost lost in admiration, force of habit stood me in good stead. I mechanically made the first exposure, having had my hand on the cap, not more than a second of time elapsing between the flashing of the corona and the removal of the cap. I then made five successive exposures of one, five, ten, fifteen, and twenty seconds. The lens was a rapid rectilinear of 18-inches focus, and was worked at *f*-11 for the whole series. The camera, as I said, had been ready focussed, and this was carefully done with a good focussing telescope.

I enclose prints from the negatives and a transparency from No. 1, *i.e.*, the first exposure. It will be seen that this one shows the fine hair-like rays of the corona very well, besides the prominences of burning hydrogen gas and a crescent-shape deposit, which would seem to indicate the presence of a gaseous envelope round the sun of less actinic activity than the coronal rays. This crescent is at 11 o'clock, if we suppose the disc to represent the dial of a clock. The *first* contact took place at 5 o'clock. Hence, my first exposure being made almost simultaneously with the first flash, I presume I was just in time to secure an impression of this darker gaseous body. In No. 2, which was exposed about six seconds after No. 1, it will be seen that this feature has disappeared. Nos. 3, 4, and 5 have suffered in varying proportions from sky fog and movement, owing to the long exposures. No. 5, which had twenty seconds, presents a curious appearance. At the nineteenth second, as near as can possibly be judged, the sun's edge flashed out at the point of the moon's first contact, viz., 5 o'clock. In an instant I replaced the cap, but the extremely brief exposure was quite sufficient to bring about reversal. The results are, I think, encouraging, and show what can be done by means of apparatus that every photographer has at his disposal, although it is not every photographer that has the good fortune to see a total eclipse of the sun. In conclusion, let me say that the plate used was an Ilford "Empress," and was well and thickly backed with a paste of lamp-black, dissolved in equal parts of methylated spirit and ordinary shellac varnish.

I enclose a photograph of the Sahdol Astronomical Camp, and one of the instruments of Professor Michie Smith, the Madras astronomer, including his 40-feet Sidero Stat.

All classes of visitors were rigidly excluded from the Camp and its precincts until after the eclipse, but then the astronomers very courteously showed visitors the instruments, and explained, with marvellous patience, as much as they possibly could to non-scientific listeners. Naturally, as a photographer, I noted the extreme cleanliness and order that obtained everywhere, and, by the shade of Daguerre, distilled water by the barrel!

AT THE CAMERA CLUB.

The long snowstorm which commenced its wild, and most uncomfortable, career on Thursday, last week, had the effect of restricting the audience, which assembled to hear Colonel Waterhouse's paper on "Photographic Intaglio Methods," to somewhat small dimensions. Indeed, it almost required the stamina of an Arctic explorer to contend with the bitter wind, and its frosty particles, which assailed street wayfarers on that inclement night. Once indoors, however, the members of the Camera Club forgot all about the slushy snow outside, and settled themselves down to listen to the story of photo-engraved plates from one who has himself done so much to bring that phase of graphic art to the perfection which it has now attained.

First came the usual notices, respecting coming events, from the Hon. Secretary, after which Mr. Wilmer, the Chairman of the evening, asked whether any members had any novelty to bring forward, or statement to make. Yes, Mr. Warnerke had something to say, and, as this gentleman never rises to his feet without warrant, the members were all agog to hear his statement.

Here it is in brief. Dr. Russell had that afternoon read a paper before the Royal Society on the action of different substances on the sensitive silver surfaces used in photography. Mr. Warnerke had himself been experimenting in this direction for a long time, and had obtained results which seemed to defy all explanation, and, as they differed in detail from those described by Dr. Russell, Mr. Warnerke took the earliest opportunity of submitting them to the criticism of the Camera Club. Broadly speaking, he had found that different substances, when placed in contact with or near to the sensitive surface in complete darkness for several hours, would have the same action upon that surface as would light, in that they would leave an image which could be revealed by development. First he experimented with chloride and bromide papers, and found that the effect differed on these two papers. Copal, such as painters used, would show a black mark, so that any word written in such varnish on ordinary writing paper placed in contact with the sensitive paper would, after some hours in darkness, give under development a black image. Gum arabic, on the other hand would give a white image, with the surface darkened round about. Cut-out rings of thin gelatine, interposed between a copal-coated paper and the sensitive surface, stopped the action, and the rings were boldly reproduced in white on the sensitive paper, Words written in variously prepared inks were reproduced, some in black, some in white; under like conditions with plates, equally astonishing results were obtained. Taking various tones of different metals, he found that the most marked result was achieved with a Belgian ten-centime piece of nickel. It so happened that this coin, being thinner than some of the others upon which the sensitive plate was laid, film downwards, was not in actual contact with the surface, and yet it was perfectly reproduced, the device upon it being plainly evident with the raised portions, *i.e.* those nearer the plate white, and the sunken portions black. Mr. Warnerke showed both papers and plates illustrating his remarks, and called attention to the circumstance that all were blackened round the edges—an effect familiar to all photographers, and one which is generally ascribed to stale plates. No explanation was offered of the phenomena, but members of the Club were invited to experiment in the same direction themselves. From all this it would seem that there are, in photography, still more worlds to conquer, and mysteries which want explanation.

Colonel Waterhouse now rose to read his paper, and it may at once be said that the only fault which we have to find with it was that it gave so much notice to the doings of the early workers, and almost ignored the labours of one of the best of the moderns, namely, Colonel Waterhouse himself. The lecturer began by pointing out that the story of photographing in intaglio was, for the most part, an old one, but it was often serviceable, in carrying out a work, to look back and review the labours of others in the same field. The art really dated back to bygone ages, for it must necessarily be associated with the introduction of copperplate engraving in the fifteenth century. But the actual starting-point was in 1814, when Nièpce the elder attempted to fix pictures made in the camera obscura, and to copy engravings by means of light transmitted through them to copper plates made sensitive. This process was called heliography. He used bitumen and lavender oil as a medium for dissolving out the varnish unaffected by light. These experiments led him to more general researches with the camera, and in 1827 he wanted to address our Royal Society on the subject of his work, but he was refused a hearing because he naturally objected to divulge all his methods before his patents were complete.

One very interesting circumstance was that Nièpce seemed in some measure to have anticipated Lippmann's interference method of producing coloured pictures, for he has left a description, quoted by Colonel Waterhouse, of the manner in which he had obtained on bitumen plates images which showed by reflected light, when the plates were held at a particular angle, the colours of the originals. More than this, he found that the different tints were due to the relative thickness of the varnish, and identified the action as being similar to Newton's rings.

The nephew of Nièpce, who, in conjunction with Daguerre, received a pension from the French Government for their invention of the Daguerreotype, continued his uncle's experiments, and the bitumen process became quite extensively employed by photo-engravers. Various processes for turning the Daguerreotype plate into a printing surface were then described, and many good workers seem to have turned their attention in this direction without any practical result coming from their labours. Next came a review of the processess based upon the action of light upon the dichromates and the methods of Poitevin, Pretsch, and others fully described. Fox Talbot's share in photo-etching work was also acknowledged, and mention made of his introduction of muslin or gauze, in order to break up the image into dots—the prototype, of course, of the ruled screen now used for photo-block work. And thus the art of photogravure was gradually brought up to date, the lecturer, as we have already intimated, almost wholly ignoring his own large share in bringing the work to such a successful issue.

Colonel Waterhouse dealt with one of the few subjects, which it is impossible to illustrate with the optical lantern. But, as a substitute, one wall of the room was covered with examples of pictures produced from photo-engraved intaglio plates of all dates, representing all the processes described in the lecture. Never before, perhaps, has such a complete collection of pictures illustrating this phase of photography been publicly exhibited, and the members of the Camera Club may well be congratulated at having such an Exhibition on their premises.

The lecture was followed by a desultory discussion, in which Mr. Warnerke and the Chairman took part. In the summing up of the proceedings Mr. Wilmer remarked that the retirement of Colonel Waterhouse from his public duties in India was a great gain to photographers generally, for he had occupied much of his leisure in visiting the Continental ateliers, and had thus added to his extensive knowledge—a knowledge which he did not keep to himself, but was always ready to impart to others.

GENRE STUDIES.

[Translated from the Photo Gazette.]

Emerson once said that a picture was "the materialisation of an idea." Stendhal used the word "crystallisation." A dream, an ideal, crosses the mind of the artist; he sets it forth with the aid of a brush, chisel, or pencil. This is Art. He touches every one with the feelings by which he himself has been moved; he makes us take pleasure in his own conception; we share his vision, and for centuries onward the idea which has influenced him is fixed, and becomes inspiration for generations of artists yet unborn. Such an aim is a noble one. Can photography aspire to it? Yes and no. No, if it sets before itself a too lofty ideal; yes, if it rests contented with simpler subjects.

M. Gustave Larroumet, speaking of Detaille, the great artist, says: "He makes his choice in truth, and with the aid of truth he imagines, for without choice and without imagination there is no such thing as art; he thinks and dreams, for painting without ideas shows only the outside of things, and never the soul of them." Here we have in the compass of a few words the substance of innumerable articles which have had the relation of photography to art for their theme. It must be acknowledged that, although the photographer is at liberty to choose, he cannot create; he can show the outside of things, but it is not for him to reveal the soul of them. We shall be wise to work within the limits of our art, and not try to pass them. All pictures which, by arrangement of figures, represent an idea are permitted us; those which call for the interpretation of an ideal, dreamed in the brain of the artist, we ought to be ready to surrender to painters, sculptors, engravers, the technique of whose art allows of their putting their soul into their work.

It is for this reason that the representation of the nude by photography should be condemned. The ideal of female beauty vanishes before the objective of a camera, and appears only as a body without soul; the form of it remains beautiful, but with a beauty utterly sensuous and different from that represented by painters and sculptors; for these choose in truth, and by the aid of truth use their imagination, whilst the photographer cannot choose in truth, and must perforce reproduce in entirety.

A musician sits down to a piano and plays a piece of music—nocturne, reverie, or what you will. We admire his talent; his music stirs the hearts of all his audience; yet, play that same piece in correct time on one of the mechanical pianos manufactured at the present day, to perform on which you have merely to insert a perforated card and turn a handle, and you will no longer experience the pleasure which the musician gave you. All the feeling has gone out of it, the piece seems tame and commonplace, for the soul of the interpreter has gone; he threw himself into the reproduction of the composer's thought, he felt the passion of it, and was able to communicate his ecstasy to the souls

of those who listened to him, whilst the automatic instrument merely ground out the notes mechanically, with no feeling and giving no artistic pleasure. When a photographer challenges an art so lofty that it strives to set forth an ideal of the mind, he encounters the same difficulty, and his apparatus effects a representation in the same way as the mechanical piano. Happily the photographer has other resources.

I want to speak about *genre* studies, a class of work very little and very poorly practised by amateurs and not at all by professionals. Do not suppose that it is easy work; that it requires no thought, imagination, skill, or artistic culture. It requires all these. It is not enough to bring various people into different positions in order to make a *genre* picture. In the arrangements of the figures in their surroundings some idea must be set forth, and everything should go to place this idea in relief.

We must, then, first of all have some leading idea for the picture, then think about it and visualise it in our mind's eye; or, better, if we can, use a pencil deftly, make a rough sketch of it. When we have come to a distinct conception of what we want to do, and how we propose representing it, then it is time enough to set the apparatus up and look at the ground glass. As a general rule this course of procedure is reversed, with consequent poor results.

Some idea of composition is a *sine-quâ-non*. A badly composed picture will never tell any story. The interest is scattered, the idea lacks unity. The study of standard paintings is of the greatest use. More can be learnt by taking a walk through our art galleries, or by looking over the reproductions of celebrated pictures than by reading whole volumes of treatises on the art of composition. But the study of great works of art on the part of the photographer should not lead to too servile imitation of them. Some imitations by photographers of classical pictures have been very successful, others less so, whilst the great majority have been simply grotesque. All depends on the subject, the selection of which calls for discretion. We have all admired the reproduction of a photograph by M. Commessy, which is a very close imitation of Millet's *Glaneuses*. The photographic portrayal of the scene was done with care and skill, and, if the photographer was successful, it was because he was careful to avoid aiming too high. The subject of the picture is borrowed from country life; it is an every-day summer scene, and no lofty idea is involved in the work. The subject comes within the limits of photography. M. Commessy, who is an artist, chose Millet's *Glaneuses*, but he has been careful to avoid attempting the celebrated picture, *Angelus*. This is equally a country scene; the same woman might have posed in each picture; the landscape, a little village church lying in a plain, is common to both; there is no technical difficulty. Why should not the reproduction of this picture have been attempted? Because, above this picture, and dominating it, hovers a thought, the thought of prayer. The idealised expression of the two faces compels us to believe that the painter has striven to shadow forth on the canvas a noble thought—his own—that he has put into his picture something of his heart, his soul, his faith; and it is to this point that the photographer cannot rise.

The imitation of good pictures is an excellent exercise for the photographer if he will but recognise his limitations; it is practically certain that the fundamental rules of art will not be ignored, that the picture will be well composed; and there is no doubt that by work of this kind much may be learnt and many interesting pictures produced. Afterwards, when the photographer begins to feel for himself, he will be able, in his own turn, to compose new subjects for himself.

Do not attempt to represent complex ideas by photography, but endeavour to translate a single one; without some leading thought *genre* study is an empty thing. Do not essay representations of a period antecedent to the discovery of photography, for even the best-trained models have a commonplace appearance when dressed in historical costumes. If we will but look around us, and if we know how to see, there will be no lack of subjects. *Genre* studies are best selected from country life, subjects of which description gives the best results in photography.

En résumé, it may be asked, What is the difference between *genre* studies and landscapes containing figures? The difference consists entirely in the preponderance of one or other of two factors. If the landscape takes the most important place, the figures in it being merely accessory, and introduced in order to give a little life to the view, the picture may be considered a landscape; but, if, on the contrary, these figures take the principal place, and the landscape serves the purpose only of a background, the scene represented may be described as a *genre* study. We have seen many pleasing scenes of this latter order taken in a hand camera. For example, vineyard scenes, reapers at their mid-day meal, arrival of the village diligence, or departure of the conscribed soldiers may be cited, but it must be admitted that many of these are lucky shots, where the skill of the artist has been confined to choosing the moment when the best grouping of the figures has come about and the background harmonises best with the subject. When greater skill has been gained the photographer may group his models in open air or otherwise, as in Robinson's *Merry Tale*, or *Village Barber*. A friend of the writer's, a past master in this kind of work, has made a very striking series of studies, to which he has given the title *The Life of a Doll*. Of these he may be especially commended for *Baby is Ill*, *The Reading Lesson*, *The First Step*, *The Breakfast*, each of which is a little gem, made with evident care and a good knowledge of composition. He has grouped his figures and accessories to such effect that each picture plainly bears out its title. He makes each study a matter of previous thought, he takes for models children in occupations familiar to them, and, in order to get a natural pose, when everything is ready, he has only to tell them to play dolls in their usual way.

In the same way, when workmen are to be represented, get hold of real workmen, and ask them to continue their work. The artist has then to choose the position of the smith, carpenter, or shoemaker, which best gives the idea of his trade, which also harmonises best with the interior of the shop of which the background of the picture will be composed.

In a word, study, taste, and patience are absolutely necessary. We must understand what we wish to represent, we must avoid a too lofty subject, must remain contented with simple ideas, and not imagine that we have succeeded in producing a *genre* study merely because we have placed five people round a teatable without previous consideration of their positions, or of the idea which their grouping is designed to set forth.

CTE. D'ASSCHE.

HOW TO INCREASE PROFITS.

IN three previous articles, on June 25, August 6, and September 3, 1897, I tabulated the retail price of photographs, the wholesale price of material, and the rate of wages at various periods. With these before him the photographer can compare the position of the trade and the amount of profits at any time within the years named. The tables given are not so complete as they might be made, but are sufficiently full to enable one to arrive at several important conclusions concerning profits. The facts supplied in the above-named articles, and what they imply, may not be readily grasped by the busy photographer; hence, in the following lines, I purpose to state the general results which can be drawn from them. If at any time more information than I have supplied is collected, my conclusions may in some degree be controverted, though in the main I think they will hold good throughout.

I began by considering retail prices for cabinet and *carte-de-visite* portraits, finding that until 1867 high prices were obtained; after that prices slowly declined, until at present they are fully twenty-five per cent. below the earlier rates. Coming to the price of material and other things that enter into cost of production, I showed that rent had increased eighty per cent., rates thirty per cent., whilst a number of articles in daily use had decreased from forty-nine to ninety per cent., the mean being seventy-two. Finally, wages were compared, and it was estimated that for the majority of photographers there has been a decline of twelve per cent from 1883–6 to 1897.

These several items may be stated as follows:—

Retail prices	decreased	25 per cent.
Rent	increased	80 ,,
Rates, taxes	,,	30 ,,
Wages	decreased	12 ,,
Material	,,	72 ,,

It is next necessary to ascertain in what proportions these items enter into cost of production, and how far they account for the total working expenses before an accurate statement can be made as to profits. To arrive at this I shall take the amounts given in the article on the "Profits of Professional Photographers," which appeared in the JOURNAL on April 16, 1897. In that estimate the takings are reckoned as 1000*l.* In the expenses the wages of an operator are left out; this has been added to the wages bill as 100*l.* a year. With the expenses so obtained is compared the probable cost of the same things in 1851–2, allowing that the decline in wages of twelve per cent. from 1883–6 represents the fall during the longer period which favours 1897:—

	1897.	1851–2.
Rent	£100	£58
Rates, taxes	25	20
Wages	348	390
Material	180	642
	653	1110

This gives a difference of 457*l.* in favour of 1897, meaning, in round figures, that the cost of production is forty per cent. less now than in 1851–2. A similar result is given by summing up the various amounts as tabulated for the two periods, putting the difference in cost of material some three to four times greater in 1851 than 1896.

	1851.	1896.
Rent	£100	£180
Rates, taxes	30	39
Wages	240	210
Materials	642	180
	1012	609

The difference is 403*l.*, and can be put roughly as forty per cent.

The working expenses accounted for by these means are some sixty per cent., hence, on sixty per cent. of production, the photographer ha

gained forty per cent. The forty per cent. not considered, of course, includes profits, the remainder being chiefly material. It would, therefore, be a moderate estimate to put the gain on working expenses between 1851–2 and 1896–7 as forty per cent. By the latest calculation, a photographer can only make 146*l.* 10*s.* profit on a 1000*l.* taking. In 1851 he would have needed to take 1400*l.* to secure the same profit. His prices to do this required to be forty per cent. greater, but, as shown, they were often eight or nine times this, which gives some idea of the large profits made in those days, and how small in comparison they are at present.

It will be remembered that I put the fall in retail prices as twenty-five per cent. from 1860; consequently, if cost of production is some forty per cent. less, profits, instead of being smaller, should now be greater than formerly, a conclusion I will proceed to examine.

The reader who has followed my remarks with any closeness will recognise that the comparison between 1851 and 1896 is an extreme, and does not strictly interpret the progress of events. If we inquire of old photographers which years were the most prosperous for commercial photography, or note the years when flourishing houses of business were founded, the conclusion in both cases will be from about 1860 onwards. These years are marked down as the palmy days of photography. The *carte-de-visite* mania had something to do with this result, but these comparative tables show why photography was so extremely profitable. From the table of wholesale prices it is seen that the cost of photographic material in 1851–2 was very high, the selling price of photographs being also fixed high. By 1860, however, wholesale prices had dropped greatly, so that sixteen articles of daily use costing 4*l.* 18*s.* 6*d.* in 1852 only cost 1*l.* 19*s.* in 1860. During the same time selling prices had scarcely changed. Thus, whilst retail prices remained high, wholesale prices went down rapidly; but selling prices had been fixed according to the earlier wholesale rates, and so the whole gain in cost of production went to profits. For some years selling prices kept up, and photographers prospered exceedingly and waxed fat.

After 1860 wholesale prices declined slowly, rent continued to rise, and selling prices to fall. This movement has continued unaltered, until at the present the profits of professional photographers threaten to become a minus quantity. . Retail prices are still falling, wholesale prices are nearing a minimum, and the prospects of photographers do not seem likely to improve unless some effort is made to alter the conditions of production. Low selling prices do not of necessity mean low profits, but what the bulk of photographers have to face is falling prices and no corresponding reduction in working expenses or cost of production.

These considerations prove that the position of photographers is much worse than previously, a fact of which photographers were already aware, and thus might charge me with doing needless labour, a charge I shall not endorse since I am persuaded that my efforts have likewise made evident the means of remedying these low profits and regaining some of the lost ground. This remedy is easily stated, but its application is by no means so simple. The remedy can be resolved into four courses of action, to be used individually or collectively: 1. To raise selling prices. 2. To cheapen production, *i.e.*, by inventing improved appliances, new processes, labour-saving devices. 3. To make assistants more efficient. 4. To limit competition.

How far the above are practicable I shall consider in the remaining space at my disposal. To raise prices was considered by commercial men of the old school as quite impossible; they held as an axiom that prices once lowered could never again be raised; hence their policy was to make every effort to keep prices at a fixed level year after year. This was sound enough under the individual system of trade, because, should one man raise his prices, he, being alone, would in consequence lose trade; but, nowadays, the individual system of commerce is giving way to the combined, the company, the syndicate, the trust, the federation; and by these improved methods we find that prices can be raised and lowered—not at random, but as the state of trade is good or bad. Fluctuating prices are now the rule instead of fixed rates, independent of the condition of trade. An individual cannot raise prices without risk, whilst a combination can do so with safety and profit. Again, railways, telephones, and other improved methods of communication make it possible for combinations to be formed, even though they be world-wide. A federation embracing every photographer is somewhat visionary, though it would not be impossible to federate the photographers in any one country.

To cheapen production by inventions and improved methods of working is open to every photographer. For instance, the gelatine dry plate, as a method of working, was an improvement on collodion, and for a few years gave photography new openings, and helped to lift it from the stagnation into which it had fallen.

The bromide emulsion paper and the platinum process have also done something in the same way. The effects due to these processes are now working off, and to repeat them it is absolutely necessary that novelties are introduced in order that new prices may be charged. This implies a progressive spirit, that photographers exchange ideas, and take means of learning what new things, capable of commercial application, are introduced at societies and in the photographic press. As a body, photographers are notorious for exclusiveness, and, until this attitude gives way, very little can be expected from the progressive spirit in commercial life.

To make assistants more efficient would also increase profits without reducing wages or lowering retail prices, since it means that, for the same expenditure of time and labour, more is produced with less waste and of better quality. This aim, of course, requires better training of assistants, both in printing-room and studio, and allowing greater facilities, and giving encouragement to assistants to attend evening classes, polytechnics, &c., thus taking every means to bring them to the highest point of efficiency.

To limit competition is regarded by many as fighting against the fates, though why competition should take upon itself this character of Nemesis I cannot say. To every poison there is an antidote, and the antidote to competition is monopoly, either by individuals or by a class. There is always plenty of room at the top, for skill is a monopoly, and the best workers do not complain of competition; if anything, they invite competition, in order to show their superiority by producing yet finer work. Evidently the only way to combat competition is to make it difficult to reach the standard of work demanded. Photographers must therefore raise the quality of their work; should the old prices not allow of this being done, they also must be put up. Failing the courage to do this, nothing remains but to let competition take its course, and to be contented with a lower percentage of profits. JOHN A. RANDALL.

COLOURING PHOTOGRAPHS: VON BENTIVEGNI'S PROCESS.

THIS process consists essentially, first, in a preliminary preparation of the pictures; second, in a solution in which the pictures are immersed to finally prepare them; third, in the employment of sheets of glass to be secured to and used in conjunction with the picture, so that a portion of the colour is applied to the glass instead of directly to the picture.

The inventor takes unmounted silver-printed photographs, but it is also capable of use upon other photographs, such as platinotypes, &c. If the photograph which is to be coloured is already mounted, it and the card must be put into sufficiently hot water to release it from the card upon which it is mounted, and, if enamelled, it can be rubbed gently with the finger or a suitable rubber and the enamel cleaned off, and also the starch or paste that is upon the back.

It is then placed upon clean blotting-paper to absorb the surplus water. The photograph is then attached to a sheet of glass of the proper size as follows:—

Take a glass plate, which has one side slightly concaved as is usual with sheet glass, warm it slightly, and put some warm melted gelatine with a brush on the concaved side of the glass so that every point is covered; then place the photograph upon this glass with the face downward, and, with a sheet of clean paper upon the back, rub and press it with any suitable tool until all the air bubbles and little marks have entirely disappeared, after which allow it to remain until dry.

A solution made as follows is then employed:—

Take 1 pint, English measure, of refined castor oil, a dessert-spoonful of best white vaseline, a small teaspoonful of spermaceti, 20 drops of rosemary, 20 drops of citronelli oil, and mix them together; heat the solution to about 130° or 140° Fahr., then colour this solution a light red by a little alkanite root, after which let it grow cold.

The photograph when dry upon the glass may be carefully rubbed on the back with fine sand paper, so that all dirt and surplus paper comes off and an even surface is made.

A large pan is then filled with the cold solution above described; if the picture be large, or the quantity of solution be not enough, it is simply increased in the same proportion. The picture is then put in so that it is thoroughly covered with the solution.

The pan with the solution and the picture are then placed over a fire or otherwise heated to about 130° Fahr., and the whole is thus allowed to remain for two hours.

The picture will then become quite transparent, and when all marks have disappeared the solution is allowed to get cold, and the picture is then removed, placed in a pan with cold castor oil for about three hours, or until it is desired to use it.

Care must be taken that no water is allowed to get into the solution or on the picture, as every drop would make a spot. If there are still bubbles or marks on the photographs, they must be removed by the use of the sand paper or other means while still in the solution, and the picture must be thus made perfectly clear before the colouring commences.

The picture, when taken out of the last oil bath, is rubbed dry with a piece of linen, then any desired colouring is applied upon the back, as, for instance, in a portrait, the various colours of the gown, ribbons, or trimmings, are laid on at the proper points on the back of the photograph, care being taken not to allow the colour to pass beyond the particular part to which it belongs.

This process brings out the peculiar richness of colour and folds of the material, the sheen of the silk, plush, velvet; also particularly brings out the colour of gold, pearls or other stones, and, by thus applying the colours upon the back, they may be comparatively coarsely done without in any way showing through the picture, the effect being soft and greatly resembling painting upon ivory.

For those parts of the photograph which show flesh tints, hair, or any specially delicate colours, such as laces or light fur, they should not be painted, but the colours for these parts are brought out as follows;—

A second plate of glass of the same size as that upon which the picture has been mounted is placed with its slightly concaved face against the back of the picture in the first glass, the concavities of the two serving to prevent the parts from coming into absolute contact with the colours which have already been laid upon the picture; but, if this concavity is not sufficient, it will be necessary to separate the glasses by thin strips of paper pasted along the edges between the two; the glasses are then secured together by gummed strips or otherwise so that they will not move with relation to each other. The delicate shades of colours above referred to are now painted upon the back of the second glass, these colours being put in carefully and of any degree of delicacy which may be desired.

The colouring upon the back of the second glass may be so laid as to cover or extend over those parts which have already been painted upon the back of the photograph itself previously described without injuriously affecting the appearance of the picture.

With the picture prepared in this manner it is easy for the artist to wash or clean off any portion of the colour which is not satisfactory, by employing a piece of linen and some of the red-coloured solution previously described.

The colours can be thus removed and the work done over again. As soon as the colours of the second glass are sufficiently dry, a background of thick dark paper is made, and is attached along the corners, so as to cover the back of the glass without any application of gum or other substance which would afterwards touch the back of the glass.

A sufficient width is left around the edges for the attachment without bringing the gum or other securing material into the line of the picture. The picture may then be framed in any usual or suitable manner.

PHOTOGRAPHIC DEVELOPERS.

Herr Julius Hauff, of Fuerbach, near Stuttgart, says that the para-phenyl-enediamines have hitherto only been capable of consideration as photographic developers in the sense of possessing a theoretical interest, inasmuch as they represent a type of developing material the capacity of which for developing purposes depends upon the presence of two of the amido groups which are in para position to one another; they do not, however, possess any practical importance, as, even with the use of caustic alkalies, they have not sufficient developing power for practical purposes, and, moreover, produce a green veil.

The para-phenyl-endiamines have only been made of practical importance by the conversion of the same into alkyl derivatives, which even with the alkaline sulphites, powerfully develop photographic pictures, securing a fine grain without green veil.

For the attainment of the necessary power for ordinary copying purposes, the alkylised para-phenyl-endiamines, notwithstanding the great initial rapidity with which they act, still require a rather long time for the developing.

The solutions do not possess the desired degree of durability, and a sensible skin is very easily injuriously affected.

The carbo-oxylised alkyl derivatives of the para-phenyl-endiamines (glycins) act otherwise; they effect a rapid development of the photographic picture with alkaline sulphites without any colouring of the gelatine, and with quite as fine a grain as the alkylised para-phenyl-enediamine, but with greater density of the silver precipitate. The alkylic developing solutions can be made in a highly concentrated form, and possess a degree of durability which has never been attained by any of the developers in use hitherto.

The advantages presented by the glycins of the alkylised para-phenyl-endiamines are as follows:—

Greater durability of the solutions, rapid developing action, even in solutions with alkaline sulphites, and with strong density of the lights, high sensibility in relation to bromide of potassium as a restrainer. The negatives are without any colouring of the gelatine also by the use of carbonates or caustic alkalies, and show a very fine grain, similar to that of wet-collodion plates.

The best for use are the alkyl-para-phenyl-endiamin-glycins of the following composition:—

1— NR^1R^2
4— $NHCnH_2nCOOH/R = Alkyl/$

and, in fact, the dialkyl-glycins of the

Para-phenyl-endiamine
Para-toluyl-endiamine
Para-xylyl-endiamine
α—β Naphtyl-endiamine
α—α Naphtyl-endiamine

The following is a good developing solution:—

Dimethyl-p-amido-phenyl-glycin	1 gr.
Sulphite of sodium	5 grs.
Potash	5 ,,
Water	100 ,,

KINEMATOGRAPHING THE GRAND NATIONAL.

Our readers will recollect that Friday last, March 25, the day on which the Grand National Steeplechase at Aintree, near Liverpool, was arranged to be kinematographed under the direction of Mr. W. I. Chadwick, of Manchester, proved to be one of the stormiest days that we have experienced this winter, the weather being totally unfit for outdoor photography. The arrangements for securing animated photographs of the principal steeplechase of the year were carried out on the completest and most extensive scale. Eleven machines placed at different parts of the course were in action, and it was found possible to secure seventeen distinct records of the progress of the race, while the race course and police authorities heartily co-operated with Mr. Chadwick in the arrangements. Unfortunately, the weather during the race turned out dark, tempestuous, and snowy, and, although, thanks to a brief gleam of sunshine, some excellent views of the preliminary canter and the finish of the contest have been obtained, the majority of the pictures are unsatisfactory from a photographic point of view, and it has therefore been decided not to publicly exhibit them. Captain Turner, however, has obtained a similar concession for next year, when, by the aid of the valuable experience of this, another attempt will be made to kinematograph the Grand National. We congratulate all concerned on their determination and enterprise; and, if they are successful in their next year's efforts, a unique series of pictures should be available for public exhibition.

Our Editorial Table.

Radiography and the X Rays in Practice and Theory.

By S. R. Bottone.

London: Whittaker & Co., 2, White Hart-street, Paternoster-square, E. C.

Mr. Bottone, who is a prolific writer on electrical matters, has found a congenial topic in radiography, and the result of his present labours is a useful addition to the voluminous literature of the subject, the sustained interest in which, among surgeons, physicists, and others, may excuse the tardiness with which this volume has made its appearance. Theory and practice appear to be fully dealt with, and there are about forty-seven illustrations, which materially help the reader to follow the author in the various steps of his discourse. It is just the book to place in the hands of a student of this division of the phenomena of electricity, as the manipulatory details are clear and concise, and the author has treated the photography of the subject in simple terms, so as to be easily understood by those who have only a slight acquaintance with what is required of them on that side of radiographic work. A capital index adds to the utility of the book, and the reproduced radiographs are mostly good and interesting. We regard Mr. Bottone's volume as a worthy addition to the publishers' well-known series of technical manuals.

The Benton Printing-out Papers.

Manufactured by Benton & Co., 239, Whitehorse-road, Croydon.

Messrs. Benton prepare both gelatine and collodion printing-out papers, and they have forwarded us samples for trial. Every care seems to have been expended in the manufacture of the papers, the surfaces being free from mechanical defects, and the prints upon them exhibiting the qualities most desirable in such photographs. For the gelatine paper the ordinary sulphocyanide bath is recommended. The collodion paper appears to behave exceedingly well, the film being free from any discernible tendency to split or blister. The instructions issued for working this paper are eminently practicable and to the point, and, if followed, should always lead to the production of successful results. Messrs. Benton are to be congratulated on the good qualities of their papers, which deserve to be popular among photographers.

News and Notes.

The Reynolds Fund.—Received from F. H., 4*s.*; W. Stanbury, 5*s.*; E. Milner, 5*s.*

Messrs. Berger & Co., South Hill Works. Hampstead, the makers of Luxia P.O.P., have issued a new pamphlet relating to that paper, for the manipulation of which it contains excellent instructions.

Photographic Club.—Wednesday evening April 6, at eight o'clock, a chat on "Latitude in Development and Local Treatment in Carbon Printing," by Mr. E. W. Foxlee, the demonstration by the Autotype Company.

Many of our older readers will regret to learn of the death of the Rev. Locke Macdona, M.A., Vicar of Acton, Suffolk. Mr. Macdona was an amateur photographer of many years' standing, and at one time he was a frequent contributor to the pages of this Journal and our Almanac.

THE paper on "Adjustable X-ray Tubes," which Mr. A. A. C. Swinton read before the Röntgen Society on December 7, has been published in pamphlet form by the Rebman Publishing Company, of 11, Adam-street, Strand, W.C.

TUNBRIDGE WELLS AMATEUR PHOTOGRAPHIC ASSOCIATION.—Sir David Salomons, Bart., has kindly presented the above Association, of which he is patron, with one of Edison's kinetoscopes for showing on the screen the animated pictures so much in favour just now. It is a very complete instrument, having many little improvements of the donor's own adding, and works without the uncomfortable jumping so noticeable in most of those usually shown.

LEEDS CAMERA CLUB.—A lecture arranged by the Leeds Camera Club, under the auspices of the Affiliation of photographic societies (Yorkshire division), will be delivered on Wednesday evening, April 6, 1898, in the rooms of the Leeds Camera Club, Grand Restaurant, Boar-lane, Leeds, by Mr. W. Edwin Tindall, R.B.A., entitled, "Composition and Light and Shade." Syllabus: Lines and Classes, Different kinds of Composition, Method of Altering Lines and Curves, Tone, Value, General Light and Shade, Improving Nature's Composition. After the lecture about thirty lantern slides of members' work will be thrown on the screen, and the lecturer will review them from a pictorial standpoint. Mr. W. J. Warren will take the chair at eight o'clock. Tickets of admission may be obtained from the Hon. Secretary of the Club.

ROYAL INSTITUTION.—The following are the lecture arrangements after Easter:—Mr. T. C. Gotch, two lecture on "Phases of Art, Past and Present;" Dr. S. R. Gardiner, four lectures on "The Historical Development of Europe;" Professor S. H. Butcher, two lectures on "Literary Criticism in Greece;" the Rev. Canon Ainger, three lectures on "Some Leaders in the Poetic Revival of 1760–1820—Cowper, Burns, and Scott;" the Right Hon. Lord Rayleigh, F.R.S., three lectures on "Natural Philosophy;" Dr. E. E. Klein, two lectures on "Modern Methods and their Achievements in Bacteriology; Sir Walter Parratt, four lectures on "Programme Music" (with musical illustrations); Mr. J. A. Thomson, two lectures on "The Biology of Spring;" Dr. R. Caton, two lectures on "The Temples and Ritual of Asklepios at Epidaurus and Athens." The Friday evening meetings of the members will be resumed on April 22, when Mr. W. H. M. Christie, the Astronomer Royal, will deliver a discourse on "The Recent Eclipse." Succeeding discourses will probably be given by Professor A. Gray, Mr. E. A. Minchin, Professor W. A. Tilden, the Right Hon. D. H. Madden, Lieut.-General the Hon. Sir A. Clarke, Professor W. M. Flinders Petrie, the Right Hon. Lord Rayleigh, and other gentlemen.

BEFORE the Australasian Association for the Advancement of Science in January last, a paper on "The Measurement of Cloud Heights and Velocity" was read by Mr. P. Baracchi. The year 1897 had been called by some writers on meteorological subjects "the cloud year," on account of the systematic observations of clouds which were carried on in nearly all the civilised countries during that period under a scheme laid out and finally agreed upon in all its details by the International Meteorological Committee at its Upsala meeting in 1894. The object of the scheme was to obtain more information and comprehensive data to serve as the basis for the furthur study of atmospheric conditions, as indicated by the forms and movements of clouds. After a brief reference to the methods adopted in Victoria for securing results anticipated by the scheme, Mr. Baracchi said that there were some 20,000 observations ready. For the determination of absolute height and velocity a pair of stations for simultaneous observations were established, one being on the grounds of the Melbourne Observatory and the other on the roof of Parliament House, at a distance of 6820 feet bearing. After consideration he adopted the photographic method, which had been successfully employed at the Kew Observatory some years ago. The absolute height and velocity of a cloud would, provided it was suitably situated, be determined from two photographs if it taken simultaneously with two cameras placed at a distance of from a few hundred yards to one or two miles from each other, the cameras being in all respects equal and rigidly mounted, so as to point accurately to their respective zenith, namely, having their collimation axes truly vertical. Under good conditions the highest clouds could be measured within 500 feet and the lowest within fifty feet.

DR. W. J. RUSSELL, F.R.S., lecturer on chemistry at St. Bartholomew's Hospital, about a year ago published an account of some experiments with reference to the action exerted by certain metals and other bodies on a photographic plate. It then appeared that specified metals and alloys could be made to act even at a distance on a sensitive plate, producing effects similar to, and developed in the same fashion as, plates acted upon by ordinary light. Since then Dr. Russell has been quietly experimenting in the Davy-Farraday laboratory, and, having made steady advances in the direction aimed at, he took, on Thursday, March 24, an analysis of his investigations as the theme of the annual Bakerian lecture before the Royal Society. Dr. Russell has made several interesting experiments with the printing inks used in the production of a number of daily newspapers, and has contrived to imprint pictures of the letterpress upon photographic plates which exhibit relative degrees of sensiveness. Investigation goes to show that the vapour given off is the immediate cause of the action on the sensitive plate. Boiled oil and turpentine separately act in the same manner as does printer's ink, both being active substances, while similar experiments have been instituted with zinc, aluminium, nickel, lead, and bismuth, and, with results less successful, by means of cobalt, tin, and antimony. By experiments described in minute detail by the learned lecturer, it was shown that the action of the metals, as in the organic bodies, is attributable to the vapour given off, which can be carried along by a current of air, and has the power of passing through thin sheets of such substances as gelatine, celluloid, and collodion. Indeed, so transparent are these bodies to the vapour that, even after it has passed through them, a clear picture is produced of the surface of the metal from which it emanated. Dr. Russell's discourse was illustrated by a series of lantern slides and photographic prints, and before concluding he promised ere long to bring forward some further developments in the sphere of what, in a sense, might be described as "self-photography."

THE ROLL OF MINISTERING CHILDREN.—Additional list of agents:—Alston: T. Bramwell. Alton: G. Frost, Market-street. Biggleswade: J. Phillips, Market-square. Bootle: H. Dowden, Parkside Studio. Barrow-in-Furness: Cavendish Studio, Cavendish-square. Broadstairs: Swaine & Co., 17, High-street. Basingstoke: Southern Counties Photo and Art Company, 27, Potters-lane. Budleigh Salterton: T. Andrews, 15, High-street. Bishop Auckland: Crane & Co., Swiss Art Studio. Brentwood: F. W. Burford, The Studio. Buckhurst Hill: C. G. Cutchey, High-road. Barnard Castle: W. Atkinson, Montalbo Studio. Bognor: W. P. Marsh, Royal Marine Studio. Berkhamstead: J. T. Newman, The Art Studio. Brigg: T. A. Smith, 47, Wrawby-street. Bexley Heath: A. R. Pickett, 67, Broadway. Bowness: Brunskill & Co., Lake-road. Colchester: Roger Deacon, 14, Queen-street. Chichester: Russell & Sons, East-street. Cranbrook: E. Williams. Christchurch: A. Mallett, 18, Church-street. Crewkerne: Beach Bros., Market-square. Chard: Higgins & Son, Holyrood-street. Dover: Lambert Weston & Son, 18, Waterloo-crescent. Dundee: Watt & Son, 30, Reform-street. Doncaster: F. J. Garrison, 9, High-street. Devizes: H. Wilkinson, 3, High-street. Dunmow: W. Stacey, High-street. Dorchester: W. A. Lucas, 25A, High West-street. Ealing: Muir & Co., 78, Uxbridge-road. E. Molesey: W. H. Deakin, Walton-road. Earlestown: T. Unsworth, 51, Cross-lane. Exeter: Denney & Co., 21, St. Sidwell-street. Erith: Cobb & Keir, Pier-road. Eastleigh: A. Webb, 39, High-street. Egham: James Burgess, The Studio. Edinburgh: Horsburgh & Son, 131, Princes-street. Enfield: Burchall & Co., Enfield Highway. Fakenham: J. C. Applegate, Norfolk Studio. Freshwater Bay: A. H. Kirk, Palmerstone. Frinton-on-Sea: A. Azulay, Station-road. Finsbury Park: A. W. Lee, 118, Stroud Green-road. Gateshead: H. Walker, 37, West-street. Godalming: G. West, 13, High-street. Gosport: West & Son, Eagle House. Gloucester: Paul Coe, 39, Eastgate-street. Goole: Garrison & Harrison, Sydney Studio. Greenwich: Adams & Co., 31, London-street. Halifax: T. Illingworth, 41, Crown-street. Hanley: American General Photo Company, 34, Pall Mall. Huddersfield: J. T. Pentney, 6, South-parade. Horsham: J. Wheeler, 50, North-street. Harpenden: H. Valentine, High-street. Hereford: Jakeman & Carver, 4 and 5, High-town. Hayle: W. J. Bennetts, Commercial-road. Havant: W. Scorer, North-street, Hexham: T. H. McAllan, 23, Fore-street. Herne Bay: J. Craik, 55, William-street. Iron Bridge: R. P. Smitheman, Fontine Hill. Keswick: G. P. Abraham, Victoria Buildings, Lake-road. Lostwithiel: W. E. Hawken, Queen-street. Leighton Buzzard: W. F. Piggott, High-street. Leek: W. H. Horne, 69, Derby-street. Lewes: Bliss & Co., 34, Lansdown-place. Leyton: G. H. Hales, High-road. Longfleet: C. A. Welch. Leominster: T. H. Winterborne, 36, Broad-street. Lichfield: 34, Tamworth-street, W. Nicholls. Littlehampton: A. King, 37, High-street. Landport: W. V. Amey, 253, Commercial-road. Lutterworth: W. C. Bax. Ludlow: Jones, Son, Harper, 51, Broad-street. Finsbury Park: A. W. Lee, 118, Stroud Green-road. Streatham: Douglas Pym, Belle Vue Studio. Blackheath: H. Wayland, Rembrandt House. Mexborough: G. & A. Barber, 222, Wath-road. Mossley: E. B. Maude, Royal Studio. Matlock Bath: J. W. Hilder, South Parade. Matlock Bank: W. H. Barber, Bank-road. Malton: Boak & Sons, Market-place. Maidstone: London Photo Company, Broadway. Malvern: Bennett & Sons, Church-street. Woolwich: H. J. Dalby, 82, Wellington-street. London: T. Waltenberg, 419, Bethnal Green-road; E. Gordon, 34, High-street, Putney. Nuneaton: Marie Weale, Helios Studio, Coton-road. N. Shields: Sawyer & Son, 21, Saville-street, W. Newport Pagnell: W. Thorneycroft, London-road. Paignton: H. F. Bultz, 18, Victoria-street. Pocklington: M. Tayleure, Railway-street. Plumstead: Cobb & Keir, 29, Plumstead-road. Petersfield: J. P. Blair, Chapel-street. Lytham: David Hedges, Clifton-square. Royston: R. H. Clark. Romford: J. Macnamara, 3, South-street. Rawtenstall: T. Clegg, Springside. Rushden: S. Powell, High-street Studio. Rhyl: E. Jones, Vale of Clwyd Studio. Reigate: The Surrey Photo Company, 59, London-road. Sheerness: R. Hider, 22, Edward-street. Sale: J. Ingham, Winton House. St. Neots: J. Phillips, High-street. Southwold: J. Martyn, The Studio. Shipley: A. Dobson, 8, Saltaire-road. Sutton Coldfield: T. Whitlock, Park-road. Shepton Mallett: Day & Sons, Caxtonian House. Sandgate: W. H. Jacob, Broadway Studio. Stow-on-the-Wold: F. Gegg, Park-street Studio. Strood: J. H. Weekes, High-street. Stalbridge: Clarke & Son. Stamford: H. E. Bird, 6 and 7, St. John-street. Sittingbourne: London Photo Company, 21, Station-road. Sunderland: T. Fitzgibbon Forde, 15, Waterloo-place. Sedbergh: F. Walmsley, Main-street. Thetford: Boughton & Sons, King-street. Todmorden: Lord & Binns, Central Studio, Patmos. Teignmouth: Denney & Co., Promenade Studio. Tisbury: G. Pitcher. Twickenham: Nelson & Sons, 4, The Broadway. Totnes: Brinley & Sons, 43, Fore-street. Uttoxeter: George Elly, Mount Pleasant Villas. Uxbridge: T. H. Billinghurst, 56, St. Andrews. Winchester: H. W. Salmon, 77, High-street. Wantage: F. W. Chamberlain, Market-place. Walton-on-Thames: A. J. Gosden, 2, Evesham-place. Warminster: F. Futcher, 36, High-street. Wotton-under-Edge: A. Durn, The Studio. Whitby: J. Aston Brigg, Marine Parade. West Bromwich: H. M. Whitlock, 319, High-street. Walton-on-the-Naze: A. Azulay, Newgate-street. Walton (Suffolk): C. J. Emeny. Windsor: Russell & Sons, 13, High-street.

Patent News.

THE following applications for Patents were made between March 14 and March 19, 1898:—

ELECTRIC LIGHT.—No. 6184. "Improved Electric Light for Use as a Search or Signal Light, or for Photographic and other Purposes." E. M. BROWN.

SHUTTERS.—No. 6214. "Improvements in Shutters for Photographic Cameras." P. WALLIS.

SHUTTERS.—No. 6259. "An Improved Time and Instantaneous Roller-blind Shutter for Photographic Purposes." C. JONES.

PROJECTION APPARATUS.—No. 6375. "Improvements in or connected with Optical Projection Apparatus." Communicated by Nordisk Riklame Kompagni. J. G. LORRAIN.

ROCKERS.—No. 6384. "Improvements in and connected with Dish-rocking Apparatus for Photographic and other Purposes." A. SALMON.

PLATE-CHANGING.—No. 6432. "Improvements in Apparatus for Changing Photographic Plates in Daylight." Communicated by J. Stork. Complete specification. E. EDWARDS.

GLASS MOUNTS.—No. 6465. "Improvements in Glass Mounts for Photographs, Pictures, and the like." R. WHITEHOUSE and E. D. HODGKINSON.

KINEMATOGRAPHY.—No. 6515. "Improvements in Apparatus for Photographing and Exhibiting Cinematographic Pictures." L. U. KAMM.

EXHIBITING PHOTOGRAPHS.—No. 6553. "An Apparatus to Contain and Exhibit Photographs and the like." W. R. BAKER.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

April.	Name of Society.	Subject.
4	Bradford Photo. Society	*Lightning and How to Photograph it.* Mr. Leadbeater.
4	Ealing	Lantern Evening. T. Simpson.
4	Putney	Enlarged Paper Negatives and Enlarging.
4	Richmond	*Three Men in a Boat.* Display of Slides by W. H. Wilshere.
4	Stafford Photo. Society	Practical Application of Lecture on *Cloud Photographing.* W. H. Kirkham and Members.
5	Bolton Mutual Photo. Society	*The City of Bristol.* Rev. G. H. Carnson.
5	Hackney	*Hand-camera Work.* W. Thomas.
5	Isle of Thanet	*Cloud Photographing.* A. Horsley Hinton.
6	Edinburgh Photo. Society	*The Properties of Light.* T. W. Drinkwater, Ph.D., F.C.S.
6	Leeds Camera Club	*Composition and Light and Shade.* W. Edwin Tindall, R.B.A.
6	Leicester and Leicestershire	*Kallitype.* E. H. Chapman.—*Photographic Advances of the Last Few Years.* T. C. Hepworth.—Prize Slides, 1897.
6	Leytonstone	Practical Demonstration: *Printing and Mounting.* W. J. Ball.
6	Photographic Club	*Latitude in Development and Local Treatment in Carbon Printing.* E. W. Foxlee.
6	Southport	*Retouching.* Part II. George Cross.
7	Leeds Photo. Society	*Bromide Printing.* J. H. Walker.
8	Ireland	Smoking Evening.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 24,—Mr. J. E. Hodd in the chair.

Messrs. Thornton-Pickard, & Co's representative attended, with a selection of their apparatus, to describe the Thornton-Pickard system of exposure shutter, and the construction of their various patterns of cameras. From the first this firm has made the subject of instantaneous photography its special care, and, on the principle of the roller blind, has placed in the hands of photographers a shutter which has secured for itself a world-wide notoriety. The essentials of a perfect shutter may be given as simplicity of construction, good workmanship, freedom from any semblance of vibration, workable in any position, even illumination of the field, and, not least, absolute control both in time and instantaneous work. The outer case of the shutter contains two rollers, one at the top and one at the bottom, to which is joined a flexible light-proof cloth blind, having a rectangular opening, somewhat bigger than the hood of the lens, midway between the ends. The power is provided by a strong adjustable spring in the lower roller. According to the position of the pointer or indicator, the machine makes either a time or instantaneous exposure on releasing the blind by pressure of the ball. To the top roller a cord is attached, which, passing over a pulley, terminates outside the case in a tassel, by pulling which the setting of the shutter is effected. It follows, then, that the duration of the exposure bears a fixed relation to the speed at which the opening in the blind travels across the field of the lens opening. The shutter is made in several forms on the same general principle: the Standard time and instantaneous, and the same for working behind the lens; the stereoscopic behind-lens shutter, with adjustable panels, actuated by a milled wheel and screw; the self-capping blind shutter, the necessity for which is specially felt with magazine cameras; the snap-shot shutter; a special form for high-speed work; focal-plane shutter, with adjustable slit for attachment to the back of the camera; and a studio shutter. This latter differs from the others in that it has two blinds, which, when normal, overlap and cover the aperture. By compressing the ball, each blind winds up on its own roller, and the exposure is maintained so long as the teat is expanded. A tap is provided in the length of the tube, so that the shutter may be kept open for focussing or for extended exposures without trouble. A selection of photographs was shown upon the screen, ranging in exposure from a five-hundredth of a second to time, many of which were the work of the late Mr. Pickard, who was an authority on matters of this kind. Cameras of the Amber and Ruby pattern were shown, and their special features detailed. The turntables of the Ruby are now made of compressed wood fibre instead of being cut from the solid wood, and it is claimed to be an advance on the old form, as it cannot be split.

Mr. Mundy showed one of the wooden turntables which had split after use three times.

Mr. E. G. HARVEY spoke a word in favour of better material being used or the roller blind than the rubberised cloth. He had found it to get sticky and refuse to move when left in disuse for a time.

Messrs. Thornton-Pickard's representative admitted that the turntable constituted the most troublesome part of their apparatus, but they anticipated that the introduction of the compressed fibre would remove this source of complaint. He thought Mr. Harvey's remarks were based upon a very exceptional instance; the fault was rare, and, in fact, in his own experience was quite strange to him.

PHOTOGRAPHIC CLUB.

MARCH 16,—Mr. E. Crofton in the chair.

Mr. J. R. WILLIAMS read a paper on, and gave a demonstration of,

LANTERN-SLIDE MAKING BY THE WOODBURY PROCESS. [See LANTERN SUPPT

Two or three slides were printed and shown in the lantern during the evening, in addition to several brought up by Mr. Williams, which were much admired.

Mr. E. W. FOXLEE said that, in working the process commercially, there were usually a number of presses for the production of slides and prints going at one time. These were arranged on a revolving table, and were sufficient in number to keep the operator employed continuously. He said that wet-plate negatives were better for the process than gelatine plates.

Mr. DOWELL asked what advantage the washing of the ether and alcohol out of the collodion had over allowing it to evaporate.

Mr. FOXLEE said that by washing it out the collodion film was left in a different physical condition to that which would result by the evaporation method. If the latter method were adopted, the probability was that the film would split off the glass. The washing-out method, however, had not the tendency. Castor oil was added to the collodion, but the less of this the better, and only just sufficient for the purpose should be used. In reply to a remark on the method of releasing the pressure in making the mould, he said it was found in actual practice that a sharper and crisper image was the result by removing the lateral pressure before the vertical pressure was released. It was difficult to say why, but such was the case; and at one time this was considered one of the secrets to success.

Mr. Foxlee was invited to sketch the modified process called Stannotype which obviated the use of the hydraulic press. Handing round a couple of Woodbury's own reliefs by this process, Mr. FOXLEE said there were two methods of the Stannotype process, and the reliefs shown appeared to be the later of the two. In the first, while the relief described by Mr. Williams was on the glass, a sheet of tinfoil was rolled upon it and made to assume the character of the relief image. The foil was then electrotyped, to strengthen the mould so formed, and this electro was then mounted upon a glass plate with resinous cement and put under pressure until this had set. It only remained to separate the mould from the relief to give the printing surface. The second process differed in that the relief was printed from a carbon transparency and not direct from the negative. Having been developed, a coating of tinfoil was rolled on in a very similar way, and this formed the printing mould. The object of the tinfoil was this. The relief would have done all that was wanted if it were not for the fact that, though rendered insoluble by light action, the gelatine was still capable of absorbing moisture, which would be provided by the ink were it not for the intervening tinfoil.

Mr. JAMES BROWN suggested the treatment of the relief with formalin, and was informed that, however insoluble the gelatine, there always remained a absorbing power.

The CHAIRMAN suggested the trial of soluble aniline black for the pigment to overcome the time required in grinding the Indian ink. It was soluble in water or spirits of wine.

Mr. WILLIAMS referred to the possibility perhaps of discharging the colour locally in subjects where an improvement would follow in the effect.

MARCH 23,—Mr. Lewis Medland in the chair.

Mr. THOMAS BOLAS, F.C.S., F.I.C., gave a demonstration of glass-blowing at the lamp for experimental and other purposes. In glass-blowing at the lamp it is much easier to make a start with tube than with the rod. There is generally manifested on the part of the worker, and more so the demonstrator, an inclination to hurry in more than one direction, but this temptation must be resisted. The cold tube or rod must be slowly heated through, and the thicker the mass the more heating is required, lest it should break by the sudden rise of temperature when the powerful jet of the blowpipe is directed upon it. It is interesting to note the effect produced when the end of a tube or rod is inserted in the flame. The sharp edges disappear, falling in towards the centre, the tendency of glass being towards the spherical form, which is due to what may be called surface tension. In course of time the tube closes and the end may be expanded by pressure of air into a bulb. Where allowable, the falling-in method of closing is preferable to the drawing-off, as the latter leaves a "blab" or thickening of the glass where the division takes place, which the former does not. There is a right and a wrong way of blowing a bulb. Continuous blowing is unsuitable; after the first impulse an interval is allowed, the thinner distended part congeals, and the next puff attacks the still viscous mass, and so on, puff after puff. A continuous single puff produces an irregular sausage-like formation of a very flimsy nature, the influence of the air pressure having effect upon one part and distending it to such extreme thinness that iridescent effects are produced, and the bulb crumbles into flakes. Such glass sealed in a tube affords an excellent means of showing the effect of thinness upon glass in the direction of iridescence. A method of tubulating or branching, at present very little known, consists in placing against the more gently heated side of the bulb or tube, on which the branch is to be made a very hot bead or bit of softened glass. The inside pressure of air being now increased, the part of glass expands to a bulb, but, by a simultaneous drawing motion, a short tubular branch is produced. This process may be applied to the making of the beak-like branch of a dropping bottle and the lower branch of a pipette. In the same way hollow grotesque animal-like figures may be

from glass rod to an unlimited extent. The bag pipette seems to be a neglected piece of apparatus from the photographic point of view. It is a useful means of releasing small quantities of strong solutions and so forth. The firing-in of inscriptions on such vessels is performed very readily. The name or title is set up in indiarubber-faced type, and an impression made upon the original tube of which the vessel is to be made in an adhesive medium, such as fat oil of turpentine, by rolling the stamp carefully around the tube. A vitrifiable enamel is then dusted on. Oxide of iridium answers the purpose, but its price is a drawback to its use. This is then fused in, and the tube may be worked to the shape desired. This firing-in of inscriptions has to be done in an early stage.

Mr. Bolas constructed during the evening several pieces of laboratory apparatus, including a dropping bottle and a bag pipette, in addition to blowing a very complicated hollow figure in the accepted likeness of the devil from the solid rod in the way described above. Methods of dividing the tube or rod by the file (the teeth of which are renewed by grinding one edge) and by the glass-cutter's knife were demonstrated, in addition to the alternative one of applying a hot bead to the crack. The experiments of the evening suggest many applications to the laboratory student and others at once instructive and of service. The tools required consist of a suitable form of bellows, in the construction of which a couple of domestic bellows may be so adapted as to answer all preliminary requirements; a blowpipe, in which provision is made for a perfectly axial flow of air to ensure complete combustion; carbon plugs for distending orifices, fireclay, files, scissors, &c. A large number of variations are described in Mr. Bolas's book on glass-blowing, in which the subject is treated in a very exhaustive way.

A vote of thanks was passed to Mr. Bolas.

Newcastle-on-Tyne and Northern Counties Photographic Association.—March 22, Mr. W. Parry (President) in the chair.—Mr. JAMES BROWN, late Hon. Secretary of the Association (now with the Eastman Company in London), contributed a paper entitled,

BROMIDE PRINTING UP TO DATE.

The paper principally treated of a series of experiments which the writer had carried out with the object of obtaining warm tones on bromide paper by development. Although some of the results promised fairly well, complete success was not obtained, but the writer stated he had hopes of ultimately obtaining the tones he desired when he had more time to perfect his formula. More successful were the results got by toning after development in the hypo-alum bath usually associated with the name of the Eastman Company. The results shown by the process were very beautiful, especially where the paper used was the rough cream Royal Bromide of the Company. Many of the enlargements which accompanied the paper were made on this rough paper through the now well-known boulting silk, and were remarkably effective, possessing a charming softness without running any risk of being called "fuzzy." It was universally admitted that the combination of a rough bromide paper of this type, with the use of boulting silk and the additional advantage of a toning bath giving permanent results, placed a power in the hands of those wishing to produce large pictures of artistic quality, but who have not the opportunity of producing the enlarged negatives necessary where platinum or carbon are to be the final processes. The thanks of the Association were due to Mr. Brown for his paper, and especially to the Eastman Company, for their kindness in preparing the accompanying prints and enlargements. If these results on rough-toned paper could be more fully brought before photographers, it would give a new lease of life to bromide paper.

FORTHCOMING EXHIBITIONS.

1898.

April 22–30 ..... National Photographic and Allied Trades Exhibition, A. C. Brookes, Temple House, Temple-avenue, E.C.

„ 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

SULPHITE OF SODA AND METABISULPHITE OF POTASH.

To the EDITORS.

GENTLEMEN,—Referring to the leader in your issue of February 11 ast on "Sulphite of Soda and Metabisulphite of Potash," it occurs to me hat an account of my experience may possibly be of interest to some of our readers who, like myself, were impressed by the advice you endered.

You will remember that you said, "If one-half of the quantity of metabisulphite be used as compared with the ordinary proportion of neutral sulphite, the due quantity of the latter salt in the actual eveloper will be maintained, and in these proportions we have found he former to behave in every way as well as the other, and to keep the olutions better, when used with amidol, metol, glycin, or para-midophenol."

Well, sirs, as I had been in the habit of making my amidol developer by adding 4 grains dry amidol to each ounce of a ten per cent. solution of sodium sulphite, I proceeded to concoct a developer which contained 4 grains amidol and 24 grains metabisulphite of potash in each ounce. *It would produce no image of any kind either on a plate or on bromide paper!*—at least, ten minutes' action showed no trace of an image. "Vita brevis est," and no image in ten minutes is to me in effect no image at all.

I was flabbergasted! I began to wonder whether I had omitted the amidol when the happy inspiration seized me to add a little of a solution of sodium carbonate. Whether the previous failure had been due to the presence in excess of the free acid given off by the metabisulphite, or not, I don't know, but the addition of the alkali acted like a charm and converted the inert solution into an admirable developer.

How much sodium carbonate I added I cannot tell exactly—at a guess, 5 to 6 grains per ounce.

Is this what you would have expected to happen? and, if so, ought I to have concluded as much from the leading article in question?

I would add one statement confirmatory of your eulogy of the preservative qualities of metabisulphite. A solution of amidol and metabisulphite of potash—4 grains and 24 grains per ounce respectively—made on March 1, was *yesterday* (19th inst.) as clear and active as when made. I have never been able to keep amidol in neutral sulphite half as long.—I am, yours, &c., JOHN H. HIELD.

54, *Dartmouth Park-road, N.W., March* 20, 1898.

P.S.—Perhaps you can tell me exactly how much carbonate in proportion to the metabisulphite should be added to an amidol developer to make it work. In my experience, not nearly as much as the additional carbonate you say in your article is necessary to neutralise the free acid in a pyro—metabisulphite—soda developer, viz., eight additional grains of soda for each six grains of metabisulphite.

[The result is precisely as we should have expected under the circumstances, for, though amidol is capable of development without alkali and even in a state of acidity, it can certainly not be expected to work as rapidly under the latter conditions as when neutral or slightly alkaline, as it will most probably be when used with ordinary sulphite of soda. It is impossible to say exactly how much carbonate of soda should be used with the metabisulphite, as this is purely a matter depending upon the rapidity of action desired; but it is an easy task to ascertain by experiment the quantity required to confer approximately a degree of energy somewhere approaching that exhibited by amidol and sulphite of soda. Then development with amidol is placed on precisely the same footing as with other agents; or, in other words, it may be kept perfectly in solution and used in conjunction with an alkali, its special qualities being at the same time retained.—EDS.]

TELELECTROSCOPY.

To the EDITORS.

GENTLEMEN.—With reference to your description of the telelectroscope, will you allow me to point out that, apart from the intrinsic mechanical and electrical difficulties of Mr. Szczepanik's apparatus, there is one other very serious difficulty to be overcome before the transmission, by electrical means, of moving objects and scenery becomes feasible.

We know that the selenium cell, which converts the light rays into electric-current undulations, immediately responds to light stimulation, but it is also well known that the return of the selenium to its initial state of electric non-conductivity, after the stimulating ray of light has been cut off, takes some time, depending as it does upon molecular changes in the metalloids.

The selenium cell is, in a certain sense, a coherer, which responds to light waves, and, like every other electric coherer in wireless telegraphy, requires tapping back or decohering. How this will eventually be accomplished it is difficult to say.

Even assuming that the selenium cell rotates very slowly, thus presenting a fresh point of impact to the succeeding light rays, I fail to see how the resulting current curve can be made to even approximately follow the curve of visual-light intensity. Presupposing, as Mr. Szczepanik's system does, an exceedingly rapid succession of single-point impressions in order to give us the appearance of a contiguous image, there must necessarily be such an amount of lag and overlapping in the transmitting current impulses, quite apart from electrostatic and electromagnetic retarding influences, that the ultimate result becomes more than doubtful.

I have touched upon this difficulty in a paper read before the Photographic Club on February 16, before I was acquainted with Mr. Szczepanik's work, and I believe that this peculiarity of selenium has so far frustrated the numerous previous attempts to solve the fascinating and extremely important problem of telelectroscopy.—I am, yours, &c.,

A. W. ISENTHAL.

5, *Sotheby-road, Highbury-park, N., March* 26, 1898.

TEED'S CAMERA—A CORRECTION.

To the EDITORS.

GENTLEMEN,—In the last number of the JOURNAL you made reference to a new camera, which I showed at the meeting of the Royal Photographic Society on 20th inst.

As your report is not quite accurate and is somewhat misleading, I shall be glad if you will insert this correction. My name is not Mr. Kidd, as reported.

The report appears to suggest that identical views can be taken from the same spot, with the same lens, on different scales, whereas it was shown that, as the angle of the lens was elevated, the centre of the plate always being kept in focus, the scale of the image necessarily varied, practically as the cosine of the angle of elevation. This, of course, applies to all cameras with vertical backs and tilted lenses, but is only very apparent with high angles of elevation.

I also desire to explain here that, when I showed the camera referred to, I was unaware that I had been anticipated by Mr. Alfred Wrench, whose priority I am glad to acknowledge.—I am, yours, &c.,

March 28, 1898. HARRY W. TEED.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

Peter Greenhalgh, 159, Market-street, Farnworth, near Bolton.—*Photograph of John Clelland Clarke, M.D.*

G. H. J. Burrows, 62, Princes-street, Perth, N.B.—*Photograph of the Rev. A. J. Cater, of Glencarse, Perthshire.*

H. C. Messer, 29, Castle-street, Salisbury.—*Photograph of the Rev. A. J. Edwards, pastor of Brown-street Baptist Chapel, Salisbury.*

RECEIVED. —"CAPTAIN;" "ANXIOUS;" S. HUMPHREYS; E. GARDON; J RANDOLPH; and others. In our next.

NEMO.—We know nothing of the firm. Can you not make inquiries locally?

F. B. J.—The address of the Artistic Touring Company is care of Arthur Vivian, 82, Strand-road, Bootle, Liverpool.

J. NOAKES (Liverpool).—Stevens's is the principal market in this country for second-hand photographic apparatus. We do not answer questions by post.

H. PHILLIPS.—We are very sorry to hear of your experience, but the matter is scarcely one with which we can deal. You always run such risks by parting with your money except under cover of the deposit system.

AJAX.—We know of no such process as you appear to be in search of except by transferring the film from the glass to the copper. If you want a positive on the copper, you must make one from a negative; this you can do in the copying camera.

DEVELOPERS.—S. GEORGE. All the new developers, and we have tried them all, answer well, and each has its characteristics. For general work, however, pyrogallic acid is still the most generally used developer, and we still prefer it for all-round work.

A WORKER OF PHOTOGRAPHY.—There is no better method of producing glossy prints than that given. Your trouble is due to the glass not being thoroughly clean in the first instance, and the French chalk not being sufficiently rubbed on the glass. The remedy is obvious.

DEVELOPER.—C. P. Both materials are not very soluble in water; hence very strong solutions cannot be made as is the case with pyrogallic acid. The strongest that can be made, is "saturated" solutions, and they will be very weak as compared with a saturated solution, say, of pyrogallic acid.

FINGER-STAINING.—FILM says: "I shall be much favoured if you will give me a metol and hydroquinone formula, or any other good developer, for films that will not stain the fingers and nails as pyrogallol does."—Formulæ for both metol and hydroquinone developers will be found on pp. 963-4 of the ALMANAC. They are admirable for films.

GUM BICHROMATE.—GUM. Your failure is probably due to your using "office gum," or rather an unsuitable office gum. Many of these compounds are not gum at all; some are merely acid solutions of glue. Get good gum arabic, as recommended by Mr. Packham. You will then be working with a pretty definite article; with that the process is easy enough.

LANTERN SLIDES.—INSTANTANEOUS. The albumen process is a rather difficult one for a novice to work, and requires considerable skill in order to get the best results. Still, when they are obtained, they are unsurpassed by any other process. Unless you are prepared to devote the necessary time to become proficient in the process, we should recommend you to use the commercial gelatine lantern plates, with which excellent results are obtainable. A good gelatine slide is far preferable to a bad albumen one. In the hands of an expert the albumen process is a troublesome one, by reason of the several different operations.

COLOUR PHOTOGRAPHY.—R. W. We believe that Messrs. Cadett & Neall are experimenting with plates for the Lippmann process, but we think we are correct in saying that there are none ready for the market yet. This is the only English firm we know of that has given any attention to the subject. The other process mentioned will possibly be made more public in the course of a few weeks.

LENS.—WIDE ANGLE asks: "Will you kindly inform me if I took away the front combination of a *carte-de-visite* Dallmeyer portrait lens, and used the back with stops in the slot, it can be used as a wide-angle lens, and would it cover a 15×12 plate?"—No. The back combinations of a portrait lens is of no use as a single lens. The front may be used as a landscape lens, though not as a wide-angle one.

STUDIO.—ALPHA. 1. A little more slope to the roof would be better. Unless the studio is closely sheltered by some high building, the sun will shine upon it when it is at its highest altitude. 2. Yes, for keeping the sun out. 3. Light green or a tolerable dark blue. 4. From any architect, or a horticultural builder. 5. The light to the eaves will do. The ridge six inches higher will give more slope to the roof.

DAMMAR.—GEORGE TOOMER writes: "What is dammar resin? I have seen it recommended for making a varnish that will dry without heat. I applied for some at an oil shop that supplied such things and they laughed at me, and said there was no such thing—I must mean gum dammar."—Dammar is not a gum but a resin, though it is generally known, at chemists' and oil shops, as "gum dammar." It is what you want, but for a photographic varnish it should be the best obtainable.

REDUCING CHLORIDE OF SILVER.—JOHN SMITH says: "I have precipitated 200 grains of silver nitrate with hydrochloric acid, and filtered on evaporating. There is a sediment left in the bottom of the cup. I have a book by Clement J. Leaper. It gives instructions to ignite the residue. What sort of a crucible must I get? The teacup will not stand the heat."—Dry the precipitate, and mix with it an equal weight of a mixture of carbonate of soda and carbonate of potash and fuse in an ordinary clay (skittle pot) crucible. Unless you have a properly constructed furnace for the work, you had better send the chloride to a refiner.

DEVELOPED PRINTS.—A. HUNT writes: "I beg to inquire if you can, through the medium of your JOURNAL, give me some information for developing prints with gallic acid. I notice, on p. 872 of THE BRITISH JOURNAL OF PHOTOGRAPHY ALMANAC, that green tones can be obtained by the simple use of this developing agent. I have followed out instructions, but can only get a brown tone, and this upon three different makers' papers. I am rather anxious to obtain this tone, if possible, and if you can help me in this, or suggest another method, I should esteem it a great favour."—We quoted the article as given by its author. We should advise you to try again, using the brand of paper mentioned as yielding the tones you desire. The prints forwarded are very much over-exposed. Evidently a minimum of exposure and a prolonged development are necessary, as well as a strong negative.

ACID FIXING BATH.—NEMO says: "In your issue No. 1973, for February 25, p. 126, in the report of the Wirral Society meeting, the following hypo bath is given:—Hypo, 4 ounces; water, 20 ounces; then mix ten per cent. solution of sodium sulphite, 2 ounces; sulphuric acid, 1 drachm, and add to the hypo solution. I did this, and immediately the acid solution was added to the hypo solution the liquid became very turbid and of a yellow colour. In twenty-four hours a yellow substance was precipitated, and I then filtered the bath, which seemed to work properly. Is the formula above correct, and should the action I describe have taken place, as I don't want to wait hours after mixing a bath before I can use it?"—The formula, as given, is correctly quoted. By the admixture sulphur is precipitated, and that should either be allowed to subside or be filtered out some little time after mixing.

STUDIO LENS.—C. L. asks: "1. Would you kindly tell me what is the shortest length a professional photographic studio may be in order to take good cabinet full-length portraits and groups well? Also what width? The place which I have in view seems to be (outside measurement) twenty-two feet, from which is to be deducted thickness of end partitions, space for backgrounds, and space for camera. 2. Also what is the best kind of lens to use for studio of this length for work described?"—1. From twenty-five to thirty feet will be a suitable length, and a width of twelve to fifteen feet is a suitable size for professional work. The length proposed is short unless lenses of very short focus be employed when full-length portraits and groups are taken; then the results will not be pleasing, owing to the violent perspective. 2. Ordinary portrait lenses, or those of the group or universal series. The latter will require double or more the exposure of the former.

COPYING.—D. K. writes: "Will you please answer the following:—As you will see by the above heading, I am making a speciality of copying. I have had very awkward things to do lately, such as copying a tiny picture, the head of which is, say, one-eighth or two-eighths of an inch to carte or cabinet vignettes. I am having an extension made to fit my instrument, and should be obliged if you could advise me what sort of lens would he best suited for such difficult subjects. I have a 2B Dallmeyer, but it does not seem to answer the purpose well."—The lens you have is excellent for the work, but you will require a very long extension camera to use it with. A lens of shorter focus would be more convenient to work. You speak of such work as you mention being difficult but it is done every day by every professional photographer. On page 1074 of the ALMANAC you will find a table of enlargements, from which you may judge what length of camera, with a given focus lens, will be required for such work.

*** *As Good Friday falls next week, we shall go to press a day earlier than usual. Correspondents and others, please note.*

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1979. Vol. XLV.—APRIL 8, 1898.

Contents.

	PAGE
Ex Cathedrâ	209
Protecting the Negative	210
Leaderettes :— Recognition by Photographs—The Tichborne Case and Photography—The Projected Poisons Act—Pictures in Whitechapel—Sunday Opening of the National Gallery	211
By the Way. By Dogberry	212
Hints on Spotting Negatives. By Roland C. Whiting	213
The Decorative Capabilities of Photography. By T. N. Armstrong	214
Experiments in Lunar and Planetary Photography. By John Milton Offord, F.R.M.S.	215
The Action of Metals and other Substances on Dry Plates	215
Action of Oxide of Iron on Gelatine Films	216
Marine Photography Thirty Years Ago. By Valentine Blanchard	216
Committee on Acetylene Gas-generators	217
Photographs on Leather	218
Colour Photography at the Camera Club	218
Exhibition of the West Surrey Photographic Society	218
Eastman Photographic Materials Company Annual Meeting	219
Our Editorial Table :— The Voigtlander Portrait Euryscope — The Warwick Dry Plates — Diphenal — Catalogues Received	220
News and Notes	221
Patent News	222
Meetings of Societies :— Photographic Club — Borough Polytechnic Photographic Society — Hackney Photographic Society — North Middlesex Photographic Society — Bradford Photographic Society — Liverpool Amateur Photographic Association	222
Forthcoming Exhibitions	223
Correspondence :— Halation: A Misunderstanding—The Return of Specimens	223
Answers to Correspondents	224

EX CATHEDRA.

An unknown friend has been good enough to forward us copies of two Sydney (New South Wales) newspapers, which contain the advertisements of several photographers, displayed more prominently than we are accustomed to in similar announcements published in English newspapers. From the data here at hand it is possible to form some idea of the very keen competition there exists among professional photographers in Sydney. Thus, in one advertisement, "craotint enlargements" are offered to patters at a cost of five shillings. Ten shillings per dozen seems to be the price usually charged for cabinet-size photographs. Another firm, calling themselves "The Vice-regal Photographers," offer twelve fine-art cabinets and a 12 × 10 enlargement on opal for 10*s.* 6*d.*, a by no means excessive price, which is also charged by other firms.

* * *

Another firm offers cabinets at 8*s.* 6*d.* per dozen. The Eden Studio, with an astute appreciation of the sporting instincts of the Australian public, offered a chainless bicycle for competition among those disposed to try and guess the winner of one of the Anglo-Australian cricket matches—the grand total score of the match, how many runs the match was won by, and the total score of the winning team being the information asked for. Not only is competition keen among our Australian brethren, but we have been told that, in promoting business, their methods are of a vastly more enterprising and sensational nature than those employed at home. The process of what is known as "beating the drum" is largely practised, and it is no uncommon thing for a new studio to have the inaugural assistance of a brass band. Here, at home, newly starting butchers and grocers appear to have the monopoly of the last-mentioned method of attracting attention.

* * *

An esteemed friend of this Journal, Mr. H. Hands, of Jubbulpore, from whom some valuable practical contributions have from time to time appeared in our pages, secured some exceedingly successful photographs of the recent solar eclipse, and has been good enough to send us copies thereof. These photographs admirably illustrate the various stages of the great phenomenon upon which the attention of the world of science was recently concentrated, and, from an inspection of Mr. Hands' results, one can well imagine that the sight of the solar corona at the moment of totality must have been an awe-inspiring one. Prints and transparencies from Mr. Hands' interesting negatives may be ordered of Messrs. Penrose, Upper Baker-street, E.C.

* * *

Mr. Reginald Craigie asks us to announce that the Sixth Annual Exhibition of the Photographic Salon, devoted exclusively to pictorial photography, will be held as usual, at the Dudley Gallery, Piccadilly, during the month of October next. Communications should be addressed to the Hon. Secretary, Photographic Salon, Dudley Gallery, Piccadilly, W.

* * *

The association of Mr. Craigie's name with this year's Salon Exhibition is, we suppose, to be taken as an intimation that he is to act as Secretary of the affair instead of Mr. A. Maskell. Mr. Craigie's colleagues have exercised a wise choice, as that gentleman is on the Council of the Royal Photographic Society, and is also a member of the Committee appointed to deal with its Exhibition next September, he thus having command of the

most favourable opportunities for acquiring a knowledge of how an exhibition should be run—knowledge by which the Salon will, doubtless, profit. There is so much room for improvement in the management of that Exhibition that Mr. Craigie is to be congratulated on the excellent chance he has of distinguishing himself in his new office. If he can spare time to run through our Correspondence columns for the last three or four years, he will be put in possession of many hints as to what to avoid in dealing with exhibitors who are not members of the "General Committee of the Photographic Salon." We wish Mr. Craigie every success.

* * *

A MEETING of the Committee of the Traill Taylor Memorial Fund was held last week. Mr. Philip Everitt agreed to act in future as Secretary, and it was decided to invest the money in hand, about 240*l.*, in Government stock. The Trustees are Sir Henry Trueman Wood and Mr. George Scamell, Honorary Treasurer of the Royal Photographic Society. Unavoidable delay has arisen in carrying out the Lecture scheme, but it is hoped that the Committee will shortly be in a position to announce the name of the gentleman who is to give the first lecture, which it has been suggested should be delivered at the Glasgow meeting of the Photographic Convention next July.

* * *

LAST week there was a meeting of the Royal Society to hear from some of the most distinguished observers an account of the total eclipse of the sun as seen in India last January. The Astronomer-Royal (Mr. W. H. M. Christie) illustrated his preliminary report on the observations at Sahdol by showing a series of very successful photographs of the corona upon a large scale. These photographs indicated the details of the structure both at the base and as it stands out from the sun. Another part of his programme was to determine the position of the moon at that part of her orbit when she is invisible except by eclipsing the sun. For this purpose, a series of photographs were taken between first contact and totality, and between second contact and totality. The time at which each was exposed was obtained by determining local time, and then fixing the longitude of the station from Greenwich—a work carried out by the Indian Survey Department. The Astronomer-Royal's station was situated in a dense jungle, in which a clearing had been made for the occasion, and everything was declared to be most comfortable by the party. Mr. Christie expressed himself well satisfied with the photographs, which were taken with a shortened tube, and with the aid of the cœlostat — novelties in connexion with the observation of eclipses of the sun. Other photographs showed the variations in the register of magnetic currents at Greenwich at the time of the eclipse. The variations had been remarkably small in 1897, and the currents were quiet both before and after the eclipse, at which time there were three fairly striking groups of sun spots.

* * *

THE Department of Science and Art has received information, through the Foreign Office, of an Art Exhibition to be held in Vienna this year in celebration of the fiftieth anniversary of the Emperor of Austria's accession. The Exhibition will be opened about the middle of April, and closed at the end of June, and the works will be arranged in the following groups:—Architecture, Works of Sculpture, Painting, Reproducing Arts [the latter section presumably including photographs and photographic reproductions.—EDS.]. Further information respecting the Exhibition can be obtained from the Committee of the Jubilee Exhibition of Fine Arts, 1898, Künstlerhaus, I Lothringerstrasse, No. 9, Vienna.

PROTECTING THE NEGATIVE.

WE feel it incumbent upon us to sound a note of warning, emphasised as it will be by recent utterances from high quarters, upon the due care of the negative. Attention has already been called in these columns to an announcement made by the well-known writer in the *English Mechanic* who takes the pen-name of "A Fellow of the Royal Astronomical Society." He said a little time ago: "In common with, I imagine, an overwhelming majority of astronomers, I have always considered that the chief value of the astrographic chart catalogue now in process of construction would lie in the means it furnished for comparisons of the heavens, as they now exist, with their configuration in the more or less distant future. In order, however, to ensure this, the very first essential is that the photographs themselves shall be permanent. It is, then, with a feeling of real sadness that I heard from one of our greatest astronomical photographers the other day that the plates are not permanent, and that stars had disappeared from those which he had taken some years ago. This, I venture to think, is a subject requiring urgent and immediate attention."

Now, it is at once obvious that the consideration of the cause of this disastrous state of affairs is embraced in the scope of the title of this article, for there has been an absence of due protection of these priceless negatives, be that protection what it may.

The star pictures, it is well known, are taken upon dry plates, the image upon which is, in the main, metallic silver. Now it is well known that the metallic silver of a photographic image, if properly cared for, lasts for an indefinite period. There are hundreds of glass pictures nearly half a century old which to this day retain their pristine perfection of delicacy of image; others there are, which have been insufficiently protected, that now are mere wrecks.

It may be objected that the comparison of a collodion negative with one of gelatine is not a fair one; be it so, but the comparison is, it might fairly be argued, in favour of collodion, for the permeability to air of a collodion negative or positive—there is no essential difference between the two—is far greater than with one of gelatine. We are thus led to the consideration of the nature of the protecting agency that has been exercised in one case and not the other, and we are more likely to arrive at a satisfactory conclusion by taking, one by one, the recognised protecting modes.

First we have the retention of the plate in the fixing bath for a longer time than is necessary for the mere removal of the visible haloids. If a plate be removed directly after these unused silver salts have disappeared, there is considerable probability that sooner or later there will be decomposition, followed by disappearance of the fainter portions of the image, as compounds of silver and thiosulphate will have remained behind and gradually undergone a change, thus initiating an ordinary case of "fading." Next, to protect the image properly, the whole of the hypo must be eliminated by proper washing—as much on account of the silver compounds

dissolved in it as for any inherent power to injure, possessed by the hypo itself. Again, it is quite conceivable that, in the case of negatives with such faint deposits as images of stars of small magnitude would produce, if a final washing with distilled water were not adopted the dissolved salts of some samples of water might gradually react with the faint deposits and cause them to disappear—from sight, that is to say.

Thus far we have dealt with protection from internal danger; we may now turn to external injurious agencies. Mechanical injury is too obvious to need discussing. Chemical injury may arise from the atmosphere, whether pure or polluted, with such volatile matter as is common to centres of population, or from the consumption of coal or gas. We take it that the relative impermeability of the gelatine film itself is protection enough for all deposits of silver reaching from the front to the back of the film; but the faint deposits necessarily lie either on, or near to, the surface, and here the atmosphere may act. It is to be remembered that gelatine is slightly hygroscopic, and rarely is the atmosphere so pure that it might be predicated that any atmospheric moisture absorbed by the film would be pure water. What would happen in the case of a negative exposed to air would be the continual, if microscopic, alternate absorption and evaporation of atmospheric moisture. The purely aqueous portions of the moisture would, each time it evaporated, according to the hygrometric condition of the air, leave behind an almost infinitely small amount of what, as in the case of the leather bindings of books, has been proved to be sulphuric acid, and in course of time this aggregate of infinitely small amount would become an almost measurable quantity, quite capable of accounting for the disappearance of the fainter images or portions of images.

Fortunately, the mere recital of such a danger is sufficient to indicate a means of protection—varnishing.

We are not in a position to state whether the astro-photographic negatives referred to by "F. R. A. S." are varnished or not—we should be inclined to think that the absence of such protection is the cause of the regrettable loss he refers to—but to our readers generally, taking the catastrophe as a text, we cannot give better advice than is contained in the simple sentence, "Varnish every negative you print from." Where albumenised paper is used, it is courting disaster to print without varnishing. When P.O.P. or collodio-chloride paper is used there is less danger, but it is never wholly absent, and we can assure our readers that if they saw but a small proportion of amateurs' negatives entirely ruined through the absence of such protections, that have come under our own notice, they would make it a constant practice to adopt the varnishing of every negative of more than evanescent interest they take, if they wish to adopt the most important precaution of all in protecting the negative from danger, internal or external, chemical or atmospheric.

Recognition by Photographs.—*Apropos* of the Tichborne case, and how photographic portraits figured in it, a weekly contemporary is responsible for the statement that in the Druce case as to a portrait, which is being relied upon, and which has been "impounded" by the Consistory Court, one gentleman will swear to its being that of the late Mr. Druce, while Mr. Forbes Winslow has stated that, to the best of his belief, it is the portrait of Dr. Harmer, a former patient of his. Again, the photograph is declared to be identical with one taken of the late Duke of Portland. The portrait, it seems, is a full-length *carte-de-visite* one, hence the face is very small. The question may arise as to whose portrait it is. More work for experts, perhaps.

The Tichborne Case and Photography.—The death of Arthur Orton—better known as the "Claimant," and probably one of the greatest and cleverest impostors that ever lived—last week, has again directed attention to the almost forgotten though remarkable Tichborne trials. The first of these was a civil action to obtain the Tichborne estates, in which Orton was the plaintiff. It lasted one hundred and three days, when a non-suit was entered, and Orton was committed for trial on the charge of perjury and fraud, and in the second trial was found guilty and sentenced to fourteen years penal servitude. The first trial cost the estate something like 100,000*l*. The second trial lasted over six months, and cost the country an enormous sum. Even after the "Claimant" was found guilty, many still thought that he might be the real Sir Roger Tichborne, and, until the last three or four years, that possibility was alluded to annually by one of our contributors to the Almanac. However, two or three years ago Orton confessed and made a declaration to the effect that he was an impostor, and that he was the son of George Orton, shipping butcher, of High-street, Wapping.

In no cases before or since has photography, *pro* and *con.*, figured so largely as in these. Those who happened to have portraits of any one who figured in them, whether as plaintiff, defendant, judge, juror, or witness, found a ready sale for copies. Very much of the evidence was photographic, particularly with reference to a portrait of the real Sir Roger Tichborne, which was taken in Chili, and its alleged similarity to some taken later on of Orton. Experts were called on both sides, amongst whom were some well-known men; prominent ones were the late Mr. J. T. Taylor and the late Colonel Stuart Wortley. These gentlemen, with others, were called by the plaintiff's side, and their evidence was taken at great length.

The Projected Poisons Act.—The publicity we gave to the fact that the Home Secretary had said in the House that the Privy Council have prepared a Bill to be shortly introduced with regard to the sale of poisonous substances, and the suggestion that those who use, or sell, such things for industrial purposes should watch for this Bill, has raised the ire of our contemporary, the *Chemist and Druggist*. Of course, chemists and druggists do not want a new Poisons Act, as they, no doubt, realise that it will probably take away some of the monopolies they now enjoy. The Privy Council do not look with favour upon the present Poisons Act and the way it is administered by the Pharmaceutical Society, as they refuse to sanction such things as carbolic acid being scheduled as poisons, so that its members should have a monopoly in its sale. Possibly, also, the projected Bill will take the administration of the Act out of the hands of the Pharmaceutical Society, and place it in the hands of some responsible body, who will see that it is not infringed by chemists and druggists, as it is at present. In the majority of cases of death from poisoning, whether by inadvertence or suicide, we see that the poison was supplied by the chemist, and that in the sale the Act has been violated. Several cases in point have come out in evidence in coroners' courts during the past week or two.

Our contemporary, in its wrath, says, "It makes one shudder to think what will happen to The British Journal of Photography when it realises that there is actually a Pharmacy Bill before the House at the present time." No cause for shuddering, good friend. We had the Bill as soon as printed. Our readers are not interested as to whether a certain proportion of the members of Council of the Pharmaceutical Society shall retire annually [by seniority or by ballot; or whether "apprentices or students" are eligible to become "student associates;" or even whether persons on the register of chemists and druggists are eligible to become members of the Society or not—the three points of the Bill.

One remark of our contemporary is amusing. It says that "at least two-thirds of the photographic trade is already in the hands of chemists." What think you of that, ye photographic dealers? If it had said that chemists divided with the toy and similar shops a large proportion of the trade in the commonest forms of apparatus —three-and-sixpenny and five-shilling cameras, "guinea sets," and the like—it would be nearer the truth. Who but a schoolboy or the veriest tyro, would think of going to the druggist for photographic apparatus or material? Practical workers prefer to deal with those who understand something about the goods they sell.

Pictures in Whitechapel.—We alluded, a few weeks back, to the annual Loan Exhibition of Pictures to be held in Whitechapel. This Exhibition was opened on Tuesday last week by Mr. Beerbohm Tree. In a neat speech he said that one of the most pleasing characteristics of our time—perhaps the greatest sign of the revival of chivalry—was the desire on the part of those who possessed beautiful things to share them with others, who only possessed them, as it were, by proxy. These annual exhibitions are well worth a journey to the East End to see, by those resident in other districts, as they always contain loans from some of the finest collections in England, and which cannot be seen elsewhere. We have before now commented upon the fact that the majority of the East-end photographers, judging from their show-cases and shop windows, profit but little, in art matters, from these exhibitions.

Sunday Opening of the National Gallery. — On April 3rd the National Collection of Art, in Trafalgar-square, and the Tate Gallery were opened to the public, on a Sunday, for the first time this year. They will continue to be open every Sunday till the dark weather sets in. It is possible, however, as the British, the Natural History, the South Kensington, the Geological, and the Bethnal Green Museums have been open on Sundays throughout the winter, without the aid of artificial light, that the Trustees of the National Galleries will see their way to opening these under the same conditions. The Sunday opening of Art Galleries should be of great assistance to photographers and their assistants, who cannot get the opportunity of visiting them on week days. They thus have the chance of studying the works of all the great masters, and profiting thereby. But it would be interesting to know how many photographers' assistants really avail themselves of the opportunity. The great majority of photographers' assistants, and photographers, too, for that matter, in this country, we are sorry to say, have yet much to learn in matters of art.

BY THE WAY.

It would seem as if some people were never satisfied, or, if satisfied intentionally laid themselves out, for some hidden reason, to find fault with anything and everything. Some time ago a friend showed me a cutting from a provincial paper, in which the writer discussed the approaching Exhibition of the Royal Photographic Society at the Crystal Palace from a distinctly novel, if not exactly original, point of view. I have not the paragraph to refer to, but I recollect that it speaks of the probability of the chief exhibits consisting of "stacks of dry plates, colossal cameras," and suchlike, and goes on to say that an exhibition of paintings is not usually eked out by a show of artists' materials, and that therefore the technical side of the coming Exhibition is out of place and not required.

From the general drift of the article in question, it is plainly written by one of the "new school," and one cannot but admire the complacency with which he gives his own little efforts what I may call academy rank, and places those who are not professed or professional picture-makers and fakers in the category of outsiders. His limited vision does not recognise that there is probably a vast body of intelligent beings whose horizon is extensive enough to permit them to take an interest in the scientific aspects of photography, and who, unlike himself, justly regard its mere pictorial side as the very least useful of its innumerable applications. Like "the heathen in his blindness," he bows himself down to the little god he has himself erected and dubbed art, and thinks that everybody else must pay homage to his fetish only. Smarting under the edict that has recently gone forth, that he "who cannot draw with his own unaided hand is no artist and never will be," he would hide the signs of his disability by banishing from the view of the lay public all those mechanical and scientific aids by means of which alone he is enabled to produce those results which he so strenuously endeavours to hall-mark with the spurious stamp of art. It is an ingenious if not ingenuous plan, but it is not honest, it is not even grateful.

This ultra-partisan of the new school does not see—of course, he cannot—that photography and painting are not precisely on the same footing. When one goes to an exhibition of paintings one goes to study art and, incidentally, the various methods by which different artists arrive at the same end; but, when you go to an exhibition of photographic pictures, you go to see the photographs, and perhaps to be amused at the very various ways in which different fakers try to imitate art and arrive at different results, methods probably that exhibit all the eccentricities of poor Aubrey Beardsley without his ability, his grotesqueness without his originality. But with the average visitor to photographic picture shows, whether blessed with a really artistic sense or merely one of the common public, a little of the regulation thing goes a very long way. The usual puddle with a few tufts of coarse grass round it, or a crooked ditch with a bit of ragged hedge, rendered with the proper amount of heaviness and want of detail, and balanced by the conventional patch of white obtained by sticking a lump of cotton-wool or a pocket-handkerchief, or a bit of brown paper, in the right position on the printing frame, and the whole capped with an impossible sky, and with a fancy title appended, may be all very well for once or twice as a clever specimen of faking; but it soon palls when the only variations are in the size and shape of the puddles, or the crookedness of the ditches, or the unnaturalness of the skies. It is probable we may for a brief period have a change, a branch off in another direction, and mud banks translated into or served up in insoluble gum and brush marks will, no doubt, be the fashion for a season or two.

But, when one goes to a photographic exhibition as distinguished from an exhibition of photographs, the photographs are perhaps the last thing that the average visitor thinks of looking at, if he comes across them, certainly the last he will put himself out of the way to search for. I spent a considerable time last year at the Victorian Exhibition at the Palace, and found it most interesting, but it was not until after my return home that I found from the catalogue that there were any exhibits at all of a purely pictorial character. If I came across them at all, I must have instinctively passed them by as being, at any rate, of minor interest to the technical and historical exhibits. Of picture shows we have enough and to spare, of technical ones sadly too few; the last of any importance was at the "Inventions" in 1885, and before that we have to go back to Sir H. Trueman Wood's Exhibition at the Society of Arts, in 1881. The two or three annual shows previously held at the Crystal Palace were purely trade affairs, but even at these, I venture to say, it was the technical and mechanical side that formed the chief attraction to the many. I shall not go so far as to say that the pictures had *no* admirers, for I one day came across a well-known professional photographer, seated with folded arms before a huge screen covered with portraits that the public went past in a constant stream, and it seemed as if he was endeavouring to make up for their neglect. But they were his own pictures!

Returning, however, to the coming Exhibition, I shall be surprised if it does nor prove the most interesting as well as the most successful show that has been held in connexion with photography for many years, if not since photography came into existence. The Inventions Exhibition, to which I have already referred, covered inventions and discoveries of the previous two or three-and-twenty years, or since the International Exhibition of 1862. But in the twelve or thirteen years that have elapsed since that show opened,

in photography at any rate, almost a revolution has taken place, and, if the technical exhibits were confined to advances made since 1885, those alone would constitute a sufficient attraction for the whole of the two or three weeks the Exhibition will be open. It is to be hoped, however, that the general effect will not be spoiled by over-doing the "popular" phases of photography, and that the Exhibition will not drift into a mere succession of lantern and cinematograph shows.

Speaking of the latter instrument reminds me that I have read that Mr. W. I. Chadwick has undertaken to "cinematograph" the Grand National Steeplechase next year, and I am wondering how he will set about it. I have seen most of the principal racecourses of the kingdom, but, of the whole lot, the Grand National Course at Aintree is, I think, the one that lends itself least favourably to the task of getting a series of consecutive views of the race, for the simple reason that even from the Grand Stand, during a great portion of the race, the horses are practically out of sight. On the Knavesmire at York, the Carholme at Lincoln, or the Town Moor at Newcastle, a fairly presentable result might be obtained with comparative ease; that is to say, a series of pictures that would bear exhibition on the screen afterwards as a fair representation of the race. At Epsom and Newmarket, especially the latter, I fancy it would prove a difficult job, but the course I should choose, if I wanted an easy task and to make a really presentable show, would be the Roodee at Chester. It was here that a well-known jockey of the last generation refused a mount on the ground that he "did not train for circus riding," from which it may be gathered that on the Roodee you would have your subject in a condensed form.

But, if Mr. Chadwick is going to post his twelve operators at different points on the course, I want to know whether he is going to show snatches of the race as the horses pass only; and, if so, how they are to be joined up finally. The start and finish, of course, will be represented, and, I suppose, the "water jump," a pretty stiff one, placed directly opposite the Grand Stand, to afford the occupants some amusement at the expense of the unfortunate riders who come to grief. Then there is Becher's Brook, supposed to be a particularly difficult, if not dangerous, "natural" jump, though I think the fence next past it is worse—a thick low edge, with a tricky drop on the off side. Here I saw "Mr. Rolly" (the name under which a certain noble lord used to ride) many years ago come what is vulgarly termed a "purler," his horse striking the fence and shooting his rider into space. A cinematographic analysis of that fall would have been interesting and instructive, in fact a valuable object-lesson on how to take care of yourself under difficulties. As he shot out of the saddle like a stone from a catapult, the unfortunate jockey's whip arm seemed to swing through the air and wind itself round his head, while the left went similarly under his chin and round his neck, his knees at the same time drawing close up to his chest. The result was, that when he touched mother earth he tumbled along for some distance like an exaggerated football, and was picked up with no worse injury than the shaking, and was able to walk his horse back to the stables without assistance.

A few such incidents, almost certainly obtainable at any of the chief points of the course, would undoubtedly, such is human nature, form popular and taking subjects for subsequent exhibition; but I can scarcely see the possibility of securing any permanent record of the event as a race that would possess any beneficial value. However, we shall see next year.

From the cinematograph to the latest new thing, the machine for seeing at a distance, which is credited to a Galician schoolmaster with an unpronounceable name. Reference has been made to the ubiquitous Edison as having pursued investigations in this direction for some years past; but why, I would ask, pass over our own countrymen? I remember hearing Mr. Shelford Bidwell lecture on this very subject at one of the meetings of the British Association many years ago, either at Southampton or at York, I fancy the latter. Why cannot we give credit to our own people without always writing to Edison?

DOGBERRY.

HINTS ON SPOTTING NEGATIVES.

IT is a strange thing that so important a matter as the spotting of negatives should receive so little attention from those into whose hands the work is given, and the number who really realise its importance, and who are capable of doing the work successfully, is very few indeed.

It seems such an easy thing to touch a little pinhole with the point of a brush charged with colour, that the work is almost always relegated to those whose salaries are as slender as the interest they take in it. It is usually put into the hands of young girls whose instructions have been of the scantiest description; unless, indeed, the retoucher himself does the work, when even then it is to be feared that it is often hurried through with the least possible trouble and care. It is looked upon as such a hindrance and waste of time, and so long as the spots have been touched with colour it does not seem to matter how they are done. Yet it must be plain to every thinking mind that, unless these imperfections are properly removed, they must appear on every print which is taken off the negative, and which must all be gone over with the brush and colour, thus multiplying the labour to an unlimited amount.

There are firms who employ whole rooms full of girls to spot prints where two or three should be amply sufficient if only they were careful to see that those employed to spot their negatives were really capable of doing their work perfectly.

It is here proposed to expound the science and art of the subject in as brief a manner as possible, in the hope that those who care to do so may render themselves perfect, to the saving both of time and money.

It will not be necessary to treat upon the causes of these defects (pinholes as they are generally called, from bearing the appearance of having been produced with the point of a pin); the causes are many, although they are mostly due to dust upon the film during exposure, but it is quite impossible to prevent some of them making their appearance. Care in all manipulations will, however, greatly minimise their quantity.

Now, in every negative there will be found a greater number of these pinholes than will be seen in the resulting prints, and a knowledge of this fact will greatly reduce the amount of labour to be expended upon their removal. The reason for this difference is apparently somewhat obscure, and is due to two causes.

The light which reaches the eye after passing though a negative is very considerably stronger than that which is reflected from a print. Consequently, owing to excessive brilliancy, the pinholes in the negative look much larger than do their paper impressions. If the print be very carefully examined, every one of the spots will be seen, but, owing to the lesser contrast, they will not be nearly so evident. If, however, the amount of light which passes through the negative be reduced, so that it appears no stronger than does the light which is reflected from the print, it will be noticed that there appear no more pinholes in the negative than there are spots on the print.

The other cause mentioned is due to the fact that our eyes suffer with the defect of halation almost as much as does a dry plate. Hence, when a negative is held up to the light, each pinhole, owing to this ocular weakness, appears greatly enlarged, which, of course, adds to the prominence of the defect.

It will be inferred from this that it is possible to employ too strong a light behind the spotting desk. At the same time it must be remembered that too weak a light is quite as bad, if not worse. With a weak illumination, many pinholes will be allowed to remain which should be removed; and those that have been obliterated will be so heavily touched that they will appear as white in the print. The best strength of light will be that which allows the negative to appear no brighter than the print when seen by good daylight; but experience built upon actual practice will be the best guide in this matter, and will enable the spotter to become almost independent of a regular and constant strength of illumination.

With a fairly good light, the spots should be removed in such a way as to be invisible when examined from about eighteen inches' distance from the negative. This, of course, does not apply to the larger pinholes. No notice should be taken of the appearance of the spotting when the negative is held up to the sky, as, although they may print correctly, they will appear not to have been touched when examined with a strong direct light. The cause of this is due to the aforementioned intensity and halation of light.

The colour of the spotting pigment is thought to be of great importance, and different people seem to have various ideas respecting it. One uses crimson lake or vermilion, whilst another uses Prussian or other blue. As a matter of fact, it matters little what colour is used providing the user is able to judge correctly the effect of the work, but it will be found much easier to judge some colours than others, and a pigment which can be relied upon in this respect is much to be desired. The writer some time ago made some experiments to ascertain the best and easiest material to use, and, after many trials, it was found that a mixture of Chinese ink and Payne's grey was both certain and easy to work. A little of each should be ground on an opal plate, and the two mixed together with a little weak gum water, varying the proportions of each pigment to suit the colour of the negative to be spotted. The paint should be applied to the spots with a No. 1 or No. 2 red sable hair brush.

The charging of the brush with colour is a somewhat difficult matter

to describe. The brush should first of all be placed in water, after which as much of the fluid as possible should be removed from it by pressure against the sides of the water-holder. Then the point should be charged with colour by moving it over the palette with a kind of rotary motion produced by the rolling of the brush handle between the fingers and thumb. In no case must the brush be pushed backward and forward on the palette, as that practice is very destructive to the hair. When sufficient colour has thus been taken up, the brush is carefully primed to a point, at the same time removing all superabundant colour. It will be observed that only the tip of the brush contains the paint, whilst the body of the brush is filled with ordinary water, but only just sufficient to hold the hairs together. *The brush must not be allowed to get clogged up with colour.*

The spots are now to be touched very lightly with the extreme points, the brush being held almost perpendicular to the surface of the negative. One touch merely will be found sufficient for small holes, whilst larger ones will require two or more touches, but one touch should become quite dry before another is put on. In very large holes it is better to put a wash of colour on first, as by so doing the stippling is more easily applied. In no case should the spot be dabbed with the tip of the finger, as is frequently done to remove superfluous colour. Such a practice is only the work of the unskilful, and deposits grease on the negative besides. The reader must here be cautioned against the rapid pecking style of spotting which is practised by so many, and which is so much waste labour.

The transmission of the colour from the brush to the negative largely depends upon capillary attraction, and this action requires a certain length of time to be brought about, therefore the brush should not be taken off the negative too rapidly, but should be allowed to rest upon the spot for an instant, so that the colour may have the chance of travelling from the brush to the negative.

Enough has now been said to enable the thoughtful student to become proficient in this insignificant but important work; and the practical part of this article has been purposely treated in a somewhat exhaustive manner, as it is felt that a little extra time spent upon the spotting of the negative would be amply repaid by the amount of time saved upon the spotting of the prints.

ROLAND C. WHITING.

THE DECORATIVE CAPABILITIES OF PHOTOGRAPHY.

CONSIDERING the number of ladies who now practise photography, and likewise take an interest in the meetings of our photographic societies, it appears to me that there is a very useful and, in some respects, even a wide field open to them, which their brethren of the sterner sex fail to take advantage of to anything like the extent such deserves. At least, judging from the exhibits that one sees from year to year regularly contributed to our various exhibitions and competitions, it would appear as if the, strictly speaking, useful phase of photography, in so far as its capabilities for adorning many articles of home interest are concerned, were almost entirely ignored by those to whom such would form, not merely a pleasant recreation, but yield likewise results both beautiful and tangible.

As a rule, those ladies who practise photography as a hobby during their leisure hours, no doubt, confine themselves to the exposing of small-sized plates, and the printing of negatives yielded by such, on one or other of the newer paper printing mediums, which are so conveniently acquired from any photo-dealer. Such in very few instances realise what a mine of wealth they possess in these little glass negatives, say, of quarter-plate size. The mere mention of their utilising such for producing pictures on one or other of our flexible supports, that may be inserted in or made to adorn numerous articles of household utility, at once conjures up thoughts of some extremely advanced and difficult branch of photography, which, to their mind, is a long way in advance and beyond their capabilities, no doubt merely because hitherto such have remained satisfied with the productions that accrue to the rudimentary stage of photography; they shirk the mere idea of undertaking what is, in reality, an extremely simple operation in printing, and one that is distinctly suitable for ladies to undertake, without many of the drawbacks which even attend the production of a highly glazed silver print on paper.

To those ladies who have a fair amount of time on their hands, and who are anxious to depart from the mere rudimentary stage of printing so common, I can safely promise a very profitable and enjoyable change, provided they will only give a reasonable amount of care and thought to the production of their photographs on a suitable cloth, and then utilise their prints in any way that may apply itself towards the adornment and decoration of the household.

To enumerate all the items that would come within the sphere of such household articles would be indeed difficult. Any lady, in giving this subject the smallest amount of thought, must at once see that there is quite a wide field for the adaptation of photography to articles in daily use in any household. A few instances may suffice, such as the centres of d'oyleys, having lace or a border of crochet work, corners of table napkins, tea-cosy covers, centres of serviettes, monograms on handkerchiefs, or even one's own portrait, and many other similar articles, the mere application of which calls for the exercise of much healthy thought and taste.

At the outset let the idea be grasped that the printing of such pictures can be performed in such a manner that any article so adorned is capable of being washed and dressed over and over again, without any liability whatever that such fades in the operation of washing and dressing, and, no doubt, a powerful factor at once arises that must go far to interest many ladies who, somehow or other, look upon the fading of photographs, when such are subjected to the ordeal of the washtub, as a necessary consequence of such treatment; and, once this erroneous impression is dispelled, the work is, no doubt, entered upon with a zest little dreamed of previously.

During many years, on my showing no end of articles adorned by means of photographs on cloth, I have been forcibly impressed with the crass ignorance that prevails among photographers generally on this very one point. Whenever an article such as, say, a large d'oyley, or a set of such, be shown to admiring groups, hardly an individual in such will be met who does not at the very outset ejaculate something or other about the fading of the image, when such comes to be washed, and who expresses surprise at being told that no amount of washing will remove the image printed thereon.

Another apparent stumbling-block to the uninitiated appears to be the idea that some insuperable difficulty exists in the production of or means of acquiring suitable material for the execution of work of this kind. This is another fallacy. By all means, whenever possible, let the persons undertaking the work proceed to prepare their own materials if they can; but, if this is beyond their capabilities, there is no reason why they should not acquire the materials quite as easily as they do any of their other photographic articles from their dealer. I think, however, there is a delight in the preparation of one's own materials, be it merely that of ordinary printing paper, that is unknown to those who invariably procure them ready-made from the manufacturers.

In the production of photographic images on textile fabrics such as are suitable for the purpose, mention may at the outset be made of those more particularly adapted for the work, and which are regularly prepared and sold in a sensitised form ready for being used in the printing frame like ordinary printing paper.

These fabrics embrace silk and fine muslins, such as Nainsook, which is largely used, being admirably adapted for the purpose, and which the Platinotype Company supply in suitable size and form at any time.

At the outset a very little consideration will be required (when it is considered that the operation means the forming of an indelible image *in* an open texture) to see that, in some respects, the requirements in a negative differ from those necessary for the yielding of fine detailed prints on paper.

In the first place, some consideration should be given to the selection of suitable broad subjects, free from niggling detail. Luckily in this respect there is always a wide field to choose from, and perhaps one of the simplest examples that I can at this stage mention as a guide to any beginner in this work is the selection of a bold, vigorous portrait negative, one that would be judged too hard for the yielding of a soft paper print. Where such is not at hand, and when it is desired to copy any article that it is intended to use in the printing on cloth, especial attention should be given to the production of bold, vigorous negatives to obtain this class of picture. I would merely suggest at this stage, without entering into any minute particulars of the *modus operandi*, that very fast plates ought not to be used; on the contrary, slow lantern plates are very suitable for yielding the desired vigour so necessary in cloth printing. When these very slow plates are used, and developed after a full exposure by means of a well-restrained hydroquinone formula, an ideally perfect negative for textile printing is obtained. This may be termed the first and most important stage in textile printing, and, once a beginner grasps the idea that bold prints on cloth cannot be obtained from any weak or poor, thin negative, he or she will have got over the keystone of the bridge in this work, and the results will, instead of being a distinct disappointment, be the realisation of an amount of pleasurable satisfaction that no other amateur occupation that I know of is capable of yielding.

Should any one have no absolute knowledge of the proper means to take for producing these bold, vigorous negatives, by all means let him refer to the back numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY, where the production of such is fully detailed under the heading of black-and-white working.

On the other hand, another easy method of procuring a suitable negative for this work is by utilising a good lantern slide by placing in contact with it the slowest lantern plate that can be obtained, and then developing the same for pluck and vigour. Many highly suitable subjects are easily produced in this simple manner, provided the exposure is well-timed, and not too strong a light employed when exposing the plate.

As a rule, when a suitable negative has been selected, much may be done by only utilising a portion of the same, for in many instances—such as, say, negatives of half-plate size—some part may offer just the desired class of subject, when the remaining portions are found to be less suitable. When treating with negatives of this description, it is well t

nploy a suitable-shaped mask on the face of the negative that just cludes the desired portion of the picture. Lantern masks, with wings ded to their edges, come in very handy, and, as a rule, will be found ite large enough to embrace a wide area of this kind of work.

Of course, the masking in some cases is not necessary, for much pends on the class of article the picture is intended to embellish; but, a rule, the masking of a negative is an improvement, for it permits of an white margins being obtained in the pictures eventually produced, d which are not intended to have any addition, such as lace edgings, ., &c.

T. N. Armstrong.

XPERIMENTS IN LUNAR AND PLANETARY PHOTOGRAPHY.

[Paper read before the British Astronomical Association.]

the year 1883 I commenced experimenting in astronomical photo-aphy, using for the purpose a very fine 5¼-in. refractor by Grubb, uatorially mounted and corrected for the visual rays. With this strument no really good results were procured, although a great number exposures were made to obtain the chemical focus, and I finally gave the experiments, concluding that, without a correcting lens or jective corrected for the chemical rays, no useful results were possible. About three years since I recommenced my experiments, having then very good 12½-in. silvered-glass reflector, which appeared to be well ited to my purpose. The mirror of this instrument was originally ured by With, but was only perfect over the central 10 inches. I erefore had it refigured by Linscott, with the result that it has now a ry fine surface to the extreme edge. It is of short focal length, 6 feet inches, and was mounted, when I commenced my experiments, on a ong equatorial stand, with hand-driving gear, but a clock motion has en recently added.

On the main telescope is mounted a 3¾-in. refractor by Cook, provided th a diagonal eyepiece and a Slade micrometer. The telescopes are refully balanced, and used in the open air, the glass hut which pro-cts them when not in use being run off on rails.

When working with the telescope, I usually keep a thick baize cover er the whole of the tube, unless the night is a warm one; this simple rangement checks dewing, and greatly reduces the tendency to air rrents in an iron tube.

The cameras, of which I have several in various lengths, are of light od, and screw on to the sliding eyepiece tube. The whole camera is erefore moved by the fine focussing screw, which is a delicate but strong ral rack and pinion. I do not find in practice that the light weight of e camera affects the focussing.

The sliding eyepiece tube is provided with a number of enlarging lenses various focal lengths and forms of construction. At first I photo-aphed the direct image, but, as this is only about ⅝ of an inch in ameter with the focal length of my mirror, it was obvious that no after-largements could make such a small picture of practical use. I then ed several negative or Barlow lenses as amplifiers, giving an image of er 2 inches diameter, with about 14 inches camera extension, and thus tained beautifully sharp negatives. But I was still ambitious to secure greater enlargement if possible, and, as the negative lens would mean outrageously long and heavy camera, I tried a number of microscopic ises and eyepieces out of my large collection, ultimately deciding upon e monocentric magnifiers on Steinheil's formula as giving the best ults. These are somewhat expensive, but they transmit a large ount of light, and give exquisitely sharp definition. They may readily procured in three powers, magnifying 6, 10, and 20 times, but I had a ver power of very large size made to obtain the full advantage of my ole aperture on the full moon. I may mention that these lenses form cellent eyepieces for visual work, but are somewhat troubled by flares d ghosts.

The shutter I first employedwas a Thornton-Pickard roller blind of ge size, which was placed inside the telescope over the opening for the epiece tube. From this a long rubber tube was passed outside down to e eyepiece of the refractor, and terminating in a bulb. This shutter d to be used as for time exposures, its lowest speed for instantaneous rk being too short for my purpose.

As I have stated, my first experiments were made without the aid of a iving clock, the method being to allow the lunar image to drift until ntral in the field, as shown by the micrometer on the refractor, and then ke the photograph. I found exposures of half a second, or a little over, uld be given without much blurring being evident from movement of e moon's image, and that, with such exposures, images were obtainable very rapid plates, the lunar image being 4½ inches in diameter.

Since I have used a driving clock, I have, however, somewhat altered y arrangements. The driving clock is a very powerful one, being driven a weight of 140 pounds, falling 10 feet in about 1½ hours, and governed a centrifugal regulator, but I find that, although this answers per-ctly for visual work, yet, for photographic purposes, it requires very reful watching.

The defect of this form of clock, so far as my experience extends (and have had three of them on different instruments), is, that the governor kes too long to act. Thus the clock begins to go too fast, then the vernor slows it down to too slow, and so on, the result being a nearly nstant movement from side to side, which is fatal to critical results in photography. So far I have not been able to cure this defect, but I believe that, if a clock were made with the governor running at a very high velocity, say, four times the usual rate, a great improvement would result. At present I watch the refractor for periods of steady driving, which occur at intervals, and make my exposures accordingly.

Recently I have been using another form of shutter, which has decided advantages. This is an iris diaphragm just behind the enlarging lens, operated by a spring and controlled by air pressure. It is one of Bausch and Lomb's shutters, and will give exposures of three seconds' duration, or less, when worked instantaneously. It moves with far less vibration than the roller blind, but the speed varies according to the position of the shutter, and must therefore be ascertained before an exposure is made.

Of the various dry plates and developers I have tried a great number, and, of course, the most suitable will depend upon the exposure possible. So far as my experiments extend, Cadett's lightning plate and their Velox developer form the most rapid combination procurable; but where long exposures can be given, and driving power is available, a slow plate is preferable, on account of the greater density of the film and fineness of grain. I am inclined to think that the difference in speed of plates is not so great as some makers allege, and certainly far more may be done in developing faint images than is usually supposed to be possible.

The result of my experiments so far has gone to prove that, with a telescope of short focal length and large aperture, such as I possess, the finest photographs can be obtained by using enlarging lenses, confining the field to one portion of the moon alone, and keeping the camera within a reasonable length, say, 15 inches. The entire moon may be photographed with a low-power enlarging lens, the field of which is sufficiently flat for the purpose; but such lenses do not give the sharpest results, and it is better to confine the attention to the terminator, or part of the terminator, at one exposure.

There is another reason why this method is preferable. It is quite impossible to print the whole moon satisfactorily, the light varying so greatly from the terminator onwards that the less exposed parts are lost before the others are printed out, so that, even if the whole moon be taken, several prints are required from each negative.

During my experiments, I have tried different methods of focussing, but have reverted to the original fine ground glass for lunar work, there being plenty of light to deal with. I have a piece of microscopic cover glass, however, cemented on the centre of my ground-glass screen with Canada balsam, thus producing a central space of clear glass, through which a lens may be focussed on the aerial image if found necessary for faint objects.

Just one word as to the great bugbear of astronomical observations generally, and astronomical photography in particular, atmospheric unsteadiness. This is the great difficulty, and the nights are few indeed that can be called first-rate in this respect. Often, as in visual observations, a hazy night will be steady, and then the photographer may, by giving a long exposure, secure good results, but he has a great many difficulties to contend against, and I have usually found very bright windy nights, during south-west gales, taking advantage of lulls in the wind and breaks in the clouds, the finest opportunities that occur, as the exposure may then be very short, and the driving irregularities and atmospheric tremors thus reduced to a minimum.

John Milton Offord, F.R.M.S.

THE ACTION OF METALS AND OTHER SUBSTANCES ON DRY PLATES.

The remarkable series of experiments made by Dr. W. J. Russell some time ago, and communicated by him to the Royal Society, showed that very many ordinary substances are capable of affecting dry plates when kept in close proximity with them for a fairly long period. It will be remembered that among the substances which Dr. Russell found capable of affecting plates were the metals mercury, zinc, magnesium, cadmium, and others; wood charcoal, copal, printer's ink, strawboard, methylated spirit, turpentine, and other liquids. The cause of these bodies acting in this manner was, as the writer of the paper stated, somewhat difficult to explain, but he could hardly suppose that it was due in all cases to the evolution of vapour from the active body. This view of the question is discussed by Herr J. Gaedicke in a recent issue of the *Wochenblatt*. This writer defends the "vapour theory," and maintains that practically all Dr. Russell's experiments point to this being the correct explanation of the phenomena. In certain cases—uranium, for example—there certainly is an emission of radiations which exert an action on the sensitive plate, but in other instances the chemical action results from the evolution of vapour from the body under examination. The method employed by Dr. Russell consisted in interposing some opaque substance of definite outline between the sensitive plate and the body under examination, so as to afford an indication of the slightest action. It should be recollected that metals are not so stable as is generally supposed. Mercury is volatile at the ordinary temperature, a fact amply proved by the change of colour in gold leaf suspended above it, and by its effects on workmen employed in refineries. Zinc also, as demonstrated by the experiments of Colson, is volatile at ordinary temperatures.

Cadmium is a metal closely analogous to zinc, and from which similar results might *à priori* be expected. The two noble metals, gold and platinum, however, exert no reducing action on bromide of silver, a fact not unconnected with their high infusibility and consequent resistance to evaporation. In answer to the objection that the action of vapours arising from such metals as zinc and mercury is not sufficient to reduce the bromide of silver in the sensitive plate, the writer states that such action is sufficient to commence reduction, which is completed on development of the plate. In the case of zinc, for example, one molecule can disturb from their equilibrium a series of groups of molecules of silver bromide in consequence of the greater affinity which it possesses for bromine, and all the particles coming under its influence are afterwards reduced by the developer. It can further be readily imagined that the same particle of zinc vapour diffusing into the film affects the equilibrium of more particles of silver bromide and makes them capable of reduction by a developer. Hence the conclusion that the influence of metallic zinc is the result of the formation of a vapour is a perfectly natural one. This explanation receives further confirmation from what takes place at different temperatures. An elevated temperature is favourable to the formation of vapour, and, as a matter of fact, Russell found that a stronger action of the above metals on dry plates took place on raising the temperature. At 70° C. a strong action was observable within five hours, whilst at 0° C. only a trace of action was produced during the same period. The list of the various substances which have been classified as penetrable or impenetrable by the unknown radiations is another reason for considering vapours the active agents; for those bodies which permit the passage of the action are substances of cellular or fibrous structure, whilst fused substances of vitreous character are not pervious to the radiations. Paper, celluloid, gelatine, caoutchouc, and gutta percha are among those bodies which allow the passage of the action.

Wood charcoal exerts action, but not after having been ignited. When it is borne in mind that the difference between ignited and unignited charcoal lies in the fact that the first is pure, whilst the latter contains occluded gases and colouring matter, another reason for attributing the action to emitted vapours has been stated. Black net reproduces its outline, but not white net. The black variety is usually dyed with acetate of iron; it possesses a distinct odour, and gives off vapours. Pure white paper has no action, but straw paper has. The latter is obtained by treatment of straw with alkalies, and gives off an odour, a fact easily recognisable on smelling the inside of a box made of straw board. Copal dammar and Canada balsam are active. All these substances possess an odour. Some varieties of printing ink produce images, whilst others exert no action, a fact due to the very variable composition of printing ink. Any one who will apply the nose to printed matter will find that many inks evolve quite a strong odour. Dr. Vogel has shown that the fog experienced when using new dark slides is due to the oil used for polishing them. Vapours arising from wood, and even from old mahogany, are similarly active. Mahogany has commonly a strong odour. It has been shown that collodion paper is turned brown by wood, and that the veins depict themselves upon it in a definite manner. Contrasting the action of alcohol, benzine, ether, mineral tar, and crude wood spirit—liquids which exert very little action—with that of turpentine, the action of which is hardly any stronger, the author states that much depends on the conditions of the experiment. It is evident that less action will take place when little surface of liquid is exposed than when a thin film is spread over a rough surface, but the writer believes that the above considerations prove that the results obtained by Russell are really due to the action of reducing vapours.

ACTION OF OXIDE OF IRON ON GELATINE FILMS.

[Translated from the *Photo Gazette*.]

I WISH to call the attention of photographers to a curious accident due to the action of oxide of iron on the gelatine films of some negatives, and which affords an instructive example of the action which this substance exerts on organic bodies in general. It is, of course, a familiar fact that ferric oxide, as rust (Fe_2O_3 $3H_2O$), gives up a portion of its oxygen very readily to organic material like wood fibre, linen, &c., becoming thereby converted into ferrous oxide. Damp air reoxidises this ferrous compound to the ferric state, when it can once more give up its oxygen to oxidisable matter, these actions being capable of taking place over a considerable period, and enabling the oxide of iron to play the part of a carrier of oxygen. Organic matter is in this way subjected to a sort of slow combustion. The examination of a piece of wood in which a rusty iron nail has been long embedded will often reveal the fact that the wood around the nail has been destroyed as though by combustion. Being recently obliged to economise in the matter of water, I placed six negatives to soak in water contained in a large dish of enamelled iron. Four of these negatives were on hard and two on soft gelatine. The dish being in the dark room, I did not notice that the enamel was removed in certain places, and that in less than twelve hours a notable quantity of rust had formed. The negatives were placed flat in the dish in the morning, and were removed in the evening to be dried. They were covered with an extremely thin and uniform deposit of rust, which at some points had formed into little conglomerations, owing to the occasional movement which I had given to the dish in the course of the day. Both this film and the accumulations of rust had escaped my notice when setting the plates to dry, but, on bringing them out of the dark room the following morning, it was apparent that the deposit of oxide of iron had played its characteristic *rôle* of oxidising agent, and had destroyed the gelatine films, in many places eating right through to the glass, particularly in the case of the soft gelatines. One of the negatives, in which the action appeared to have been confined to the formation of cavities, was placed in water, when it was found that the gelatine had been rendered soluble. The negatives on hard gelatine fared the best. Although covered with numerous small cavities, showing the change which had taken place, they yet yielded prints. A. SORET.

MARINE PHOTOGRAPHY THIRTY YEARS AGO.

BEING AN ACCOUNT OF THE GREAT NAVAL REVIEW OF 1867.

IT is well sometimes to look back; it is instructive if not always profitable to do so, and varies the monotony of the eternal looking forward. At any rate, I could not help doing so a few months ago, when the great Jubilee Naval Review was the great talk of the day, for it took my mind back to another great naval review just thirty years ago. In the history of photographic progress it is a big jump from 1867 to 1897. How difficult marine photography was then, how easy now! All my adventures on that remarkable day, when the first naval review during the Queen's reign took place, are so fresh in my memory that I feel the following narrative of my adventures at the Great Naval Review of 1867 would not be altogether unprofitable reading to those who now find photography so easy. I am sure any old wet-plate worker will agree with me that, in spite of all the hard labour and general botheration attendant on the collodion process, the fact that each picture was fully developed on the spot furnished compensation, and the tired photographer felt he had earned a night's repose.

Englishmen are undoubtedly an amphibious race. The schoolboy spends at least half his summer holidays in the water, and the young lady, free from scholastic discipline, considers one hour per day not ill spent when employed in dancing and floundering, like a veritable mermaid, minus the comb and glass, in the clear, green waters of some shady seaside nook. Indeed, salt water seems essential to the perfect preservation of the English race.

How this intense love of salt water, so peculiar to us, has been brought about, I know not. It may be that from our insular position, and also from the fact that, as England is not the largest country in Europe, the salt-laden air appears to penetrate further inland than in most countries.

If my hypothesis be true, it may account for the intense interest excited throughout the the country when the announcement was made that a naval review would take place at Spithead, in order to show the Great Turk and others whom it might concern, that, through the agency of the engineer, iron monsters might be made as docile as the old wooden *Nautilus* which represented the navy of the past. It was necessary, however, to be at the seaside, and near the historic spot, to fully realise the excitement amongst the nautical population of Shanklin, where I was staying a week before the review. Not a day passed without the turning out of the marine inhabitants to criticise the proportions and general appearance of some warship on her way to join the fleet rapidly assembling at Spithead. It was impossible to be on the spot and not share in the excitement. In my case it was increased by the desire to make some photographs of the great event, and then to know how best to go about it. From Ryde Pier or from Southsea Beach the distance was at least two miles to the nearest ship, and five to some of those furthest away. It seemed impossible, therefore, to do more than secure a few instantaneous bits of foreground filled by eager spectators, and including as much of the fleet as might happen to show in the distance. On passing through the fleet, however, in a steamboat on my way to Cowes, I saw the full necessity of being nearer in order to produce anything worthy of so great an event. Could I have photographed from the deck of a steamer * the group of ships I then saw, I might have been satisfied, for the photograph would have indicated in some degree the immense proportions of the huge leviathans before me, but that was not possible. The passenger-boat only pauses for a moment to dip her colours, and to enable a melancholy band of five Germans to imitate Britannia ... to annihilate her rule on the waves—musically, at any rate, for the time being—and then we were off again. It is evident that salt water does not agree with the constitution of the saxe-horn, for never has it been my misfortune to hear such horrid sounds tortured out of any brass

* The modern photographer may well smile at this sentence, but he must remember that the events described took place thirty years ago. The Utopian dream of the period was to have a process so quick that one could photograph even from an express boat. The impossible of that period is now a reality; and still we are not happy

hing before, and I fervently hope such a martyrdom will never be my again.

After a day at Cowes, I determined to stop photographic work for a m and make the best arrangements possible for the great day. To hat end I went to Portsmouth, for I remembered I had a friend who ould serve me. Next to the deck of a warship where could I find so ood a point for operations as on one of the unfinished forts out at Spithead? That point settled, who so able to help me as Mr. L——, an nthusiastic amateur in the days of paper negatives, and an old musical riend? I was sure of efficient help from him, for he was the brother of he contractor of the forts, and the manager of the works then in progress. As I had anticipated, every help that could be rendered was reely given. A plan of Spithead, with the various forts in progress, was ooked at, and the likely one pointed out, and I started off with my apparatus to catch one of the contractor's steamers on its way to the orts. As the distance from my friend's office at the dock works to those at Stokes Bay, which was the starting point of the steamer in question, was three miles, I saw it was impossible to get there before the starting of the last boat for the day, I determined to sail out of the harbour in one of the Portsmouth wherries, and intercept, if possible, the steamer on its way. We tried to accomplish this, but the wind was against us, and we failed. There was nothing for it, therefore, but to sail, with unfavourable wind, to the selected fort, distant about five miles. The morning had been misty and unfavourable, with strong indications of coming change. Among others, a halo round the sun, with definitely marked prismatic colours; but now everything seemed to favour photographic operations. There was a brisk wind and advancing sea, with grand clouds overhead. The fleet had gone off in the morning, enveloped in a cloud of smoke, which shut out every trace of its whereabouts, thereby giving the numerous spectators a foretaste of what they might expect on the great day should the wind be contrary. There was just a possibility, therefore, that I might get to work before the return of the fleet, and, perchance, secure a picture of the dress rehearsal.

Before we had been long at sea we could just make out a host of white vapourous forms, apparently as unsubstantial as the clouds themselves and scarcely breaking the boundary line of sky and water. The fleet were returning under full canvas, as the wind was favourable for them though against us. Their forms steadily increased, but with amazing rapidity, like phantasmagoric images, until the outlines of the nearest ones were painfully gigantic. Our little cockle-shell was so hopelessly small, so snail-like, and so fragile, that it seemed a gross impertinence to be there at all. It is totally beyond my power to describe all I felt at that moment. I had witnessed the fascinating power of the snake on a helpless rabbit; I have read Livingstone's description of the power of the lion when, with death before him, he calmly speculated what would happen next, but could never realise the feeling till now. Silently but swiftly a double procession of gigantic forms, swan-like but antediluvian in their fantastic outlines, were bearing down upon us. Our pace was so tortoise-like that it seemed impossible to clear their track. There seemed nothing for it, therefore, left to do but to watch our destroyers as they came on, so beautiful but so cruelly determined to annihilate us for our indiscretion. The old boatman, a salt of sixty winters, shared in a lesser degree my feelings, for after we had just cleared the track of the *Minotaur* he said, "Well, master, that's what I call a close shave. Them are ugly customers to deal with, and we were in closer quarters than I like, I can tell you. Ye see these chaps can't pull up quick, even if they want to."

We soon landed on the fort, and as speedily as possible I had my tent up and was ready for work. But it was too late; the order had been given to furl sails, and, as if by magic, their gigantic wings had disappeared, and all that indescribable grandeur of outline which had impressed me so much was gone also. I had discovered also when I attempted to work that my ordinary lenses were quite useless for the work, for, though some of the ships were comparatively near, yet the distance was too great to render them otherwise than as dots upon the focussing screen. One thing consoled me, however, I had chosen my point well, for the port opposite me, 2000 yards away, and the Norman Fort, on which I stood, formed a sort of gateway through which the fleet must pass in going out to sea, and, should the ships come in again under canvas, and the wind remain in the west, should have the nearest point possible and at the same time be clear of the smoke of their guns. I decided, therefore, as the steamer was waiting for me and there was not time to pack up properly, to leave everything behind in charge of the lighthouse-keeper, and get back to London as speedily as possible for a larger camera and a lens of the longest focus possible to work with it.

On Monday morning I was on my way for Stokes Bay, again well prepared for work, for I had tried Dallmeyer's long-focus lens for groups, and found the back-lens adjustment help me considerably, for it enabled me to work with a very large aperture if necessary. I could get a picture home in a second, and therefore, with fine weather at sea, I could work as quickly as I desired, and yet get good definition. When I reached the pier I found it was blowing a gale and raining in torrents. Nothing, therefore, was to be done but wait patiently, for the steamboats had not been able to go near the fort since I left; and one of the barges, laden with stone, unable to bear her burden in such a sea, had turned bottom upwards and thus relieved itself. I had not a sufficient amount of the philosophy of Mark Tapley to be jolly on that day, nor on the day following, when the weather, if possible, was worse. I found it a grim kind of pleasure to stand all day on Southsea Pier and watch the misery expressed on the faces of those who were so unfortunate as to cross over from Ryde on that day. It was no pleasure, however, to see one of the mail boats so disabled by a collision with the pier, that it had to be towed into Portsmouth instead of proceeding on her journey. A tremendous storm of rain finished up the day, and then, as if by magic, the sun came out bright and golden just before sunset, and seemed determined to make amends for the past two days. The sea, which an hour before had been tearing and foaming in a most uproarious manner, was now tame and submissible. The distant fleet was lit up with long glinting touches of gold, and more distant Ryde became a golden city, for no baser metal covered its roofs at this moment. There was hope then for the morrow, for the old salts had said that such a gale could not last more than forty hours in July, and the time was up. To get my apparatus to the fort was now the great matter, for, as the contractor's steamers would not run on the day of the review, it was necessary to get them from Stokes Bay as speedily as possible. As the trains were hours behind time, this was an easier matter than I could have hoped for.

It was now half-past ten. A jolly young waterman at the station took me to his house to arrange for a start in the morning at four. "The father was out," a pale-faced woman said; "but, if I would come in, I probably would not have to wait long to see him." I waited till twelve, and, as beds were not to be had in Portsmouth for love or money, I made an arrangement to occupy the couch till four. The wind was again getting up—determined to be up before me—and as it howled round the house the woman's face wore an anxious expression. "My husband went out to the fleet on business, and should have been home at ten. Had I heard of an accident in the afternoon—of the upsetting of a launch, and the drowning of the captain and some others?" I said, "I had heard such a rumour, but had not learned details." She replied, "The weather is very bad, quite unsafe for small boats, for the wind blows in such short puffs that there is no time for one man, alone in a boat, to prepare for them, and I am never happy when he is away at night and the wind up." No more was said, for her face brightened and the anxious expression was gone, as an evidently well-known step was heard at the door, and the husband, a handsome, well-built man, made his appearance upon the scene, and was not a little surprised to see a stranger in his house at a most unseemly hour. We soon settled the preliminaries, and he promised to call me at four, though he said he feared I would not be able to go, as it was blowing up half a gale again.

At length four o'clock came, but with it more wind; so, as there was no present possibility of going out to the fort, we agreed that I was to join him at eight should the wind at all moderate, and I turned to sleep again. Later on, the wind did drop, and I was on the strand, but the boatman was not there. "I think he has gone out to one of the ships," said a neighbourly salt; so, after waiting half an hour longer, I hailed another boatman, and asked him to take me to the Norman Fort. He performed a most knowing whistle, and said to his mate, standing close by, "Here's a gen'man wants to go to the Norman. What d'ye say?" "Well," said the other, "it is to be done, but you'll have to shell out, for 'taint an easy job, and if it's to be done at all we must look alive, for it's blowing up again, and there's all the tide out there!" After a little bargaining, I was requested to jump in and look alive, and in a moment we were off.

VALENTINE BLANCHARD.

(To be continued.)

COMMITTEE ON ACETYLENE GAS-GENERATORS.

THE last number of the *Journal of the Society of Arts* contains the following announcement:—The Orders in Council regulating the use of calcium carbide and of acetylene gas (when the gas is under high pressures or liquefied) do not legislate for apparatus in which gas is generated from the carbide at low initial pressure, and of these there is now an immense variety before the public. Whilst the majority of such generators may be, and doubtless are, absolutely safe with ordinary precautions, yet some of them may, from want of adequate scientific knowledge of the properties of calcium carbide and of acetylene gas, be so constructed as to constitute a very serious danger in the hands of unskilled labour, and it is chiefly where unskilled labour is employed that the new illuminant now meets with the largest demand.

The Council of the Imperial Institute have authorised the holding of an Exhibition of Acetylene Gas Apparatus in the grounds of the Institute at an early date, and, in order to ensure that no apparatus should be admitted to the Exhibition unless it was shown to fulfil the requisite conditions of safety, the Council of the Society of Arts have appointed a Committee to decide upon those conditions, and to lay down rules for the admission of apparatus.

The following gentlemen have been appointed to act on this Committee:—Major-General Sir Owen Tudor Burne, G.C.I.E., K.C.S.I. (Chairman of the Council); Sir Frederick Bramwell, Bart., D.C.L., F.R.S.; Prof. James

Dewar, M.A., F.R.S.; Harry Jones, M.Inst. C.E.; Prof. Vivian B. Lewes; Prof. Boverton Redwood; Prof. W. C. Roberts-Austen, C.B., F.R.S.; Prof. J. M. Thomson, F.R.S.; Sir Henry Trueman Wood (Secretary).

The Committee has held two meetings, and have generally decided as to the conditions which the apparatus should be required to fulfil.

Full particulars will shortly be issued as to the regulations and rules laid down.

PHOTOGRAPHS ON LEATHER.

This process is due to the Farbwerke vormals Meister Lucius and Brüning, of Hoechst a/Main. Photographs on leather have hitherto been produced, it is observed, either by copying on transfer paper or by the pigment process, and final fixing on leather by transferring. This method is not only troublesome and uncertain, but also too expensive to be practically employed.

When ordinary leather is prepared directly with a sensitised emulsion, the emulsion soon decomposes. In the same way the gold salts of the toning baths decompose, that is to say, the leather treated with them becomes spotty, and finally turns black by the gold, &c., separating out. This is due to the chemical action which the substances contained in leather exercise by their reducing properties upon gold and silver salts.

The Company have succeeded in avoiding this injurious reducing action by preparing the leather, before it is treated with a sensitised emulsion, with a substance such, for instance, as collodion, which protects the silver salts of the emulsion, as well as the gold salts of the toning baths, against reduction.

The following is an example of the process. The leather intended for copying is put on a frame, and saturated on both sides with a solution of collodion of one half to one per cent. strength. After twenty-four hours the leather, upon which the collodion, apart from its mechanical protection, evidently has a chemical oxidising influence, may be covered with any sensitised emulsion, and then treated in the same way as prints and plates.

COLOUR PHOTOGRAPHY AT THE CAMERA CLUB.

The Camera Club always musters in strong numbers when its much-esteemed President (Captain Abney) is down on the list for a paper. And this is the more complimentary to him when it is remembered that a considerable section of the members is wedded to art, and is inclined to look askance at the claims of science; and that another section, while it regards scientific things with respect, has no great love for spectra, curves, and the mathematical formulæ with which the Captain is apt to illustrate his remarks. This is so well understood by the President, that he invariably takes up the chalk for blackboard demonstration with a pleasant allusion to the love which the Camera Club has for those things which by others would be described as abstruse.

With a few words of introduction by the Chairman of the evening (Colonel Waterhouse), Captain Abney began his paper, or rather his remarks, for he spoke without notes. His subject was "The Colour Process by Professor Joly," a subject which, it will be remembered, was first brought to the notice of photographers at the meeting of the Convention at Dublin four years back. But, before commencing the matter set down for him, the President had something to tell the members of the Club concerning certain experiments in which he had been engaged, which had reference to the three-colour process worked out by Mr. Ives and modified by Professor Joly. He regarded the Camera Club as a fit and proper receptacle for useful hints, and he trusted that what he had to say would come under that category. He had lately worked out a method by which colour screens could be made from definite data, instead of the trial by error process by which the work had previously been done. So long ago as the year 1860, Clerk Maxwell had shown that the three colours—red, green, and blue-violet—were capable of making all the colours of the spectrum. Ives had worked this out, and shown in a very beautiful manner, by superposing the three positives from special negatives conjoined with coloured screens, how theory could be reduced to practice and the most exquisite results obtained.

The coloured screens must embrace certain parts of the spectrum and overlap one another, as he was able to demonstrate by means of curves drawn on the blackboard. The three negatives necessary for working out most colour processes must correspond to those curves. Captain Abney then described how, by means of certain films prepared by Mr. Warnerke, it was possible to reduce the luminosity of prominent colours so as to obtain constant densities throughout the spectrum, and make a colour sensitometer by which screens could be prepared or corrected. Glasses could thus be measured and tabulated in such a manner that screens could be obtained for any particular plate.

The colour process of Professor Joly differs from that of Mr. Ives in that he produces his three negatives on one plate. In taking the photograph of the coloured object, he places against the plate in the camera and in contact with it a screen of peculiar construction. It is of glass, and is ruled with lines of such a breadth that 200 are contained within an inch. These lines are transparent, and are coloured blue, green, and orange, the three colours following one another, and being repeated in that order from one side of the screen to the other. The resulting negative has somewhat the appearance of the negative used for process-block printing, only that the lines are continuous instead of being broken up into dots. From this negative a transparency is made, and this is associated with a lined screen of the same character, called the viewing screen, the only difference being that in the latter the colours are more pronounced, and consist of blue, dark green, and red in consecutive order as already described. For his colour effect the inventor relies upon the circumstance that the eye cannot separate lines very close together, and the pictures shown on this occasion on the lantern screen with the electric arc light were somewhat trying to the process. The spectators should be at least six diameters of the lantern sheet distant from it, and this was impossible with the limited space of the room at the Camera Club.

The lecturer explained that he had prepared his illustrations under such a pressure of work that he had not had time to put them in the order which was desirable, and that the examples of Professor Joly's method had only reached him by post just before he stepped on the platform. He was therefore obliged to ask the indulgence of the Club for pausing in his remarks while the right illustrations were sorted out by the lanternist.

The specimens of the new colour process were very effective, but from their nature they had more the appearance of designs for tapestry than anything else, and one could not help thinking how valuable such a means of reducing pictures to line form would have been found by our ancestors, who at one time regarded the loom as being as important a means of artistic expression as the palette and brush.

As we have seen, the great advantage of the Joly method is the use of only one negative and a single transparency. The direction in which it could be improved is the reduction in the size of the lines, so as to get something more than 200 per inch.

In the discussion which followed Captain Abney's remarks, this necessity of increasing the number of ruled lines was dwelt on by many speakers, who at the same time acknowledged the mechanical difficulties involved. Captain Abney said that he knew that Professor Joly was endeavouring to increase the number of lines per inch; but he himself thought that it would in the future be possible to make light itself rule these lines by diffraction, when, instead of hundreds, we could have at command thousands to the inch.

Mr. Cadett regarded the lecturer's remarks with regard to colour measurement as highly valuable. He had himself been working in the same direction, and was now engaged in making an instrument which some day he hoped to describe to the Camera Club.

The discussion after this became of a desultory character, and gradually drifted into the direction of colour blindness. Mr. Storey thought well of the Joly process, but objected to the straight lines. Could they not be made wavy in character? Whereupon a member remarked, in an under-tone, that perhaps the thing could be done if they lubricated the ruling machine with whisky instead of with oil.

Mr. Wilmer's experience with colour-blind persons was interesting. He had tested some 300 for colour blindness, and the mistakes some made in their estimate of colour were ludicrous. He tested them by the Holmgren method, with coloured wools, and had to reject as being wo fully colour-blind only eight persons out of the 300. Professor Holmgre himself, it may be remembered, who tested the entire *personnel* of one o the Swedish railway lines, did not obtain such a favourable result.

The meeting closed with the usual vote of thanks.

EXHIBITION OF THE WEST SURREY PHOTOGRAPHIC SOCIETY.

The Tenth Annual Exhibition of the work of members of the Wes Surrey Photographic Society was held at the Stanley Restaurant, Laver der Hill, S.W., and was open free to the public on the evenings of Wed nesday, Thursday, Friday and Saturday of last week.

The Society succeeded this year in organizing an exhibition which wa distinctly better than any held in previous years, and, if the same rate o progress be maintained, we shall expect to find the successors of the pr sent Exhibition ranking among the important exhibitions held within th metropolitan area. In place of the unsuitable room in which the la two or three exhibitions have been held, this year we found a hall ha been secured of admirable proportions and sufficiently large to enable th pictures to be displayed to advantage. The average quality of the pi tures themselves, too, was undoubtely higher, and a considerable propo tion of them were framed tastefully.

The Judges (Col. Gale and Mr. Staynes) were empowered to give certi cates of merit at their discretion, and seven of them were awarded: five the class for landscapes, one for a portrait and one for a lantern sli In the Landscape Class the successful exhibitors were Messrs. J. I. Pric W. H. Wilshere, H. P. Hodd, G. Bottle, and E. W. Burch. The membe of the Society seem to devote themselves almost entirely to landsca

rk, for, out of a total of 131 pictures in the members' classes, no less an 107 were landscape Mr. E. W. Burch is evidently an industrious rker, for he contributed at least a dozen pictures, almost without exception admirable. The Judges selected *A Summer Evening on the Thames* the best, a work which has recently received recognition elsewhere, but veral others among his works seemed to us almost as good. In suggesting that a little more variety in the treatment of his subjects would ake his work more interesting, we do not intend it to be understood at it is not interesting as it is. Mr. J. I. Price's *Thames Embankment*, delicate little picture, was certainly his best work, and we doubt if any e would be likely to question that the *Path by the River* was Mr. W. H. ilshere's, and his frame of twenty prints, each by a different printing prosss, was interesting. Mr. H. P. Wood had several pictures wich we arked on our catalogue as noteworthy. That for which he was awarded certificate was without a title in the catalogue. It was a carbon print canvas, and the effect was extremely good. Mr. G. Bottle had two three good pictures in addition to his *Southwark*, which the Judges arked.

Mr. W. J. Channon's *Morning Views* were pictorially treated, and Mr. J. lbeck's prints, which we understand are by a process of his own, were teresting from that fact. The process seems to have possibilities in it. The Portrait Class was a very small one, the only picture works of embers being a *Study* by Mr. H. P. Hodd, which received a certificate, d *Blackberry Gathering* by Mr. E. P. Burch. We should not omit to ention, however, some frames of portraits by a member of the Society, r. W. M. Wolfe, a professional photographer, which show rather more aracter than is found in most professional work.

Mr. J. Faulkner received the certificate for lantern slides.

In a small section devoted to works obtained by invitation, Mr. George vison and Mr. Paul Martin each have an interesting series, and Mr. G. James (President of the Society) shows a selection of his works.

ASTMAN PHOTOGRAPHIC MATERIALS COMPANY ANNUAL MEETING.

HE Eighth Annual General Meeting of the shareholders of the Eastman otographic Materials Company, Limited, was held on Monday, March , at the registered offices of the Company, 43 Clerkenwell-road, E.C. r. Andrew Pringle (the Chairman of the Company) presided.

The Acting Secretary (Mr. J. M. Whitchurch Bennett) read the notice nvening the meeting.

The Chairman said: You are all by this time aware that, when we ve only a pleasant state of circumstances to discuss, meetings of our areholders are apt to be not very numerously attended, and it is, oreover, a matter for regret for us to-day that the weather should be inclement as to make your attendance even smaller than it otherwise would have been. As I have already said, we have on this occasion nothing but pleasant circumstances to discuss, and our balance-sheet is ample proof of that. The balance-sheet is of such a nature at I do not believe it will be necessary for me to enter into it at y length. We have tried to make it as simple and as easy to be derstood as possible, and the matter contained in it is so satisfactory at it it will be unnecessary for me to discuss it at all. At the same he it must be clearly understood now, as always, that, if there is any nt in the balance-sheet which is not plain to any of you, it is only for u to ask for an explanation, and I venture to say it will be forthcoming. other introductory point I might mention now is the fact that you are called the meeting in this building. Of course, I need not say that we do propose to make it a practice to call our shareholders together on our n premises, but on this occasion we wished to follow out the course ich we have always tried to pursue, namely, to take our shareholders far as possible into our confidence. The meeting is held here to-day, order that you may see what we are doing, and what we are expecting be able to do in the future. You are at liberty as soon as the meeting over to inspect the premises, to see how large and commodious they , and I think you will find, if you inquire, that they are extremely l arranged for the business of the Company. I need hardly point out t the spaciousness and the commodiousness of the premises are not y matters for the personal convenience of the staff, but they also bear the most direct way on the economy of management, and consuently, I put it to you that the acquisition of these large and comdious premises in Clerkenwell-road is a matter that will lead directly economy in the organization and distribution of our affairs. I may that all along the line things are progressing as pleasantly as it is sible for them to do. We have initiated certain new movements since met last year. The first and most important of these, the acquisition new premises, I have alluded to. Our Cheapside branch has been ng very well indeed all the time; our Oxford-street establishment keep on as a retail branch, and we expect to do very good business eed at the remarkably good premises that we have acquired in Regentet.

These premises are not yet fully prepared for opening, because there been a considerable amount of trouble with regard to legal matters. is is Crown property, and we have to get many assents before we can make structural alterations. There is no hitch of any sort beyond this difficulty of seeing a great many persons. In Berlin we have made a step in advance by securing additional premises for retail business on Friedrich-strasse, which I believe, and, in fact, know, to be a leading business thoroughfare in Berlin. In France also we have since our last meeting secured a very much more attractive site than we had before. Both the Paris and Berlin businesses are answering every expectation and are doing extremely well. The French business has been a very great success, under the able management of Mr. H. M. Smith, who is personally known to many of you here. To come to details, I am happy to know that a considerable number of those present are practical photographers, and I am also one, as you know. I say from personal experience that during the past year we have introduced two new lines of cameras which are certain to be successful—which, in fact, already are successful, and are certain to be more successful in the future. Of course, I allude to the 5-inch by 4-inch cartridge Kodak, which is admirably suited to be carried on a cycle, and that, I believe, has a very great future before it. Another, more or less of the same sort, is what we call the folding pocket Kodak. Now, all practical photographers, like myself, who have used these two cameras will, I am quite sure, bear me out when I say that they have in them every element of success. Our opinion is distinctly that these are the very best things of the kind at present on the market, and you will know that it is our intention from time to time to bring out novelties of the same description. Therefore it is our policy to keep on improving and introducing from time to time improved apparatus of various kinds. As I said at the beginning, I need not go in detail into the items of the balance-sheet, but, I repeat, if any of you wish for detailed information with regard to the accounts, you have only to ask. The report is, as usual, brief and to the point.

Having tasted and explained what is contained in the report and balance-sheet, you will naturally desire to have some information with regard to a matter which is omitted from the report. I refer, of course, to the organization of the Company to take over the businesses in Europe and America. Under the contract authorised by you in April last, the accounts of the Company had to be made up, and the profits ascertained to September 30, 1897, and it was not until the end of November or the beginning of December that this portion of the work was completed. The capitalisation was fixed, in accordance with the terms of the contract, at £2,000,000 sterling, a very influential board of directors was obtained, and matters were ripe for the public issue of the stock. It was then suggested to Mr. Eastman that to ensure an enthusiastic reception of the scheme by the public it would be wise, in the interests of all concerned, to reduce the capital to £1,600,000. Mr. Eastman readily agreed to this proposition, because the shares of the reduced capital would be of greater market value than the shares of the larger capital, and the loss to him would be more apparent than real; but this concession raised a difficulty. The shareholders in the English and American Companies had given the most generous reception to the proposal. In England, with the applications for shares in excess of the number claimable under the scheme, the total number of shares asked for, or underwritten, equalled, if they did not exceed, the amount payable in cash, and a very generous support was also given by the American shareholders; but the scheme had, in fact, been altered in a material particular, and while the variation was entirely in favour of the present shareholders and of the public, who would be asked to subscribe to the issue, yet, as a matter of law, it was possible that the alteration might destroy the validity of the applications received. The agreements with the American shareholders would expire on April 1 of this year, and, as it was impossible to get confirmation of the alteration in time, it was determined to postpone the issue until new contracts were obtained, and Mr. Eastman is now in America for that purpose. At the time our report and balance-sheet were issued we had no definite news as to the success or otherwise of Mr. Eastman's efforts, and so it was thought desirable to make no reference in the report to the subject, but the letters since received from Mr. Eastman show that the matter is being favourably taken up by the American shareholders, and there is now no reasonable doubt about the ultimate success of the project. Only half an hour since we received a further cable from America which confirms this. The scheme is of great importance to the English Company, and we think it is equally in the interest of the American shareholders. So soon as matters have developed to a point which justifies calling you together, we shall convene a special meeting, and submit to you new contracts on amended terms. I am not able to tell you at the moment when this will be done; there must be considerable delay owing to the fact that the shareholders on the other side are scattered over North and South America. I may say, in conclusion, that, if the Directors of this Company ever entertained any doubt as to the wisdom of the scheme in the interests of the business, they have none now, and they anticipate a very successful future for the Company. I think that what I have said is all that is necessary in putting before you such a satisfactory report and balance-sheet as the one we have under our consideration to-day, and therefore I conclude by moving the adoption of the report and balance-sheet.

Mr. George Dickman (Managing Director) seconded the resolution.

Mr. Spiller expressed his supreme satisfaction at the nature of the report, and heartily congratulated the Directors on the result of their year's work. There was one item in the balance-sheet, however, which

he thought was something of an injustice. While he saw that so large a sum as 60,970*l.* was carried to the credit of profit and loss, he also saw that only the infinitesimal amount of 304*l.* 17*s.* 10*d.* was paid for Directors' fees—only one-half per cent. of the profits. He thought this was far too small a remuneration for such services as the Directors had rendered, and he should like to propose, as a purely voluntary offering on the part of the shareholders, that some further sum be awarded to the Directors.

The Chairman said that might be a matter for after consideration. At present they were considering the adoption of the report.

The resolution was then put to the meeting and carried unanimously.

The Chairman then said, with regard to the extremely kind suggestion of Mr. Spiller, it was a fact that the Directors were now receiving only 250*l.* a year in fees, though they were entitled by the Articles of Association to draw 400*l.*, while, at the same time, neither himself nor his colleagues had charged anything for travelling expenses for attending the meetings; but it had not been a pecuniary question with him—what he had done was a labour of love for the well-being of the Company.

Mr. J. W. Pritchard thought that the matter might be left to the Directors themselves.

Mr. Spiller thought it would be better that the shareholders should vote a definite sum as a mark of their satisfaction with the work of the Directors, and he therefore proposed: "That a sum of 600*l.* be offered for the acceptance of the Chairman and his co-Directors as an honorarium to signify the gratification of the shareholders at the results of their labours during the past year."

Mr. Jay seconded the resolution, which was carried unanimously.

The Chairman said he was surprised and gratified at the resolution, not so much because of the money, but because it showed that the shareholders appreciated the Directors' services.

The Chairman next moved "that a dividend of twenty per cent. per annum, less income tax, on the preference and ordinary shares of the Company for the year ending December 31, 1897, be, and the same is hereby declared, the interim payment of ten per cent. part thereof having been paid in July last, the balance of ten per cent. to be payable forthwith."

Mr. George Davison seconded the resolution, which was carried unanimously.

Mr. Jay moved "that Mr. Henry A. Strong be re-elected a Director of the Company."

This was seconded by Mr. Wright and carried.

On the motion of Mr. Whatton, seconded by Mr. F. W. T. Krohn, Mr. Andrew Pringle was also re-elected a Director.

The auditors (Messrs. W. S. Ogle & Co.) were then reappointed on the motion of Mr. Harold Senier, seconded by Mr. Wright.

The Chairman, in inviting the shareholders to inspect the premises, said that it should not be forgotten that a very great part of the success of the year's operations was due to the energy and ability of Mr. Dickman, the Managing Director. They had also received very valuable assistance from Mr. George Davison.

The proceedings closed with a vote of thanks to the Chairman.

Our Editorial Table.

The Voigtlander Portrait Euryscope.

Voigtlander & Sohn, 92, Hatton-garden, E.C.

This series of lenses is constructed in the form of a symmetrical doublet. The full aperture is *f*·4·5, and the included angle is 56°. We recently had an opportunity of placing on the camera the No. 5 of the series, which, with an equivalent focus of 13½ inches (approx.), serves for taking a portrait on a whole-plate. At *f*·4·5 the definition is admirable, and an evenly illuminated, well-modelled image is obtained. The series seems well adapted for portrait work, and appears to bear out the makers' claims of having great depth of definition, and extra rapidity on account of the colourless glass used.

Our *confrère*, Mr. F. Dundas Todd, editor of the *Photographic Beacon* (Chicago), in forwarding us the second edition of Inglis's very instructive little book on *Artistic Lighting*, draws our attention to the quality of the half-tone illustrations which, in their way, are superb. Mr. Todd says: "The book is having quite a run here, the sales totalling about a hundred a week. Already it has had a wonderful influence on photographers, as you will see when I send specimens along in the fall. We are having a great big boom in amateur circles in this country, and the demand for goods is something astounding. I am turning out about a thousand books of all kinds every week, and I sometimes wonder what it will be like when the snap-shot season opens in June. I shall not be surprised if my total output for 1898 amount to 100,000 books; and only two years ago I was told on every hand that the American people would not read books!" Such cheery news concerning the progress of photography in the States is gladdening to the eye of an English photographic editor who is seldom addressed in a similar manner by his home correspondents.

The Warwick Dry Plates.

Manufactured by the Warwick Dry Plate Company, Warwick.

Samples of this newly introduced plate have been sent us for trial by the Company. On each box there is printed the approximate speed of the plate, as it may be expressed according to the four following systems:—Warnerke sensitometer, 25; Hurter & Driffield, 100; Watkins' meter, 100; Wynne's meter, 78. The formula for development is thus given:—

No. 1.	Pyrogallic acid	1 ounce.
	Nitric acid	20 drops.
	Water	80 ounces.
No. 2.	Sulphite of soda	10 ounces.
	Carbonate of soda (crystals)	9 ,,
	Water	80 ,,

Add the acid to the water before dissolving the pyro. For correct exposure, use equal parts of Nos. 1 and 2. For over-exposure, use more of No. 1, or add a few drops of ten per cent. bromide potassium solution. For correct exposure no bromide is necessary.

Coming to an estimate of the qualitative character of the Warwick plate, based upon an experience obtained by some camera experiments, we should say that it is quite rapid enough for all kinds of ordinary work. In prolonged development the plates do not fog, the image yielded is fine in the grain, and negatives of excellent density and gradation appear to be readily secured. The Warwick plate, in fact, is an extremely easy one to develop, and is evidently very carefully prepared, as upon development and fixation a clean and flawless deposit is left. It has a liberal coating of silver, and on an ordinary dwelling-house interior failed to show traces of halation. A good and uniform plate is certain to make its way in popular esteem, and the Warwick plates have only to be equal to the samples we have tried to be sure of a very wide vogue among photographers.

Diphenal.

A. & M. Zimmermann, 9 and 10, St. Mary-at-Hill, E.C.

Diphenal, one of the recently introduced new developers, is chemically di-amido-oxydiphenyl, and it is the production of the Actien-Gesellschaf für Anilin-fabrikation, of Berlin. It is sent out in the form of a readil prepared solution of a brown colour, and the following are the direction for its use. For correctly exposed plates take:—

Diphenal	1 part.
Water	15 to 20 parts.

For over-exposed plates—

Diphenal	1 part.
Water	8 to 10 parts.

and for under-exposed plates take—

Diphenal	1 part.
Water	20 to 25 parts.

Diphenal is primarily adapted for use in cases of over-exposure. T modes of development are available for an over-timed plate. Either may be allowed to remain in the developing bath until the lights ha assumed sufficient density, the shadows being left entirely out of accoun or, on the other hand, development may be terminated before the ligh show sufficient density, the negative afterwards being corrected by mea of the ordinary mercury-ammonium intensifier. The addition of potassiu bromide to the developer is not necessary. When treated with a soluti of diphenal 1:20, correctly timed plates are fully developed in about t minutes. In the case of considerably under-exposed plates it is well add to the developing bath a few drops of a ten per cent. soluti of caustic soda. Such plates may safely be developed for half an ho or even longer. Whenever it appears doubtful whether a plate has be correctly timed, it is advisable to ascertain whether the exposure has be correct, insufficient, or excessive. This is done by means of a soluti composed of one part of diphenal and twenty parts of water. As so as the nature of the exposure becomes evident, development must completed in a suitable bath. Diphenal, even with correctly expo plates, is slow and deliberate in action. It does not stain the film, a gives bright negatives, the high lights of which attain great density wi out clogging. We should imagine diphenal to be well adapted for tra parency work and negatives of a highly contrasted character. In acti it appears somewhat to resemble glycin, and it is an extremly pleasa if slow, developer to use, throwing down a rich brownish-black deposit

Catalogues Received.

W. Butcher & Son, Blackheath.

IS catalogue, which is devoted to setting forth the features of the ll-known Primus cameras and apparatus, should be found extremely eful to the amateur photographer at this time of the year. In the urse of its 270 pages it details and illustrates almost every requirement practical photographic work, and includes mention of many inte- ting novelties. The catalogue is decidedly useful to have at hand for erence.

Jonathan Fallowfield, 146, Charing Cross-road, W.C.

E occasion of Mr. Fallowfield's annual stocktaking clearance sale has n seized for the issue of a job catalogue of bargains in apparatus, terial, &c. A glance through the forty pages of the catalogue reveals the t that there is an unusually wide choice for bargain-hunters, who may advised to send for this useful compilation. Mr. Fallowfield also ds us his List No. 1 for 1898, which includes reference to the latest velties on the market.

KE Lenses for Photography is the title of a tastefully got-up little phlet issued by Messrs. Taylor, Taylor, and Hobson, of Leicester. s devoted to an illustrated exposition of the optical properties of the ke Lens, and is sent free to applicants.

Maguire & Baucus, Limited, 3, Warwick-court, High Holborn, W.C.

s little catalogue is confined to one theme—viz., animated photo- phy and the apparatus and materials required in that branch of work. firm's speciality in cinematographic apparatus is called the "oscope," and the greatest prominence in this catalogue is given to it, le much is made of the necessary accessories. Those interested in matography should procure Messrs. Maguire & Baucus's catalogue price-list, as it forms quite a useful guide-book.

EIVED: Results of Meteorological and Magnetical Observa- s at Stonyhurst College Observatory, 1897.

News and Notes.

HOTOGRAPHIC Club.—Wednesday evening, April 13, at eight o'clock. bers' Open Night. Slides, &c.

ISS Catherine W. Bruce, of New York, will give to the Yerkes ervatory, Chicago University, a photographic telescope of 10 inches ture and 60 inches focal length.

MONG the exhibits of Messrs. John J. Griffin & Sons, Limited, 22, Garrick- t, Covent Garden, London, W.C., at the forthcoming Crystal Palace ibition, will be specimens on the Nepera Chemical Company's Velox lopment printing papers; the Climax sensitised albumen paper; the printing-out paper, a gelatine emulsion with a hardened film which can orked without alum or other hardeners in the hypo bath, and can be d in a separate gold bath without sulpho cyanide; Rubens P.O.P., a odio-chloride paper; Nepera bromide papers, a model of a photographer's io, Acme burnishers, silver gloss starch mounting solutions, photographic nts, copper and zinc polished plates for photo engravers, X-ray apparatus, rescent screens, and other appliances.

HE Blairgowrie and District Photographic Association have been successful ecuring a lease of those premises, belonging to the trustees of the copal Church, formerly occupied by C Company 5th V.B.R.H. as a drill- and armoury. The building will be thoroughly repaired and decorated he proprietors, and the Association, on their part, will see that no effort ared to fit it up in an up-to-date manner for the convenience of their bers. The hall will be fitted up as a permanent Exhibition of photo- hic work by the members and others, and the Association will be very eful for any specimens of work from photographic firms, which they will appy to give a place on their walls. In the winter season lantern and r entertainments will be held here. The room used by the volunteers as rmoury will be fitted up as a dark room, and this will be open to photo- hers visiting Blairgowrie on the same terms as formerly.

HE late Rev. Locke Macdona.—Mr. Pringle has been kind enough to ur us with the following particulars relating to the late Rev. Locke dona, whose death we announced last week. "Locke Macdona was the gest of seven brothers, all of whom were clergymen of the Church of and. His eldest brother was first a clergyman, then a barrister, and is M.P. for Rotherhithe, with a specialty in derelict vessels. Mr. Macdona Vicar of Cheadle Hulme, Cheshire, before he went to Acton, and he had a medical degree. He had worked at photography in various branches nany years, and was chiefly given to experimental work in chemistry and anics; in these directions he was quite an enthusiast. He never exhi- t that I know of. His end was very sudden. He had been consulting lon physicians about some symptoms that had troubled him for a time, they gave him rather a disturbing diagnosis; he got home, and next caught a severe chill, and was dead within a week, his mind clear to the He left his photographic apparatus to his brother, the Rev. A. M. dona, Vicar of Halston, Hastings. He was a very quiet, unassuming, but oughly enthusiastic, amateur."

A Copyright Case.—In the Queen's Bench Division of the High Court on Friday last, April 1, before Mr. Justice Day and Mr. Justice Bruce, sitting as a Divisional Court, a case was heard, in which a photographer named Brown, carrying on business at Nottingham, sued another, named Henson, in respect of a breach of copyright. Mr. Marriott, on behalf of the plaintiff, said it was a motion for judgment, in default of defence. The defendant did not appear, and was not represented, in that Court, but, for the information of their Lordships, he would mention that the plaintiff was suing for penalties and damages under the Copyright Act of 1862, in respect of an infringement by the defendant of the plaintiff's copyright. An injunction was also asked for. The photographic prints, in respect of which this action was brought, represented local views of Nottingham. They were duly copyrighted by the plaintiff, who first produced them in October 1896, and, although he did not openly place them on the market, he sold upwards of 60*l.* worth during the first year, but during the past year, although they have been openly placed on the market, he had only sold 9*l.* worth. He attributed this to the fact that the defendant had infringed his copyright, and was selling the unauthorised copies at a lower price than the plaintiff charged. Although the plaintiff asked for 50*l.* damages, he would be content with any reasonable sum the Court might fix. Mr. Justice Day remarked that the matter ought to go before the official referee, to ascertain the actual damage. Mr. Marriott said he would do that. Their Lordships granted the injunction asked for, restraining the defendant from selling any infringed copies, to deliver up to plaintiff all infringements in his possession, and the damages to be ascertained by the official referee, with liberty to the plaintiff to mention the matter in Court again if found necessary.

Plymouth Exhibition.—The Third Annual Exhibition of the Plymouth Photographic Society, held on March 28 and 29, was in all respects very gratifying. It was much larger and better arranged than in the two previous years, and the quality was distinctly higher, and the attendance much in advance. On the walls were seen little P.O.P., and that little was of matt surface. There was quite a respectable representation of carbon and platinotype work, but only one example of gum bichromate. Two frames of prints on Velox paper were shown, and one member had used Argura paper with fine effect for architectural subjects. But the largest proportion of the 182 works by members were on bromide paper, in the majority of cases being enlargements, in which the Society may be said to excel. Among those who contributed such enlargements were Mr. Micklewood, the President; Mr. W. Aver Duncan, Vice-President; Mr. T. Stanning, Hon. Treasurer; Mr. W. H. Harris, Hon. Secretary; Mr. J. F. Trend, Mr. J. D. Turney, and Mr. T. J. Dunstan. Mr. Aver Duncan also had large and very fine carbon work in sea and sky effects. A contribution by Mr. W. C. Johns was of remarkable merit for one who took up photography less than twelve months ago. He has been as successful as he has been ambitious, for all his works were either by the carbon or platinotype process, and he has tackled portraiture, landscapes, seascape, and *genre* subjects with equally good result. Mr. W. Collier James was the only exhibitor of flower studies, and his *Orchids* was very fine. Rev. G. Hermon had several telling Venetian canal pictures, and Mr. W. H. Mayre good architectural studies. Other capital contributions were made by Messrs. F. E. Bowden (Swiss mountain scenery), Algate, A. Moore, J. Anning, W. E. A. Drinkwater, and H. S. Hill. On the Wednesday evening an exhibition of members' lantern slides attracted a large gathering to the Athenæum.

Stereoscopic Projection of Lantern Slides.—Mr. G. H. Bryan writes to *Nature*: "In your report of the meeting of the Physical Society on February 26, p. 454, I notice an account of the exhibition, by Professor T. C. Porter, of a somewhat complicated apparatus for exhibiting lantern slides in stereoscopic relief. An equally elaborate arrangement, depending on the use of polarised light, was exhibited at the British Association at Nottingham in 1893. It may possibly, therefore, be of interest to call attention to the much simpler means of accomplishing the same result which suggested itself to me some time ago, but I subsequently found that it had been invented previously by Lieut.-Colonel Moëssard under the name of *monocular* stereoscope (*Cosmos*, May 23, 1896). In this stereoscope one eye views one of the pictures directly, while the other eye sees the other picture after reflection at two mirrors, the angle between whose planes can be adjusted so as to bring the image into apparent coincidence with the picture seen by the first eye. In viewing distant pictures, such as lantern slides, a projecting partition, with a flange whose breadth is nearly equal to the distance between the two eyes, is all that is necessary to prevent either eye from seeing the wrong picture. For lantern work, either two pictures could be projected side by side with separate lanterns, or two small views could be photographed side by side on the same slide, and thus enable stereoscopic effects to be shown with a single ordinary lantern. Moreover, by turning the arrangement of mirrors through 90° it can be made to displace the image seen by one eye *vertically* instead of horizontally. This would enable the two pictures of an oblong view to be projected *one above the other* instead of side by side, and viewed with the same apparatus as before, but differently arranged. As regards the foreshortening of the upper picture, this would be to a great extent compensated for by the fact that the lantern itself projected the picture upwards. It is evident that two pairs of mirrors, one for each eye, could be used if desirable."

Death of Mr. James Abbot, of Dundee.—By the death of Mr. James Abbot, Dundee, the photographic art has lost one of its earliest pioneers. Born in Dundee seventy-six years ago, James Abbot was at a very early age apprenticed to the trade of mechanic, but constantly showed a marked artistic tendency, and, as a boy, eagerly availed himself of every opportunity of studying works of art. Some fifty years ago, when photography was yet in its infancy, and apparatus not so easily procured, Mr. Abbot's knowledge of the nature of optics enabled him to make a lens for the purpose of taking a sun picture. Out of the bottoms of ordinary tumblers he succeeded in making the desired instrument. This lens was exhibited at a photographic exhibition held in Dundee a few years ago, and is still in existence. From that time onwards

Mr. Abbot's enthusiasm never cooled, and he continued vigorously his researches and study of the art. In 1858 he started a business in Dundee, which has been successfully carried on ever since. In these days a knowledge of chemistry was absolutely necessary for the expert artistic photographer; Mr. Abbott possessed this knowledge, and almost as soon as collodion was anywhere heard of he manufactured that wonderful material for himself, and continued to do so during all the years the wet process was in vogue. Along with his most intimate friend, the late Mr. Rodger, of St. Andrews, Mr. Abbot exhibited some beautiful specimens of his art in one of the earliest exhibitions in Edinburgh, when the highest praise was awarded to them for the high artistic nature of the work. There always existed a great similarity between the work of the two artists. Mr. Abbot made many improvements in the art, and about thirty years ago he discovered a new method for washing silver prints, the object of which was to render the pictures more permanent than had ever been possible before. A paper on this subject was read at one of the annual meetings of the Photographic Society of Scotland in Edinburgh, when it was highly commended. Mr. Abbot was not only a photographic enthusiast, but a man of a very scientific turn of mind, and there were few subjects with which he was not conversant and upon which he could not talk in an interesting and instructive manner. He was never happier than when assisting others, and many a photographer of the present day can tell how he has been helped by Mr. Abbot's kind advice, and how ready he always was to give to young photographers the benefit of his knowledge and experience. To those who knew Mr. Abbot an hour spent in his company was always interesting, he had so much to relate of the early days when people were not so enlightened as to the secrets of the dark room as they are now. Mr. Abbot was married fifty-four years, and the happiness of his home circle was unbroken until the death four years ago of one of his sons, and, a little over a year ago, the death of his youngest daughter was a great blow to Mr. Abbot; from that time he seemed to lose much of his interest and joy in life. Mr. Abbot lived to see all his photographic comrades pass away, and by his death the last of the old school of photography is gone. Successful in all branches of his art, and particularly so in photographing old people and children, many will remember with great pleasure their visit to his studio in Constitution-road.

CROYDON CAMERA CLUB.—The Annual Dinner of this flourishing local Club of photographers took place at the King's Arms on Wednesday, the 30th ult. The chair was taken by the President (Mr. Hector Maclean, F.G.S., F.R.P.S.), and he was supported by a large number of members of the Society. To Mr. Thomas Bedding (Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY) was allotted the task of proposing the joint toast of "Club and President." This he did with the deliberate and kindly humour which always characterises his speeches, his remark that the Club was to him like "an oasis of photographic sweetness set in the Sahara of Croydonian Vigilantism," being but one of the many flashes of pleasantly sharp wit which embellished his discourse. Respecting the President, his description of that gentleman was so eulogistic that the latter will need to make a severe and sustained effort to deserve only a tenth of the good qualities attributed to him. Mr. Hector Maclean, replying, stated that, when, in 1890, he persuaded some forty gentlemen to band themselves together, scoffers prophesied that the Club would be dead in six months; instead of which, after eight years, they numbered over one hundred members. He also drew attention to the all-day outing to Tonbridge, which Mr. Carley had organized for Good Friday, when a first-class saloon, a romantic castle, the picturesque reaches of the Medway, and a goodly company of enthusiasts would be in evidence. Having referred to the likeness which a bad photograph of the gum variety sometimes bears to that pictorial production which a wag described as having come

"... into being one night last week
When a cat tipped over the ink,"

he added that too many amateurs were like the sick nurse who said, "I'm not trained; I'm gifted!" These immature dabblers too frequently made a new process the scapegoat for their crimes. Any how, all who had seen the best examples of gum printing would acknowledge the fascination of some of its results, and, moreover, rejoice to know that the picture produced was an absolutely permanent one. "The Press" was given by Mr. James Packham in appropriate and discriminative terms, and was replied to by Mr. Horsley Hinton (*Amateur Photographer*) and Mr. J. W. Ward (*Croydon Advertiser*). We regret that we cannot print all the brilliant things said by either of the above. It must suffice that Mr. Hinton stated he was always glad to come to the Club's dinner, because the Club was so prosperous, and he (the speaker) was particularly fond of prosperous people or institutions. Amongst other things, Mr. Ward dwelt upon the fateful inroads of photo processes upon the once virgin regions of letterpress, which latter in our age was becoming more and more infringed on by illustrations. "The art preservative of all arts" was rapidly being superseded by what might possibly be a blend of photography and phonography. To Mr. Isaac fell what was perhaps the toast of the evening, *i.e.*, "The Visitors," coupled with the health of Mr. F. E. Ives, the distinguished inventor of the kromskop and its colour photographs. The toast met with an enthusiastic reception, and was accompanied by the singing of "Yankee Doodle," Mr. Ives being a fellow-countryman of Edison. Mr. Ives replied in an admirable speech, in which he created much merriment by the recital of his art experience as applied to photography, and wound up by impressing upon those present the need of all studying those fundamental photographic principles upon which the sustained progress in the science depends.—*Croydon Advertiser*.

Patent News.

THE following applications for Patents were made between March 21 and March 26, 1898:—

LANTERN SCREEN.—No. 6812. "Optical Lantern Screen." F. LAMBERT.

METALLIC LUSTRE PHOTOGRAPHS.—No. 6879. "Improvements in the Production of Photographs with Metallic Lustre." J. PASCHKA.

COLOUR SCREENS.—No. 6910. "New or Improved Coloured Screens for u in Photography." T. R. WATSON.

ANIMATED PHOTOGRAPHY.—No. 7095. "Improvements in Animated Phot graph Machines." W. J. KING.

STEREOSCOPES.—No. 7190. "Improvements in and relating to Stereoscope Communicated by A. Block. G. C. MARKS.

SHUTTERS.—No. 7232. "An Improved Photographic Shutter." S. McKELLEN and J. D. McKELLEN.

CINEMATOGRAPHS.—No. 7292. "Improvements in and in connexion wi Cinematographs, or Animated Picture Books, Mutoscope Reels, and t like." A. ROSE.

PHOTOGRAPH-HOLDER.—No. 7329.—"A New or Improved Holder or Sta for Plates, Photographs, and the like." W. T. BROWETT and E. BROWETT.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

April.	Name of Society.	Subject.
11.....	Bootle	Excursion: Hadlow Road for Bur Woods.
11.....	Hackney	Excursion: Keston Common. Lead A. Dean.
11.....	South London	Excursion: St. Albans. Leader, Capt E. G. Ruckes.
11.....	Stafford Photo. Society.....	Easter Monday Excursion.
12.....	Hackney	Discussion on Developers.
13.....	Kingston-on-Thames	*Kingston Parish Church and its Histo* Dr. Finny.
13.....	Leytonstone	*Negative-making.* John A. Hodges.
13.....	Photographic Club	Members' Open Night: Slides, &c.
14.....	Leigh	Competition: Autumn.
14.....	London and Provincial	*Polarised Light.* J. J. Briginshaw.
14.....	Oldham	*Four Cycle Tours: North Yorksh Midlands, Wye Valley, Norman* T. W. Hilton.
14.....	Woolwich Photo. Society	Development of Unknown Exposu By Members.
15.....	Croydon Microscopical	*The Application of Photography to Study of Natural History.* Capt D. Wilson-Barker, R.N., F.R.G.S
15.....	Wakefield	Lantern Slides: *Norfolk Broads.* I by Great Eastern Railway Compa Description by H. M. Briggs.
16.....	Borough Polytechnic	Excursion: Chingford.

PHOTOGRAPHIC CLUB.

MARCH 30,—Mr. E. W. Foxlee in the chair.

Mr. Horatio Nelson King, architectural photographer to the Queen, sho a very interesting and comprehensive collection of lantern slides on the sub of the Royal Palaces of England. Starting from Charing Cross with a pictures of public and private buildings, he proceeded *vid* Whitehall to James's Palace. The Yeomen of the Guard and the different State ap ments, the Throne-room, and the private chapel were beautifully rende Proceeding, the handsome rooms and picture galleries of Buckingham Pal Hampton Court, and Osborne, the more homely castle of Balmoral, A geldie, and, coming south again, the private and State apartments at Win the St. George's Chapel and Frogmore, were in turn viewed upon the scr The whole series without exception speaks well of Mr. King's skill a architectural photographer, and was particularly well received. Mr. I concluded with some photographs taken in the very early days of the art, Ra Castle, Tintern Abbey, and Burnham Beeches, taken during the first ha the fifties, and stated that the last-named was done in 1853, when in comp with Scott Archer. These early examples of Mr. King's work are as credit as his more recent efforts, and were evidence enough that, despite the gre obstacles to be overcome in those wet-collodion days, very good photogra was accomplished, and such that holds its own against much of later perio

Borough Polytechnic Photographic Society.—The Half-yearly Gen Meeting of this Society was held on Wednesday, March 29, Mr. Bedd (Chairman) presiding. The report for the winter session shows a steady crease in the membership, which now numbers nearly one hundred. attendance of members at the lectures and practical evenings has been maintained throughout the season, the average being about thirty per meet A high-class programme was provided, and included, amongst others, the w known names of Messrs. H. W. Bennett, John Carpenter, Thos. R. Dallme William Gamble, E. Cecil Hertslett, A. Horsley Hinton, John A. Hod and W. Thomas. The third annual Exhibition held at Christmas prov splendid success, both financially and otherwise, and was the means of siderably increasing the numerical strength of the Society. Fortnig outings have been arranged during the summer months to the follo places, viz.: Richmond to Kingston, Chingford, Broxbourne to Rye Ho Wellhall to Chislehurst, Wanstead, Guildford, Barnes to Richmond, Paul's Cray to St. Mary Cray, Crohamhurst, Hayes to Orpington, Loug to Theydon Bois, Hampton Court to Sunbury, Southgate to Hadley Wo and Ashtead Woods. Mr. E. J. Hoar, the new and energetic assistant excursion secretary, has all arrangements well in hand, and some pleasant useful trips are promised. The Committee regret to have to record the lo

. F. W. Bannister as Hon. Secretary. Although his term of office was but rt, he displayed unbounded energy and tact throughout, and his resigna- n came as a surprise to many. Mr. H. C. Philcox, late Assistant Secretary, been duly elected to fill the vacancy. A further addition has been made the already long list of officers. Mr. Albert T. Harris will in future act as e-Chairman.

Hackney Photographic Society.—March 29, the President (Mr. E. ttock) in the chair.—The Excursion Secretary announced that the Club ing on Easter Monday would be to Keston Common. Train for Hayes to ve Cannon-street at 9.33, London Bridge at 9.36. Members' work was wn by Messrs. Carpenter, Dunkley, and Roofe. Mr. W. Rawlings read a er entitled

CONSTABLE AND CONSTABLE'S COUNTRY.

subject was illustrated by a number of lantern slides, both of copies of nstable's pictures and of photographic views of the district referred to. nstable's Country was the term applied to the Stour Valley, which divides ex and Suffolk, and more particularly to that part of it lying between Nay- d on the west and Manningtree on the east. It was the district in which nstable was born and passed his youth, and which he has commemorated in nany of his paintings. He was the son of a miller, and was born in 1776 East Bergholt, a village on the Suffolk side. He showed aptitude for drawing n early age, but his desire to become a painter was not encouraged by his er, who wished him to study for the Church. However, he found a wealthy ron in Sir George Beaumont, who sent him to London to study in 1795. er a short time, as his father still objected, Constable returned home and sted his father at the mill. In 1799, by some means, the parental objection removed, and he went to London and entered the Royal Academy as a ient. He first exhibited at the Academy in 1802, and was thenceforth a rly constant annual exhibitor. At the outset he confined himself to copying styles of other artists, but eventually he broke away from conventionality went direct to nature for models. His work received but little encourage- t at first, but gradually his fame grew, not only in England, but on the tinent. His style exercised a tremendous influence on English art, and, r, on European art as well. He died in 1837. Mr. Rawlings recommended stable's Country as a fine district for photography, and springtime is the season for going there. Of great value also to photographers was the ly of Constable's sketches in the South Kensington Museum.

orth Middlesex Photographic Society. — March 28, the President J. C. S. Mummery) read a paper on the

GUM-BICHROMATE PROCESS.

said the process was a revival of that worked by Pouncey, and published him in *Photo Notes*, 1859. It depended on the power of bichromate salts ender colloid substances sensitive to light as in the ordinary carbon ess; but, unlike carbon, there was no transfer necessary, and the image not reversed. He believed the process had several advantages over on, notably it allowed the worker to better control the results. Since the oduction of the process in 1894 it had received a deal of harsh criticism, in the press and on the platform, but it was impossible to shut one's to the fact that this was largely due to the intemperate language of the eers of the process. Having referred to many of the formulæ already ished, the lecturer gave as his own method the following:—Windsor & ton's levigated ivory black (in powder), 50 grains; best Soudan gum per cent. solution), 2 drachms; incorporate thoroughly and add: romate of potash (saturated solution), 5 drachms. Coat the paper with a el's-hair mop, afterwards smoothing with hog's-hair or badger softener. If whites are required, it is best to choose as a support a piece of single fer paper. When rough paper is used, it is advisable to soak it first in a tion of bichromate at a temperature of 70°. The addition of too much results in harsh contrasts, and uneven coating will produce irregular kings in the finished print. It is necessary when printing to use an ometer, as the image is not visible previous to development. The sed print to be developed is soaked face downwards in cold water for a minutes, then laid face upward on a sheet of glass and the superfluous ent removed by pouring over it a warm mixture of sawdust and water. lecturer said that even with the greatest care failures were very frequent. proceeded to mix the ingredients, and to coat a few pieces of paper, and developed several prints he had brought with him. These proved to be what under-exposed, and afforded an opportunity of demonstrating the ulties of the process. The Chairman (Mr. S. H. Fry) opened the ssion by saying that, while he always read with interest the skirmish een the supporters and opponents of the gum-bichromate process, he did llow such to prevent him from trying the process or admiring some of its ts. A number of members joined in the discussion, which centered upon oint of "control." Mr. Mattocks was of opinion that "control" was a er of skill, and had little to do with the particular process. Some held the gum-bichromate placed a greater power of control in the hands of the er than any other process. Others thought that, as so widely different s were obtained from the same negative, it seemed that the worker had to to chance, and that it was "the tail that wagged the dog," while yet s contended that, when the peculiarities of the process were thoroughly ered, the worker would be able to bend the process to his will in a er not at present possible. One gentleman, referring to some examples n, said he noticed that while the landscape portion appeared to have been ed from a negative, the skies were invariably the result of manipulation, sked wether better results could not be obtained by printing the clouds a negative and supplying the landscape entirely by brush work.

dford Photographic Society.—March 21.—Mr. GRAYSON, of Leeds, ed on

TRANSPARENCY-MAKING FOR STEREOSCOPIC AND OTHER PURPOSES.

rayson, who is a thorough master of his subject, led up nicely to the point, showing first the construction of the cameras most suitable for stereoscopic work, and later demonstrating the best method of making transparencies from stereoscopic, film, and ordinary negatives. The lecturer had with him a most elaborate and satisfactory stereoscope for showing a dozen or more pictures in rotation which met with high approval, being not only a handsome piece of furniture, but also giving the very best and most realistic effect to the picture put in.

Liverpool Amateur Photographic Association.—The monthly meeting of this Society was held on Thursday, the 31st ult., the senior Vice-President (Mr. E. R. Dibdin) occupying the chair. Mr. G. WATMOUGH WEBSTER'S lantern lecture,

A TRIP TO CHESTER,

constituted the principal business of the evening. He exhibited a number of pictures of the natural history collection in the Grosvenor Museum. There was a large and most appreciative audience, and at the conclusion of the lecture a vote of thanks was carried, on the proposition of Mr. Paul Lange.

FORTHCOMING EXHIBITIONS.

1898.

April 22–30 .... National Photographic and Allied Trades Exhibition, A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

HALATION: A MISUNDERSTANDING.

To the EDITORS.

GENTLEMEN,—Nothing could be wider of the mark than to suppose, when I referred to "a curious fact," I intended to insinuate unfairness on the part of Major Russell, for I have for these many years always considered him an honourable and straightforward man. I should point out that he did not publish anything concerning the backing method for halation until after he had read the late Mr. Sutton's proposition to place the plate the wrong way in the dark slide as a cure for halation. This was evidently sufficient to arouse the suspicion of the optical nature of the defect in the Major's mind. The clue from this source led to the rest that transpired at the time and all that has followed. But for Mr. Branfill's memory, who knows but what the same want of an efficient method might have gone on until the present day; but this turned the course of events, and led the Major to pen his letter to me disclaiming any merit in the matter. This is the Major's own statement in the letter you had published for me a week or two back. To insinuate unfairness after this would amount to hypercriticism on my part. The curious fact referred to will consequently be evident to an unprejudiced person, as it has always been to me, a *pure accident*, and you may well infer from this how it pained me when I was charged by Mr. Branfill with insinuation of unfairness when I stated the circumstances referred to "as a curious fact." Indeed, I may say we have here another "curious fact," how two persons can view the same expression in two totally different ways, and I might say that in the said letter he sent me I do not think the Major could have said anything more distinctly and fair than he did if he had especially tried. I hope from this Mr. Branfill's irritation will be set at rest by considering the expression referred to as having not the slightest meaning on my part he appears to have attached to it in his letter.

He does, however, qualify his accusation by the term *apparent*. I hope, when he considers the matter further, he will find even this surface appearance completely vanish.

It is very remarkable he should consider these statements of mine as unfriendly after the assurance the Major has set forth in his letter to me. I should consider myself exceedingly dull not to understand as giving me the full credit for what was due to me in this matter. As will be seen on referring to his letter to me, he reiterates this assurance at the end of it as "claiming no merit in the matter." After this, it would have been grossly unfriendly to use innuendos, as there was absolutely no occasion for them. What more could I want, or what more could he give?

There is one feature in Mr. Branfill's letter I am pleased to see, and that is his watchfulness over the reputation of his late brother, and, if he has done nothing else, he has enabled me to vindicate the late Major's candour and fairness, which is quite the opposite of that Mr. Branfill accuses me of. I do not know I have complained of this at any time; rather the reverse. I was, on the contrary, pleased he did

what he did. Indeed, a friend remarked to me, when I drew attention to his letter, that my remarks concerning the Major were more complimentary than otherwise.

I have hitherto been contented to deal with halation from an optical point of view, as it is a purely optical phenomenon, both as cause, effect, and cure; but, as Mr. Branfill brings in a chemical side with which his brother struggled for about two years after the publication of my first two papers (1861), I may fairly conclude he was on the wrong scent these two years. I should not think it was for remaining silent concerning these chemical labours of his late brother that has led Mr. Branfill to pen his letter of accusation against me. Whether effective or not, the chemical treatment for halation was eventually and completely given up by his brother as soon as the optical principles of the phenomenon became known to him, and on this side of the question he laboured long and hard to make it known to his brother photographers hard of belief.

It cannot, therefore, be said I have given offence in any way respecting this aspect of the matter, unless it is by being silent concerning it. If I have sinned against his late brother, it must come into the category of a sin of omission on this point. If I am, therefore, after this last resort to divine a reason for his present attitude towards me, I must repeat, I am at a complete loss to understand how he came to pen such a letter, and wherein I have sinned to incite him to do it.—I am, yours, &c., G. MARLOW.

80, *Lower Sutton-street, Aston-road, Birmingham, April* 2, 1898.

THE RETURN OF SPECIMENS.

To the EDITORS.

GENTLEMEN,—Now and again one sees letters from operators complaining of not receiving their specimens back. From recent experience I should say it is sometimes their own fault. They rarely send stamps for return postage, and one applicant who is sufficiently skilful to ask £3 10*s.* a week is unbusinesslike enough to omit the name of the town where he lives, giving merely the address of Toronto Road. Unless he happens to see this there is little likelihood of my being able to return his specimens. Not long since a lady retoucher twice wrote to me when I was advertising for some one with quite different qualifications—her letter evidently referred to the advertisement just above mine.—I am, yours, &c., H. 16.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPH REGISTERED :—

John Miller, 40, Scorton-street, Tue Brook, Liverpool.—*Photograph of Old Woolton Mill, near Liverpool.*

EMULSION.—Probably fog will be caused in both cases.

H. E. WATKIN.—Complaints such as yours have reached us before. We have written him.

CYANIDE.—You omitted your name and address. No notice is taken of anonymous communications.

SWISS COTTAGE.—A. H. Baird, Lothian-street, Edinburgh, and J. Day, Scout Hill View, Dewsbury, have very portable forms of stereoscopes in metal.

JAS. STOKOE.—A threat of legal proceedings will doubtless have the desired effect. Write in these terms. We do not undertake to answer questions through the post.

JOHN RANDOLPH (Southampton).—Wilkinson's book on *Photo-mechanical Processes*, published by Hampton Judd, & Co., 13, Cursitor-street, E.C., should suit you. It is by no means difficult to understand. We do undertake to answer questions by post.

PAPER.—It is possible the paper may be at fault, as you suggest, but we have not time to try it. Possibly you are over-toning it. Try less toning. You can easily satisfy yourself as to the paper being at fault by trying one or two samples of a different brand, working, of course, under the same conditions.

AJAX.—Wilkinson's book is published by Hampton Judd, & Co., Cursitor street. A work on *Photogravure*, by Mr. Herbert Dennison, might be of use to you. It is published by Iliffe, St. Bride-street, E.C.

TRACING CLOTH.—A. CLARKE asks: "Will you kindly answer me the following through your Correspondence column? By doing so you will greatly favour me. Where can I procure tracing cloth for blocking out superfluous light, also price of same per yard?"—Tracing cloth may be obtained from any of the artists' colourmen. We do not know the price, but it is not at all expensive.

STAINED NEGATIVE.—PRINTER asks: "Would you kindly let me know what would take silver stains out of a negative? I put a piece of paper on the negative before it was quite dry, and when I soaked it out it left a stain where the paper had been."—It is doubtful if the stain can be removed without injury to the negative. The best thing will be to treat it with a dilute solution of cyanide of potassium.

DARK ROOM.—AMATEUR writes: "I am about building a small studio. What glass would you advise me to put in my dark-room window? Some say ruby is not enough, others recommend ruby and orange, others ruby and green. Your advice shall decide the matter."—All must depend upon the aspect (not given) of the window. If it faces the south, it must necessarily have deeper glass than if it faces the north. Ruby and orange, if good, will do very well if there is never a very strong light on the window.

EMPLOYMENT.—ANXIOUS. You would certainly have to pay a premium, or give some time, to get into the photographic profession, and the amount would depend upon the status of the house you entered. The best way will be to advertise for what you desire. We may tell you, however, that the photographic labour market is already overstocked with skilled labour seeking employment. We should recommend you to try some other business, as we fear there is but small prospect now for any one who knows nothing of photography.

BLINDS FOR STUDIO.—E. GARDON writes: "I am just about to open a studio and your kind advice will greatly oblige as to the proper way to light same and what colour curtain and material you would advise. The studio is 20 × 12 feet, 3 feet wall each end of eaves; there is 3 feet wall from floor and 5 feet glass at eaves, making it 8 feet; there is 8 feet glass to light the whole length of studio. Glass is all ground, direct north light, the east side all covered in. Your advice as to how much blind would be required and colour of same will greatly oblige."—For the top we should recommend blinds of green window holland, and for the sides curtains of dark blue or green. The size of the blinds and curtains should be such as to cover the whole of the glass when they are drawn. Then any variety of lighting of the sitter can be obtained.

DOUBLE TONES.—S. HUMPHREY writes: "Would you kindly inform me the best prevention of double toning in gel.-chl.? For some time past I have been much troubled with this nuisance, more especially round the edges of vignettes. I have carefully followed the instructions of the makers' papers, both as to careful washing and formulæ. I have also tried different baths without sulphocyanide of ammonia, but without success. I shall therefore be much obliged if you could point out to me the best remedy for this."—Gelatine papers are more or less prone to give double tones—some more than others. Possibly another brand, in your hands, may work differently. If you mix the toning bath according to the directions supplied with the paper, using a good sample of the sulphocyanide and chloride of gold, it will be in the right condition for toning.

LENS FOR PORTRAITURE.—YOUNG PROFESSIONAL says: "I should be thankful for advice on the following: 1. I have a Dallmeyer 3c lens, which I bought second hand, and in practice I consider my cabinet heads are not such satisfactory likenesses as *carte* size. The focus of the lens is, I believe, nine inches. As I have to bring camera rather close to the sitter when taking, would not that account for the difficulty? Could I, by altering the positions of lenses, lengthen focus? 3. Do you consider another kind of lens more suitable for studio work; if so, what would you recommend? Thanking you in anticipation."—In reply—1. The No. 3c lens, we think, is but eight inches focus, hence the sitter has to be brought very close to the sitter for the larger-size heads, with the result that the portraits are not so pleasing. 2. Not without interfering with its quality. 3. A portrait lens with a smaller aperture and lower focus, such as the ordinary portrait lens. The c lenses must have an exceptional aperture to secure rapidity, but they are not to be recommended if longer-focus lenses will answer the purpose.

AMMONIA POISONING.—ANXIOUS says: "Some years ago I remember reading in the JOURNAL a communication respecting the effect of ammonia on the tongue or in the mouth of any person continually using it, and, if I remember quite right, a remedy for this was given. I wonder if you would be kind enough to give me the remedy. Some weeks ago I was opening a Winchester of ammonia, and by some means or other inhaled a considerable amount of the gases. A few days afterwards my tongue was swollen considerably, and my lips also. The doctor said it was due to ammonia poisoning. I have just lately been doing a little developing with pyro and ammonia, and I begin to feel some effects of the fumes of the ammonia again. I should be glad to know if this is a usual occurrence. May I add that I have been using ammonia as a developer continually for the last six years?"—There is an article on the subject on page 559 of the ALMANAC for 1889, which recommends acid drinks, such as lemonade, &c. Perhaps some reader can suggest other remedies. We and many others have used ammonia on a large scale, and have experienced no ill effects therefrom.

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Contents.

	PAGE
Ex Cathedrâ	225
Bleaching Engravings for Copying	226
Leaderettes:—	
Pernicious Exhalations in Photography — Stereoscopic Portraiture—New Use for Röntgen-ray Photography—Our Patent Law — Electrolytic Reflectors — A New Source of Iceland Spar — Spectacles — Rembrandt Exhibition in Amsterdam	227
Colour-filter for Three-colour Work	228
Foreign News and Notes:—	
Ink-testing in Colour Work—Ketone and Aldehyde Developers—Pyrocatechin — Matt-surface Prints — The Rag Harvest in France — The Detection of Crime — Drilling Glass — Direct Reproduction of Metals and Coins — Some Wholesale Profits —The Purification of Acetylene —Devils—Black Tones on Silver Paper — Papier pour Héliogravure d'Art	229
Some Comparisons of Developers. By J. S. Teape	230
Marine Photography Thirty Years Ago. By Valentine Blanchard	231
The Decorative Capabilities of Photography.—II. By T. N. Armstrong	232
Portraits	233
The Latent Image and its Development. By F. Hurter, Ph.D., and V. C. Driffield	233
The London Stereoscopic Company	235
The Camera Club	236
Our Editorial Table:—	
Practical Radiography — The National P.O.P.—*A Simple Guide to the Choice of a Photographic Lens*	236
News and Notes	236
Meetings of Societies:—	
London and Provincial Photographic Association — Photographic Club — Bath Photographic Society — Bolton Mutual Photographic Society—Bradford Photographic Society — Newcastle-on-Tyne and Northern Counties' Photographic Association — Sheffield Photographic Society— Edinburgh Photographic Society	237
Forthcoming Exhibitions	239
Patent News	239
Correspondence:—	
The Stereoscope: A Camera Wanted — Ammonia Poisoning	239
Answers to Correspondents	240

NOTICE.—THE CRYSTAL PALACE PHOTOGRAPHIC EXHIBITION, 1898.

The British Journal of Photography for April 29 will be a special Double Number of thirty-two pages, and will contain a full report of the International Photographic Exhibition at the Crystal Palace to be opened on Monday, April 25, by His Royal Highness the Prince of Wales. The publishers ask us to announce that advertisements for this special issue should reach them not later than Monday, April 25.

EX CATHEDRA.

The report of the Annual General Meeting of the shareholders of the Eastman Photographic Materials Company, which we printed last week, must be a very gratifying document to all concerned. A dividend of twenty per cent. on the preference and ordinary shares is a striking testimony to the acumen of the present management. We understand that the business of the Company since the accounts were last made up shows a marked upward tendency, and it is announced that new branches are shortly to be opened in Regent-street, London; and Berlin. Of the various photographic manufacturing firms the Eastman Company are probably in the best position for ascertaining whether photography is on the increase or decrease among the general public, and it is therefore satisfactory to learn that the use of the "blessed word" Kodak is daily on the spread in the habitual vocabularies of vast numbers of the community. Photography in general, and film photography in particular, if the experience of the Eastman Company be taken as a criterion, is becoming more and more popular, and the time is probably a long way off when the too favourite prophecy that the pursuit of the black art will be looked upon as a spent fad is destined to be realised.

* * *

Probably one of the best moves the Eastman Company have recently made was the acquirement of new premises at 43, Clerkenwell-road, E.C., over which we recently had the pleasure of being shown. This building is set aside for wholesale business, a staff of about one hundred is employed there, and room for the accommodation of a far larger number is available if required. The building is extremely spacious and well lighted, and the offices are lofty and roomy. The arrangements made for the reception and distribution of goods greatly facilitate the transaction of business. The plan for the disposition of the managerial, clerical, and warehouse staffs was laid down by Mr. Eastman himself, and the result is a very conveniently arranged suite of offices and warehouses. The counting-house on the first floor is of really noble proportions. Developing and camera-repairing departments for emergency work are to be set going if required. Under the present enlightened management the Eastman Company are exhibiting the greatest enterprise, the reward of which, in the shape of increased prosperity, may confidently be looked for, and in the enjoyment of which they will have general congratulation.

* * *

One of the oddest queries that has of late been addressed to us emanates from a friend who assures us that he is quite serious in questioning us. Is there a photographer in Croydon? he asks. This year's local directory, he tells us, only has the name of one in the list of trades and professions, and his address is at Thornton Heath. Croydon is one of the "great towns" of the British Isles, its population exceeding a hundred thousand, and the fact of its local directory not recording the presence of any professional photographers in the town would seem to point

to the inference there was here considerable scope for the establishment of a few photographic businesses. Of course, such is not the precise position of affairs. Croydon is the centre of very great photographic activity, and in and about the town we find that there are at least twenty professional photographers, whose neglect to put their business addresses in the local directory may well cause surprise to others besides our friend, who, anxious to have his photograph taken, and being a few miles from the town, naturally sought the only available means for ascertaining where to go for the purpose.

* * *

A Glasgow correspondent informs us that the forthcoming meeting of the Photographic Convention is locally expected to be a great success, and that no effort is there being omitted to make it so. Our friend adds that he hopes the Council meeting in London will not impose any restrictions that may tend to spoil the carrying out of local arrangements. He says that they would be "far wiser to leave all to the Glasgow bodies, who know better than they [the Londoners] do what to provide and how to do it. For instance, two of the best districts will not be visited, by the silly rule that excursions are not to be split up. This might be a desirable rule in some small localities, but, in a large place like the West of Scotland, it is absurd, and will only lead to a number of parties going on their own account."

* * *

Personally, we have no fear that the policy of consolidating rather than splitting up the excursions will break down when it is put to the practical test. The point has received the most careful consideration at the hands of the Council, who, fortified by the experience gained at previous Convention meetings have, we think wisely, discouraged splitting up the party into small groups. It has happened that where this has been done before, the element of the ridiculous has made itself unpleasantly conspicuous, as in the case of last year's visit of the Photographic Convention of the United Kingdom (surely a title which is calculated to raise high hopes of numerical greatness in the hearts of sympathetic municipalities and other public bodies) to Lowestoft. Only about a dozen Conventioners journeyed thither from Great Yarmouth, and were courteously received by the Mayor, who would have been more than human if he could have suppressed some surprise at the ludicrous smallness of the gathering he had so kindly gone to the trouble of receiving. United excursions have hitherto invariably proved successful and satisfying, and they save trouble, time, and expense on the entire week's working.

* * *

Further, if we are rightly informed, our Glasgow friends object to being asked to have the assistance of the Council in selecting the lantern slides to be exhibited at the evening meetings. At many past Conventions the slides shown, both as regards nature of subject and technical qualities, have been utterly unworthy of the Convention, and at least have unpleasantly surprised most of the local visitors who have been present at these "exhibitions." To prevent the recurrence of anything so regrettable in future, the Council recently appointed a small and highly competent committee to sit in judgment on the slides proposed to be shown. That committee is virtually responsible to the Convention and to Glasgow for the qualities of the slides—they practically undertake the selection of the transparencies to be exhibited. We hope our Glasgow friends, appreciating the motive that is at the bottom of the Council's action in this matter, will co-operate with the committee in assuring the presentation on the screen of only the very best lantern photographs that can be obtained.

* * *

Some of the commercial firms who are exhibiting at the Crystal Palace the week after next will, if we are correctly informed, surprise visitors by the great care bestowed in making their installations beautiful as well as interesting. We hear of "confections" in green plush and gold, and other ideas of a like character; while the hand of Mr. George Walton, the art designer who was responsible for the *mise-en-scène* of last year's Exhibition of the Photographic Salon and the Eastman Exhibition at the New Gallery, will be evident in the adornment of some of the stands. Thus, in respect of total effect, it may reasonably be expected that the Exhibition will delight the eye in a manner which its predecessors at the same place failed to do.

BLEACHING ENGRAVINGS FOR COPYING.

We are often asked, as a reference to our Correspondence columns will show, how to clean, or "bleach," soiled, yellow old engravings previous to copying, and there cannot be a doubt that the best possible advice to the inexperienced is that conveyed in *Punch's* often-quoted advice to young people about to get married, "Don't." Nothing is easier than to irreparably damage a valuable engraving; nothing more difficult than to repair even the slightest injury. At the same time, if it is determined that the attempt shall be made, a few hints may be given to enable the work to be done with the greatest chance of success and the least of injury. It should be borne in mind at the outset that the paper upon which engravings are printed—plate paper—is quite different from ordinary paper, used for printing, drawing, or writing upon. It is almost as porous as blotting-paper, and the tenacity of its surface is little superior to that well-known material. Hence in removing finger marks, dust, or surface dirt, indiarubber should not be used, if its employment can possibly be avoided as it is too apt to roughen the surface. A piece of bread (preferably with crust attached) should be used, the soiled portion continually removed as it is produced, and the whole engraving carefully treated. (It need scarcely be pointed out that the engraving should first be placed on a clean, smooth board or table—a drawing-board is best.)

It will now be seen whether all the marks are removed. If not, a further application of bread is needed. If they are still obstinate, indiarubber may be tried as a *dernier ressort*. "ink-eraser" would injure the fine lines of the engraving. These may occasion grease spots. These should be dabbed with a pledget of cotton-wool steeped in benzole or petroleum ether, and the surplus fluid removed with blotting-paper. Repeating this several times, using clean blotting continually, the benzole may be allowed to evaporate. It will soon be seen whether the grease spot is removed. If it be, there will be left, most probably, a slight trace of the grease in the shape of a ring, marking the edge of the region to which the benzole extended. The removal of this is the difficulty usually experienced; but, if gone the right way about, the method is

rocedure is simple. The surface tension of benzole being reater than that of oil or fat, the latter is pushed before the dvancing wave of benzole; hence the ring. That must be reated the same way. Benzole should be poured upon the ngraving on one side of the spot, leaving the spot or ring etween the advancing benzole and the edge of the plate. As ne benzole advances, it pushes the grease ring before it till ne edge of the paper is reached. When the engraving, looking t this stage greasy and wet, has become quite dry from the enzole, there will probably remain a clean sheet. If not, the enzole must be applied again, from the farmost corner or dge, in sufficient quantity to wet the whole sheet. Upon rying out, a perfectly clean print should result.

Next we have the yellowness to get rid of. This can be one by one of two agents, peroxide of hydrogen solution urchasable in two strengths, containing respectively ten and venty volumes of peroxide). The plate is to be placed in a rge dish, flooded with the solution, and allowed to remain me hours, then slightly rinsed and dried.

At this stage the great risk of injury occurs. The wetted heet becomes heavy, and will only bear the most delicate andling; any attempt to lift it up by one corner would sult in a tearing away of a portion and the ruin of the ate, for it should be known that the possession of its full or early full margin is one factor in determining the value of n engraving; therefore all the washing should be conducted y tilting the dish and pouring off the liquid.

The alternative solution, and that most frequently employed, a solution of bleaching powder, or one of its analogues, abarraque's solution, or eau-de-javelle. If one of these three gents be employed, the danger that arises to the picture is hat, if every trace of chlorine be not eliminated, the paper ill ultimately become quite rotten. To get rid of this danger, e engraving, after the bleaching is complete, should be oroughly well washed to free it as much as possible from the leterious chemical, and then there should be poured upon it solution of hypo. This, which is the method employed by per-makers in treating the pulp, entirely converts the chlorine hypochlorous acid salt into an inert chloride. Allowed remain half an hour, its work is done. The solution should poured off the paper, washed by several changes of water, membering the precautions named as to handling it, and, er well draining, carefully placed to dry, say, on a flat ard and resting on several folds of filter paper or of linen.

Still our first advice is what we press upon our readers, "Don't."

Pernicious Exhalations in Photography.—The recent lkerian lecture, by Dr. W. J. Russell, before the Royal Society, s once more attracted attention to the injurious effect that some pours may exert on photographic plates and films. This pro-ty, with regard to many substances, was well known years and rs ago, but it seems to have been much neglected. For example, was found, in the early days of collodion dry plates, that if they re stored in some boxes they were quickly deteriorated by emana-ns from the wood, while in other boxes they suffered no injury atever. A decade or more ago we called attention to the fact that deterioration of gelatine plates was frequently caused by emana-ns from the paper or boxes in which they were packed, and re-mmended plate-makers to give attention to the subject. It has g been known that some kinds of leather used for the hinges of shutters of dark slides produce a mark on plates kept in them. t only will the leather affect the film, but we have seen examples, ere the shutters (mahogany) have been panelled, that one panel in a short time regularly marked the plate, and another did not Dr. Russell's researches, however, show that there are exhalations from many other substances, not before suspected, that have an influence on the photographic film. Several of the metals—for example, tin, aluminium, zinc, and others—give off vapours that act on the plate with long exposure.

Stereoscopic Portraiture.—The stereoscope, and stereoscopic photography, is evidently receiving more attention just now than it has since the period of its decline. That is partly due to all the best cameras over the quarter-plate size being now fitted with a central diaphragm to enable stereoscopic pictures to be taken when desired; and, partly, to what has appeared in the JOURNAL during the past few years. In all that has been written on the subject but little has been said in regard to the application of stereoscopic photography to portraiture. In the days of the Daguerreotype process, a large and very lucrative business was done by professional photographers in stereoscopic portraiture, and also in the early days of the collodion process—glass positives and paper pictures. Would it not be well, now that there is a fair prospect of a revival of the stereoscope, for professional portraitists to give the subject consideration, with the view to increasing their returns during the coming season, particularly as little, if any, outlay will be required, as in most cases all the necessary appliances are ready to hand?

New Use for Röntgen-ray Photography.—The exact constitution of metallic alloys, whether chemical or mechanical combination takes place, is often a matter of dispute, but quite recently, before the Cambridge Philosophical Society, Messrs. C. T. Heycock and F. H. Neville have utilised the Röntgen rays to elucidate the matter, and have met with considerable success. The two metals forming the alloy possess different degrees of transparency to the rays, and, when a sciograph is taken, the actual structure is exhibited. Thus, alloys of gold and sodium, containing less than thirty per cent. of the former metal are found to consist of well-developed very transparent crystals, which must be pure or nearly pure sodium imbedded in another substance which solidified last, and which, from its comparative opacity, evidently contains the gold. On the other hand, when there is a larger proportion of gold present, it takes the form of opaque needles imbedded in a less opaque or other substance. Photographs of aluminium and gold, and of aluminium and copper, exhibited similar effects.

Our Patent Law.—This is very unsatisfactory as it stands, and Mr. Crawley has given notice in the House that, on the Civil Service Estimates, he will call attention to the great advantage which our Patent laws give to foreign manufacturers, and especially to the ambiguous and inadequate character of the compulsory clause of the Act of 1883, and to move "that Section 22 be brought into conformity with the laws of foreign countries." Here is the section referred to: "Compulsory Licences.—If, on the petition of any person interested, it is proved to the Board of Trade that, by reason of the default of a patentee to grant licences on reasonable terms—(*a*) the patent is not being worked in the United Kingdom; or (*b*) the reasonable requirements of the public with respect to the invention cannot be supplied; or (*c*) any person is prevented from working or using to the best advantage an invention of which he is possessed, the Board of Trade may order the patentee to grant licences on such terms as to the amount of royalties, security for payment, or otherwise, as the Board, having regard to the nature of the invention and the circumstances of the case, may deem just, and any such order may be enforced by mandamus."

THIS reads very ambiguously, and is not at all satisfactory. English Patent law is different from that of most other countries, and to the disadvantage of the British inventor. If a foreigner takes out a Patent here, he secures a monopoly in his invention,

although he does not manufacture the thing here, and thus blocks the way from any one making or using it. That is not the case in America, Germany, France, and some other countries. In them the invention of a foreigner must be manufactured, commercially, within a certain time of the granting of the Patent, or it lapses and becomes public property. Thus, unless a Patent, granted, say, for example, in France, to an English inventor, is worked there within a given time, it becomes void. Here is a case in point. Some of the new anastigmatic lenses, of German invention, were patented in France, but they were not manufactured there within the prescribed period, consequently the patents became void, and the lenses can be made, and are being made by several firms, and used without let or hindrance. According to our law, there was no compulsion that they should be made here to retain the Patent right, even for the full term of the Patent.

Electrolytic Reflectors.—Mr. Sherard Cowper Coles recently described before the Society of Electrical Engineers a most ingenious, and, apparently, perfectly practicable method of producing a solid, or at least a substantial reflector by electrolytic means. As there are so many purposes for which reflectors are required in photographic work of various kinds, we give our readers a fairly complete account of a process which appears to us to promise to be of considerable use in photography. The method is intended, in the first place, for the manufacture of metallic mirrors for use as projectors in search-lights, and also to overcome the difficulty that has been experienced in producing a true metallic reflector that will not readily tarnish when exposed to the heat of an arc light; but the same method is also applicable for the production of mirrors for astronomical purposes. The process is, of course, a copying one, and consists in taking a concave surface from a convex mould, so figured as to give the correct curvature to the copy taken from it. In the words of the author "a glass mould is prepared, the convex side of which is accurately shaped and polished to form a true reflecting surface. On the prepared surface is deposited a coating of metallic silver, which is thrown down chemically on the glass and then polished, so as to ensure the copper backing being adherent to the silver. The mould thus prepared is placed in a suitable ring and frame, and immersed in an electrolyte of copper sulphate, the mould being rotated in a horizontal position. The copper adheres firmly to the silver, and together they form the reflector, which is subsequently separated from the glass mould by placing the whole in cold or lukewarm water, and then gradually raising the temperature of the water to 120° F., when the metal reflector will leave the glass mould, due to the unequal expansion of the two." The concave surface of the reflector thus obtained has a brilliant polish, and requires no further treatment to answer all the purposes of a reflector; but, for uses where tarnishing would soon take place, it is further immersed in a bath of palladium ammonium chloride, and a coating of palladium deposited on the concave side; this metal does not tarnish readily, and resists heat to a wonderful degree.

A New Source of Iceland Spar.—For a long time past large crystals of this indispensable optical substance have gradually become scarce, so that at present the price is greatly increased. It is therefore satisfactory to learn that a new source has been pointed out, and may turn out to be of considerable value. According to the *British Central African Gazette*, recently arrived in this country, a sample of limestone found on Kelwa Island, Lake Shirwa, was sent to the Imperial Institute for examination. Mr. Wyndham R. Dunstan says of it in one portion of his report: "The sample of limestone from Kelwa Island, which is used at Zomba for making lime (!), turns out to be Iceland spar. . . . . Another point to which I think it would be well to direct attention is the value of large, well-formed, colourless, transparent rhombohedral masses of the spar. These are employed in the construction of certain optical instruments, and I was informed by one of the principal manufacturers not long ago that the supply of these crystals is now very scarce."

Spectacles.—The Court of the Spectacle-makers' Company met recently under the Presidency of Dr. Lindsay Johnson, and perfected a scheme for the examination of opticians and the granting of diplomas. The regulations, the syllabus of subjects for theoretical and practical examinations, and forms of application to be used by candidates were finally settled upon. It was also decided that the first examination shall take place in London in November next. The Company continue to receive warm support from all parts of the metropolis, as well as from the provinces, as it is felt that public confidence will be placed in those who hold certificates to a greater extent than in those who do not.

Rembrandt Exhibition in Amsterdam.—An evening contemporary says that the Duke of Westminster has consented to lend all his Rembrandt pictures, without exception, to this forthcoming Exhibition. It may not be generally known that the Duke of Westminster owns one of the finest, if not the finest, private collections of paintings in this country. Those who have had the opportunity of seeing them have had a treat.

COLOUR-FILTERS FOR THREE-COLOUR WORK.

M. Vidal recently read a paper on this subject before the Société Française de Photographie, of which the following is an abstract:—

It is possible to use either one kind of plate for all the negatives, or else three plates, each sensitised, for the particular regions, and he inclines to the latter method. It is not necessary to use any filter for the blue if an ordinary plate be used.

For the yellows and greens a yellow, and not a green, screen should be used. If a green screen be used, the action of the light is uselessly lessened. The green screen does not cut out the blues and violets better than the yellow, although it does absorb the red; but this is a useless advantage as plates sensitive to yellow have no sensitiveness to red.

For the red and orange a plate specially sensitised to these colours should be used, and orange-red should be the colour of the screen to be used. This screen should absorb the whole of the spectrum from H to E ¾ D, and thus let through only the yellow, yellowish-orange, orange, orange-red and red. The yellow screen should cut out the violets and blue from H to b, and allow the rest of the spectrum to pass.

In the second case, when only one kind of plate is to be used, it is obvious that one sensitive to all the colours of the spectrum must be used. Three screens are necessary—a blue-violet, a greenish-yellow, and a red orange. The blue screen should absorb from C ¾ D to E—that is, the yellow-orange and orange-red, and part of the red. It is possible to make this screen so dark that the rest of the red from C to A will not act. The result of using this screen is that the two other colours—red and green—are absorbed.

The red-orange screen should absorb the whole of the colours from H to D ¾ E; the reds and yellows alone act on the plate.

The yellowish-green screen should absorb from A to C ¾ D and from G to H. The yellows and greens should alone act on the plate. It is obvious that a yellow screen such as was used in the last instance would allow the red to pass, and therefore cannot be used with a plate sensitive to all colours.

The method of preparing the filters which seems to be the most convenient is by bathing. A thin glass commercial dry plate should be taken and fixed in hyposulphite of soda, and well washed and then dried. Various solutions should be prepared. For the yellow, aurantia or naphthol yellow may be used, and preferably a saturated solution, and the gelatinised plate should be immersed for about five minutes, and then it should be rinsed under a tap and allowed to drain.

The same procedure should be adopted with the other screens, using "vert sulfo" for the green, eosine for the red, and methylene blue for the blue-violet.

The absorption of the screens must be experimentally determined, but they should finally correspond to those stated above.

Generally speaking, taking the three primary colours, red, green, and violet, the result should be in each of the three negatives, that two colours should not act, whilst the third should act like white.

The saturation having once been established, it is easy to always arrive at an identical saturation to the standard screens by simple comparison.

The best way of using the screens is to place them in a suitable frame close in front of the plate.

Although the aniline colours are not stable, still they will last a long time if kept, when not in the camera, in the dark.

FOREIGN NEWS AND NOTES.

Ink-testing in Colour Work.—The *Photographische Correspondenz* has a short article by Dr. J. M. Eder on inks for three-colour work. The addition of eosine colours to render them more brilliant is of no consequence for letterpress, and does not occasion much difficulty in lithography. In the collotype process, however, the film is moistened with glycerine, hygroscopic salts, and ammonia. This etching fluid tends to dissolve the eosine, the film becomes stained, and the prints suffer similarly. Pure madder lake and cinnabar are free from this fault, and it is desirable, before using a coloured ink, to ascertain its suitability. Dr. Eder recommends the following test: Take a small quantity of the ink on the tip of a knife, and rub it down in a saucer with strong alcohol and a little ammonia. Filter the supernatant fluid. The slightest trace of eosine will be detected by the reddish tint of the alcohol. Further tests for fluorescence, absorption, and with chemical reagents may also be made. If the fluid remains colourless, the madder lake, cinnabar, &c., are free from eosine or other deleterious colouring matter of a similar nature.

Ketone and Aldehyde Developers. — In the same periodical Professor Valenta gives an account of some experiments, undertaken at the Vienna Technical School, with the new developers introduced by Messrs. Lumière and Seyewetz. A number of aromatic ketones were also tested, but gave no serviceable results. Acetone, C_3H_6O, was found to be the best, and gave very useful developers with hydroquinone and pyrogallol, mixed with sulphite of soda. Professor Valenta confirms Lumière's opinion that pyrogallol is especially suitable in conjunction with acetone, and is to be preferred to pyro soda, by reason of its less alkaline character. Its advantages in this respect are still greater in comparison with pyro potash. Professor Valenta found the following formula the most suitable:—

Water	1000 parts.
Pyrogallic acid	28 „
Sulphite of soda	350 „
Strongest sulphuric acid	6 drops.

For use take 30 c. c. of the solution and 80 c. c. of water, to which 8 c. c. of acetone have been added. This developer is quick, and gives plucky negatives with clear shadows. The colour is a fine greyish-black. The developer may be used repeatedly without causing stain. Bromide of potassium has a powerful retarding action. For films and plates with a frilling tendency the developer should be valuable. As disadvantages may be mentioned its higher price and unpleasant smell.

Pyrocatechin. — According to the *Photographische Mitteilungen*, it has been found, at the Imperial Technical School, Berlin, that pyrocatechin developer will preserve its energy for more than two years. A concentrated solution may be prepared as follows:—

Water	200 c. c.
Crystallised sulphite of soda	25 grammes.
Crystallised carbonate of soda	50 „
Pyrocatechin	10 „

For use, one part of the solution is diluted with five parts of water.

Matt-surface Prints.—The many photographers who still favour silver for the variety of pleasing tones it gives may find the following an interesting process, which we take from the *Photographische Chronik*. For small work Rives or Saxe paper should be used, but for large sizes strong, rough drawing-paper is best. First prepare a solution of—

Sandarac	5 grammes.
Distilled water	60 to 70 c. c.
Ammonia	5 „

The sandarac is reduced to a very fine powder, and added slowly, in small quantities, to the water and ammonia. If it is not entirely dissolved, add ammonia, drop by drop, until no sediment is left. Beat the whites of several hens' eggs to a froth, and allow it to settle. Rub down 10 grammes of arrowroot in 150 c. c. of water until quite even. Heat 350 c. c. of water, and gradually stir in the solution of arrowroot, and boil for five minutes. Dissolve 2 grammes of chloride of sodium, 2 grammes of chloride of ammonium, and $3\frac{1}{2}$ grammes of chloride of barium in 150 c. c. of water, and add this solution to the boiled arrowroot. Filter the hot liquid through flannel. To 150 c. c. of the albumen add 150 c. c. of water, and filter through paper. When the salted arrowroot solution is sufficiently cool, gradually add the diluted albumen. Finally add the solution of sandarac with stirring, and neutralise with pure nitric acid. To obtain brilliant prints, add citric acid, drop by drop, until the solution gives a strong acid reaction. For flat negatives, chloride of copper and ammonium bichromate may be added; for hard, phosphate of soda. The paper is brushed over with the solution, and, when dry, sensitised with a twelve per cent. nitrate of silver bath, acidified with citric acid. The sensitising may be done with a brush or by floating the paper.

The Rag Harvest in France.—*Le Progrès Typo-litho* mentions that M. Louis Paulian estimates the quantity of rags collected annually in France at 288 million kilogrammes. This is at the rate of 8 kilogrammes per head for a population of 38 millions. The value is 50 centimes per kilogramme, or about $5\frac{3}{4}$ millions sterling per annum. In 1889 the export of rags from France amounted to about $1\frac{1}{2}$ millions sterling. Every day the Parisians throw away 2000*l.* worth of rags.

The Detection of Crime.—The *Photographisches Wochenblatt* reports a very interesting lecture by Dr. Jeserich, the well-known expert in the detection of falsified documents, &c. The following remarkable cases were given. A registered letter, declared to contain 20*l.*, was handed in at the Post Office, but the recipient found only a piece of blotting-paper instead of the money order in the envelope. A post-office robbery was supposed to have been committed, as the lower edge of the envelope had been cut and joined again on the inside with a strip of folded gum paper. Dr. Jeserich first photographed the front of the envelope, and then the blotting-paper, under a strong side light. The shadow of the impression of the post mark was visible on the negative of the blotting-paper, which proved that the robbery must have taken place before obliteration of the stamp. It was then noticed that the gum paper had been inserted with dirty fingers. The marks being inside the envelope, the robbery must have occurred before the letter was posted, and thus the attempted fraud was discovered.

Another case was that of a supposed dedication by Luther in an old book, said to have been the property of Gustavus Adolphus, from whom it had passed to a distant relative. To egg on the purchaser, the vendor said he doubted the genuineness of the writing, and by this means suggested he was asking much less than the real value. The book was printed in 1525, and the dedication was dated 1528. Moreover, the volume was riddled with worm holes, and appeared to have been lying undisturbed for dozens of years. It was certain that the volume could not have been worm-eaten in such a manner between 1525 and 1528, and the inscription must therefore have been written before the book was damaged. But it was observed that the worm holes in the cover and flyleaf did not correspond, from which it was inferred that the leaf must have been taken from some other book. Dr. Jeserich then photographed the writing on a very large scale, and it was discovered that where the writing was pierced by the holes the ink had been drawn up and down by capillary attraction. It was thus proved that the dedication had been written on worm-eaten paper, and that Luther could not have written it in 1528.

Drilling Glass.—According to the *Deutsche Photographen-Zeitung*, an optician has discovered that glass may be drilled as easily as wood if the drills are kept in mercury before use. A saturated solution of camphor in oil of turpentine is used to preserve the point. The latter is an important item, and, as the process appears to have been patented, it would be curious to learn what part the mercury plays.

Direct Reproduction of Metals and Coins. — M. Guebhard, in his experiments as to the action of certain objects when placed in contact with the film of a dry plate, discovered that a piece of money or an intaglio engraved plate would produce an image on the film. In order to do this, a plate should be exposed for a very short time to a weak light so as to generally fog it; then place it in the dark room in a dish and flood it with developer, and when it is soaked place the money or engraved plate on the film and leave it for five or ten minutes, and then withdraw the plate and remove the piece of money. The result is an image more or less sharp according

to the nature of the subject; with an intaglio engraving the results are absolutely sharp, but with a coin less so. The explanation of this action is said to be as follows: the plate having already been exposed to light, a reduction of the silver bromide naturally begins when it is placed in the developer; but, as soon as the coin is placed on the wet film, the parts in relief press out the developer, as it were, which collects in the hollows, and thus the developing action only goes on there. The half-tones which correspond to the lower parts of the relief also appear, and this is ascribed to capillarity.

Some Wholesale Profits.—Three of the largest sensitised paper factories in Germany have just declared the respectable dividends of ten, fifteen, and twelve per cent. respectively, and, judging from the statement that the Dresden-Albumin Papierfabrik shows a profit during the last twelve months of 210 609 marks (10,530*l.* English), which is an increase of 13,444 marks (672*l.* English), it is probably correct to say that albumen is not yet dead.

The Purification of Acetylene.—A new acetylene-gas-purifier has been invented at Marseilles, which is sold at from 70*s.* to 100*s.*, and, according to Dr. Odernheimer, this is nothing more than a mixture of oxide of iron and iron filings; this, whilst preventing to some extent the smoking of the flame, is not really efficient, and it is obviously nothing more than Laming's coal-gas scrubber. A much better purifier, and one which removes the phosphoretted hydrogen, is chloride of lime made into balls with water, and a second chamber filled with chalk to absorb any chlorine. This was suggested by Lunge and Cedercreutz.

Devils.—According to G. Braun, the undoubted cause of these pests in photogravure is the insufficient adherence of the asphalt grain to the copper. Every grain rests first of all on the copper on a point, and, if the copper plate is now heated to melt the asphalt until the copper turns blue, it has already become oxidised, and before the asphalt grain has melted, and thus by continued etching the grain is eaten away and devils are formed, chiefly in the darkest parts, where they are less noticeable in printing, however, than in the half-tones. If four etching baths are used, the devils first appear in the third. The remedies are the use of resin instead of asphalt, as this melts at a lower temperature than the asphalt, and therefore the copper is not oxidised so much. The carbon tissue should be kept very dry also; if the air is very dry, devils do not appear, but only small round holes.

Black Tones on Silver Paper.—According to the *Rivista Scientifico-artistica di Fotografia*, black tones may be obtained on printing-out paper by first toning to a blue-violet colour in—

Potassium chloro-platinite (1:1000)	30 parts,
Potassium chloride	2 ,,
Water	1000 ,,

and then transferring to—

Chloride of gold	2 parts,
Mercuric sulphocyanide	20 ,,
Citric acid	20 ,,
Water	1000 ,,

then well washing, fixing, and washing as usual.

Papier pour Héliogravure d'Art.—Under this title a new matt-surface printing-out paper has been introduced in France. Ritter Phillip von Schöller, whose fine pictures were shown at Pall Mall for the last two years, showed it recently at the Camera Club in Vienna. There is a special toning bath for black tones, and one for Bartolozzi red, but the paper may also be lightly printed and then treated with gallic acid, and fixed in the ordinary hypo bath. Von Schöller states that the results have all the appearance of a photogravure.

SOME COMPARISONS OF DEVELOPERS.

[Paper read before the London and Provincial Photographic Association.]

The development of the latent image is certainly of the first importance to photographers. Evidently chemists have detected this, and have laboured to discover new substances which will equal or eclipse our old friend pyro. The last few years, developers have followed one another rather quickly. The various claims for them, and the number of them is becoming rather confusing. It is generally claimed that the new rival will do more than any previously introduced. Many who have used these new arrivals have found some satisfactory change in the character of their work. Many, and I think the majority, have returned to pyro after a short experience with the new substance. In the ordinary course of daily work, it is very difficult to form a true estimate of the results with different developers. The conditions, which are always changing, may be the cause of the variation, and not the developer. I have, myself, tried many of the new developers, only to return as many times to pyro. I recently determined to make a few experiments in a way which would clear away some of the changing conditions. In bringing to your notice the results of these experiments, I wish you to understand that I do not in the least pretend that they are exhaustive. To carry these investigations on through all the possible, and perhaps useful, variations would entail an enormous amount of work. This little show of sixty plates will satisfy me for the present.

I think it not unlikely that some of you will smile when you take a casual survey of the lot, which at first sight appear so much alike. I must tell you that I have endeavoured to produce the best result in each case by the means employed. Perhaps some of you will say I have done those things which I ought not to have done, and left undone those things which I ought to have done. With none of these plates have I used tentative development, which I have used to great advantage in some of my work. In these experiments I determined to mix the developer, pour it on the plate, and await the result without any after-addition. The manner in which these plates have been exposed I will describe to you. Ten sensitometers were obtained, there being ten developers which I desired to test. The plates used were the Paget XXX, all from the same batch. An arc was drawn from the point where the light was placed, and ten radial lines drawn, then each sensitometer placed at right angles to these. The ten were exposed at the same time to the same burning magnesium ribbon. For supporting and consuming small quantities of magnesium ribbon I found an ordinary large-size pin the best. Pressed into one end of the piece, it was easily held and completely consumed. A set were exposed normally, and, developed in the same dish, were found very even. I made many tests to decide the normal exposure, and developed with the plate-maker's formula.

The normal exposure proved to be $\frac{3}{8}$ in. of magnesium ribbon, burnt at 3 ft. distance. The other exposures given were $\frac{1}{4}$, $\frac{1}{2}$, 3 times normal, 10 times normal, and 15 times normal. I should like you to notice that the 15 times normal is 60 times more exposure than the $\frac{1}{4}$ normal, and yet there is one set which shows almost the same result through the 6 plates. In most cases the formulæ recommended by the makers of the developers have been strictly adhered to, also variations for over and under-exposure. I do not intend to weary you with a detailed description of each case; I shall dwell more upon the more conspicuous cases. Of course, pyro is prominent in one's mind, and comes out well in the result.

PYROGALLIC ACID FORMULA USED.

Exposure.	Pyro. Grains.	Ammonia. Minims.	Br. Pot. Grains.	Sulphite. Grains.	Water. Oz.
Normal	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$	6	1
$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	3	1
$\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{10}$	3	1
3 times	$2\frac{1}{2}$	$1\frac{1}{2}$	10	12	1
10 times	4	1	20	18	1
15 times	5	1	32	22	1

The ten per cent. ammonia was tested with Mr. Haddon's ammonia tester. The times in developer were:—

	Appearance.	Complete.
Normal	$\frac{1}{2}$ minute.	3 minutes.
$\frac{1}{2}$	$2\frac{1}{2}$ minutes.	7 ,,
$\frac{1}{4}$	3 ,,	8 ,,
3 times	3 ,,	10 ,,
10 times	6 ,,	24 ,,
15 times	11 ,,	22 ,,

The fifteen times shows a better result than the ten times, showing the advantage, in over-exposure, of keeping the bromide and pyro high, and the ammonia low. Yet this was completed in two minutes less than the ten times exposure. I ought to have stated before that the temperature throughout was 60°-*f*, except in case of diogen, which was 68°-*f*, as recommended by the maker. To return to our pyro, the under-exposures have much fog. The one-half exposure is rather weak compared with the normal; this is caused by the reduction of the pyro from $1\frac{1}{2}$ to $\frac{1}{2}$ grains. A little intensification would set this right. The one-fourth exposure shows good pluck, and nice gradation to No. 21. Rodinal shows four numbers further in the normal than any other plate. Glycin shows more than any other plate in the half-time exposure. The simple addition of one-third water allowed the developer to show more detail than the normally exposed plate, before the first numbers were too dense. Amidol shows a little more detail than pyro in the one-half exposure. Eikonogen same as pyro. Diogen gives a nice gradation in the half-time exposure, from 1 to 21, with a little more density in the first numbers than pyro. The diogen plate is yellow with stain; this was

thirty minutes in the developer. Diogen shows the shortest scale, by eight numbers, of any plate in the one-fourth exposures; this plate was in developer sixty-one minutes, its colour is orange with stain—developer used according to maker's directions Diogen, in the over-exposures, comes out well; the three times plate is very good. The addition of bromide to this developer is very effective in over-exposures. Hydroquinone I could not keep back in the over-exposures; the addition of bromide up to 26 grains to the ounce for the fifteen times. The first sixteen numbers came up almost at once.

Amidol, glycin, eikonogen show the weakest images in the over-exposures. I will go rather fully into the description of one set which seems to show some remarkable qualities in both the under and over-exposures. These are developed with a mixture of hydroquinone and rodinal. The method was the following:—

No. 1.

Hydroquinone	40 grains.
Citric acid	5 ,,
Sulphite	40 ,,
Water	10 ounces.

No. 2.

Caustic potash	80 grains.
Sulphite	80 ,,
Water	10 ounces.

Equal parts of each with 3 minims of ten per cent. bromide for normal exposure.

Rodinal, No. 1.

Rodinal	1 part.
Water	25 parts.

No. 2.

Rodinal	1 part.
Water	15 parts.

For my normal exposure I took of—

Hydroquinone (normal)	1 part.
Rodinal, No. 1.	1 ,,

Image appeared in 3 seconds, complete in 40 seconds. For one half-time exposure, water equal to one-third of the developer was added. Image appeared in 12 seconds, complete in 65 seconds. For the one fourth normal exposure, water equal to one-half of the developer was added. Image appeared in 25 seconds, complete in 2 minutes.

For the three times over-exposure I took hydroquinone, with one-half the quantity of No. 2 in it, 1 part.

Rodinal, No. 2	1 part,
Bromide	12 grains,

to each ounce of developer.

Image appeared in 40 seconds, complete in 1 minute 40 seconds.

For the ten times, the same, but with 24 grains bromide to each ounce. Image appeared in 1½ minutes, complete in 4 minutes.

For fifteen times I took—

Hydroquinone, with ⅓ the quantity of No. 2	1 part.
Rodinal, No. 2	1 ,,
Bromide	32 grains to each ounce.

Image appeared in 4 minutes, complete in 6½ minutes. The action of this developer is very rapid, you will notice. I do not know what would happen if this developer, in the normal form, were kept long upon the plate. The image flashes up like a very fully exposed wet plate. I really believe, judging from the quarter-timed plate, that it is possible to develop exposures much less than this with a good result. This I hope to try, and will show you what I obtain. J. S. Teape.

MARINE PHOTOGRAPHY THIRTY YEARS AGO.*

Being an Account of the Great Naval Review of 1867.

The morning was glorious, and I felt so eager for work that I had no thought for anything but Norman Fort, five miles away. And yet I have a confused picture before me with brilliant colours, but so Turneresque in effect that I can scarcely make a coherent picture. We are struggling to get out of the harbour, and have to fight our way through crowds of steamers, launches, and boats of every description. Everybody seemed mad with excitement. Gaily dressed ladies are scrambling up the sides of the longer steamers in a manner they would have regarded as most unbecoming could they have been spectators instead of actors in the motley scene. Acres of bunting of every conceivable form and pattern are gaily fluttering in the morning breeze, Victoria and South piers are radiant with gay flags and bright skirts, and not an inch of standing room seems unoccupied.

We are at length clear of the crowd and confusion of the harbour, and are twisted and tossed by conflicting currents; but soon our sails are set, and we are dancing along at a goodly pace, and the gaudy scene is gradually toned down by distance. We had not long cleared the harbour's mouth when we saw clearly enough that the predictions of a squall would soon be verified. The glorious cumulus clouds, which but a moment before stood out solid as rocks in the clear morning sunlight, were gradually blotted out by low, dark, murky masses driving swiftly after us as though eager to spoil our sport. The waves changed their merry dance into a frantic leap to urge us onwards in order to escape the fury of the gale. Their efforts were in vain: its icy touch was upon us, and in a moment we were literally hissing through the water. I have all my life been used to boating, but never before did I see such perfect handling of a perfect craft. Like an animated thing, she seemed ever on the alert to obey the slightest wish of her master. Seas that would have swamped a less perfect boat, in unskilled hands, passed us harmlessly by, for she turned her head aside to avoid the blow, and then held on her course again.

As we neared our destination, we found the current strong against us, and in the struggle betwixt wind and tide, in spite of all the skill of the boatmen, we were drenched by the spray. When we finally got to the leeward of the fort, we found the task of landing no easy one. All ended well, however, for there were practised hands to help us, and as the sun was now shining out a welcome, and I was all eagerness to get ready for work, I soon forgot the discomfort of wet clothes, and in time got dry again without any further thought on the subject. My seaside experience had taught me the necessity for having the plates properly cleaned, dusted, and securely protected against sea-spray, for it is always potent for evil, even on a moderately breezy day, and any delay in getting the plate coated with collodion and into the bath brought punishment in a streaky negative covered with comets, the products of the crystals of sea salt deposited all over the plate.

* * * * *

I found the men on the fort kind, jolly fellows, and extremely useful besides, for they understood everything that was going on, and knew every ship in the fleet. Whilst I was busy, therefore, with my preparations, one of them, posted on the wooden framework above the fort, spy-glass in hand, kept on shouting out a report of the proceedings.

"Signals are hoisted from the *Vic.*," shouts he.

"What does that mean?" bawls I.

"The Sultan's train is at Gosport," is the rep'y.

Immediately afterwards bang goes a distant gun, and in a short time another.

"They have entered the yacht," is the interpretation.

In a brief space the booming commences, and goes on continuously, increasing in violence, as the near ships contribute to the roar.

"Anything in sight yet?" is my anxious query, for the fleet is mad with excitement, and the yards of every ship are literally alive with tars in white.

"Not yet," is the reply.

The roaring of the guns is now almost past endurance, and again I put the question, and get the same reply.

I could not help thinking of a most dramatic situation in *Blue Beard*, though my nautical friend, who played the part of Sister Anne, and like her could see nobody coming, scarcely looked the devoted relative so dear to children.

The long-delayed intelligence came at last, and a plate was soon ready; but the weather was now most exasperating, for the sky and sea could scarcely look more gloomy. One or two plates were tried, however, and were interesting as records, for it showed the fleet with the yards manned. But in a few minutes it began to rain in earnest, and, as the fleet were completely blotted out, I could for a time do no more work. I had now leisure to discover that I was very hungry, and in consternation remembered that, in my eagerness to start in the morning, I had quite forgotten to make any provision for the wants of the day. The kindly light-keeper and his companions, however, gave me an invitation to dinner, which I gladly accepted. The meal was simple enough: a bason of tea, and some meat and bread, but never did I find a meal more acceptable, and we had quite a jolly hour of it.

The weather brightened up fine as if in honour of Her Majesty's visit, for the distant guns announced the departure from Osborne. Again my look-out went to his post of observation, and I returned to work, but only to again reap disappointment, for another squall had sprung up, and the timbers creaked with the fury of the wind. The use of a tripod was impossible. I had to wedge the camera up on the timbers, and even then I could scarcely prevent it from blowing away to sea. The Royal yacht was now very near to the fort, surrounded by a fleet of sailing yachts, that looked like a guard of honour; when, to crown the misfortunes of a most unlucky day, a gust of wind, unusually violent, carried away my focussing screen, and smashed it to atoms, and with the same breath sent my focussing cloth far out to sea. Fortunately for me, the focus was already made; I had only, therefore, to make the centre of my camera the vanishing point, and the sides the boundary, of the view, and I could still go on with the work. When the Royal yacht came into my field of view, I fired my photographic shot, and secured the best picture of all, as a reward for perseverance.

An Admiralty steam tug came very near the fort, and, with great difficulty and loss of time, a party of Royal Engineers landed with their photographic equipment. They were sent to photograph the Royal yacht, moored a short distance away, whilst the luncheon was proceeding.

* Concluded from page 217.

The captain in charge of the photographic party started in amazement when he saw me, and evidently believed I had dropped from the clouds. I briefly explained how I had managed to get there, and offered him the use of my tent, as clearly he would not have time to erect his own. I stipulated that they should use my chemicals, as I could not risk the introduction of unknown collodion into my nitrate bath. All was in vain, however, for, by the time the plate was ready for the camera, the yacht had weighed anchor and was well on her way back to Osborne. The captain thanked me and departed with his party. In a short time I was at work again, for a sham fight had started between the fleet and the forts at Southsea. When busy in the tent developing a most successful plate, the light-keeper came to tell me that the boat had come back again. On coming out from the tent, I found my photographic friend waiting to tell me that when Sir A——, who was in charge of the expedition, heard of my kindness, and that as I was compelled to sleep on the fort for want of any means for getting away, he had sent to offer me a passage to Portsmouth Dockyard, and thence to London by special train.

It is needless to say how glad I was for this unexpected escape from imprisonment. I had coated my plates with glycerine and water to keep them moist; so, leaving my apparatus in charge of the light-keeper, I departed with my plate box and its precious contents. When I got on board the steamer, I found myself an object of curiosity and had to tell my adventures not only to Sir A——, but to a crowd of pressmen who were eager, pencil in hand, for copy. There is the result, which must be considered a wonderful example of literary accuracy:—

"*A Persistent Photographer.*—A photographer in a small boat risked being drowned, and was nearly so, suffered starvation for a long time, and had much of his apparatus broken in putting out to sea to photograph the Naval Review. The poor man's negatives were washed out repeatedly, but he got them in again and kept dry next his heart, and was saved by a friendly steamer. Will he accept, at our hands, the title of the Nelson of Photographers?"

It was about three in the morning when the train got to Waterloo, but I was so anxious about the results I could not sleep, so set to work to carefully wash, and, where necessary, intensify the negatives and get them varnished as speedily as possible. I had used ten plates and published eight of them. Not a bad day's performance for wet-plate work.

VALENTINE BLANCHARD.

THE DECORATIVE CAPABILITIES OF PHOTOGRAPHY.

II

IN a previous article I mentioned a few of the necessary requirements to successfully practise the printing of photographs on textile fabrics such as cloth, and pointed out the need for utilising only such negatives as are possessed of strong contrasts.

As to the most useful material to employ, this to a large extent must necessarily depend upon a worker's individual taste. No doubt the materials supplied by the Platinotype Company are highly convenient, and the quality of their sensitised cloth of the Nainsook fabric leaves nothing to be desired. I always had a grudge somehow at the cost of these excellent materials, but I suppose, however, if people want a good thing, they must pay for it. I can therefore confidently recommend those who are desirous of producing permanent prints on cloth to procure their material ready-sensitised from the Platinotype Company, for they will invariably find such of most excellent quality and free from any blemishes.

In doing this, I am far from saying that the preparation of or the sensitising of a piece of cloth ought not to be done by the workers themselves, for there are many purposes that such decorative articles may be applied to that can be supplied by home-made material and which are so easily performed as to be quite startling in their simplicity to those who fancy the operation one of great intricacy.

At the outset, therefore, let it be borne in mind that, if the article it is desired to decorate be one that is to be subjected to the scouring of the washtub at frequent intervals of time, then platinotype should be selected; but there are so many other articles in domestic use that lend themselves admirably for decoration and which do not require washing so frequently, but only now and again, as it were, that our friend the silver bath can supply with the greatest of ease.

Take for instance the following. A lady or gentleman is requested to send a donation of some kind or other to a bazaar that has some calls upon their purse and patronage. What more suitable contribution can be imagined than, say, a dozen or two of nice d'oyleys, having an edging of lace or crochet work round a centre bearing a beautiful photographic image. Sets of any suitable subjects are easily provided, such as marine views, yachts, steamers, or it may be architectural views of church surroundings, &c.; in fact, there is no end to the many delightful subjects that can be worked upon to fill up a set of a dozen or so, and when supplied they always sell well.

Let it be supposed, then, that it is desired to produce a dozen d'oyleys. The first step is the selection of twelve good lantern slides, and let these be provided with round masks of the same size. If the worker has a copying box, I advise him or her to place these in the copying box and then, by means of his camera and a short-focus lens, proceed to make bold strong negatives from the slide; if he uses his box for this purpose, he will find he has much greater control over his plate by exposing the same through his lens with the aid of a small stop than he has by merely placing his plate in contact and exposing in a printing frame. In any case, however, having procured a dozen bold, strong printing negatives from the twelve selected lantern slides, the next step is to provide himself with suitable cloth and to sensitise the same.

There are quite a number of materials that may be selected for the purpose, such as Nainsook, a fine muslin, or cambric, or fine linens, or even a good sample of cotton cloth can all be brought into requisition. Say, however, it has been decided to use a nice piece of cambric, the first thing to do is to make certain that it contains no dressing or that it in any away possesses ingredients that would cause stains when such receives a sensitising bath of nitrate of silver. There is, fortunately little difficulty at this stage, however, for, by merely well washing the material in clean water, such is readily prepared for the salting bath.

I have no hesitation in recommending any one undertaking the sensitising of fabrics such as we are dealing with to ignore all ideas of gelatine as a medium for the salting solution. With gelatine I never could rely upon regular results, and so I discarded it, not only for the sensitising of cloth, but also for the salting of my plain paper. Arrowroot is the best medium I know of for either cloth or paper, and with it failures will never occur if the operations are properly conducted. To utilise arrowroot in the making of a salting solution, take a teaspoonful or so and, by adding a very small quantity of water, beat it up into a paste in the bottom of a clean basin; then place in an enamel kettle or other vessel a quantity of clean water that has added to it as much table salt as just makes it salt to the palette. In practice I seldom bother to weigh it out; but, lest any of my readers should care to be very particular, then about four grains of salt to each ounce of water will be about right. When the water is boiling it is poured into the arrowroot paste and the same strained until it forms a thin, gelatinous fluid. This is then set aside to cool, and, when cold, the cambric, after being wetted in clean cold water, is immersed in and wrung out of the arrowroot solution; after being thoroughly saturated and allowed to remain in such for, say, half a minute, it is taken out and held in front of the fire till quite dry; if the salting solution is about right, the cambric will be stiff, but not very much so. When dry, the same is sensitised by immersing it in a bath of nitrate of silver composed as follows: 150 grains nitrate of silver dissolved in 3 ounces of clean cold water and rendered slightly acid by inserting a glass rod in nitric acid and then placing the end of the rod in the silver solution.

To sensitise the cambric or as much of it as is necessary for the little pictures we are dealing with is quite an easy operation.

In an absolutely clean porcelain dish (at a pinch a clean soup plate will do), place as much of the nitrate of silver solution as will thoroughly saturate the dry salted cloth. A few seconds' immersion is sufficient. Then hold the cloth before a brisk fire and dry it; if any markings appear at this stage, or when dry, the operations I have described have not been properly conducted. On the other hand, if, as is almost certain to be the case, the cloth dries up slightly stiff and clean, *i.e.* free from any slug or other markings or stains, everything is right, and, if the negative is a suitable one, brilliant prints will be pulled without any trouble.

In sensitising the cloth there is no need to go groping about in the dark room, all these operations can be performed in a dull-lighted sitting room, provided the cloth is dried off rapidly before a brisk fire.

It is not a difficult operation in any sense, and a period of ten minutes will suffice to prepare a piece of cloth and have such in the printing frame; therefore the cloth ought always to be freshly prepared and sensitised. When it is found that the salting solution is working satisfactorily in conjunction with the silver solution, a few pieces of cambric should be salted and kept in stock ready to be sensitised as described at any time.

To print cloth sensitised with nitrate of silver, if it is desired to maintain a white margin around the picture, the negative must be marked to the exact shape the image is desired. For d'oyleys a round shape is most suitable, and lantern masks can be utilised if black paper be added to their sides.

When, however, the bordering of the crochet work, or lace, or whatever the edging is composed of, comes right up to the edges of the picture, there is no need for adding to the sides of the mask.

In printing, as a rule, the image should appear a good deal darker before it is taken from the printing frame than it is intended to appear when finished, for the density will lose somewhat when toned and fixed.

After the printing is sufficiently conducted, the cloth is washed slightly in two or three changes of water as rapidly as possible to remove the free silver, and the print is then immersed in an ordinary acetate of gold toning bath; the image will tone rapidly to a deep purple black, and after a slight washing is fixed in weak hypo in the customary manner, the result being a delightful photograph on cloth of a good rich brownish black colour, and which, when ironed out and finished like other similar articles, possesses a strikingly charming appearance.

T. N. ARMSTRONG.

PORTRAITS.

ECENTLY Mr. Lionel Cust, the Director of the National Gallery, delivered an address on "Portraits as Historical Documents" at the Royal nstitution. Mr. Cust said that the generally accepted definition of a ortrait as the picture of a person must be discarded as inadequate. Vhen sincerity and truth in recording what was seen were allied to xecutive ability, the result was evident in great portraits. The whole f the Dutch school of painting proved this, and a still more recent nstance was that of Sir John Millais, whose art was essentially that of ne portrait painter. Its continuity might be broken here and there by ne uprising of a Turner or a Constable, but the names of Holbein, Vanyck, Hoppner, Lely, Reynolds, Gainsborough, Romney, and Millais ormed a golden chain which proved the truth of the assertion that the t of portrait painting was one which especially appealed to the instincts f the British artist. The first man to arrange the immense mass of naterials that existed for a national collection of portraits in this country as the Rev. James Grainger, whose work was followed by Lodge's great eries of national portraits. In February, 1856, Earl Stanhope brought orward a proposal in the House of Lords for the formation of a gallery f portraits of most famous personages in the national history. The esult of Earl Stanhope's efforts was now to be seen in the National ortrait Gallery, which at last, through private generosity, had found a ermanent home. Mr. Cust hoped that recognition would be given to ne importance of the collection from an educational point of view, and nat before long a thorough acquaintance with the historical documents ontained in the National Portrait Gallery would form an important onstituent in any scheme of national education.

THE LATENT IMAGE AND ITS DEVELOPMENT.*

The Development.

V.—Properties of Gelatine and of the Sensitive Film.

HE conclusions we have so far arrived at are :—

(1) that the energy needed for the production of the visible image from lver bromide may be wholly supplied by the developer.

(2) That the energy supplied by the light during an ordinary photoaphic exposure is too small to account for any complete separation of omine from silver bromide.

(3) That the composition of the exposed silver bromide in a photoaphic film still corresponds to the formula AgBr, and

(4) That the amount of energy required to render silver bromide velopable appears to be the same for all plates; the rapidity of the ate depending upon its physical properties; mainly, upon the amount light reflected by the film.

These conclusions point to the probability that the behaviour of various ates to various developers will not differ much, since such differences as ist in the exposed silver haloids of the various plates cannot be very eat. The exposures are generally proportioned to the rapidity of the ate, so that the energy stored in the latent images of different plates is most the same in amount.

The differences which manifest themselves in the behaviour of various ates to the same developer are chiefly due to differences in the amount d quality of the gelatine employed in the manufacture of the plates. hese differences are generally confined to the time required to reach a ven development factor upon a correctly exposed plate.

The rapidity of the chemical change which constitutes the developnt depends upon the facility with which the reagents of the developer n approach and come into contact with the silver bromide in the film. e gelatine of the film may rapidly absorb sufficient of the developing ution to supply the whole amount of reducing agent required, and, in t case, development will be complete after the process of absorption s proceeded a comparatively short time. On the other hand, if the latine be incapable of absorbing sufficient reducing agent to complete velopment, a process of diffusion takes place, and continues till the luction is complete. It is evident, from these considerations, that, in der to thoroughly understand the process of development, it is necesy to study the properties of gelatine.

The gelatine used in our experiments was in the form of thin sheets, d was supplied to us by a well-known firm of plate-makers.

0·8665 gramme air-dried gelatine absorbed the following amount of ter :—

Table VII.

In 15 minutes	2·999	grammes	or	3·45	water	per	1 gelatine.
„ 30 „	3·177	„	„	3·66	„	„	1 „
„ 12 hours	4·468	„	„	5·16	„	„	„
„ 24 „	5·148	„	„	5·95	„	„	„
„ 48 „	5·447	„	„	6·30	„	„	„
„ 60 „	5·864	„	„	6·67	„	„	„

t will be seen that the absorption is very rapid at first, and proceeds y slowly at last. Thus, if the water absorbed in sixty hours be taken 100, we have

* Continued from page 137.

Table VIII.

In 60 hours	water absorbed	= 100	per cent.
„ 24 „	„	88	„
„ 12 „	„	76	„
„ 30 minutes	„	54	„
„ 15 „	„	51	„

This absorption depends, however, much on the temperature at which the experiment is made; for instance, the following absorptions were observed in fifteen minutes at 50° Fahr. and at 70° Fahr.

0·1317 gramme gelatine absorbed 0·4222 gramme water at 50° Fahr. or 3·22 water per 1 gelatine.

0·130 gramme gelatine absorbed 0·5740 gramme water at 70° Fahr. or 4·35 water per 1 gelatine.

While gelatine absorbs of water and of dilute solutions from 3 to 7 times its own weight, according to length of time and temperature, more concentrated solutions are not so readily absorbed. Thus we found that 1 gramme of gelatine absorbed the following amounts of various saline solutions in fifteen minutes.

Table IX.

(1)	Pure water	3·8 to 3·5 grammes.
(2)	Potassium oxalate (neutral).	
	36° Twaddle	0 89 to 0·75 gramme.
	27° „	1·48 grammes.
	21° „	2·57 „
	11° „	4·35 „
(3)	Dilute ammonia	5·70 „
(4)	Sodium carbonate.	
	4° Twaddle	5·70 „
(5)	Sodium thiosulphate.	
	33° Twaddle	1·73 „
	17° „	4·75 „
(6)	Sodium chloride.	
	41° Twaddle	1·91 „
	22° „	5·40 „
(7)	5 per cent. solution sodium carbonate 5 „ „ „ sulphite	3·60 „

A glance at this table indicates that a half-saturated solution of thiosulphate is more efficient for fixing purposes than a saturated solution; that very little concentrated ferrous oxalate developer will enter the film; and, generally, that dilute solutions enter the film much more rapidly than do concentrated.

A strong saline solution will deprive a wet gelatine film of the water it had previously absorbed, as is shown by the following experiment :—

0 3139 gramme gelatine, soaked in water for fifteen minutes, absorbed 1·225 gramme of water, or 3·9 times its own weight. After immersion in a strong solution of potassium oxalate, the gelatine contained 0·478 gramme of solution, or only 1·5 times its own weight. Hence, a considerable quantity of the water (at least twice the weight of the gelatine) had passed from the gelatine into the oxalate solution.

The question as to whether the solution absorbed by the gelatine has the same composition as the solution into which it is immersed is also of importance. Experiment shows that in the case of common salt, caustic soda, and ammonia (with which it is comparatively easily performed), that the solution absorbed by the gelatine is identical in composition with that surrounding the gelatine. The method of making such experiments is very simple, and may be illustrated by the two following examples :—

1·082 gramme of air-dried gelatine was submerged for five minutes in a solution of sodium hydrate containing 80 grammes NaHO per litre. The gelatine was rapidly freed from adhering solution by means of blotting-paper, and was again weighed. It was found to weigh 5·598 grammes, and had thus absorbed 5·598 – 1·082 gramme = 4·516 grammes of solution. The specific gravity of the solution is 1·08, hence the gelatine had absorbed $\frac{4{\cdot}516}{1{\cdot}08}$ = 4·18 c. c. of the solution. The gelatine was next dissolved in water, and the solution titrated with normal nitric acid, using methylorange as indicator. The amount of acid consumed was 9·7 c. c., indicating 0·38 grammes NaHO in 4·18 c. c., or 90 grammes NaHO per litre. The solution, therefore, within the gelatine was richer in sodium hydrate than that in which the gelatine was immersed.

In the case of a solution of common salt containing 234 grammes per litre (1·15 specific gravity) in which 0·415 gramme gelatine was submerged for fifteen minutes, it was found that the gelatine had absorbed 1·491 gramme of solution or 1·3 c.c., yielding, on titration with silver, 0 303 gramme NaCl = 233 grammes NaCl per litre. In this case the solution entering the gelatine had the same composition as the solution in which it was placed.

If, however, gelatine be first immersed in water and then in a salt solution, the water previously absorbed is rapidly displaced. 0·508 gramme gelatine immersed first in water and then in a salt solution for seven minutes absorbed 2 49 grammes = 2·16 c. c. of solution containing 0 508

gramme salt = 235 grammes per litre. Hence, in a very short time, the gelatine had exchanged its water for salt solution.

These properties of gelatine are, of course, shared by photographic plates: indeed, almost exactly the same figures are obtained for the absorption of liquids, if the amount of gelatine upon the plate be known. A certain quarter-plate, for instance, absorbed in fifteen minutes 0·968 gramme of water, but only 0·296 gramme, or not quite one-third as much of a strong potassium oxalate solution. Another plate, of different make, absorbed 0·803 gramme of water, but only 0·175 gramme of strong oxalate solution.

The rate at which any particular plate absorbs either water or other solution differs very much with the quality of the gelatine and the relative quantity of it upon the plate. A soft gelatine absorbs readily; a hard gelatine, very slowly. The following table shows the difference in the absorbing capacity of some different brands of plates:—

TABLE X.

Grammes water absorbed per 100 square cm. area.

TIME MINUTES.	PLATES.						
	D_2	F_1	H_3	H_1	C	D_6	K
2·5	1·045	0·715	0·632	0·535	0·572	1·12	0·580
5	1·42	0·899	0·780	0·627	0·670	1·62	0·661
10	1·86	1·03	0·805	0·661	0·765	—	0·691
15	2·12	1·12	0·810	0·670	0·790	—	0·712
25	—	—	—	—	—	2·65	—

In studying the properties of a plate, it is worth while to make the following experiments so as to learn (1) the quantity of water absorbed in a given time, say, fifteen minutes, and (2) the approximate composition of the film.

A quarter-plate, which has been carefully dried, is weighed on a fine chemical balance, and then plunged into pure water for exactly fifteen minutes. Adhering moisture is then rapidly removed, by means of blotting-paper, from the film, and from the back of the plate, and the plate is reweighed. The difference in weight gives the amount of water absorbed.

The plate is next thoroughly fixed, washed, dried, and weighed again. The difference between the first and this third weight gives the amount of silver haloids on the plate.

Finally, the plate is washed in hot water, so as to entirely remove the film, and, when quite dry, the plate is weighed a fourth time. The difference between the last two weighings gives the amount of gelatine on the plate.

In this way the following results have been obtained:—

TABLE XI.

PLATES	E_1	H_4	D_2	L	K	H_3
Grammes emulsion on ¼ plate	·461	·282	·27	·290	·254	·398
,, silver haloid ,, ...	·210	·108	·140	·098	·065	·181
Silver haloid } in 100 emulsion ...	46	38	26·5	34	26	47
Gelatine }	54	62	73·5	66	74	53
Water absorbed in 15 min. ¼-plate	·968	·803	1·861	·975	·626	·710
,, ,, per 1 gramme emulsion	2·10	2·86	3·54	3·35	2·46	1·78
,, ,, ,, ,, silver salt	4·57	7·50	13·40	9·85	9·50	3··0
,, ,, ,, ,, gelatine..	3·90	4·60	4·80	5·10	3·34	3·35
% silver required for density 2·0 ..	18·5	36	28	40	60	20

PLATES	H_1	C	D_6	G	I	Dry Coll.
Grammes emuls on on ¼-plate	·301	·278	·517	·300	·421	·278
,, silver haloid ,, ...	·149	·098	·177	·098	·114	·052
Silver haloid } in 100 emulsion	49	34	34	33	27·5	—
Gelatine }	51	66	66	67	72·5	—
Water absorbed in 15 min. ¼-plate ...	·588	·693	2·120	1·15	1·629	—
,, ,, per 1 gramme emulsion	1·96	2·52	4·07	3·45	3·75	—
,, ,, ,, ,, silver salt	4·02	7·40	11·90	11·20	15·20	—
,, ,, ,, ,, gelatine	3·85	3·82	6·15	5·70	5·06	—
% silver required for density 2·0 ...	26	40	22	40	34·5	76

These results explain much of the different behaviour of plates as regards rapidity of development and facility of developing high densities.

Whilst some plates are so poor in silver that from sixty per cent. to seventy per cent. of the silver present has to be reduced in order to obtain a sufficiently dense sky in a landscape negative (say density 2·0), others are so rich that twenty per cent. only of the silver present is utilised to yield the required density.

Plates which absorb from 4·8 to 6 grammes of water per 1 gramme gelatine in fifteen minutes develop rapidly, while plates which only absorb 3 to 4 grammes of water develop slowly.

We may here call attention to variations we have incidentally found in the amount of emulsion on plates taken from the same packet. Our conclusions, with regard to the physical properties of plates, render it clear that these plates would vary in speed. Absolute uniformity of speed in the twelve plates contained in a single packet is therefore not to be expected.

TABLE XII.

Emulsion, in milligrammes per quarter-plate, on plates taken from the same packet.

PLATE H_4.	PLATE E_1.
(1) 273	(1) 414
(2) 283	(2) 452
(3) 295	(3) 403
(4) 271	(4) 420

VI.—Quantitative Chemistry of Development.

The result of the development of the latent image is said to be a deposit of metallic silver on the film. This deposit is the denser the less light it permits to pass through, that is, the more silver there is deposited per unit area of the film. We have defined the density of a plate as the logarithm of its opacity, a number which is proportional to the weight of metallic silver per unit area, and which is also proportional to the sensation produced upon the eye. The eye, in judging gradation, is influenced by the amount of silver which produces the gradation; and it calls that a perfect gradation in which the amount of silver per unit area uniformly increases in arithmetic progression; such a gradation as is observed on looking through a wedge of coloured glass.

The amount of metallic silver corresponding to any given density, as measured in our photometer, varies with the colour of the precipitated silver, and may be approximately ascertained, for a sufficiently large plate, by chemical analysis. The smallest area which will yield satisfactory results is that of a quarter-plate. The sensitive plate is exposed to light so as to produce approximately the required density uniformly all over the plate. After development, fixing, washing, and drying, the density is measured in at least nine places (preferably in more) and the mean of the measurements is taken as the density.

The film of the plate is next removed by immersion in water acidulated with a few drops of hydrofluoric acid, and is then transferred in one single piece, by means of a camel-hair brush, into a small beaker. It is next washed with distilled water and drained. A small quantity of strong nitric acid is now added, which generally produces sufficient heat to liquefy the gelatine, and which dissolves the metallic silver. When solution is complete (assisted, if necessary, by warming in a water bath) water, together with sufficient hydrochloric acid to precipitate the whole of the silver, are added. The liquid is allowed to remain on the water bath until the precipitate has completely settled and the supernatant fluid is perfectly clear. Occasional stirring assists. The chloride of silver is then filtered, washed, dried, and transferred to a weighed porcelain crucible; the filter is burnt and the crucible allowed to cool. A drop of nitric acid is dropped into the crucible to re-dissolve any metallic silver, which is again transformed into chloride by the further addition of a drop of hydrochloric acid. Moisture is now expelled by gentle heating the crucible (carefully avoiding spurting) and the temperature is then raised till the silver chloride is just brought to fusion.

We published a series of such determinations in 1891, which we here repeat.

EXPERIMENT 2.

Optical Density.	Gramme AgCl.
0·525	0·0163
0·960	0·0299
1·470	0·0450
1·970	0·0611
4·925	0·1523

The ratio $\frac{0·1523}{4·925}$ gives the amount of silver chloride which corresponds to density 1·00. The area of the plates was 192 square cm., hence the amount of metallic silver per 100 square cm., corresponding to the optical density 1·00, was found to be

$$\frac{0·1523}{4·925} \times \frac{100}{192} \times \frac{108}{143·5} = 0·01212 \text{ gramme.}$$

Since these determinations were made, our photometer readings have gained in accuracy, and the following new determinations have been recently made:—

EXPERIMENT 3.

Optical Density.	Grammes Ag 1
0·757	0·0115
2·535	0·0388
3·292	0·0503

he area of these plates was 87 2 square cm., hence the amount of allic silver per 100 square cm., corresponding to unit density, is

$$\frac{\cdot0503}{3\cdot292} \times \frac{100}{87\cdot2} \times \frac{108}{143\cdot5} = 0\cdot0131 \text{ gramme.}$$

he above plates were all developed with ferrous oxalate. The density ates differs, however, with the colour of the precipitated silver, pyro- loped negatives requiring less silver to yield the same optical density. plate developed with pyro-soda gave the following results (Experi- t 4) :—Density 2·356 = ·0547 gramme AgCl.

he area of this plate was 168 square cm., hence the amount of llic silver per 100 square cm., corresponding to unit density, is, in case,

$$\frac{\cdot0547}{2\cdot356} \times \frac{100}{168} \times \frac{108}{143\cdot5} = 0\cdot0104 \text{ gramme.}$$

he mean of these results (having due regard to the number of ex- ments made) gives, as the amount of silver per 100 square cm., sponding to density 1·00, 0·0121 gramme, or, say 12 milligrammes. he densities of good ordinary pictorial negatives range between the s 0 and 2·5. The extreme density of a landscape negative is usually due to the sky, which amounts to about 2·0. The highest density studio portrait is frequently about 1·5.

he following table gives the amount of chemical changes which occur g development expressed as milligrammes of the substances pro- d and consumed per 100 square cm.

TABLE XIII.

tallic silver and potassium bromide produced, and ferrous sulphate $FeO_4 + 7H_2O$) and pyrogallol required, for the development of different ties :—

l Density.	Mill'grammes per 100 square cm. Sensitive Film Area.			
	Metallic Silver.	Potass. Bromide.	Ferrous Sulph.	Pyrogallol.
0·50	6 05	6 67	15·55	1·78
1·00	12·10	13·35	31·10	3·57
1·50	18·15	20·02	46·65	5·35
2·00	24·20	26·70	62·20	7·14
2·50	30·25	33 37	77·75	8·92
3·00	36·30	40·05	93·30	10·71

pyrogallol required is calculated from experiments which are ed below. The ferrous sulphate required is calculated on the basis 08 milligrammes Ag correspond to 278 milligrammes ($FeSO_4 + H_2$.

s table enables us to judge more correctly the quantitative aspect process of development, and we will now proceed to discuss some in connexion with the developers we most frequently use. We ve our standard formula for ferrous oxalate :—

Ferrous Oxalate.

A.

Potassium oxalate	1 part.
Water	4 parts.

B.

Ferrous sulphate	1 part.
Citric acid	0·01 ,,
Water	3 parts.

C.

Potassium bromide	1 part.
Water	100 parts.

use take :—

A	100 parts.
B	25 ,,
C	10 ,,

Development to be conducted at a temperature of 65° Fahr.

(1) *Ferrous Oxalate.*

The ferrous-oxalate developer, compounded as above, contains in

1000 parts	potassium oxalate	185	parts.
	ferrous sulphate	61·5	,,
	citric acid	0·61	,,
	potassium bromide	0·74	,,

From previous experiments (see Tables IX. and X.) we have learnt that the plate with the highest absorption capacity absorbs in fifteen minutes, 2·12 grammes of water per 100 square cm., and that it would only absorb a quarter of this amount of strong oxalate solution, that is, about 0·53 gramme or c. c. of solution.

Since 1000 parts of standard ferrous-oxalate developer contain only 61·5 parts of ferrous sulphate, 530 milligrammes of developer will contain 32·5 milligrammes of ferrous sulphate. As we learnt from Table XIII. that 31·1 milligrammes of ferrous sulphate are required to produce an optical density of 1·0, it will be quite evident that the most absorbent plate is quite incapable of absorbing, in fifteen minutes, sufficient ferrous-oxalate solution to develop anything like a sky density of 2·0. In this case development depends upon exchange of reagents between the film and the mass of the developer by a process of diffusion.

Remembering that the film absorbs relatively much more of a dilute than of a concentrated solution, it will be readily seen that the dilute solution will actually introduce more ferrous sulphate into the film in a given time than a concentrated solution ; thus the rapidity of development does not depend very much upon the concentration of the developer.

It will also be perceived that, for other plates which absorb less than 2·12 grammes of water in fifteen minutes, development will depend almost entirely upon diffusion of the reagents from the mass of the developer into the film, and that the amount of developing solution absorbed by the film is utterly inadequate to produce such densities as are obtained and required.

(2) *Pyrogallol.*

It is easy to calculate the quantitative changes which happen within the film when ferrous oxalate is the developer employed, since one atom of iron reduces one atom of silver. It is not so, however, with pyrogallol. Its formula and constitution are very well understood, but its behaviour on oxidation is still very obscure, and no literature at our disposal enabled us to obtain even an approximate idea of the relative amount of metallic silver which one part of pyrogallol might reduce. We had therefore to appeal to direct experiment. After many failures, the following method gave approximately constant results.

A carefully weighed quantity of pyrogallol is dissolved in distilled water. A quantity of silver nitrate (from eight to twelve times the weight of the pyrogallol) is also dissolved in distilled water, and dilute ammonia is carefully added until the brown precipitate of silver oxide is just redissolved.

To this ammoniacal silver solution, the solution of the weighed quantity of pyrogallol is added, well mixed, and allowed to settle. The yellow-coloured solution containing the excess of silver is passed through filter paper (Schleich and Schüll's), and the precipitate is washed by decantation with very little water. The precipitate is then transferred to the filter paper and again washed with a small quantity of water. The washing must be interrupted immediately the precipitate begins to pass through the paper.

(*To be continued.*)

F. HURTER, Ph. D.
VERO C. DRIFFIELD.

THE LONDON STEREOSCOPIC COMPANY.

THE Thirteenth Ordinary General Meeting of the London Stereoscopic and Photographic Company, Limited, was held, on April, 5, at the Regent-street premises, under the presidency of Mr. R. W. Kennard (the Chairman of the Company).

The Secretary (Mr. S. M. Clark) having read the notice convening the meeting, the Chairman said : "I am pleased to say that the Directors are satisfied with the progress of our business in its various departments. More particularly are they gratified to find an increase of business in the amateur photographic department over that of the preceding year. In this section the greatest attention is paid to the constant introduction of every improvement in photographic apparatus and appliances which the wide experience of our managers indicates as being desirable. This next season several new cameras will be introduced, especially a new series of cameras adapted to the popular daylight changing of films or cartridge photography. This is a very important advance, in the facility it affords of enabling the user to expose as many films as he may desire without having recourse to a dark room to fill his camera afresh, as, by an ingenious arrangement, the camera can be refilled in perfect safety in the daylight. Owing to the very large amount of business last year in the development, printing, and enlarging of amateurs' negatives, the Company was unfortunately unable to deliver proofs and prints with the expedition its customers would have liked. This season we hope to have overcome this difficulty, as it has provided a complete and special department, fully equipped for the sole execution of amateurs' requirements in developing, printing, and enlarging from their negatives, and hope to be able to pro-

mise the execution of orders within a few days. The principal work will be under the immediate supervision of the manager of the apparatus department, who will thus be enabled to personally superintend our customers' requirements. Our cycling department is becoming more and more a requirement amongst our amateur photographic *clientèle*, who appreciate the facility of having their photographic apparatus fitted to one of the best cycles in the market. The twin amusement bids fair to hold its own for many years to come, and the demand for Elswicks amongst our amateur photographers grows greater every day. In our portrait department several new styles have been introduced, particularly the new metalloid photographs, produced on a basis of gold, silver, and other metals. Samples of these you will see around you, the artistic effect of which you will readily appreciate, as well as several new processes in printing, yielding a pleasant variety to the standard processes which are still in demand. In entirely new departures in photography the Company has been fortunate in securing the West-end agency for Mr. Ives's kromskop, the first practical instrument for the production and exhibition of photographs in natural colours. It is impossible to describe in a few words the importance of this discovery; but of its marvellous beauty you will be able to satisfy yourselves after the meeting by an inspection of the instrument now placed on view. I am pleased to be able to announce that very shortly we hope to put on the market apparatus at popular prices, which will enable any amateur photographer to take photographs in colour similar to those now shown. Another important development in our business has been the practical working of the X rays for the investigation and recording of every condition of the bones in the human body. Thanks to the practical knowledge of electrical matters of our General Manager, we were early in the field with all the latest appliances, and have now fitted practical operating rooms at both our establishments, where doctors bring their patients, and where any injury can be examined and photographed in a few minutes. We are also sending our operators to attend cases in all parts of the country. The apparatus has been fitted up so that our operator may demonstrate the process to you and enable you and your friends to see each other's skeletons without waiting for a time which I hope will be far distant. The additional premises secured in John-street as warehouses have proved most invaluable, and have enabled us to cope with the very largely increased requirements of our apparatus and cycle departments. The now historical Jubilee has left us with the finest set of photographic souvenirs obtained by any firm; no less than 25 operators and assistants were at work on that occasion. Our commercial publication and wholesale departments continue prosperous, and are efficiently maintained and up to date. I have now the pleasure to propose: "That the directors' report and accounts be approved and adopted, and that a dividend at the rate of four per cent. per annum, less income tax, be declared and paid on April 7."

Mr. William Clarke seconded the motion, which was unanimously agreed to, and after other business the proceedings terminated.

THE CAMERA CLUB.

The April number of the Camera Club *Journal* says: "For many years past it has been the custom to hold a Conference in the spring. It has, however been decided not to do so this session. It is a question to be considered, whether, after a session of seven months, with two lectures a week, the members are able to feel that keenness and vigour so desirable for the due appreciation of the scientific lectures which are necessary to render the Conference a success. Possibly in the future a Conference earlier in the session will be found more acceptable to members. Several, however, of the leading features of the Conference period will remain. There will be the usual exhibition of members' pictures, the Lantern-slide Evening (Ladies' Night), and the Annual Dinner.'

The exhibition of members' work opens on May 2, exhibits having to be sent in by the previous Friday. Wednesday, May 4, is the date of the Annual Lantern-slide Evening, and the Annual Dinner will be held at the Club House, on Thursday, May, 5.

The following interesting announcement is made in regard to the formation of a Photo-etching Society:—Apart from the intelligent interest that all members of the Camera Club take in everything that concerns photography, there are many who follow the art with the deepest industry, and are famous for the good work which they turn out. Some of this band of real workers have lately taken up the study of photogravure, and, like all enthusiasts, they were not content until they had banded themselves together into a guild, the objects of which are the study and development of photographic etching. Such was the origin of the recently formed Photo-etchers' Society,' of which Mr. Horace Wilmer, so well known for the excellence of his work in this direction, was made President; Mr. Basil Lawrence, Secretary; and Major Lang, Treasurer. The Committee of the Club, having been asked to recognise their existence, have had much pleasure in doing so, and have placed every facility at their disposal for carrying out their work, one of the leading features of the Club being the encouragement of every branch of photography. This Society, consisting, of course, of members of the Camera Club only, is full of enthusiasm.

Thirty-four members were elected during the months of January, February, and March.

Our Editorial Table.

Practical Radiography.

By A. W. Isenthal and H. Snowden Ward. 157 pp., price 2s. 6d. London: Dawbarn & Ward, 6, Farringdon-avenue, E.C.

For the preparation of a second edition of this book the assistance of A. W. Isenthal has been secured, and his extensive knowledge of phy has been so largely utilised that the work has been completely rewritt and now forms a very thorough guide to the theory and practice of ra graphy. The scope of the book is broad. Starting from an histor review, which forms the initial section, successive chapters deal with necessary apparatus; the electrical and photographic aspects of ra graphy; its medical and diagnostical applications, and other branche the subject. The work, which is very fully illustrated, has the sta of thorough knowledge on every page, and should prove especially us to surgeons and others directly interested in subjecting the latest coveries of science to the noble uses of the healing art. The literat of radiography has undoubtedly been enriched by a valuable addit and the authors are to be congratulated on a painstaking volume.

The National P.O.P.

Manufactured by the National Photographic Company, 59 & 61, Cromwell-roa Southampton.

The Managing Director of the National Photographic Company photgrapher of long and varied experience in all branches of the fession, whose knowledge of what is required in a printing-out paper stood him in good stead in the preparation of the National P.O.P. S samples of this paper were recently sent us for trial, and during Easter holidays we snatched a little time for grappling with some arr of developing, printing, &c., the paper used for the latter being National gelatino-chloride. We had had the sample by us for some and were pleased to find that it had kept remarkably well. It yielde prints of great depth and richness, and in all other respects beh admirably—indeed we could desire nothing better in the way of prin paper. We have also seen a number of very fine specimen prints o paper, which are as good a recommendation as the National P could have.

A Simple Guide to the Choice of a Photographic Lens.

By Thomas R. Dallmeyer, F.R.A.S. London: J. H. Dallmeyer, Limited 25, Newman-street, W.

Mr. Dallmeyer's qualifications for discoursing on the subject of p graphic lenses do not call for analysis. In the present case he probably felt the difficulty of writing down to the intellectual lev the non-mathematical photographer, and of condensing the great am of optical knowledge which he, of course, possesses. The little differs in many vital points from similar efforts that have already issued, and notably so in respect of the information it graphically for enabling the photographer to ascertain for himself the le characteristics of the lens he proposes to employ. The diagrams trating the features of focal length in relation to size of plate; cov power; circle of illumination, and, in particular, the one marking the ence in practice between slow and rapid lenses and the effect of diaphr supply in themselves a well-conceived and easily grasped little edu in the fundamentals of the subject which should successfully appeal understanding of every user of a photographic lens. A stigmatic test for oblique rays is also given in the form of a detachable chart, an admirable bromide prints by Messrs. Wellington & Ward effe portray what can be accomplished with the Stigmatic lens used eit its compound or simple form. A careful study of the book will be t well expended, for, in carrying out its purpose of being a simple gu the choice of a lens, it contrives to impart, in terse and lucid lan a great amount of information on photographic optics of a soun authoritative character. The book is got up in excellent style.

News and Notes.

Alleged Photographic Fraud.—Arthur Douglas Thompson, a grapher's assistant and canvasser of Rotherham, was charged at the Rot West Riding Police Court, on Monday, with obtaining money by means pretences from Mrs. A. E. Conson, of Terrace-road, Parkgate, Roth Superintendent Quest said the prisoner had been apprehended for ob 20*s.* by means of false pretences. He was alleged to have called prosecutrix and obtained an order for photographs to the value of He was given 1*l.*, and it was alleged that he had not handed it ove employer. The prosecutrix and the photographer afterwards called u (Superintendent Quest), and said they wished the case to be withdra the magistrate refused to allow this to be done, until some evidence h given. The photographer was not then present in court, and the accordingly adjourned for a week.

PHOTOGRAPHIC CLUB.—Wednesday evening, April 20, a demonstration of Photogravure by Mr. A. Ernest Smith, F.R.P.S. (of the Autotype Company), winner of the Society of Arts gold medal. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

MIGHT HAVE BEEN DIFFERENT.—William Henry Smith, aged twenty-four, labourer, Frank Leslie, aged twenty-two, clerk, and Arthur Roberts, aged twenty-one, farrier, were indicted at the Clerkenwell Sessions, before Mr. M'Connell, with breaking and entering the shop of Messrs. Haydon & Urry, Limited, cinematograph-manufacturers, of 353, Upper-street, Islington, N., and stealing eighty-five cinematograph films of various subjects, thirteen projecting lenses, a typewriter, a cycle, and a magic lantern, valued at 200*l*. After evidence had been given at length, the jury returned a verdict of not guilty. The Chairman advised the prisoners to be careful in future, and he felt sure that, if the jury knew all that he did, the verdict would have been very different.

MR. S. M. PROKUDINE-GORSKY, Director of the Course of Practical Photography, No. 2, Manegnaja, St. Petersburg, Russia, writes: "I have opened a course of practical photography—the first in Russia—and in connexion with it I have established an experimental laboratory. Several specialists, members of the Imperial Russian Technical Society, are co-operating in the above my enterprise. Everything concerning the progress of photography being thus of great interest to me, I herewith take the liberty to invite those concerned to send me, prepaid, samples of their products, which will be carefully examined and tested in my laboratory. Those articles, the samples of which will be found upon examination to give satisfaction, will be reported upon in the accounts of the laboratory, and, besides, the lecturers will particularly acquaint their auditors with such novelties."

IN the Queen's Bench Division of the High Court of Justice, before Mr. Justice Bruce and Mr. Justice Day, sitting as a Divisional Court, the action was mentioned, Brown v. Henson, in which the plaintiff, a photographer, of Leicester, had obtained an injunction against the defendant, who carried on business in Nottingham as a photographer, restraining the latter from infringing the copyright of certain views of Nottingham and the surrounding neighbourhood, taken by the plaintiff. Mr. Marriott, on behalf of the plaintiff, stated that at the trial of the action their Lordships directed that the amount of damage should be assessed by the official referee, but the plaintiff now thought it over, and was prepared to accept a nominal verdict for 40*s*. as damages. Their Lordships accordingly agreed to enter up judgment for the plaintiff for 40*s*., and the order referring the question of damages to the official referee was cancelled.

POSTAL REFORM.—At a meeting of the Postal Service Committee of the London Chamber of Commerce held on Monday afternoon, it was reported that the representations made by the Chamber to the Postmaster-General on the subject of the prohibition against the transmission through the post of samples of liquids, greasy and colouring substances, had at last borne fruit. A circular notice was issued from the General Post Office on February 22, announcing that, from March 1, such samples would be accepted if packed in accordance with the regulations, which are identical with those in force in other countries of the Postal Union. The concession applies to samples for transmission either at home or abroad. Great satisfaction was expressed at the granting of this service by the Post Office, which responded to a much-needed want in business circles, and considerable gratification was expressed at the action which it was believed that the Duke of Norfolk had personally taken in bringing about this improvement. It was also decided that steps should be taken in connexion with the registration and postage of newspapers, telephone delays, post-registered telegrams, &c.

"COPYRIGHT."—A contributor to the *Newspaper Owner and Manager* observes: "The writer recently produced, in a London suburban paper, the portrait of a local curate who had been preferred to a city living. He borrowed the photograph in the ordinary way from this gentleman for the purpose of reproduction, and duly placed beneath the engraving, when published, the name of the photographers. (It is always as well to do this, if only as a matter of courtesy.) Within a few days he received a charge of half-a-guinea from the photographers in question, but at once wrote to them repudiating any liability. He also wrote to the clergyman, who stated that he was not aware that the photographers had any right to make the charge. The bill came in again, however, and was again returned, this time with the intimation that the original of the portrait had not, to his knowledge, parted with any right to the photographers. Finally, the photographers wrote, stating that, under the circumstances, they would withdraw their claim. The moral of this is that, if similar demands should be made upon any of our readers, they would do well to ascertain (1) whether the original of the photograph had for a consideration parted with his rights in the portrait to the photographer, and (2) whether the photographer had secured his purchased rights by copyright at Stationers' Hall."

Re WILLIAM NICHOLSON, photographer, Shanklin, Isle of Wight.—The public examination of the above-named bankrupt took place before Mr. Registrar Blake at the Newport (Isle of Wight) Bankruptcy Court on Thursday last. The statement of affairs filed by the bankrupt disclosed gross liabilities amounting to 738*l*., of which 556*l*. was expected to rank against the estate for dividend. The assets were estimated to produce 129*l*., thus leaving a deficiency of 427*l*. The debtor, in reply to questions put by the Official Receiver, said he commenced business in Ventnor in 1870. He afterwards opened a branch business at Shanklin, and since 1892 he had carried on business at the latter address only. When he commenced business he had 50*l*. capital of his own, and he subsequently borrowed 200*l*. from the National Provincial Bank of England on his own personal security and two sureties. He was sorry to say he had been in the hands of money-lenders for some time past, his first transaction being after a severe illness of his wife. He answered an advertisement by a man who traded as W. Willis, in Great Russell-street, W.C., but he afterwards discovered that the real owner of that business was Isaac Gordon, of Birmingham. His life was insured for 500*l*., the policy having been taken out in 1868. His drawings from the business had amounted to about 35*s*. per week. He could not say what his takings had been. Of late years he had not put all his receipts into the bank. The debtor was eventually allowed to pass his examination.

DR. JAMESON AND THE "CAMERA FIEND."—A correspondent of the *Aberdeen Journal* narrates an aggravating experience Dr. Jameson had with a photographer while fishing at Glentana on the Dee. The correspondent and the doctor's gillie, W. P. Campbell, were joking together when Dr. Jameson and Sir John Willoughby appearad at the river's side. Wheeling round to his man, with a merry twinkle in his eye, Dr. Jameson broke in with "What story was that you were telling, Campbell, when we came along?" "He was asking if we had any more attempts at interviewing by the 'watch-dogs of civilisation;' and I was telling him that they were a treat compared with the fellow with the camera the day before yesterday, and how we managed to dodge him." "Oh, that was it. Yes, he was a caution. I guess he did for that day's sport," laughed Dr. Jim; and, from the account of the day's proceedings, it would seem that they had rather a rough time of it in eluding the focus of the "camera fiend." Without even "by your leave," it seems that a persistent and highly impertinent owner of a camera, bent on having a shap-shot at the doctor, suddenly appeared at the river side right in front of him, and "out-spanned" in a deal of hurry to do him in the act of fishing. Campbell immediately took in the situation, and before the "black clout" could be of any use in setting the focus, the doctor, apprised of his danger, reeled up immediately and moved off to a fresh pool, at the same time warning the fellow to drop it, and take himself off and his "infernal machine" with him. But he had come to make "copy," as the reporters have it, and was not to be bluffed of his prey. No sooner had the doctor got settled into work in these fresh quarters than the "fiend" was again on their track on the bank above. Another move was made, and the same operations gone through, Campbell giving the signal whenever the head of the operator went under the "black flag," and the doctor immediately presenting his back, which was not the part wanted, and then, reeling up, moved off. This was repeated more than half a dozen times, and, of course, was irritating in the extreme. Yet the doctor never lost his temper but once, and that was at the Bridge of Dinnet. He thought his enemy had at last been baffled, and had made himself scarce. The doctor was getting on beautifully, and had just hooked a fish when the "infernal machine" was again popped up on the parapet of the bridge. It seemed as if "cheek" was to be at last rewarded; but, at the now common signal of alarm of the presence of the enemy, the doctor wheeled into the unwelcome position (from a photographic point of view), but in doing so actually had to break away from his fish.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

April.	Name of Society.	Subject.
18.....	Bradford Photo. Society	*Exposure and Development.* Mr. Brooks.
18.....	Richmond	Demonstration: *Acetylene Gas.* Sardi Gas-generator Company, Limited.
18.....	Stafford Photo. Society.....	Practical Application of Lecture on *Photographic Dodges.* H. E. Burn and Members.
19.....	Ashton-under-Lyne.....	Lecture: Mrs Main.
19.....	Birmingham Photo. Society ...	Exhibition of Negatives in Developing Competition, and Report by the Adjudicators, Messrs. Baker and Middleton.
19.....	Brixton and Clapham	*Instantaneous Photography.* F. O. Bynoe.
19	Croydon Microscopical	*Notes from the Arctic.* Frederick Curtis.
19.....	Gospel Oak	Demonstration with Velox Paper. Messrs. Griffin & Sons.
19	Hackney	A Trip to the Norfolk Broads.
19.....	Isle of Thanet	*Chat about Lenses.* Rev. F. C. Lambert.
19.....	Leeds Photo. Society	*Pictorial Photography.* A. Horsley Hinton.
20.....	Ashton-under-Lyne.....	Meeting at the Rooms for the Inspection of Cameras.
20.....	Borough Polytechnic	Lecture: *Hand-camera Work.*
20.....	Croydon Camera Club	*The Making of Enlarged Negatives.* W. H. Rogers.
20.....	Leytonstone	Members' Lantern Evening.
20.....	Photographic Club	Demonstration: *Photogravure.* A. Ernest Smith, F.R.P.S.
20.....	Southport	Copying.
21.....	Ashton-under-Lyne..... ..	Lecture. Charles Lord.
21.....	Bolton Mutual Photo. Society .	*Home Portraiture.* Mr. Norris.
21.....	London and Provincial.....	*Photographing Small Objects by Means of Photographic Lenses.* T. E. Freshwater.
21.....	Putney	Show of Lantern Slides by Members of the Putney Photographic Society.
21.....	Woodford	*Portraiture.* Harold Baker.
22.....	Croydon Microscopical	*Japan.* Rev. W. Weston.
22.....	West London	*The Northern Highlands.* H. Selby and G. Lamley.
23.....	Bootle	Excursion: Bidston.
23.....	Croydon Camera Club	Excursion: Kingswood. Leader, J. Shadwick Taylor.
23.....	Hackney	Excursion: Woodham Ferriss. Leader, J. H. Grear.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 31,—Mr. Robert Beckett in the chair.

A number of photographs, taken by West & Son, of Southsea, of yachts under sail, upon Gem plates, were shown by Mr. Bullen.

It was decided that, with reference to the present position of the Traill Taylor Memorial Fund, the Hon. Secretary should make inquiries and report upon the matter, as there were many who had an interest in the movement who would welcome some particulars as to the outcome of the Committee's deliberations.

Mr. J. S. Teape read a paper on

Some Comparisons of Developers. [See p. 230]

At the conclusion of his paper Mr. Teape was asked if he would make a few observations in the way of generalisation as to what inferences he would draw from the results of his experiments, and how these would affect his future practice in photography. It was thought that this would facilitate their understanding, and better enable them to discuss the paper than the mere recital of his figures.

Mr. Teape replied that, in the first place, he had so far but imperfectly digested the facts revealed by his experiments, a proper study of which he anticipated would absorb some time. As regards the developer which he proposed to use for negative work, Mr. Teape felt very certain that, for a time at any rate, he should employ the new combination of hydroquinone and rodinal which he mentioned in his paper, that is, for hand-camera work; and if his impression of its power were rightly formed, he would continue in its use. He was induced to say this because there was nothing in the whole series of his test plates, although some showed up very well in the under-exposures, with such an evenness of scale, such a nice gradual increase of density up to the small numbers, as was afforded by this combined developer. For full exposures he should adhere to pyro, which showed a very fine scale in the over-exposures.

Mr. R. A. Hodd asked which developer gave most grain in the under-exposures, as it was not easily seen on account of the method of mounting the plates.

Mr. Teape replied that hydroquinone by itself gave the most granular negative.

Mr. J. E. Hodd thought the utility of the experiments would have been increased had Mr. Teape extended their scope to exposures of one-twentieth normal. It was a common thing in hand-camera work, and in addition there was the fact that far more difficulty was found in handling rank under-exposures than over-exposures. Mr. Teape had taken up the subject from the standpoint that ordinary camera exposures more often suffered from over-exposure than the reverse, and that was why he had increased the exposures to the pitch in his paper, to show what could be done.

Mr. A. Thomas observed that, as a result of developing a dozen plates, exposed as nearly as possible for a like time, with different developers, he found that rodinal alone gave a passable negative on what was an under-exposed plate. With such plates, or where there was a suggestion of under-exposure, he would proceed with dilute rodinal, and gradually increase its strength.

Mr. J. E. Hodd thought pyro-metol and carbonate of potash was enough for any snap-shot.

Mr. Teape, continuing, said that glycin, eikonogen, and amidol would appear to be useless for over-exposure.

Mr. P. Everitt insisted that Mr. Teape's conclusions were premature by reason of his own limitations, that is, in confining himself to the makers' formulæ in composing the developer. It was a question whether these necessarily gave the best results.

After some discussion, Mr. Teape adopted the suggestion that he should give expression to a disclaimer that his paper purported to be an investigation of the deposit of silver caused by the action of light and the developer from a scientific standpoint. Such a course, he agreed, would close any opening for discussion, which, from the practical point of view, was of little interest.

There was the scientific side, in which measurements were of the greatest possible value to everybody but the maker of negatives, who must judge by other methods, and it was felt by several members that to mix up the nature of the discussion was likely to obscure the ultimate value such a paper should prove.

Mr. Teape said that, in attacking the matter, he had done so in a way which every one would comprehend, and in such a way that, if there were any value in the results, every one might make use of them. He hoped it might prove some guide as to what to avoid and what to make use of.

PHOTOGRAPHIC CLUB.

April 6.—Mr. J. R. Gotz in the chair.

Mr. E. W. Foxlee gave a chat on

Latitude in Development and Local Treatment in Carbon Printing,

with a demonstration by Mr. Burton and Mr. Platford for the Autotype Company. Mr. Foxlee said: We have heard a great deal lately of a disinterred process of Pouncy's under various new names—the gum-bichromate process and photo-aquatint. Much has been said and written regarding the great latitude for local treatment which this process affords, but it is not the only process in which latitude of treatment is possible; in fact, so far from this, there is no developing process in which this is not the case, except, perhaps, the Daguerreotype. The collotype, albumen, the collodio-albumen, and the collodion processes all allow free scope for local treatment. The platinotype process, with the addition of glycerine to the developer, and the dry-plate plate process, both are also amenable to such treatment. Many will remember Mr. Cembrano showing photographs of the Alhambra, in which, while one part required something less than a second, several minutes were required for another, yet he managed to produce an harmonious negative. True, the development in some cases occupied some hours, but the end justified the means, because he so obtained what he wanted. With the help of Messrs. Burton and Platford I propose to show that in the carbon process we can do almost anything in the shape of local treatment, and do this also without in any way sacrificing the delicate tints of our picture. For this purpose we have brought some pieces of tissue which have been to-day exposed to the same negatives for an equal time, and will ask the Chairman to number these and the transfer papers upon which the pictures are to be mounted. Except to say that these are then soaked in cold water until they become a little flaccid, and then each sheet of tissue squeezed on to the transfer paper, we will not explain at length the carbon process. The photograph is Colonel Gale's *Sleepy Hollow*, a good photograph, with perfect detail everywhere, and at the same time a good picture. On the table will be seen several forms of actinometer used to time the printing of the tissue, amongst which are Johnson's, Bankart's, Burton's, and Sawyer's instruments, the general principle of which is well known. The conditions under which our demonstration proceeds are of an extremely amateur type. At the works the custom is to have large tanks for development, with a convenient hot and cold-water supply. On the Continent I saw that camel's-hair brushes were used for wiping out lights as occasion required, and Mr. Packham, in his demonstration of Pouncy's process, also used the brush. The brush is strongly recommended to those who want a means of local treatment in the gum process, but it has to be used very delicately indeed to preserve the fine tints of the picture. One of the charms which is claimed for this process is its great uncertainty. You do not know what you are going to get until the picture is finished. This so-called charm of uncertainty, however, is a libel on Pouncy's process. Any uncertainty about it simply means that you do not know how to work it. In itself it is as certain as any process can be. Naturally an amateur's first attempts at making his plates or papers would be a matter of uncertainty, and so with Pouncy's process. But for the carbon process we claim that it has not this charm of uncertainty. You make up your mind, and you get what you want. The carbon image has none of that delicate nature which belongs to the gum process. In the Autotype Works use is made of a water brush—that is, a jet of hot water conveyed by a piece of rubber tubing, and with this a jet of any power almost can be easily made by pressing the delivery end of the pipe. With such a tool any amount of local development can be carried out. The variations of the normal which are possible include a general heaviness or light appearance, a light sky with detail in the foreground subdued, the reverse of this, and others which individual taste might suggest. It cannot be too clearly realised that all this is possible in an amateur way in houses with a hot-water service, of which very few now are unprovided. The Chairman wishes me to produce the following variations upon the six pieces of tissue:—(1) Normal; (2) clear the water in the foreground; (3) deepen foreground; (4) clear the sky; (5) a general blackness; and (6) a light-toned print. Of course, no one of these variations will be an improvement on the normal, which shows the picture at its best; but they will show what may be done with prints from negatives which in themselves cannot yield the best results. While the prints are being manipulated, I will pass round some examples from the same negatives in different-coloured tissues, and on papers of different surfaces, to show the wide scope one has in the carbon printing process. Unfortunately, the heat of the water obtainable here is not more than 105° Fahr., and we are considerably hampered. A temperature of 180° or higher should be at hand, in which case it is customary to proceed with local treatment by means of a sponge or the jet of water. Failing this, it will be seen that Mr. Platford makes use of the fleshy parts of his hand, and rubs those parts which are to be lightened. Much of this could, however, be done with the rubber tube with water of 180° to 200°. The water can be too hot, but it depends on the exposure, the more of which, the hotter may the water be. Transparencies are quite as open to treatment as prints on paper if you have a substratum, and an excellent substratum consists of bichromated gelatine. There are a few facts about carbon tissue which it is profitable and interesting to note. Its sensitiveness is suspended when in a wet state, and so development may proceed in daylight. While this is quite true, the tissue is also insensitive when absolutely dry, that is, when thoroughly desiccated and in a brittle condition. After printing the light action goes on in the tissue though kept in the dark according to the amount of moisture present. It is therefore possible to print for half the necessary time, and find in an hour's time that the print is fully exposed if kept in a moist atmosphere at a high temperature. The same tissue, however, if kept thoroughly dry, might be preserved six months without fear of any continuing action. There are several prints on view which, either by accident or design, were kept for periods of from seven to eighteen days between printing and development, but evidently in a dry state, or much deeper images would have resulted. In addition to the methods of reducing which I have enumerated, there are chemical means of doing the same thing. The addition of ammonia, carbonate of soda, or any other alkali, acts like hot water. It is a risky proceeding, nevertheless, for the reason that it is apt to destroy the delicate tints. This perhaps to a Salonite would be a recommendation. With some colours there is also the disadvantage that they will be made of a warmer tint. Black, red chalk, or sepia, would not be affected, but the madder or alizarine colours are very easily changed. Ammonio-nitrate of silver, followed by pyro, is a very good intensifier for carbon transparencies. Their colour can be changed to almost anything, *plus*, however, the original colour of the tissue. Treat the picture with a solution of protosulphate of iron, wash, and then apply a solution of gallic acid, and the results will be inky black. For a yellow print, soak in some chromium salt, followed by a salt of lead. With the exception of the silver method, intensification really resolves itself into a dyeing action, and any dye colours may be used for carbon work. The action is not upon the colour of the pigment, but upon the gelatine, and as this is of various thicknesses, according to the lights and shades, the forms are represented by an absence of deposit, while the latter is increased in proportion with the thickness of the film. Permanganate is permanent, but its effect upon an organic colour would be destructive with the formation of oxide of manganese. As regards the moderation of over-exposure, it is a question of time and hot water. As an extreme case, probably three times normal could be brought down with long soaking and high temperature, but some colours are reduced more easily than others.

Bath Photographic Society.—March 30, Surgeon-Major Adcock, M.D., in ıe chair.—Mr. G. F. Powell and the Secretary gave an illustrated account the Yarmouth Convention. Leaving Bath on Tuesday evening, Norwich was ached at nine the following morning. A description of Norwich was given, ith especial reference to its castle, cathedral, quaint streets, public ıildings, and commercial prosperity, which a dozen slides served to illus- ate. The travellers arrived at Yarmouth the same afternoon in time for the onvention excursion to Caister Castle. Although too late to be included in ıe group of members, an illustration was given of the gathering,as well as one the 1891 Bath Convention. Photographs of amusing sketches of welcome ıd other incidents were given, these having appeared in the Yarmouth papers the form of cartoons. Several slides showing the attractive character of ıis famous seaside resort followed, including boating, bathing, and beach enes, perhaps the most interesting being a close view of the new revolving wer, around which the Mayor, Corporation, many friends, and a military ınd were being lifted to the summit, about 140 feet or so from the beach, inaugurate the public opening of this attraction. Two whole days were ent on the rivers and broads in special steamers provided by the committee, that a good many views of wherries, yachts, and other craft helped to swell ıe number of pictures placed on the screen. The members who joined the econd day's excursion had the opportunity of witnessing the annual regatta Oulton Broad, which proved so engrossing to snap-shottists that the pro- cted further excursion to Lowestoft the same day was not attempted. llusion was made to the work of the Chairman in his capacity as Presi- ent of the Yarmouth Camera Club, as well as that of Mr. Harvey George ıd the local committee, and some particulars were given respecting the next eeting at Glasgow on July 4.

Bolton Mutual Photographic Society.—March 31.—There was a fine athering of members to a lecture and demonstration, by Mr. A. W. Roscoe, on

How to Make Photographic Enlargements by Artificial Light Without the Use of a Condenser.

he lecturer claimed for his method the following advantages: (1) the pparatus required beyond that already possessed by photographers, could be ıade by themselves almost for nothing; (2), that it was exceedingly simple o use and as certain as any other method. It consists essentially of a hamber in which to burn magnesium ribbon, a box about two feet square erving admirably, in the front of which a hole is cut to receive the negative ou wish to enlarge; then, with the ordinary camera placed with the part sually occupied with focussing screen against the negative, or the lens only ıay be fixed on a board and the space between covered over with a cloth; a oard is then fixed vertically in front on which to receive the enlarged image. his apparatus proved by demonstration to be handy, easy to work, and fficient. After the lecture the Hon. Secretary (Mr. Woods) placed before the eeting a draft of a survey scheme which is intended to form the summer ork of the Society, and is expected to extend over a period of several years. xperts in several branches, such as geology, botany, surveying, archi- ecture, &c., have been approached and consented to act as guides. The mplete scheme will be ready in a few weeks.

April 5.—There was a large gathering of members to hear a lecture by Mr. eter Woods (Hon. Secretary) on

Photography in Natural Colours.

he lecture treated of colour as related to light, of the correct rendering of ne value by isochromatic photography, and most of the published accounts r the production of photographs in natural colours—including Lippmann's terference system and the three-colour sensation methods—were fully ustrated. Mr. Ives's kromskop or photo-chromoscope, with a series of omgrams, had been kindly lent by Mr. Harold Barnes, and added greatly the interest of the lecture. The ruled-screen method of Professor Joly so, illustrated by a beautiful set of slides from the Natural Colour Photo mpany, Dublin. A large number of photo-mechanical three-colour prints ere on view, and admirably illustrated the application of the three-colour nsation method for book and magazine, &c., illustration.

Bradford Photographic Society.—April 4, Mr. Sutcliffe occupied the air.—Mr. Ledbeater, of Rotherham, delivered a lecture on

Lightning, and How to Photograph it.

he first part of the evening Mr. Leadbeater devoted to explaining what ghtning was, its cause and its effect, and later on he told how he himself had ptured a considerable number of flashes. His *modus operandi* was to go on e roof during a severe storm, and hold his camera in his hand at a fixed cus, to point it directly towards the seat of the storm after every sixth flash sheet lightning, as he had found after every sixth flash forked lightning uld appear. The lecture was made specially interesting by the handing und of several photographs taken by Mr. Leadbeater. These were very good amples of lightning pictures. Another most interesting and unique feature the evening was the production of at least a dozen magnificent frost photo- aphs. These also had been taken by the lecturer, and were splendid, the st forms on window panes giving most lovely designs.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—pril 5, Mr. W. Parry (President) in the chair.—Dr. Blacklock gave a talk on

Clouds and Halation.

e described the methods he adopted in order to avoid what had been aptly rmed "bald-headed" landscapes. He thought that it was regrettable that notographers confined their efforts in cloud photography almost exclusively sunrise and sunset effects, although, of course, these were more easily secured an white cumulous clouds on a blue sky. Dr. Blacklock then detailed his xperiments in photographing the latter class of clouds. He had tried, but on abandoned, a black mirror placed in front of the lens at the polarising ngle, and showed the arrangement of mirror and shutter. He had obtained s best results, however, by simply photographing the clouds direct through yellow screen. These screens he made himself, and demonstrated his simple ethod of grinding them optically flat. Halation.—Dr. Blacklock detailed various experiments in formulæ for backing compositions, and recommended the following: 40 grains of shellac dissolved in 1 ounce of methylated spirit, shaken up with a little chalk to clear it, filter, and add about 4 grains of aurine. This dries quickly, and can be easily removed after development.

Mr. W. J. Belton, representing Messrs. John J. Griffin & Son, attended, and gave an interesting demonstration of the now well-known Velox paper.

Sheffield Photographic Society.—The members and friends of this Society met last week to hold their annual musical evening. The exhibition of members' work, which was so pleasant a feature of the evening, contained plenty of good and delicate amateur work, and while there was an abundance of clever technical work, there was evidence of refined artistic feeling. A great feature of the evening's entertainment was a series of members' lantern slides, including some striking sea effects and some exquisite photographs of flowers, the lanternist being Mr. J. H. Lygo. Mr. H. Jasper Redfern delighted the members with his cinematographic exhibition, which was followed by his throwing upon the screen a series of colour photographs, the process of which is one of the most recent and interesting achievements of scientific photography. No artificial colouring whatever is used, and a series of most charming landscapes and flower pieces were shown in their natural tints, even to the most elusive shades of colouring. [We should be glad to have further particulars of this process from our Sheffield friends.—Eds. *B.J.P.*]

Edinburgh Photographic Society.—April 6.—Dr. T. W. Drinkwater delivered a lecture on

The Properties of Light.

The lecturer said that great carelessness was often to be observed among workers, in that they took no trouble to acquire even an elementary knowledge of the properties of the light by the aid of which they produced their pictures. It was shown that light itself was invisible, and that reflection was the means of making it known to us. Refraction was spoken of, and the effect which water, glass, &c., had upon rays of light demonstrated. Dr. Drinkwater explained how different kinds of glass with different powers of refraction were combined to produce lenses for photographers. Colour, he said, did not exist, and should be known as colour sensation.

FORTHCOMING EXHIBITIONS.

1898.

April 22–30 .... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Patent News.

The following applications for Patents were made between March 28 and April 2, 1898:—

Shutters.—No. 7454. "Improvements in or connected with Photographic Shutters." H. Bate.

Camera.—No. 7712. "Lock and Key Camera." S. M. Yeates.

Dark Slide.—No. 7799. "An Improved Photographic Dark Slide." T. P. Bethell.

Shutters.—No. 7857. "Improvements in or relating to Photographic Shutters." C. Bentzin.

Cycle Camera-holder.—No. 7870. "A Device for Supporting Photographic Cameras upon Cycle Handle-bars." J. A. Reid.

Telectroscope.—No. 7939. "New or Improved Telectroscope." H. Bauer.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE STEREOSCOPE—A CAMERA WANTED.

To the Editors.

Gentlemen,—I was very glad to see some remarks on the above in your issue of February 25. You advocated a portable stereo camera and showed that it could easily be made. I would go one better. People will never go in for stereo exclusively, hence we must have something combining stereo with a regular and popular size, namely, quarter-plate. The half-plate, established in favour rather by its history than by its merit, is a most objectionable size, it is not the half of a whole-plate, it is not artistic in its proportions, it introduces great irregularities in cutting up papers, and has other inconveniences. It is high time the half-plate was abolished, and public attention turned to the genuine half-plate, or "double quarter," at present almost disused, and masquerading under a strange name, its own having been appropriated by a usurper. To return to the subject however, I advocate, not the double quarter, but the quarter itself. There is no reason, except lantern plates, why the stereo-

picture should be limited in height, and it seems to me that what is wanted is a hand camera capable of taking one quarter-plate, or two as a stereo, at will. I have roughly put together such a camera and done decent work with it, but, though a "hand camera," it is no more *portable* than nine out of ten of the hand cameras on the market. This camera consists of a pair of five-inch Cooke lenses, mounted on a Thornton-Pickard stereo shutter, with a body of light wood and a fixed partition. The dark slides are book form, having four shutters, two at each end, so that one exposure can be made as long as desired without fogging the other. If it were possible to get double quarters out here, the partition would have been removable, so that a central lens could have been used for a *real* half-plate picture. This camera is but a makeshift till I can carry out *the* idea. My notion of a *portable* camera is not "one that requires a porter," a millstone round your neck or a portmanteau in your hand, but one that you can, on occasion, carry in an overcoat pocket or pockets, with ease and comfort. Such a camera is the Eclipse, and the Xit. Either camera, with a double slide, will go easily into an ordinary coat pocket, and three more slides in a third pocket would give two cameras and ten quarter-plate films, in an ordinary coat, with the hands free. My new apparatus (unless interfered with by the chromoscope) will consist of two Xit-like cameras, capable of being used separately or as a pair. In the latter case there is a hinge to which both are attached very easily. The hinge must allow not only for spacing the lenses close together or far apart, but also for conveying them so that an object at a given distance may be brought into the centre of both plates. The Xit, with all its advantages, does not lend itself easily to the adaptation of this hinge, but as portable a camera might be made to do so. This necessitates a flexible or adjustable connexion between two separate shutters accurately synchronised. I suggested this apparatus to the makers of the Xit, but they did not seem to think much of it, saying that the difficulty of synchronising the shutters was too great. It seems to me, not having yet had to do it, that there need be no great difficulty in synchronising two separate shutters within practical limits (focal plane shutter, for example, is not synchronous in itself); but, unless we adopt a pneumatic release, the difficulty will lie in joining up the two shutters at varying distances and angles. A pneumatic release I should hardly expect to remain synchronous, even if once made accurate, certainly not in any form known to me, though it might be possible to adapt the pneumatic principles to a totally different form. An apparatus such as the above would do more than anything else to popularise stereoscopy, and I do not think anything else will suffice. I shall be glad of any criticisms or suggestions. No roller films need apply; I work with cut films only.—I am, yours, &c., F. Gleadow, I.F.S.

N. W. P. India, March 15, 1898.

AMMONIA POISONING.

To the Editors.

Gentlemen,—As a surgeon, I can reply to the query by "Anxious" in your last number under the heading "Ammonia Poisoning."

The term "ammonia poisoning" is, strictly speaking, erroneous. What really occurred was inflammation of the mucous membrane of the tongue and fauces, caused by the vapour of the strong liquid ammonia. For some time to come the mucous membranes of these parts will be sensitive to any irritant; but, if "Anxious" will for a time give up the use of a developer containing ammonia, this extreme sensitiveness will gradually disappear. He will help matters if he will wash out his mouth with a weak solution of alum, to which a little tincture of myrrh has been added.—I am, yours, &c., Ajax.

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries, must be addressed to* "The Editors, The British Journal of Photography," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 24, *Wellington-street, Strand, London, W.C.*

Photograph Registered :—

Joseph Nickelson, 19, Craven-street, Newbury, Berks.—*Photograph of the late Rev. Edward Allen, Tiverton, Devon.*

Pioneer.—We have forwarded.

George Pitcher.—Doubless of Messrs. Marion, Soho-square.

Captain.—Your letter was, unfortunately, mislaid. Reply in our next.

Artist.—We do not answer questions unless names and addresses are given.

F. G. (Indian Forest Service).—The articles appeared on May 27 and June 23 of the year named. We shall shortly reprint them.

J. Bailey & Co.—We have not hitherto had any complaints of the person. It seems a case for a legal threat. We do not answer questions through the post.

C. Hore.—It is a gelatino-chloride print. Consult the formulæ section of our Almanac for 1898, and you will, doubtless, find information that will enable you to obtain the tone.

Government Appointments in Photography.—A. says, "I should feel much obliged if you would say if there are any appointments for photographers under the Government; and if so, where application is made."—In reply: None that we are aware of.

Residues.—Economy. At the present price of silver, and the small quantity that is contained in dry plates and in the gelatine papers, we should say it was false economy for an amateur, working on a small or even moderate scale, to save his silver residues.

S. Binns.—Do not use glass paper to ease the sliding portion; put the apparatus in a warm and dry place for a few days, and the wood will probably shrink to its original proportions and without warping. The trouble is not infrequent with cheap apparatus.

Reversed Image.—S. W. The reversal of the image, as regards right and left, is easily accounted for, and there is nothing phenomenal in the matter. The plate was simply put into the slide hind side foremost. By doing that you can always produce the "mysterious phenomenon."

Patent.—R. W. B. If a patent was taken for the method sixteen years ago, and another taken since is "still in force," it is, of course, invalid, and is not worth the paper on which it is written. If you are sure about the first patent being for the same thing, work it to your heart's content and laugh at the second patentee.

Wooden Trays.—J. Wright. The best material for coating wooden vessels that are to contain silver solutions is paraffin wax. As those you require are only 15×12, why not use porcelain ones? they would cost less, and be far better for your purpose. Wood is only to be recommended when porcelain is not obtainable of the size required.

"Artistic Lighting."—T. H. R. says: "Will you kindly inform me by whom *Artistic Lighting*, by Inglis, is published, and whether it can be obtained in this country?"—In reply: So far as we know, the book is not obtainable in this country. It is published by the *Photo-Beacon* Company, Chicago, U.S.A., and the price, we believe, is one dollar, exclusive of postage.

Prices.—Amateur, N.W., writes: "Will you kindly tell me about what amateurs generally charge for cabinet portraits and half-plate views of the best quality, as I am afraid I am charging too little, and I want, of course, to make as much as I can?"—Amateurs do not charge anything for their pictures. If they did, they would cease to be amateurs. You are sailing under false colours—you are a professional in disguise.

Sulphocyanide—the Colonies.—Cyanide writes: "Would you kindly let me know if there is danger in the use of a large quantity of sulphocyanide, say, in the toning of about 600 prints daily; also if there are openings in the colonies for good general assistants?"—We have not heard of any unless there have been cuts or abrasions on the skin at the time of using. But it will be well always to wash the hands thoroughly in warm water each time after toning as a precaution against ill effects. As to the colonies we can give you no decided opinion except saying that we have heard at different times that the colonial labour market, as regards photography, is as well stocked as it is here.

Gold.—Inquirer asks: "Could you give me a test for gold? I have dissolved some old trinkets in hydrochloric and nitric acids, but whether they are gold or not I'm not sure. The liquid has the appearance of gold. A reply to this question will oblige."—For tests for gold we must refer you to one or other of the elementary works on chemistry, as our space is too limited to give them here. We may tell you, however, that any gold there may be in the solution you have got will be thrown down as a dark precipitate on the addition of a solution of protosulphate of iron. It may then be washed and redissolved in nitro-hydrochloric acid, and used for toning purposes, or sent to the refiner for reduction.

Address Wanted.—A. W. Dobbie writes: "On p. 808 of The British Journal of Photography Almanac you give a full account of Mr Scripture's method of lantern stereoscopic projection. I have tried to find Mr. Scripture's address, but my letter has been returned 'not known.' I am very anxious to communicate with him, because I wish as President of the South Australian Photographic Society, to lecture on the subject, and I will take it as a favour if you will kindly send me his address."—In reply: Mr. Scripture is, we believe, one of the professors at the Smithsonian Institute, Washington, U.S.A. Messrs Newton, 3, Fleet-street, London, brought out a similar system two years ago, and would, doubtless, give information.

Lens-burnisher.—Comyn says: "I should be glad if you would answer the following:—I have a Dallmeyer 12×10 No. 4 patent wide-angle landscape lens; would this lens suit for general out-door work, such as groups, houses, landscapes? If not, will you kindly say what subject should not be taken with same? also would you kindly let me have address where I can send my burnisher to have a scratch taken out?"—The special use of the lens is that for which it is constructed, namely taking landscapes in confined situations. If, however, it be used on smaller sizes, say the whole-plate, it is then an ordinary angle lens. It is not suited for architecture, as straight lines at the margins of the picture will be rendered curved. The lens may be used for groups, but will be slow, as its aperture is but about *f*-16; but with that it will take a whole-plate picture. Better send the bar of the burnisher to the maker to do the needful.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1981. Vol. XLV.—APRIL 22, 1898.

Contents.

	PAGE
Ex Cathedrâ	241
The Alleged Influence of the Developed Image on an Unexposed Film.—I.	242
Leaderettes:— Ortol—Action by "Inert" Bodies on Dry Plates—The Odour of Metals—Something Wrong with the Sun	244
Oxamin Dyes as Optical Sensitisers	245
Collotype with Gelatino-bromide of Silver. By R. Ed. L'esegang	245
Further Experiments on the Action Exerted on Certain Metals and Other Bodies on a Photographic Plate. By W. J. Russell, Ph.D., V.P.R.S.	246
A Contribution to the History of the Art of Photographing Living Subjects in Motion, and Reproducing the Natural Movements by the Lantern	248
The Latent Image and its Development. By F. Hurter, Ph.D., and Vero C. Driffield	249
Individualism in Photography. By Charles H. Oakden	250
Photographic Surveying	250
The Forthcoming Convention	251
The Crystal Palace Exhibition	251
Our Editorial Table:— The Bioscope	252
News and Notes	252
Patent News	253
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Croydon Microscopical and Natural History Club (Photographic Section)—Polytechnic Photographic Society—Leeds Camera Club—Portsmouth and Southsea Amateur Photographic Society	253
Forthcoming Exhibitions	255
Correspondence:— Colour Filters—Halation: A Misunderstanding—The Photographic Club: An Invitation—"Ammonia Poisoning"	255
Answers to Correspondents	256

NOTICE.—THE CRYSTAL PALACE PHOTOGRAPHIC EXHIBITION, 1898.

The British Journal of Photography for April 29 will be a special Double Number of thirty-two pages, and will contain a full report of the International Photographic Exhibition at the Crystal Palace to be opened on Monday, April 25, by His Royal Highness the Prince of Wales. The publishers ask us to announce that advertisements for this special issue should reach them not later than Monday, April 25.

EX CATHEDRÂ.

The International Photographic Exhibition at the Crystal Palace opens on Monday next, April 25. For the first time in its history photography will have a representative display embracing the whole period of its existence. The intelligent visitor will be able to study typical examples of photographic reproduction by all the processes that have been practised since the days of Daguerreotypy and Calotypy—will, as it were, see at a glance the best of what has been achieved in every branch of camera work, pictorial, scientific, industrial, manipulative. In these regards it is probably not too much to expect that the illustrative section will not only constitute a complete objective history of photography in all its progressive stages, but will also accurately inform the student to what a pitch of excellence its innumerable applications have in these days been brought. It should bring home to the non-photographic visitor the large, the indispensable part which photography fills in the fields of modern science, industry, and art. It will be found, we believe, that the measure of support accorded to the Exhibition by the trade and other exhibitors is unprecedentedly large, and that the purely commercial side of the display will be fully worthy of photography as a scientific and manufacturing industry. Throughout the photographic world the interest awakened in the Exhibition is remarkably keen, and all the signs point to a great and popular success. We are confident that, when, next Monday, His Royal Highness the Prince of Wales is conducted through the well-filled naves and courts of the Crystal Palace, he will recognise, in the Exhibition he is to honour by opening, a rich and noble exposition of the capabilities of what has been termed the most interesting and wonderful invention of the Victorian era.

* * *

At the present time, when the United States and Spain are in antagonism over the misgovernment of Cuba by the last-named country, it will probably interest very many of our readers to know it is to a photographer, Dr. P. H. Emerson, that they may look for a most remarkable little book on Cuban life and adventure. This is *Caõba*, published by Mr. David Nutt. It tells the story of a former Cuban rebellion, and the exciting incidents that are described are founded on fact, while the book gains in verisimilitude from the circumstance that Dr. Emerson writes from some years' personal knowledge of the country. The author, in his preface, strongly advocates the annexation of Cuba by the United States.

* * *

The Committee of the International Photographic Exhibition, to be opened by the Prince of Wales, at the Crystal Palace, on Monday next, April 25, have agreed to reserve a space for exhibits in connexion with the "Roll of Ministering Children." The exhibits will include portraits of all the children of the Royal family taken by Messrs. F. & R. Speaight for inclusion in the "Roll," a large map of the United Kingdom showing

where they have appointed their 500 agents to act for them in this matter, and also specimen pages of the "Roll."

* * *

Mr. P. R. Salmon, who is travelling in the East for Messrs. Levy et ses Fils, of Paris, his object being to obtain a large number of stereoscopic views, sends us the following interesting and brief account of his photographic and other experiences *en route:* "I had a most successful time in Egypt, and have now arrived in Jerusalem for the purpose of doing about six weeks' work, or longer, if necessary. Messrs. Levy are sparing no expense in having the Holy Land done as it has never been done before. My final command was, 'Don't hurry, but stay as long as you like; what we want in return are good negatives.' I have had many adventures. I was turned out of the graveyard at Jaffa by a large mob, who thought I was photographing some weeping women. I had to pay 24*s.* duty on plates at Alexandria, and 2*l.* at Jaffa. At the latter place I had great difficulty to get my materials through. I have seen no photographic papers since I left England. I cannot tell when I shall be back, probably about August—perhaps before, as the heat is awful. I have had two days fever, been kicked by a donkey, and thrown from a horse, but still live. There are thousands of hand cameras about here, but I have not seen another stand camera since I left England."

* * *

The Third Annual Congress of the South East Union of Scientific Societies will be held in the Town Hall, Croydon, on June 2, 3, and 4, 1898. The President-elect is Professor G. S. Boulger, F.L.S., F.G.S. An excellent list of papers on subjects of wide scientific interest has been arranged, among them being one by Mr. J. H. Baldock, F.C.S. on "Photography in Relation to Science." Twenty-nine local scientific societies are affiliated to the Union, and the circular before us states that lantern slide sets illustrating the Wealden, Greensand, and Gault formations, with written description and lecture, are now available for the use of the societies. There are three photographic societies in the Union.

* * *

The London Stereoscopic Company of 54, Cheapside, E.C., recently received the following remarkable communication:—

Lower Town, Axim,
17/3/98.

To Gentlemen,

Dear Sir,—Having read some illustrated newspaper found your name if anybody write you, you will send plenty photography* post free on application to you. I have no greater joy than to take your agency here as to secure you some clients such as shippers of logs, kernels (? nuts, Ed.). P.O. or draft at the same time. I will charge you a commission of 5*s.* per each log and 1*s.* on every pound. Therefore, if you desire me to do so, kindly let me have a case of full samples to introduce clients with, 8 almanacs for 1898 and catalogues. Awaiting your early good news per returning steamer. Please send me your addressed envelope. No more to say you, with due regards.—Yours faithfully,

John Wilson,
The young princes (*sic*) of
Egyombra *vid* Axim.

* A catalogue is probably meant.—Ed. *B J.P.*

No inconsiderable amount of commercial shrewdness appears to be possessed by the writer of this letter, a prince in his own country, we take it, but he has probably learned by this that English photographic houses do not do business in the way he imagines. Still we hope Mr. Wilson's aspiration to act as a distributor of photographic supplies among the gentle blacks of his native country will be realised in due time.

* * *

The football match between Derby County and Notts Forest for the Association Cup attracted a crowd of over 60,000 persons to the Crystal Palace on Saturday, April 16. A sea of faces surrounded the match ground, and the contest was productive of an amount of excitement which at times almost bordered on the painful. We saw Mr. Birt Acres busily engaged in kinematographing the remarkable scene, and Messrs. Negretti & Zambra, who hold the photographic rights at the Palace, were also very much occupied. The light was none too bright during the game, a haze hanging over the ground until its conclusion. We saw dozens of hand cameras held by spectators of the contest. Messrs. Negretti naturally interdict the use of cameras in the Palace or grounds whenever their attention is directed to an attempted infringement of their rights; but on Saturday last they would have required a small army of assistants to prevent the employment of the many hand cameras that we saw on the crowded football ground.

* * *

We learn that the Secretary of the Crystal Palace has intimated that the railway companies announce that trains will be run at reduced fares on certain dates during the Exhibition. This concession should undoubtedly increase the number of visitors, the total of which will, doubtless, be very large during the three weeks the Exhibition is open. The office of The British Journal of Photography will be located in the North Nave, and some time, on most days that the Exhibition is open, we shall be personally present, and pleased to see any friends of the Journal who may call upon us there.

THE ALLEGED INFLUENCE OF THE DEVELOPED IMAGE ON AN UNEXPOSED FILM.

I.

The interesting communication of Herr R. E. Liesegang, in our issue of the 25th ult., deals with a matter that has attracted the attention of experimentalists in this country during many years past, though it is now presented in a somewhat new phase. Briefly, Herr Liesegang states that, if a developed and finished gelatine negative be coated in the dark room with a film of sensitive collodion emulsion, and the latter without further exposure to light be treated with a normal alkaline developer, a second negative image will be produced upon the unexposed film; and, although he does not expressly say so, he appears inclined to attribute this result to chemical action taking place at the contact surfaces, between the metallic silver of the developed image and the silver bromide of the unexposed film.

We have personally taken a deep interest for many years past in all questions relating to the possibility of the transference of a photographic image to a sensitive film without direct exposure to light, and about five years ago (March 31, May 1

and 19, 1893), published in these columns an account of a series of experiments with multiple-coated films in which gelatine plates, both before and after exposure, were coated with collodion emulsion before development. Upwards of twenty years ago Captain Abney stated that, if an exposed collodion plate to which a protective layer of gum arabic or albumen had been applied is recoated with sensitive emulsion, on development an image will be produced upon both films; but, so far as we recollect, experiment at the time left it in doubt whether this result could be arrived at with any certainty. We are under the impression it has never previously been alleged that an unexposed film, coated upon a *developed* image, is capable of yielding an impression without exposure to light, at least under alkaline development, nor so far, as we are aware, is there any warrant for supposing such a result probable.

On this account we took the earliest opportunity of repeating Herr Liesegang's experiment, and, although after some trouble we succeeded in arriving at what may to some extent be a corroboration of his result, we scarcely think it bears out the supposition that the action is originated by the underlying negative image; but, on the other hand, when the action is once started by other influence—and we may here briefly say that that action seems to be merely one of general fog—the existing negative image does perhaps step in in precisely the manner formulated by Herr Liesegang to modify to a slight extent the action of the developer and help towards the formation of what can scarcely be considered as a practically useful image for any purpose.

We shall perhaps best explain our views in the matter by recapitulating the experiments of five years ago, to which reference has been made, and which, though not on exactly the same lines as Herr Liesegang's, go a long way towards negativing the possibility of the direct formation of an image in the unexposed film, either by chemical action of the silver lying beneath it or by any latent effect of light transmitted from the already existing negative. So far as the latter cause is concerned, if physical instead of chemical development were in question, that is to say, if it were acid pyro development instead of alkaline, there would be just a chance of assuming that the action was directly due to the influence of light still remaining in the lower film, and that the result was practically analogous to the silver intensification of a fixed negative. Even then we should have to assume the possibility of the action going on or reaching through a presumably inert interposed film; and, though there are reasons why this might be accepted in the case of silver development, we cannot take the same view in connexion with the alkaline method, for it must be remembered that there is a wide difference between the conditions surrounding Herr Liesegang's experiment and that of Captain Abney, in which the development of the two films, if it occur, goes on simultaneously, and there is consequently far more likelihood of the molecular excitement being transmitted from the one to the other; but, as we shall show, there is little probability of this occurring in either case.

The experiments to which we have now to refer were made in 1893, in connexion with the elucidation of the action of multiple-coated plates, and consisted mainly in coating ordinary commercial gelatine plates with collodion emulsion, *previous* to exposure. Here it will be seen that the primary conditions were essentially different to those of Herr Liesegang, but the results have a very strong bearing on his case. It may be said, in fact, that, so far exposure is concerned, the conditions in both cases were alike, for, although in our experiments the collodion film was actually exposed, it was for so short a time that, without the underlying gelatine film, no impression would have been produced at all, except, perhaps, the very highest light. But, as a matter of fact, although the collodion films received exposures that were only sufficient for the far more rapid gelatine films, they behaved precisely like fully exposed collodion plates, developing a strong image with all its detail in the same rapid manner as collodion, and not in the slow and regular manner of gelatine. But—and here is where the important point comes in—in proportion to the energy of the development in the collodion film, so was it found to be weaker in inverse ratio on the gelatine; and, on removing the collodion film, the whole of the image of the high lights, or nearly so, would disappear, leaving the gelatine transparent. In the half-tones the image would be about equally divided between collodion and gelatine, while, when heavy shadows existed, the removal of the collodion caused no change, as the whole of the image, such as it was, existed in the gelatine.

Here we have, apparently, as we suggested at the time, precisely the action described by Herr Liesegang in his working hypothesis to account for the formation of his image, but with this difference, that in our case we have not only a certain amount of light action upon the collodion film to *originate* development, but what is equally, if not more, likely to greatly aid that result, the molecular disturbance of the more sensitive gelatine film itself in the throes of development; whereas, in Herr Liesegang's case, we have neither one nor the other. But that this molecular disturbance alone will not originate development was proved by coating plates *after* exposure, when, so far as the effect on the gelatine image was concerned, there was absolutely no result, and, as far as could be ascertained, no development on the collodion film beyond a certain amount of fog.

We have, since the appearance of Herr Liesegang's article, repeated these experiments, and we have before us as we write three negatives that throw a very strong light upon the relations that exist between the exposed and unexposed films under the circumstances mentioned. In number one an "extra rapid" gelatine plate of ordinary commercial make had first of all a strip of its film removed by means of a sharp chisel along the centre of its length, and one end to the depth of about one-third of the length was coated with washed collodion emulsion, and the plate exposed in the camera for about half a second with the lens at *f*-32. After exposure the other end of the plate was similarly coated with collodion emulsion and the plate set aside for a few minutes until the ether and alcohol had pretty well evaporated, when it was immersed in water while a normal alkaline pyro developer was mixed. By normal we mean a developer that, while energetic enough to develop the gelatine film, was not strong enough to produce any serious amount of fog on the collodion film during a prolonged application, and for the purpose we used three grains of pyro, two minims of strong ammonia, and one grain of bromide in each ounce.

This plate, it will be observed, represented, first, bare gelatine; second, bare collodion; third, gelatine coated with collodion before exposure; and, fourth, gelatine coated after exposure. The exposure necessary to produce a satisfactory negative on the collodion film alone we found by experiment to be about a

minute with *f*-32, so that with a rapid "cap" exposure nothing much could be expected in that. Nevertheless, within three or four seconds after the application of the developer, the sky appeared, and in thirty seconds development was apparently complete on the end of the plate collodionised before exposure, the detail in the glass foreground being all visible. From that time no appreciable change occurred until, at the end of a minute and a half, the bare gelatine portion began to develop, and a few seconds later the other end began to darken slightly as if fogging, whereas the end collodionised before exposure remained up to this stage beautifully bright and clean. Development was continued until the bare gelatine portion was apparently finished, that is to say, the surface image was beginning to disappear, and at that stage the exposed collodion end showed a vigorous surface image not absolutely free from veil owing to the prolonged action of the developer, but much clearer than the bare gelatine, while the other end, without any trace of image, seemed badly fogged. On holding the negative up to the light, a clear strong image showed at the end coated before exposure, while the rest of the plate was too dense, especially at the opposite end, to leave the image visible. At the back of the plate the image was visible at the centre portion and that coated after exposure, the end at which the collodion film had been exposed showing no image at all.

We are compelled to give these details thus minutely because they are important as bearing upon the effect of and on the collodion film with and without exposure. After fixing, taking the bare gelatine portion as normal, which in fact it was, the portion collodionised after exposure presented no difference beyond a very slight general veil, but at the opposite end the high lights—the sky and a whitewashed building—showed stronger density than on the bare gelatine, the rest of the image scarcely varying. But, on removing small portions of the collodion film by gentle friction of the wet negative, the sky of the gelatine negative beneath was very appreciably lowered in density, being weaker than the middle tones on the bare gelatine portion where previously it had been the strongest part of the image, thus showing that the collodion there carried the bulk of the picture. In the foreground of that portion the gelatine image upon exposure was found to be slightly but not materially lowered in strength, while at the other end the removal of the collodion left the gelatine image absolutely identical with the uncoated. The strip of exposed collodion (without gelatine) showed a fairly strong image of the high lights, but some of it was really due to a thin layer of gelatine the chisel failed to remove.

The second negative was in every way similar to the first, except that it received twelve seconds' exposure and double the quantity of bromide was used in development. The result both on behaviour in the development and in character of the image is very similar except that the portion collodionised before exposure shows a strong, clear, vigorous image where the remainder is flat from over-exposure, the difference between those two portions being unappreciable. But, on removing the collodion from the denser portion as in the previous case, the density is reduced considerably below that of the corresponding bare gelatine image, while on the other side little if any difference occurs. This latter fact disposes of the suggestion that might be made, that it is the mere protective influence of the collodion film that prevents the developer acting; if it were so, the reduction would be equal at either end, which is not the case.

The third negative is similar to the others, but an *unwashed* collodion emulsion was used. In our experiments of five years ago we found that with a prolonged exposure an unwashed emulsion, which *per se* is absolutely insensitive, behaved exactly like a washed one, but we have no recollection of the length of exposure given. In this negative, with twelve seconds' exposure, there is practically no difference, except of colour, between the three portions, unless it be that the *exposed* collodion end is clearer.

These three negatives seem to dispose entirely of the possibility of the transmission of any action to the unexposed film, but we shall now proceed to our direct experiments on Herr Liesegang's lines.

Ortol.—Herr Kessler, of Vienna, has been experimenting with ortol, and finds that it gives excellent modelling in the negatives, and is suitable for short or long exposures. The addition of potassium bromide makes it work more slowly, and gives rich negatives, whilst dilution of the developer, on the other hand, produces less contrast. The duration of development for negatives that are intended for albumen printing is from five to six minutes. It may be used over and over again without giving fog, and gives greyish-black negatives which print quickly. The particular formula he recommends for studio and time exposures is—

A.

Water	1000 c.c.
Potassium metabisulphite	7·5 grammes.
Ortol	15 „

B.

Water	1000 c.c.
Sodium carbonate	120 grammes.
„ sulphite	180 „
Potassium bromide	1–2 „
Hypo solution, five per cent.	10 c.c.

For use mix in equal parts. The addition of hypo to the developer produces greater clearness of the negatives.

Action by "Inert" Bodies on Dry Plates.—Dr. W. J. Russell (Vice-President of the Royal Society) recently gave the annual Bakerian Lecture before the Royal Society on this subject, the exact title being "Further Experiments on the Action Exerted by Certain Metals and other Bodies on a Photographic Plate." We have from time to time given brief abstracts of these and other investigations, but the remarkable facts discovered, and in his lecture fully described, by Dr. Russell, possess so pointed an interest to photographers that it is well to again draw special attention to them. The lecture was fully reported in the *Chemical News* last week, and those of our readers who desire to be *au courant* with the most recent photographic investigations will do well to read the paper in its entirety. It is given in our columns this week.

The leading facts are given in the exordium of the lecture:—"In a paper read before this Society in June last ('Royal Society's Proceedings,' lxi. p. 424; *Chemical News*, lxxv. p. 302) it was stated that certain metals, alloys, and other substances—such as picture copal, printing ink, straw board, &c.—were able to act even at a distance on a sensitive photographic plate, producing effects similar in appearance, and developed in the same way, as plates which had been acted on by ordinary light. At that time sufficient experimental evidence had not been obtained to determine the nature of this action, or even to clearly indicate its general character whether in fact the action rose from vapour given off by the active body, or whether phosphorescence was produced which acted on the plate. That bodies so slightly volatile as zinc, aluminium, nickel &c., should be able to give off at ordinary temperatures in a few days sufficient vapour to act strongly on a photographic plate, and that such vapour should be able to pass rapidly through media such

s gelatine, celluloid, collodion, &c., seemed difficult to realise, al-
ough many of the earlier experiments appeared to indicate that
is was the kind of action which took place. Later experiments
nfirm the view that a vapour is given off which is the cause of
e action on the plate."

Dr. Russell then describes a large number of interesting
periments in the same direction, all going to show that the
iginal idea of vapour being given off by metals, &c., was correct.
e says: "It appears, then, from the above experiments that certain
etals have the property of giving off, even at ordinary tempera-
res, vapour which affects a sensitive photographic plate, that this
pour can be carried along by a current of air, and that it has the
wer of passing through thin sheets of such bodies as gelatine,
lluloid, collodion, &c.; in fact, so transparent are these bodies to
e vapour that, even after it has passed through them, it is able to
oduce clear pictures of the surface of the metal from which it
me. That much remains to discover with regard to this action of
e metals is obvious, the most active metals are not the most
latile. Nickel is very active, cobalt only very slightly so, copper
d iron are practically inactive. I hope before long to be able to
ing before the Society further developments of these curious
tions, both of metals and organic bodies."

In a note dated March 24, 1898, Dr. Russell describes the results
experiments with a large number of organic substances, some of
e results being most curious. Linseed oil is very active, olive oil
ly slightly. Essential oils were exceedingly active, as also the
re terpenes extracted from them. Mineral oils, petroleum spirit,
cohol, ether, benzine, &c., were unable to produce any action, yet
cohol in which strips of bright zinc had been steeped for three or
ur days was very active. The whole outcome of these remarkable
periments would seem to point out the probability of revolution in
e packing of dry plates, for there is every indication that most of
e actual means employed include the use of materials capable of
ving off vapours that will act upon the plates, and would thus
plain many occult instances of "fog."

The Odour of Metals.—Bearing on the subject of the
lkerian Lecture is a singular series of facts which we do not
member having seen any reference to in scientific papers. Every
e is familiar with the peculiar smell produced with handling
pper coins. What is it? Again, equally familiar is the odour of
ld produced when the fingers have been dabbling in gold solutions.
In a similar manner those accustomed to the wet process could tell
th closed eyes whether a developing cup had contained an iron
lution by merely smelling it. It is difficult to imagine that any-
ng but metallic vapour is the cause of this odour. The only
estion is, Can we trace any photographic action to such odours?

Something Wrong with the Sun.—At the Fifth Ordi-
ry Meeting of the British Astronomical Association, after some
teresting descriptions of the photographic results obtained by the
clipse observers, Mr. Chambers made some references to sun spots.
Referring to the fact that, as the minimum period of sun spots was
approaching when we ought to expect but few spots, the fact was
that there were a large number, and had been since August, one
big of a very striking character. The suggestion he had to make
was that "there was something wrong with the sun." Mr. Maunder
referred to the experience of observers that, when large sun spots
mble their appearance, they were often accompanied by magnetic
disturbances in the earth, one manifestation of this being the
occurrence of beautiful displays of the aurora borealis.

OXAMIN DYES AS OPTICAL SENSITISERS.

In the current number of the *Photographische Correspondenz* Valenta
gives the following brief note as to the colour-sensitising action of the
oxamin dyes introduced by "Farbwerke Friedrichsfeld" (Dr. Paul Remy,
of Mannheim). Several of them give very satisfactory results and should
be useful for ordinary practical work, as they give good red sensitiveness
with great freedom from fog.

Oxamin red, MF, gives two bands, one from $C\frac{3}{4}$ to D, the other from D
to $D\frac{3}{4}E$.

Oxamin red, B, a broad band from C to beyond D with maximum
at D.

Oxamin scarlet, B, a very vigorous band from $C\frac{4}{5}D$ to C, and a max-
imum at $D\frac{1}{2}E$.

Oxamin orange, G, a weak band from $C\frac{3}{4}D$ to $b\frac{1}{4}F$, maximum at $D\frac{3}{5}E$.

Oxamin blue, MD, faint band at $D\frac{1}{2}E$.

Oxamin blue, BT, faint band from $C\frac{1}{4}D$ to $D\frac{3}{4}E$.

Oxamin blue, BB, strong band from C to $D\frac{1}{2}E$, maximum C to D.

Oxamin heliotrope, B, band from $C\frac{1}{2}D$ to $D\frac{1}{4}E$.

Oxamin violet, GRF, faint distinct band $C\frac{3}{5}D$.

Oxamin violet, MD, two faint bands at $D\frac{1}{3}E$ and $C\frac{1}{2}D$.

Oxamin violet, BBR, two bands from $C\frac{1}{4}D$ to D, and from $D\frac{1}{4}E$ to $D\frac{3}{5}E$,
maxima at $C\frac{3}{4}D$ and $D\frac{3}{4}E$.

Oxamin violet, GR, is a very vigorous sensitiser, which gives a band
from D to E with maximum at D.

Oxamin black, M, faint band from $C\frac{1}{4}D$ to D.

Oxamin black, MD, tolerably strong band C to $D\frac{1}{2}E$, maximum $C\frac{1}{2}D$.

Oxamin black, MB, band from $C\frac{1}{3}D$ to $D\frac{1}{2}E$.

Oxamin black, BR, two maxima at $C\frac{3}{4}D$ and $D\frac{1}{2}E$, the very strong
band extends with long exposure from C to E.

Formulæ for their use will be published as soon as the experiments
have been concluded.

COLLOTYPE WITH GELATINO-BROMIDE OF SILVER.

[*Photographische Correspondenz.*]

Attention has been repeatedly called to the possibility of utilising the relief which is sometimes seen in gelatine negatives for the collotype process.

The process would have extraordinary advantages over that with bichromated gelatine, which is in use at the present time; it would shorten the time required to prepare the plate to a small fraction of that now essential, for the collotype plate could be prepared almost as rapidly as an ordinary negative. The bichromated gelatine plate, which will not keep, and must be freshly prepared every time just before use, would be replaced by a preparation which would keep for years.

The experiments which have hitherto been made in this direction have not yielded any satisfactory practical results, as the conditions under which a vigorous relief was formed have not been accurately determined.

It may be briefly stated here that a fairly long exposed plate was treated with pyrogallol and carbonate of soda.

The cause of the failure principally laid in the absence of the grain that is essential for collotype.

I have succeeded in producing this grain in any desired degree, and merely by moistening the plates with an aqueous solution of calcium nitrate.

Such a solution, as I pointed out in 1896 in the *Monatsheften für praktische Dermalologie*, has the property of dissolving gelatine in the cold. If this gelatine solution be mixed with water, the gelatine is precipitated in exactly the same way that silver chloride is precipitated from its solution in ammonium sulphocyanide when diluted with water.

In our collotype process we do not naturally go as far as dissolving the gelatine, but only cause a strong swelling of it. This forms the grain, and this is stronger the more concentrated the solution of calcium nitrate. At the same time this solution acts as an etching solution, that is to say, it prevents the greasy ink from being taken up by the swollen parts.

The process is as follows: Plate glass is coated in the ordinary way with gelatino-bromide of silver. Such a plate is exposed in the ordinary way under a negative in the printing frame, or, if another size is required, the negative is copied in the camera. Development is effected with—

Water	200 c. c.
Sodium carbonate	10 grammes.

to which just before use is added—

Pyrogallol	0·5 gramme.

The plate is fixed and washed as usual.

If it is to be used for collotype, it is painted over with a solution of—

Water	500 c. c.
Calcium nitrate	250 grammes.

and allowed to stand for half an hour. The excess of moisture is then wiped off, and the plate is then ready for rolling up with the fatty ink. The damping with the calcium-nitrate solution is repeated from time to time.

R. Ed. Liesegang.

FURTHER EXPERIMENTS ON THE ACTION EXERTED ON CERTAIN METALS AND OTHER BODIES ON A PHOTOGRAPHIC PLATE.*

In a paper read before this Society in June last (*Roy. Soc. Proceedings*, lxi. p. 424; *Chemical News*, lxxv. p. 302), it was stated that certain metals, alloys, and other substances—such as picture copal, printing ink, straw board, &c.—were able to act, even at a distance, on a sensitive photographic plate, producing effects similar in appearance and developed in the same way as plates which had been acted on by ordinary light. At that time sufficient experimental evidence had not been obtained to determine the nature of this action, or even to clearly indicate its general character—whether, in fact, the action rose from vapour given off by the active body, or whether phosphorescence was produced which acted on the plate. That bodies so slightly volatile as zinc, aluminium, nickel, &c., should be able to give off at ordinary temperatures, in a few days, sufficient vapour to act strongly on a photographic plate, and that such vapour should be able to pass rapidly through media such as gelatine, celluloid, collodion, &c., seemed difficult to realise, although many of the earlier experiments appeared to indicate that this was the kind of action which took place. Later experiments confirm the view that a vapour is given off, which is the cause of the action on the plate.

Certain organic bodies, as well as metals, have been shown to act on the photographic plate; and, in endeavouring to ascertain the nature of this action, experiments with organic bodies were first undertaken, as the results which they yield are more easily and rapidly obtained than those with the metals, and, if their mode of action was determined, it would probably throw light on the action exerted by the metals. In the former communication it was stated that printing ink and copal varnish are active substances, both when in direct contact with a photographic plate, and when at a distance from it. Further, it was found that the action which they exerted was able to pass through different media. Although printing inks and copal varnishes may vary considerably in composition, the main constituents are constant; hence it was easy to determine that boiled oil and turpentine were the bodies to which they owed their activity, and that these bodies separately behaved in the same way as did printing ink and copal varnish. Boiled oil—that is, linseed oil which has been heated with oxide of lead—is an active substance, and most of the following experiments have been made with the pale drying oil which is prepared by Messrs. Winsor & Newton. Pure turpentine is also a very active substance, and, owing to its volatility, in many experiments very useful. These bodies can be used either as liquids in small dishes or by saturating Bristol board or other neutral and porous bodies, such as ignited pumice stone, &c., with them. In the case of the drying oil, it can be painted on glass or cardboard and allowed to harden.

The experiments described in the former communication have been repeated under the same and under slightly different conditions, and in another laboratory; the results obtained, with one exception, confirm the previous statements. Glass, selenite, mica, even in very thin layers, are absolutely opaque to the action; whereas gelatine, celluloid, collodion, gutta percha, tissue tracing paper, parchment, and paper are more or less transparent. Linseed oil and turpentine may fairly be taken as typical examples of active organic bodies. This property of acting on the photographic plate is far from belonging to all volatile organic bodies; for instance, although vegetable oils have the power of acting, mineral oils, so far as they have been tried, have not the power. Benzine, carbon disulphide, chloroform, &c., also are without this power of acting on the photographic plate; but the question of what substances are and what are not active will be dealt with on another occasion; at present it is simply to consider the conditions under which linseed oil and turpentine act on the photographic plate. The picture copal varnish, which was much used in the former experiments, obviously owes its activity to the turpentine and the oil it contains. Warm the varnish for some length of time; these bodies are driven off, and an inactive gum remains. This experiment obviously suggests a vapour as the cause of the action; at the same time, such a vapour would pass through bodies such as gelatine, celluloid, &c. With regard, for instance, to the thin sheet gelatine, it appears to offer but very slight obstruction to the action of these organic bodies; if the thickness of the gelatine be increased, still the action takes place, only the time of exposure has to be considerably longer.† Another striking fact with regard to this emanation from these active bodies is that it gives an accurate picture of the surface from which it has come. A hard copal surface on glass will give a picture showing every brush mark, unevenness, and scratch on the surface; and if the action take place through a thin sheet of gelatine, or even as many as six or more sheets, still the picture of the scratches is distinct. The following experiments are apparently strong evidence that the action on the photographic plate is due to the vapour given off from these organic bodies.

A piece of Bristol board saturated with drying oil, or a piece of glass painted with it or with picture copal, is placed on the bottom of an ordinary plate box, and a photographic plate, larger than the active body, is suspended above it with the film upwards; light is excluded from the box, and the arrangement is left for (say) a fortnight; then the plate, when developed, will be found to have been acted on irregularly round its edge, at some parts considerably more than at others, but everywhere shading off, and evidently in the way which would occur if a vapour had rolled round the edge. Another experiment which showed this kind of action very satisfactorily was carried out as follows: A circular piece of the Bristol board was saturated with drying oil, and at a little distance above it a smaller circle of mica—which is perfectly opaque to the action—was placed, and again above this was another piece of mica with a circular hole smaller than the circular mica plate, and then the photographic plate was placed above. By this arrangement no direct action could take place between the drying oil and the sensitive plate, but a vapour could work its way between the mica plates, and thus reach the photographic plate; and this it did, for, after an exposure of three days, on developing the plate there was a dark ring formed, shading off towards the centre. Another and very simple experiment illustrating this same point is to place a small circular glass dish, with some drying oil in it, in the middle of a photographic plate, and leave it there for a week. On developing the plate, it will be found that no action has taken place where the dish stood, but that immediately beyond the outside of the dish much action has occurred, and that the darkening gradually fades away. There is still another way in which the action of these organic bodies has been tested, and that is by transferring the active power of these bodies to a neutral substance. If vapour be the immediate cause of the darkening of the photographic plate, then it would be possible, if a piece of Bristol board were suspended above drying oil, for instance, for the inactive board to take up these vapours and become photographically active. This was found to take place. Bristol board of good quality is a very useful substance in all these experiments, both as a screen and as an absorbent. It is in itself an inactive body, and may be heated in a water bath before using, to prevent the accidental presence of any substance which might act on the plate. If a piece of the Bristol board be suspended above drying oil, in the liquid or solid state, or turpentine or picture copal, for two or three days, or even less, it becomes strongly active, and, when placed in contact with a photographic plate, quickly darkens it. This action of the Bristol board is well shown if a pattern be stamped upon it, which is easily done by pressing against it a piece of white net (black net must not be used, as it is slightly active), then the charged Bristol board will give an unmistakable picture. If turpentine be the active substance used to charge the Bristol board, the exposure need only be for a few hours; but, if after this charging it be exposed to the air for a day or two, its activity will be found to have gone. There is obviously no visible indication of this activity of the Bristol board, and consequently, if a device be cut out on a screen which is placed in front of a sheet of cardboard, or any inactive paper, and it is exposed to turpentine or to oil, or if the vapour of these bodies be in any other way brought in contact with the paper, a dark picture of such device, which is not visible, may be produced. Some unexpected and curious cases of ghostly pictures thus formed have been met with; they are, however, all produced in this way, and need not be described now. The above experiments have been made at ordinary temperatures, but, if the temperature be increased, the activity of these organic bodies is also greatly increased. High temperatures cannot, of course be used, but a temperature of 55° C. does not appear to alter the photographic plate. With drying oil—which is one of the most active substances that has been used—it is easy to obtain a picture in thirty minutes at the above temperature. The interesting pictures, which, in the former communication, it was shown could be produced simply by laying a piece of dry wood, or the section of the branch of a tree, on a plate, are produced by the volatile matter contained in the wood. These pictures appear at first sight very accurate and complete; but this is not really so, for some parts of the structure of the wood are not shown, and other parts are too strongly developed, depending on the amount of volatile substance present in the different parts. It is, however, very remarkable that so small a quantity of the volatile body as exists in a piece of dry wood should be able to produce a picture; the activity of the wood is increased by the presence of moisture. This property of acting on the photographic plate, possessed by the linseed oil, belongs apparently to the vapour, and not to the oil itself; for if a sheet of thin gelatine be placed on a photographic plate, and on it a thick glass ring nearly filled with oil, and over the top of the ring another sheet of gelatine, not in contact with the oil, and another sensitive plate, it will be found that, after a week's exposure, no action has taken place below the oil, but that a large amount has occurred above it, where the vapour has penetrated the upper sheet of gelatine. A similar result is also obtained by simply floating a piece of the thin gelatine on a dish of oil, and placing a sensitive plate above. At the sides, where the vapour can form and get away, there is action on the plate; in the centre there is none.

In addition to glass, mica, and bodies of that kind, the action does not

* A Lecture delivered at the Royal Society, March 24, 1898.

† The thin gelatine is 0·02 mm., and the thick 0·16 mm. in thickness.

ce place through a layer, except it be very thin, of either gum arabic or paraffin. If a piece of Bristol board or a glass plate has hardened ying oil on it, and be painted over with a strong solution of gum arabic ich is allowed to dry, then the delicate cracking which occurs can be y well shown on a photographic plate.

Pure water does not act on the plate, neither does pure alcohol or re ether, but the ordinary commercial specimens of the last two bodies and often to a considerable extent. Alcohol, which produces a dark ture will, after digestion with lime and careful distillation, be entirely ctive, and ether after careful purification also becomes inactive. isture, if present, does not affect this result; thus the presence of tain impurities, and they appear to be some of the most common ones, n be readily photographed, and approximately their amount determined the darkness of the picture formed, so that by this means can be demined whether, for instance, a purification process is working well, and ether it has completely done its work. The pictures are easily obtained placing some of the liquid to be tested in a small glass dish, and a nsitive plate above it. Obviously it is only certain impurities which l be indicated in this way, but the reaction is otherwise of considerable portance, for it gives a simple method of determining what bodies uble in these liquids are capable of acting on a sensitive plate. This tter will be treated of in a separate communication.

That the vapour given off by these organic bodies is the immediate ise of the action on the sensitive plate the above experiments seem to ow. At the same time it is remarkable that such a vapour should dily pass through media such as gelatine, celluloid, &c., and not by re absorption, but in such a way as to produce a picture of the surface m which it emanated.

Passing on to the action which certain metals exert on a photographic te, results have been obtained which are strikingly similar to those t described. Substitute a piece of polished zinc for a piece of Bristol ard saturated with linseed oil, and similar effects are produced on a otographic plate; the time of exposure must, however, be longer. hough both magnesium and cadmium are slightly more active than c, this last metal is the most convenient one to experiment with, and s been used in most of the following experiments. In addition to the ve three metals, nickel, aluminium, lead, and bismuth have the same perty, but not so strongly developed, of acting, both when in contact l when at a distance on a photographic plate. Cobalt, tin, and timony can also act in the same way, but their action is considerably bler, and undoubtedly other metals can act in the same way, but uire much longer exposure. Mercury, which in the former paper was ted to be the most active of all the metals which had been tried, is now nd to be quite inactive; the metal used in the former experiments was pure. This matter will be explained further on.

As so strong a similarity exists between the effects produced by the ve-mentioned organic bodies and the metals, the question which urally presents itself is, Do they also give off a vapour which directly indirectly acts on the photographic plate? The following experiments w that such an action does probably occur. Zinc which has been g exposed to the air is inactive. An exposure out of doors for only ee or four days diminishes very considerably its activity, but covered in doors after three weeks it will still give a tolerably dark picture. If has a bright but perfectly smooth surface, it is active, but not strongly rub the zinc with coarse sand or emery paper, and it is then obtained its state of greatest activity; the same applies to all the metals. If, en in this condition any of the active metals be placed in contact with hotographic plate, a beautifully sharp picture of the scratched surface obtained. The great increase of the fresh metallic surface produced by rubbing may account for the increase of activity which the scratching duces. If the zinc plate be raised only slightly above the photographic te, a sharp picture of the scratches is still obtained, and, of course, as distance is increased, so is the indistinctness of the picture increased, at last it fades into a general cloudiness, and in this form the zinc te can easily be made to act through the distance of an inch or more.

This action of the metals passes through the same media as do the ours from the organic bodies, and clear pictures can be obtained ough sheets of thin gelatine, &c.; in fact, what has already been said h regard to the transmission of the activity of the organic bodies lies to the metals; gelatine, both thin and thick, allows the action of metal to pass through it; celluloid and collodion do the same, and oes gold-beaters' skin and tracing paper. Reasoning, then, from this ng analogy between the action of the organic and the metallic bodies, must be assumed that the above-mentioned metals, from a clear face and at ordinary temperatures, give off vapour, and this vapour arently acts, when under the same circumstances, in a like manner to vapour given off by the drying oil. It gives a clear picture of the al surface from which it arose, and it can permeate the same media as organic vapours. The remarkably clear pictures of, for instance, a surface, which can be produced through a sheet, or even several ets, of the thin gelatine proves that the action is not one of mere orption.

To gain further knowledge on this point and test the porosity of these erent media, the power of hydrogen to diffuse through them was tried cementing specimens of the different substances on glass tubes, which e filled with hydrogen and placed over water. The action is somewhat remarkable, but requires further confirmation. With the thin gelatine ordinary diffusion does not occur, and a hardly, if any, perceptible rise of the water in the tube occurs on starting the experiment; but on standing for some length of time—two or three days—the water begins to rise, and after a week or more it will stand at a height of four or more inches above the level in the vessel, and there it remains, at least for a month or more. With the thick gelatine there is no evidence of any diffusion occurring. Celluloid acts much in the same way as the thin gelatine; a column of water gradually rises and remains there. The action of the gutta-percha tissue is to absorb the hydrogen; the diffusion tube completely fills up with water, and remains full without showing any tendency to fall for a couple of months, and then the experiment was stopped. With tracing paper diffusion occurs in the ordinary manner, and the same happened in the single experiment tried with gold-beaters' skin. That the rise of the water in the diffusion tubes is not owing to a mere absorption of the hydrogen by the gelatine or gutta percha has been proved by placing a considerable quantity of these bodies in a tube sealed up at one end, filled with hydrogen and inverted over water; after several weeks no rise of the water in the tube occurred. The above experiments have been repeated with the same results, but further trials are being made. Possibly the metallic vapour is in a still finer molecular state than ordinary hydrogen, and thus is able easily to permeate a medium which hydrogen can only slowly get through, and air cannot get through. At all events, this may be looked upon for the moment as a working hypothesis.

That the action of the metals, like that of the organic bodies, is due to a vapour can be demonstrated by experiments exactly similar to those already described. For instance, if the thin mica plates be arranged above a zinc plate, in the way already mentioned, so as to cut off all direct action between the zinc and sensitive plate, a ring of action is produced, which can only be accounted for by supposing a vapour present, which has worked its way between the sheets of mica, and thus gained access to the photographic plate. Again, a piece of Bristol board can be made active by contact with, or mere proximity to, a piece of polished zinc. A striking instance of this arose in the following way: A piece of perforated zinc had lain on the bottom of an ordinary plate box for a considerable length of time, probably about two months; the zinc was then taken away, and a sensitive plate dropped into its place. On developing this plate, a picture of the perforated zinc was obtained. Other experiments of a similar kind have been made. If the Bristol board be not in direct contact with the zinc; if a screen, with holes cut out in it, be interposed, it will be found that the Bristol board where exposed to the direct action of the zinc will become active, and will give an exact picture of the holes or whatever design it may be which has been cut out on the screen. To produce this effect the cardboard has to be exposed to the zinc for fully six weeks. This changing of the Bristol board does not take place satisfactorily above ordinary temperatures. With other metals than zinc, these changing effects have not as yet been obtained.

Another experiment, which illustrates the way in which the metals can act, is to take a piece of ordinary perforated zinc, polish one side, and lay this polished side against a plate of plain glass in a printing frame, then place the photographic plate against the dull side of the perforated zinc, and leave it in the dark for three or four days; then, on developing the plate, a reversed picture is obtained, that is, the holes in the zinc will be represented by dark spaces, and the zinc itself by light ones. If the holes in the perforated zinc are large they are represented by shaded circles, so that these pictures are produced by the vapour emitted by the polished zinc which has crept into the open spaces, and thus gained access to the photographic plate. It has already been shown that the action exerted by zinc passes more readily down a glass than down a paper tube of the same size. This has been strikingly confirmed by taking two pieces of glass tubing one inch long, three-quarters of an inch in diameter; inside one a single coil of inactive paper was placed, and both tubes stood on a sheet of polished zinc, and a photographic plate rested on the top of them. They were then left for a week, and on developing the plate a black patch appeared above the tube without the paper, and no action was visible above the one with the paper. Without removing the paper, it was painted over with melted paraffin, and again a photographic plate put on the top of the two tubes; now two circular dark patches were produced of equal intensity.

If the activity of the zinc depends on a vapour which it emits, it seemed possible that it could be carried along by a stream of air. In order to try whether this was the case, a tube a foot long was packed with zinc turnings which had been amalgamated, and a stream of pure air sent through it. The end of the tube was fixed into the side of a dark box and a sensitive plate with a screen upon it suspended above it; thus no direct action could be exerted by the amalgamated zinc on the plate. The experiment was continued for four days; then, on developing the plate, a picture of the screen above where the tube entered the box was obtained, but at the other end of the plate there was no action.

The presence of mercury in this experiment was unsatisfactory and might account for the result obtained; therefore an exactly similar experiment was made, and zinc turnings alone were used and a plate without a screen. The experiment was carried on for a week, and it was then found that a black patch had been produced immediately above the end of the tube. To be sure that this darkening did not arise from the

action of the air, the whole of the zinc was removed from the tube and again the air sent through it for a week; the sensitive plate showed no signs of any action having taken place.

To try whether any accumulation of the vapour, and hence an increase of action, could be brought about by an increase of zinc surface, two small circular glass dishes were taken, about one and a half inches in diameter and a half inch in depth. Into one a single disc of bright zinc foil was placed, and on the other twenty similar discs, then on the top of both vessels a photographic plate was placed. The single disc was raised on a piece of glass, so both end discs were at the same distance from the plate. The discs were a little smaller than the glass vessels, and, owing to their not being quite flat, there was a space between each one. In two experiments there was no marked difference between the density of the pictures produced, the single disc producing as much effect as the twenty. A more direct way for the passing off of the vapour was then made by cutting a circular hole three-eighths of an inch in diameter through the centre of all the zinc discs, and now a very black central spot was formed by the twenty zincs, and, of course, there was a white spot with the single disc, so that the vapour accumulated to a very considerable extent in this central space.

It has already been mentioned that the statement in the former paper that mercury was the most active of the metals is incorrect. The error arose from not suspecting that a trace of any impurity would affect the activity of the mercury, and, consequently, not taking special precautions to ensure its perfect purity. On repeating the former experiments with another sample of mercury, it was found that no action occurred, which seemed very remarkable. Moisture was added, the temperature was increased, but still no action took place; the addition of a little zinc to the mercury was then tried, and it was found that this made the mercury excessively active. The presence of a very small quantity of zinc is able to effect this change, certainly less than one three-hundredth per cent. It is very remarkable that so small an amount of the metal can cause so strong an action on the photographic plate, for the exposure to the vapour given off by such an amalgam need not, even at ordinary temperature, be longer than two to three days. If other active metals are dissolved in pure mercury, they act in the same way; at all events, this applies to magnesium and to lead. If silver, on the contrary, be added, it does not render mercury active, nor does sodium. This action of mercury, which contains zinc or lead, the most common impurities, is so readily recognised that it becomes a valuable test for its purity, and a very interesting means of following the effect produced by any purifying process. A specimen of mercury containing not more than one three-hundredth per cent. of zinc gave a very dark picture. This mercury was then treated first with sulphuric acid, and afterwards, for three days, with nitric acid, and the picture it then gave was very faint, and on repeating this purifying process no picture at all was produced. Again, a sample of mercury containing zinc was carefully distilled. The distillate gave a very faint but very distinct picture. Another sample of distilled mercury also gave a faint picture.

Temperature, as might be expected, affects greatly this activity of the metals. At 4° or 5° C. zinc has but little action on a photographic plate. Most of the foregoing experiments have been made at about 17° or 18° C., and some, as specially noted, at 55° C. The Ilford special rapid plates have been used.

It appears, then, from the above experiments, that certain metals have the property of giving off, even at ordinary temperatures, vapour which affects a sensitive photographic plate, that this vapour can be carried along by a current of air, and that it has the power of passing through thin sheets of such bodies as gelatine, celluloid, collodion, &c.; in fact, so transparent are these bodies to the vapour that, even after it has passed through them, it is able to produce clear pictures of the surface of the metal from which it came. That much remains to discover with regard to this action of the metals is obvious, the most active metals are not the most volatile. Nickel is very active, cobalt only very slightly so, copper and iron are practically inactive. I hope before long to be able to bring before the Society further developments of these curious actions, both of metals and organic bodies.

The foregoing experiments have been made in the Davy-Faraday laboratory, and I beg to thank the managers of the Royal Institution for having allowed me to work in their laboratory. My thanks are also due to my assistant, Mr. Block, for the very careful and intelligent way in which he has aided me with the experiments.

March 24, 1898.—Additional experiments have been made with active organic substances, in order to determine to what class of bodies they belong. As already stated, linseed oil and turpentine were the two substances first found to be very active organic bodies, and, following out these results, it has been proved that vegetable oils in general have more or less this property of acting on a photographic plate. Linseed oil, for instance, is very active; olive oil only very slightly so. Even samples of "pure" linseed oil, obtained from the different artists' colourmen, vary considerably in the amount of action which they exert. The boiled, or drying, linseed oil has, at ordinary temperatures, the same activity as the ordinary oil; but, under other conditions, it appears there is some difference in their action. Another class of bodies, also called oils, namely the essential oils, have been found to be very active substances. Samples of commercial specimens of the following essential oils have been tried: Peppermint, lemons, pine, juniper, bergamot, winter green, lavender, cloves, eucalyptus, cadjeput, and cedrat, and were all found to be active, and not only when used by themselves, but also when dissolved in a large amount of pure alcohol. It is well known that the active substances in the essential oils are bodies known as terpenes, and I have to thank Dr. Tilden for supplying me with pure specimens of these bodies; they are all of them remarkably active. Paraldehyde and benzaldehyde are also very active bodies. Ordinary aldehyde and formaldehyde, as they have been at present supplied, are only slightly active. Guaiacum, both when in powder and in alcoholic solution, is active, and so are powdered cinnamon, sweet spirits of nitre, and eau-de-cologne. Brandy is slightly so. Now, the important property belonging to all these bodies is their reducing or oxygen-absorbing power, hence the conclusion that it is this property which enables them to act on the photographic plate. The mineral oils, purified petroleum spirit, alcohol, ether, the esters, such as ethyl-acetate, benzine, nitro-benzine, are all, when pure, unable to produce any effect on a sensitive plate, and even oxidised bodies nearly related to the terpenes, such as terpinol and camphor, are not active, neither is thymol. Terebene is an exceedingly active body. The difference of activity of the ordinary oils seems to follow their oxygen-absorbing power, at all events it is so with regard to linseed and olive oils, for the former is the most active of the oils, and one gramme of it is said to be capable of absorbing 186 c. c. of oxygen, while the same weight of olive oil can absorb only 8·2 c. c. It is also interesting to note that at least with some of these active bodies results can be obtained which correspond to what photographers term solarisation or reversal, the action, when modified, giving a black picture; when carried to its full extent, a white one.

It has already been stated that a mere trace of zinc makes mercury active, but it is certainly equally curious and unexpected that a trace of zinc should make alcohol active. It is only necessary to take pure alcohol and place in it some strips of bright zinc foil, leaving the metal in for three or four days. It will then be found that the alcohol can act strongly on a photographic plate. The same happens with ether and ethyl-acetate, but not with benzine. In addition to zinc, cadmium, magnesium, aluminium, and fusible metal can act in the same way, whereas lead, nickel, tin, silver, sodium, and, as far as experiments have gone, all the inactive metals, have no such power. This reaction is still being investigated, but certain it is that careful filtration does not remove this activity from alcohol, nor does distillation entirely destroy it.

W. J. Russell, Ph.D., V.P.R.S.

A CONTRIBUTION TO THE HISTORY OF THE ART OF PHOTOGRAPHING LIVING SUBJECTS IN MOTION, AND REPRODUCING THE NATURAL MOVEMENTS BY THE LANTERN.

Mr. H. R. Heyl writes to the *Journal of the Franklin Institute*:—

"Among the earliest public exhibitions of photographs taken from living subjects in motion projected by the lantern upon a screen was that given at an entertainment held in the Academy of Music, in Philadelphia, on the evening of February 5, 1870,* and a repetition of this exhibition was made before the Franklin Institute at its next following monthly meeting, on March 16, by the writer.

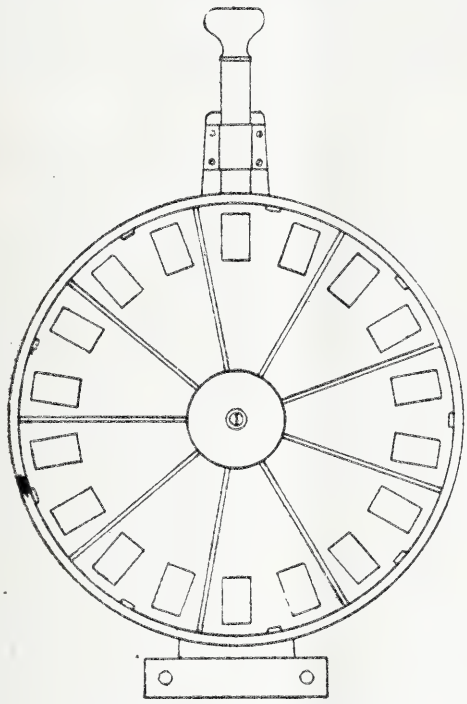
"The subjects exhibited embraced waltzing figures and acrobats, shown upon the screen in life size, while the photographic images were only three quarters of an inch in height. At that day flexible films were not known in photography, nor had the art of rapid succession pictures making been developed; therefore it was necessary to limit the views of subjects to those that could be taken by time exposures upon wet plates, which photos were afterwards reproduced as positives on very thin glass plates, in order that they might be light in weight. The waltzing figures, taken in six positions, corresponding to the six steps to complete a turn, were duplicated as often as necessary to fill the eighteen picture spaces of the instrument which was used in connexion with the lantern to project the images upon the screen.

"The piece of mechanism, then named the 'Phasmatrope,' shown by the illustration, consisted in a skeleton wheel having nine radial divisions, into which could be inserted the picture-holders, each of which consisted of a card upon which was mounted two of the photo positives in such relative position that, as the wheel was intermittently revolved, each picture would register exactly with the position just left by the preceding one. The intermittent movement of the wheel was controlled by a ratchet-and-pawl mechanism operated by a reciprocating bar moved up and down by the hand. It will be apparent that the figures could be

* The printed programme of this event contains the following allusion to the feature of the entertainment: "The Phasmatrope. This is a recent scientific invention, designed to give to various objects and figures upon the screen the most life-like movements. The effects are similar to those produced in the familiar toy called the Zoëtrope, where men are seen walking, running, and performing various feats in the most perfect imitation of real life. This instrument is destined to become a most invaluable auxiliary to the appliances for illustration, and we have the pleasure of having the first opportunity of presenting its merits to our audience

moved in rapid succession or quite slowly, or the wheel could be stopped at any point to complete an evolution.

"In the exhibitions at the Academy of Music, above alluded to, the movement of the figures was made to correspond to the time of the waltz played by an orchestra, and when the acrobat performers were shown a more rapid motion was given, and a full stop made when a somersault



was completed. A shutter was then a necessary part of the apparatus to cut off the light rays during the time the pictures were changing places. This was accomplished by a vibrating shutter placed back of the picture wheel that was operated by the same draw bar that moved the wheel, only the shutter movement was so timed that it moved first and covered the picture before the latter moved, and completed the movement after the next picture was in place. This movement reduced to a great extent the flickering, and gave very natural and lifelike representation of the moving figures."

THE LATENT IMAGE AND ITS DEVELOPMENT.*

The dark grey precipitate is now dried and ignited in a porcelain crucible and weighed. It appears then as an almost white powder which, on polishing in an agate mortar, assumes the metallic lustre. It is pure metallic silver after ignition, but it is not wholly so before the drying operation. The precipitate, when treated with potassium bromide, yields silver bromide and a strongly coloured solution. Double decomposition also takes place on the addition of thiosulphate, and it would appear as if an organic salt of silver were present in the precipitate.

The following results were obtained:—

(1) 0·2214 gramme pyrogallol and 1·8308 gramme silver nitrate.
Pyro solution poured into ammoniacal silver solution.
Obtained 0·8285 gramme silver.

(2) 0·1855 gramme pyrogallol and 2·0214 grammes silver nitrate.
Ammoniacal silver solution poured into pyro solution.
Obtained 0.6349 gramme silver.

(3) 0·1560 gramme pyrogallol and 2·0541 grammes silver nitrate.
Ammoniacal silver solution poured into pyro solution.
Obtained 0 5673 gramme silver.

The molecular weight of pyrogallol, $C_6H_3(OH)_3$, is 126. The above results calculated on 126 of pyrogallol give the following amounts of silver reduced per molecule of pyrogallol:—

(1) 472
(2) 429
(3) 457
Mean 452

The atomic weight of silver being 108, we find that one molecule of pyrogallol can reduce, under the most favourable circumstances, about four atoms of metallic silver from ammoniacal solution.

Upon this basis the figures given in Table XIII. have been calculated.

Applying this knowledge, we find that it is possible to compound a pyrogallol developer so that the quantity of solution absorbed by the film shall contain sufficient pyrogallol to readily develop any density.

On again consulting Tables IX. and X., we find that the least absorbent plate absorbs, in 2½ minutes, 535 milligrammes of water per 100 square cm., and as much or more of a dilute alkaline sclution such as is employed in conjunction with pyrogallol.

* Continued from page 235.

Since the production of a sky density of 2·0 on 100 square cm. area requires 7·14 milligrammes of pyrogallol, it is evident that a developer containing this amount in 535 milligrammes will, even with the least absorbent plate in our table, produce a tensity of 2·0 in 2½ minutes. Such a developer would contain about 6 grains of pyrogallol to the ounce.

Alkaline pyrogallol thus differs from ferrous oxalate. While the former is able to produce the necessary density without the process of diffusion, the latter cannot, and depends essentially upon diffusion for the production of the necessary density.

It will be noticed that the concentration of the pyrogallol developer in the example just given is such as is seldom used, and from this it may be inferred that, with developers containing less pyrogallol, we also depend upon the process of diffusion for the supply of a sufficient amount of pyrogallol.

As a further example, we will take the same plate again. In 15 minutes this plate absorbs 670 milligrammes of solution. If the developer were to contain only one part of pyrogallol in 1000, there would enter into the film, with the 670 milligrammes of solution, 0·67 milligramme of pyrogallol, and this would produce a density of only 0·185. It is evident that the production of any larger density than this would depend upon the process of diffusion for the necessary further supply of pyrogallol to the film. Even with the most favourable plate, which absorbs 2·12 grammes of solution in fifteen minutes, the density due to the pyrogallol entering the film would only be 0 59.

These examples will illustrate the difference in the behaviour of different plates towards the same developer, and of different concentrations of the same developer towards the same plate.

We have purposely separated in imagination the two processes by which the reducing agent obtains access to the silver haloid. These processes of absorption and diffusion proceed, of course, simultaneously, and we have already seen that the process of diffusion in gelatine is fairly rapid; indeed, it is well known that the process of diffusion is quite as rapid in gelatinous masses as in pure water. Nevertheless, the imaginary separation of the two processes assists in understanding some peculiarities of pyro development which are indicated by the following experiments:—

A plate (D_2) was given a series of exposures, cut into strips, and each strip developed with a different amount of pyrogallol. The developer contained—

EXPERIMENT 4.

In 1000 parts { potassium bromide ..... 2 0 parts.
ammonia (NH_3) ..... 1·56 ,,
pyrogallol..... 1 to 4 ,,

Pyrogallol 1 in 1000.		2 in 1000.	4 in 1000.
Time developed 2½ mins.	5 mins.	2½ mins.	2½ mins.
1·25 C.M.S.	·150	·315	·160	·180
2·5 ,, ...	·405	·645	·515	·580
5 ,, ...	·600	·890	·880	1·060
10 ,, ...	·760	1·120	1·185	1·530
20 ,, ...	·920	1·310	1·425	1·925
40 ,, ...	1·065	1·460	1·665	2·215

The rate of absorption for this plate is—

1·06 gramme in 2·5 minutes;
1·45 ,, 5 ,,

The amount of pyrogallol entering the film by absorption alone would therefore be a developer containing—

Pyrogallol 1 in 1·00.		2 in 1000.	4 in 1000.
Milligrammes Pyro.			
In 2·5 minutes...	1·06	2·12	4·24
,, 5 ,, ...	1·45	—	—

To these amounts of pyrogallol would correspond the following densities as the highest which would be obtained were the process of diffusion absent:—

Pyrogallol in Developer.	Time of Development. Minutes.	Highest Density posssible by Developer absorbed.	Density obtained for 40 CMS. exposure.
1 in 1000	2·5	·300	1·065
1 ,, ,,	5	·410	1·460
2 ,, ,,	2·5	·600	1·665
4 ,, ,,	2·5	1·200	2·215

It is again evident from this experiment that by far the larger amount of reducing agent is introduced into the film by the process of diffusion,

but the influence of the richer developer shows itself in the more rapid growth of those densities which require the larger amount of reducing agent. The smaller densities are nearly the same in magnitude for all three developers, because the reducing agent necessary to develop them is fully contained in the solution absorbed, whilst the higher densities show marked differences of about density 0·600, which differences are almost entirely due to the large supply of pyrogallol introduced by the process of absorption, since doubling the time, to allow for longer diffusion, does not produce the same result.

F. HURTER, Ph.D.
VERO C. DRIFFIELD.

INDIVIDUALISM IN PHOTOGRAPHY.

[Paper read before the South London Photographic Society.]

THE most successful photographic societies are those which are primarily established for the assistance and benefit of the members generally, and not those which exist for the good of a part of the members or the aspirations and gratification of the ambitions of the officers. Societies such as ours can and should do all that is possible for the advancement of our hobby. Acting on the co-operative principle, members as well as the officers can render valuable material assistance and advice to one another.

In all this general assistance and co-operation there is one potent, though unseen, factor, which must and does contribute to the continuance of success. That which I refer to may be termed individualism in the photographic art.

While recognising the advantages accruing from co-operation, most persons object to Socialism, or, as some prefer to call it, Collectivism, on the ground that, if the ideal sought to be attained was carried out, all emulation and stimulation to individual effort would become stultified and stifled.

Nature has not endowed us all with the same abilities to perform the same work. Our tastes differ, our ideals and our capabilities to give expression to our thoughts and feelings in our work vary within very wide limits. In nothing is this fact shown stronger than it is in the practice of photography. In some cases a given subject dealt with by a number of capable workers will be treated in an equal number of different ways, some perhaps contenting themselves with a bare rendering of the subject, while others would idealise it according to their own personal views.

Reference to the work of a few well-known men with which you are acquainted will assist in the explanation of the application of individual talent and genius.

In Mr. Horsley Hinton we have one who is recognised as one of the leaders of what is often referred to as the "Artistic School." To any of you who have visited some of the principal exhibitions his work is easily recognisable. The subjects are simple, the lights and shades are dexterously and strongly placed, and there is a tendency—but not so strongly marked as with other workers—to a low tone. The whole bears the imprint of the master as plainly as if his name had been placed across it in the boldest type. The style and execution of the work is an example of the free exercise of his individual ideal of the rendering of subjects of the nature he essays.

At the same time it is extremely doubtful whether he or any other worker, who gives full expression to his ideal, could so disguise his work as to not disclose the hand of the producer.

Mr. Charles F. Inston usually deals with subjects relating to the sea and sky and their varying moods. His method of printing in strong blacks at once proclaims the author. Of an opposite nature is the work of Mr. W. Thomas when he dealt with similar subjects. His pictures were most delicate in the shadows and half-tones. The general style and rendering gave the clue to the executant.

Mr. John H. Gear seems to have settled down to what may be termed "esturial work." His pictures either indicate the effect of mist or of bright, clear weather. The quality and style of the work is remarkable.

I will close the illustrations with one or two homely references. Apart from the question of size, the general rendering of the subject and method of printing immediately identified certain architectural work as being the production of our late and much-respected President, Mr. F. W. Edwards.

The style of another worker in this branch of work—Mr. J. H. Avery—is as easily recognisable. His style and method of execution are totally different, but the impress and individuality of the worker are clearly shown.

One more illustration and a different style of work. An interior of an Irish cottage, and round the peat hearth are grouped one, two, or three figures simply arranged, together with the domestic utensils, indicates one style of the work of Mr. Howard Esler, for which he has made a name.

In conclusion, I suggest that members should consult their own individual feelings and follow the class of work for which they have a liking or special fancy, executing it in such a manner as they feel it ought to be done, thus giving expression to their own individual ideas. If that be done, in all probability, with a little energy, success will be attained.

Figure and *genre* subjects afford a very great amount of scope and latitude of expression. Simply treated, they appeal more strongly to the human heart and passions than if they were attempted full of turgid and heavy sentiment. Failure often results from attempting too much. Never use another man's models in the same way.

Slavish copying of another man's method and style is most contemptible, and lacks originality. No one has a copyright in the selection of a point of view, and one may follow in the "footsteps" of another if with the idea of a different or better rendering of the subject.

In all your work give expression to your individuality and let the work bear its imprint.

CHARLES H. OAKDEN.

PHOTOGRAPHIC SURVEYING.

[*Nature.*]

FIFTY years ago or more, M. Beautemps Beaupré successfully employed a process which greatly facilitated the work of surveying, and which, in its modern developments, is likely to supersede the tedious work of measurement in the field. Where the greatest accuracy was not required, the method recommended itself on account of its great practical utility, enabling contoured maps to be produced without the labour of heavy calculations. M. Beaupré availed himself of the principle of the camera lucida, and by its aid sketched the panorama about him from two ends of a measured base line. In a paper recently communicated by Professor E. J. Mills, to the Institution of Engineers and Shipbuilders in Scotland, it is contended that the best work is still done when this principle is utilised. From two views taken at a known distance from each other, however procured, one is able to plot a map with a fair amount of accuracy, and, knowing the correct relative distances of the objects, their vertical height can be deduced. No doubt, there were difficulties in the application of the method. Any one who has attempted to draw a picture of a distant object by means of Wollaston's invention knows that the result is apt to be a little disappointing, though successive improvements in the mechanism have removed many of the effects arising from parallax, which interfered with correct delineation in the early days when the instrument was first used. But the process still remains long and tedious, and it was inevitable that the introduction of photography, with its rapid and accurate results, should be welcomed as likely to banish the slow methods of hand drawing in the initial stages of the work.

To obtain a photograph which should be free from optical distortion, and to which the laws of geometrical perspective could be applied without any correction, has not been an easy task. But now it may be said that we do possess lenses which will cover an angular field of about sixty degrees without measurable distortion, and give uniform definition all over the plate. Enlargements and printing from the original negatives, doubtless, still present some difficulties. Professor Mills, we notice, recommends that the prints should be made on bromide paper, and developed with amidol. Shrinkage and distortion of the paper will, it is asserted, be prevented, when soaked in a two per cent. solution of formalin, and dried at a gentle heat. Other authorities, however, distrust paper altogether, and prefer to use a bromide emulsion on opaque or translucent plates of flat glass, as likely to give less error. But the possession of accurate optical arrangements, combined with exact manipulation of the photographic result, suggests many new applications to which the camera can be profitably applied, and the surveyor now finds himself equipped with an instrument of scientific precision, in which are combined the main features of a theodolite and a level, and which replaces the plane table and its accessories.

In the earliest form of surveying camera or photogrameter, to give it a polysyllabic title, the instrument consisted of little more than an ordinary bellows camera, set on a horizontal circle, and moving about a vertical axis. The distance between the plate and the lens was fixed, and the camera could be levelled by means of screws in the head of a tripod, in much the same way that a theodolite is adjusted. In the subsequent development and increased effectiveness that have been added to this surveying instrument, two names stand out prominently—that of Colonel Laussedat, the present Directeur of the Conservatoire des Arts et Métiers, Paris; and in this country that of Mr. Bridges Lee. In the French form, the camera is placed on the top of a stand carrying a transit theodolite, and the disposition of the several parts is arranged to ensure stability and symmetry about a vertical axis, while each part of the instrument can be used separately. In the English form, Mr. Bridges Lee has wisely determined that, while each photograph should offer a correct perspective view of the country it represents, it should also carry on its face the information necessary for the correct interpretation of the picture, and the subsequent construction of a map. When passing through countries where roads are scarce and travelling difficult, notebooks are apt to be lost; but, without more words, every one must appreciate the arrangement by which the "constants of reduction" are made as permanent as the picture to which they refer.

The general principles on which the Bridges Lee camera has been constructed, and the objects sought to be attained, have already been briefly explained in these columns (vol. li. p. 191). Its present form has been adopted because experiment has proved the necessity of great nicety of mechanical adjustment to obtain the best results. To ensure

the necessary lightness and rigidity, the camera box is made of aluminium. The direction in which the instrument is pointed can be read off an azimuthal circle, graduated to minutes, on which the camera turns. A level on the top of the box ensures the horizontality of the instrument, and when this adjustment has been made a telescope, also securely attached to the top of the camera, will move in a vertical plane through a sufficient range of angle for all ordinary terrestrial work. The angle through which the telescope can be moved in altitude is also read to minutes. This supplies the observer with a theodolite, and its position is so arranged, with reference to the other parts of the instrument, that the line of collimation and the vertical wire of the theodolite are in the same plane with that which bisects the photographic lens. In this same vertical plane, a "wire" is fixed to to the frame of the camera, cutting the optic axis of the lens at right angles, and consequently marks on the photograph the median vertical plane of the instrument. Another wire, also through the optic axis at right angles to this, will mark the horizon of the instrument on the picture, and, the intersection of the two wires will give the "principal point" of the perspective. Inside the camera is placed a magnetic compass, and the scale being transparent, it is printed on the picture. The axis of rotation of this compass is in the same plane as the axis of collimation of the theodolite, and of the vertical wire. The distance between the scale of the compass and the vertical wire is kept constant by a device which works automatically when the camera is in use, and, since this distance very slightly exceeds the radius of the compass, the wire can be used as a pointer to read the scale. One very important addition to the usefulness of the instrument is the insertion of a scale of angular distance, photographically prepared by the same lens as that fitted in the instrument when complete for surveying purposes. The scale is so attached to the frame, that it is photographed on every picture taken, and by its aid one can easily read off the angular distances of any point in the picture right or left of the median vertical plane.

A method of surveying, in which the necessary observations are easily and rapidly collected, or are implicitly contained in a series of photographic views, has the promise of a large future. In travelling over unsettled districts, where it is impossible to remain for any length of time on a particular spot, the photographic method seems likely to supersede all others. Indeed, no other method seems possible. Moreover, a photograph contains an amount of detailed information concerning the country photographed which it is quite impossible to gather from notes of observations and sketches, although much time may be spent in making these additions as carefully as possible. In this connexion one might call attention to the beautiful mountain maps which have been prepared for the German and Austrian Alpine Club. Here the work is based on the original ordnance survey maps, and the topographical details filled in from photography. These maps represent one of the most successful applications of photographic surveying. Again, in preliminary experimental surveys for irrigation purposes, or for deciding on the best route for a proposed railway, the camera, properly controlled, possesses many advantages over ordinary surveying instruments. In such cases it is often excessively difficult to determine beforehand how much plotting will be necessary to secure the object in view. The district may have to be revisited over and over again to supply the requisite details, all of which may prove useless in the end; but, with the photographic pictures secured by a camera, the plan may be plotted so far as only required, and, if additional information be needed, the photographs can be made to give all the detail wanted without going again to the field. Irrigation surveys for agricultural purposes have been effected in the North-West Provinces with complete success by the photographic method, and are likely to be still further extended. Professor Mills tried to apply the method to the determination of the contents of a ship in dock by constructing a model of the vessel in clay, the necessary dimensions for which were to be taken from measured photographs. When the amount of clay in the model, and the scale of the photograph from which the necessary measurements have been taken are both known, the capacity of the ship is at once determined. In this particular instance, it is true, the method failed, owing to the impossibility of selecting suitable stations for the photographs amid the crowded machinery of a busy shipbuilding yard. But the attempt shows the wide applicability of the method and the extent of the field open to the intelligent use of photographic appliances.

But its greatest triumphs are, of course, to be seen when the method is continuously applied over a large area. One of the most successful operators is Mr. E. Deville, the Surveyor-General of Dominion Lands, who has carried his investigations over the difficult passes of the Rocky Mountains, and surveyed the country up to the United States boundary of the Alaska territory. No less than 14,000 square miles of this inhospitable country were surveyed in the years 1893–94. The proper administration of the country, he tells us, required a tolerably accurate map, and means had to be found to execute it rapidly, and at a moderate cost. The ordinary methods of topographical surveying were too slow and expensive for the purpose; rapid surveys, based on triangulations, and sketches were tried, and proved ineffectual; then photography was resorted to, with the result just mentioned. The same authority, as was natural to one in his official position, has made a very careful comparison of the relative expense of a survey made with the plane table and one with the camera; all such comparisons are liable to be modified by the climatic conditions of the country, and the amount of detailed plotting required. In the climate of the Rocky Mountains Mr. Deville estimates that on one half of the number of days in a season no work can be done with a camera, owing to smoke, fog, rain, and snow storms. But quite as great a loss of time is experienced with the plane table, added to which the apparatus is more weighty, requiring more porterage, and therefore additional expense in removal. But, neglecting these and some other slight advantages which are on the side of photography, he finds that the plane table survey is three times (rigorously as 164 : 56) more expensive than that accomplished by the camera. This is a real practical advantage, which is immediately appreciated, and on several grounds, not taken into Mr. Deville's estimate, such as the possibility of reducing the number of highly trained assistants, it would seem that the difference of expenditure has not been over-estimated. There is no sacrifice of accuracy to secure this economy; the great improvement consists in the substitution of the methods of photography—methods which, proving highly popular, must tend to displace more and more the use of the plane table.

THE FORTHCOMING CONVENTION.

Everything promises well for the forthcoming meeting of the Photographic Convention, and, although as yet but few reports of the action that is being taken by the local Committee at Glasgow have appeared in any of the photographic journals, Glasgow has been alive to the importance of the function that is to be held in her centre next July.

Meetings have been regularly held for months past, and a most attractive programme has been prepared for the comfort and enjoyment of those ladies and gentlemen who are going to spend their holiday this year in Auld St. Mungo and its neighbourhood.

Those who attended the last Convention meeting at Glasgow in 1887 will remember with pleasure the various excursions which were then taken part in. These included a trip to the Trossachs, piloted by Mr. T. N. Armstrong; a day at the coast and Largs Regatta, piloted by Mr. George Mason; a trip to the Falls of Clyde, piloted by Mr. George Bell; and several other enjoyable outings.

As the forthcoming meeting will be held simultaneously with the Mudhook Regatta fixture at Hunter's Quay, a large special saloon steamer belonging to the North British Steam Packet Company has been chartered for the day at the coast. This compares favourably with the little tug boat that did duty so well on the occasion of Glasgow's previous Convention. Owing to the decision not to split any of the excursion parties, and the difficulty of obtaining coach and other accommodation, the Trossachs will not be visited this year, but Loch Lomond will be substituted, and, we believe, a special steamer placed at the disposal of the party.

Mr. Ballantyne, of Messrs. Lizars, has kindly agreed to attend to the housing of any of the visitors who may desire his advice in regard to comfortable hotel accommodation, and Mr. Archibald Watson has been appointed Convener of the Entertainments Committee. No better selection could have been made, for Mr. Watson is an old and experienced hand in such matters.

Quite a spirit of enthusiasm animated the meetings that have been held, and altogether Glasgow folk mean to do the thing well, as usual.

The old and well-known firm of Messrs. George Mason & Co., after carrying on their extensive business for so many years in Sauchiehall-street, announce their intention to remove in May next to large and important premises in Buchanan-street, Glasgow's most fashionable thoroughfare.

THE CRYSTAL PALACE EXHIBITION.

Arrangements for the Opening.

At the meeting of the Royal Photographic Society, on Tuesday evening last, the President announced that the following arrangements had been made for the reception of H.R.H. the Prince of Wales at the opening of the Society's International Photographic Exhibition, at the Crystal Palace, on Monday next, the 25th instant: His Royal Highness will be received at about 1.30 p.m., at the Alexandra Gate of the Palace, by the Earl of Crawford, K.T., President, and the Council of the Royal Photographic Society, the Organizing Committee, and the Chairman and Directors of the Crystal Palace Company. His Royal Highness will then be conducted through the Exhibition to the Royal Apartments in the Centre Transept, where he will take luncheon at 1.45 p.m. After luncheon, His Royal Highness will proceed to the Royal box, and Lord Crawford will ask him to declare the Exhibition open; bands will play the National Anthem and "God Bless the Prince of Wales." A short entertainment will be given in front of the Royal box. His Royal Highness will then proceed to the theatre, where he will be shown the latest results of colour photography by the Lippmann, Joly, and other processes, and there will also be a demonstration of the Analyticon arrangement for the stereoscopic projection of photographs. His Royal Highness will then go through the Exhibition, and leave the building at the Centre Transept. The guard of honour will be furnished by the 1st Vounteer Battalion of the Queen's Royal West Surrey Regiment.

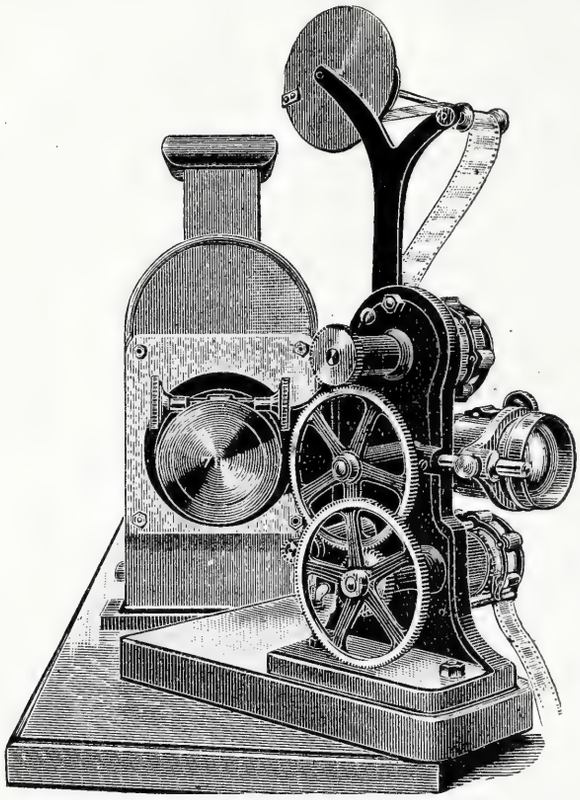
There will be a reception of members of the Society and their friends by the President at noon in the Members' Room, and luncheon will be provided at a charge of 2*s.* each. Tickets for reserved seats for the opening ceremony may be obtained by members on personal application at the office of the Secretary of the Society *at the Palace* on the opening day; the office will be found on the right-hand side of persons arriving at the Palace by way of the High-level Station.

Our Editorial Table.

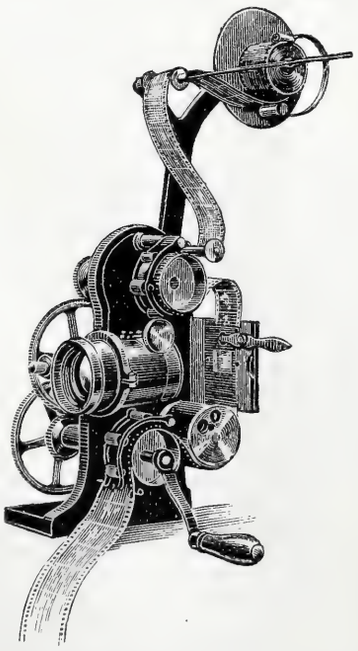
THE BIOSCOPE.

Maguire & Baucus, 5, Warwick-court, High Holborn, W.C.

THE Bioscope combines the functions of a kinematographic projector and an ordinary optical lantern. We recently had an opportunity of judging



of its performances in the former capacity, and were highly pleased at its efficiency and sweetness of movement. Its principal features may be thus summarised: The continuous feed and eccentric movement are so



designed as to admit of no jumping of the film when passed through the machine. The upper and lower sprockets are geared alike, thereby preventing all "plucking" or undue pulling of the film. No belts or chains are used; the action is positive, thereby obviating all slipping or irregular movements. All gears and sprockets are accurately cut, and, as the main frame and bearings are one steel casting, the machine is never out of adjustment. Wood does not enter into the construction of the Bioscope, consequently there is no warping or racking of parts out of centre. Flickering is entirely eliminated from the scenes projected by the Bioscope, as a shutter is dispensed with. A shutter cuts off about one-third of the light. The Bioscope having no shutter admits of fully thirty per cent. more illumination on the screen. A defect usually noticed in shutterless machines is the "ghost" or "rain" due to the movement of the film. This defect, while not as important as the aforesaid flicker, has been overcome in the Biograph by the rapidity with which the change from one photograph to the next is accomplished. The period of change to the period of rest bears a ratio of one to eight. The first illustration shows the position of the Bioscope when projecting titles and lantern slides.—The Bioscope reverser utilises an erecting prism for enabling the operator to reproduce films showing reversed action of any film subject, the machine being operated in the usual manner.—The Bioscope automatic film take-up is an attachment which is quickly adjusted by means of a thumb screw to the Bioscope frame, and will take film reels up to eleven inches diameter (capacity 1000 feet), winding the films as regularly at the ending of the strip as it does at the beginning. There is no plucking or undue tension of film as the diameter on the reel increases, which is the fault of the majority of similar appliances. The Bioscope system for kinematographic projection has been most ingeniously devised, and its mechanical excellence is such as to constitute it the ideal of perfection in use.

MESSRS. ADAMS & Co., 26, Charing Cross-road, W.C., have issued an elegantly got-up pamphlet describing and illustrating the Adams "De Luxe" cameras. These instruments, in which the changing-box principle is utilised, are of a high-class character, the aim of the manufacturers being "to produce first-class scientific instruments capable of producing the best work with the least possible trouble and the greatest certainty." We note that the illustrations are half-tones from photographs, and they are exceedingly good.

"*Creelographic*" *Film Photography for Cyclists* is the title of an illustrated pamphlet issued by Mr. David Allan, 157, Whitfield-street, Fitzroy-square. It contains several half-tone pictures from photographs made in the "Creel," a new hand camera which takes 40 cut films or less. It is stated that the method employed in the "Creel" is that the films are held gently but firmly in contact with a special suitable glass screen, plain or orthochromatic, so that during exposure the film is flat as the glass plate. The changing system is said to be simple, easy, and unerring. Great facility for reloading, daylight changing, correct registering, lightness, and portability are among the other advantages claimed for the "Creel."

RECEIVED: *Some New Studies in Cathode and Röntgen Radiations*: a Lecture delivered at the Royal Institution, on February 4, 1898, by Mr. A. A. Campbell Swinton, M.R.I. The experiments described are full of beauty and interest, and suggest that there remains a vast amount of work to be done in connexion with the scientific study of radiography.

News and Notes.

MR. E. F. BARNARD has become Managing Director of Strong & Co., Limited, Leonard-street, Finsbury, manufacturers of plush blocks and boxes, patent strut backs and view book covers for photographers.

THE AUSTIN-EDWARDS MONTHLY FILM-NEGATIVE COMPETITION.—The prize camera for the current month has been awarded to Miss H. Phillips, Woodland Park, Colwyn Bay, for her negative, *An Old Welsh Woman*.

THE WARWICK MONTHLY COMPETITION.—The following are the prize-winners in the Warwick Monthly Competition for April:—First prize, 20*l.*, Mr. C. P. Casstine, Swanley, Kent. Second prize, 10*l.*, Mr. R. W. Robinson, Linkfield-corner, Redhill. Third prize, 5*l.*, Miss Boden, The Friary, Derby.

WE understand that the Prince and Princess of Wales have each accepted a copy of Mr. R. Kearton's recently published work, *With Nature and a Camera*. The Princess, who is herself an amateur photographer, in acknowledging the receipt of the book, desired her Secretary, Sir Stanley Clarke, to thank the author for "the interesting and charmingly illustrated volume."

MR. W. SAVILLE-KENT, F.L.S., F.Z.S., is making an extensive contribution to the Natural History Subjects Section of the forthcoming International Photographic Exhibition at the Crystal Palace, a large space having been allotted him for this purpose in the Roman Court. Australasian zoological and botanical photographs constitute the main feature of Mr. Saville-Kent's exhibit, which will embrace many first prints from hitherto unpublished negatives.

PHOTOGRAPHIC CLUB.—Wednesday evening, April 27, at eight o'clock, ast Travellers' Night of the season. "Fair Life," by Mr. Lewis Medland. Visitors are admitted to the meetings of the Club on the personal introduc-ion of a member, or by invitation cards which the Hon. Secretary (Mr. ?. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on ıpplication.

HACKNEY PHOTOGRAPHIC SOCIETY.—A popular lecture, entitled "The Camera ınd the Wheel," will be delivered at the Pembury Hotel, Amhurst-road, on Tuesday, April 26, 1898, at eight p.m, by Mr. F. O. Bynoe (R. & J. Beck, Limited), Mr. Edward Puttock in the chair. The lecture will introduce the atest devices connecting the camera with the cycle, and will be illustrated with lime-light views and mechanical slides.

CAMBERWELL BRANCH NATIONAL SECULAR SOCIETY, North Camberwell Hall, 61, New Church-road, Camberwell-road, S.E.—Sunday, April 24, 1898, Mr. J. Brandon Medland will lecture on "Instantaneous Photography," and give his exhibition of animated photographs. The lecture will be illustrated by examples of the most rapid photographs ever taken, including flying bullets; and the animated photographs will include a large selection of street, railway, and domestic scenes, grand sea views, cavalry charges, realistic fire scene, and several interesting and amusing incidents, and shown by means of he oxyhydrogen lantern and Brandon Medland's new vit-autoscope. The lesseinatograph will also be exhibited.

ALLEGED THEFT OF A PHOTOGRAPHER'S CASH-BOX.—At the Lincoln Police Court, on the 14th inst, George Staniland, residing in Gas-street, was charged with stealing a cash-box containing 3*l.* and a bank cheque value 1*l.*, the property of Mr. Caleb Smith, photographer, of Norman-place, Lincoln, and he was further charged with obtaining 1*s.* 6*d.* by means of false pretences. It appeared that prisoner had been in the employ of Mr. Caleb Smith for about a month as canvasser, he being paid weekly wages and a commission of 1*s.* 6*d.* on each order he introduced. It was prisoner's habit to call at the shop every Saturday, and on the day in question he was left alone for some time, and subsequently it was found that he had disappeared, and that the cash-box had disappeared too. When the prisoner was subsequently arrested he cheque was found in his possession, but all the money he had upon him was 13*s.* 4½*d.* Upon the application of the chief constable, the prisoner was remanded.

THE South London Photographic Society's excursion at Easter to York was under the leadership of the President, most successful. Both the outward and homeward journeys were made by the Scotch express, thus devoting a minimum time to travelling. The first day was devoted to photographing the gates, the interior of the Merchant Adventurers' Hall, and street views. Next day the Minster, both interior and exterior, received attention, as well as St. William's Hospital. Easter Day was spent down stream, and some rambling was done in the neighbourhood of Nabron and Bishopsthorpe. Early on Easter Monday St. Mary's Abbey and St. Leonard's Hospital were dealt with, after which some more views of the interior of the Minster were taken. Early Tuesday morning the party were again astir, and, dividing into groups, worked in various directions. One member was noticed doing tele-photographic work each day, dealing with such subjects as roof bosses, carved caps, and gargoles. All arrangements seem to have been made so as to cause little or no trouble to those attending the outing.

WE are asked by the Stereoscopic Company, of 106 and 108, Regent-street, W., to state that they had taken a very large and important space in the forthcoming Crystal Palace Exhibition, where it was their intention to exhibit and demonstrate many of the latest forms of their cameras, &c.; but, owing to the extreme pressure of business in the first three months of this year, and the consequent increased demand upon the time and energies of their staff, they have been reluctantly compelled to withdraw at the last moment. They hope, however, to see all their friends at their Regent-street establishment, where they intend to have on view all their latest photographic requisites and apparatus. We understand that the increase in the business of the Stereoscopic Company has been so great that it has compelled them to take additional store-rooms at the back of their Regent-street premises, and again to open new dark rooms at their annexe in Glasshouse-street, where they have been able to make such complete arrangements that customers will be able to have their plates and films developed, and prints sent, within a very few days. We also understand that the Company are shortly introducing their well-known binocular camera, with the additional advantage of a full-sized under and daylight changing, and that they have also applied this latter improvement to their twin-lens form of cameras.

THE X RAYS IN PARLIAMENT.—"The announcement made at a Kensington inquest on Tuesday that no fewer than nine members of Mr. Chamberlain's family—excluding, unfortunately, the Colonial Secretary himself—had been treated by an 'electric professor' with an application of the X rays," says the *Weekly Sun*, "opens up a vista of possibilities which, by the twentieth century, may have assumed some definite practical shape. There seems to be at least a likelihood that before very long an X-ray professor may became to be regarded as much a *sine-quâ-non* of the ordinary household as the family chiropodist or the exponent of the delicate art of manicure. If in private, so in political life the professor who concerns himself with photographic reproductions of the inner body politic may be expected to rank at least with Black Rod or even the Sergeant-at-Arms himself. Among his earliest commissions would be to determine whether the repeated 'suspension' of Mr. William Redmond had really dislocated his vertebræ; whether the heart of the Colonial Secretary was broken, after all, at the thought of President Kruger's gout; and whether Mr. Balfour had sustained any fractures of his lower extremities after being smitten hip and thigh by the leader of the Opposition. The time may even come when this nineteenth-century wonder may be used to indicate how far the surgeon's skill will be necessary when the many members of the House are addressing themselves more particularly to their Scotch colleagues."

FACTORY ACT PROSECUTION.—At the Leeds City Police Court on the 15th inst., before the Stipendiary Magistrate, James Bacon, photographer, of Woodhouse-lane, Leeds, appeared in answer to three summonses, charging him with offences against the Factory and Workshops Act. It appeared that the summonses had been issued at the instance of Miss Dean, the lady Inspector of Factories for the Leeds District, and were for neglecting to exhibit an abstract of the provisions of the Act as required, for employing a young person for more than five hours continuously without allowing a minimum of half an hour for rest and refreshment, and for employing a young person after four o'clock on Saturday. With regard to the first charge, Miss Dean said that, although she called at Mr. Bacon's establishment, and warned those in charge that it was necessary to exhibit an abstract of the Act, she found, on going a month later, that the warning had been disregarded. Mr. Morgan, on behalf of the defendant, pleaded guilty to this charge, and said the offence was committed in ignorance. After evidence had been given in respect of the other charges, the lady Inspector said she did not press for heavy penalties; but, as the girls in question were working on piece work, it was of the utmost importance that the defendant should make them respect the laws of health, and see that they took sufficient time for refreshment and rest. Mr. Morgan said that, on the day in question, the light was good, and, as it had previously been very bad for some days, the girls took the opportunity of getting through as much work as possible. Eventually the stipendiary imposed the full penalty of 40*s.* and costs on the first summons, and, with regard to the other two summonses, a penalty of 10*s.* each was inflicted.

Patent News.

THE following applications for Patents were made between April 4 and April 9, 1898:—

COLOUR PHOTOGRAPHY.—No. 7971. "Improvements in or relating to Photography in Colours." J. JOLY.

TRIPOD STAY.—No. 7975. "Adjustable Tripod Stay for Photographic Cameras." J. BELL.

EMBOSSING PHOTOGRAPHS.—No. 8092. "Improvements in Embossing Photographs with Raised Borders." S. PHILLIPS.

WRAPPER.—No. 8206. "An Improved Wrapper particularly applicable for the Transmission of Photographs and the like through the Post." L. CANESI.

LANTERNS.—No. 8286. "Improvements in Automatic Magic Lanterns for Advertising and the like." Complete specification. C. PARSONAGE.

ELECTRO-PHOTO-TELEGRAPH.—No. 8298. "Electro-photo-telegraph." A. BEIN and J. BREUER.

ANIMATED PHOTOGRAPHY.—No. 8362. "Improvements in Apparatus for Producing and Exhibiting Animated Photographs." L. V. PACHT.

ALBUM.—No. 8452. "A Heart Photographic Album." E. TEDESCHI.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

April.	Name of Society.	Subject.
25.....	Bradford Photo. Society	*Portraiture.* Harold Baker.
25.....	Richmond	Show of Apparatus.
26.....	Birmingham Photo. Society ..	Exhibition of 1897-8 Prize Lantern Slides.
26.....	Hackney	Open Night.
27.....	Leytonstone	Sale and Exchange.
27.....	Photographic Club	*Fair Life.* Lewis Medland.
27.....	Southport	Enlarging Competition.
28	Ireland	Annual Meeting.
28.....	Woolwich Photo. Society	*Enlarging.* J. H. Gear.
28.....	Leigh	Business Meeting to arrange Competitions, &c.
28..... ...	London and Provincial	Open Night.
28	Oldham	Exhibition of Members' Transparencies.
29.....	Croydon Microscopical	Demonstration on Velox Paper. J. H. Baldock, F.C.S.
29.....	Wakefield	Annual General Meeting.—*Exposure Meters and Exposure Tables.* Hon. Secretary.
30..... ...	Ashton-under-Lyne.....	Ramble to Middlewood and Poynton.
30.....	Bootle	Excursion: Knutsford.
30.....	Borough Polytechnic	Excursion: Broxbourne and Rye House.
30.....	Southsea	Excursion: Isle of Wight.

ROYAL PHOTOGRAPHIC SOCIETY.

APRIL 19,—Ordinary Meeting,—The Earl of Crawford, K.T. (President), in the chair.

THE CRYSTAL PALACE EXHIBITION.

The programme of arrangements for the reception of H.R.H. the Prince of Wales at the Crystal Palace, on Monday next, on the occasion of the opening of the Society's International Exhibition, will be found in another column.

NEW MEMBERS.

Four new members were elected, and five candidates were nominated.

AFFILIATION.

The HON. SECRETARY announced that the following Societies had been admitted to affiliation:—Southport Y.M.C.A. Camera Club; Great Eastern

Railway Mechanics' Institute (Photographic and Microscopic Section); and the Bradford Camera Club.

The Latent Image.

Mr. J. Sterry read a very exhaustive paper, entitled "The Two Latent Images (Organic and Inorganic); Development before and after Fixing." He began by stating that, soon after the introduction of the collodion process, it was noticed that two distinct latent images were impressed upon a sensitive film at the same time by the action of light; and that although the subject had been dealt with by the late Mr. M. Carey Lea, Captain Abney, and Dr. R. E. Liesegang, and was referred to in Hardwich's *Chemistry of Photography*, it had received comparatively little attention. The substance of the paper does not permit of summarising in this place, and it is only possible to briefly indicate the points which were dealt with. The first part of the paper gave the comparative results of development in the ordinary manner, and by means of a physical developer after fixing the plate, the physical developer chosen being the intensifier described by Mr. J. B. B. Wellington in The British Journal Photographic Almanac for 1889, p. 575. Hydroquinone used with acid, as recommended by Dr. Liesegang, was found to be very slow in action, and failed to give sufficient density readily. Every gelatine plate so far tried —pure bromide or chloride, bromo-chloride or bromo-iodide—had, with suitable exposures, given a latent image, which after fixing in sodium thiosulphate, washing and drying, was permanent in daylight, and yet could be developed at any time by means of the physical developer. It had been suggested by Dr. Liesegang that the image remaining after fixing was due to the silver reduced by the light; but, as that latent image was capable of reversal before the reduction by light alone had reached a maximum, this could hardly be the sole cause. Seeing that chloride of silver was readily soluble in gelatino-nitrate of silver, and bromide also to some extent, it seemed probable that it was partly due to the silver haloid being dissolved in, or even chemically combined with, the gelatine; and therefore, following Professor Hardwich's explanation, Mr. Sterry called it the "organic image," in contradistinction to that impresed upon the visible haloid particles, which he described as the "inorganic image." The paper then proceeded to consider the comparative speed values of the two images; the apparent general relationship between the density obtainable with the organic image and the speed of the plate to ordinary development, such relationship giving in most cases, but not universally, a single approximate determination of the relative speed of plates, and the conditions under which the organic image could be used for the production of negatives or transparencies, the development being carried out in white light. The second part of the paper was mainly devoted to a consideration of the theory of the latent image; the conclusions given in a former communication, on *Some Causes of Apparent Variation in the Speed of Standard Plates*, were confirmed by the study of the organic latent image, and further proof was given that the first action of light upon silver bromide was probably molecular, and that any reduction of the haloid by light alone, and consequent liberation of the halogen, hindered development in two distinctly different ways. Among the points considered were the following: Reversal not dependent upon a particular exposure; the conditions under which a positive or negative may be obtained from the same series of exposures; re-reversal of the organic image; reversal counteracted by restoring the bromine, and consequent extension of the correct exposure period; and a suggested explanation of the differences in gradation found when the same exposures were given to the back and the front of plates, or when lights of different intensity were used. Mr. Sterry concluded his paper with the following deductions from his investigations:— 1. The organic image may be due to three different causes: (*a*) an organic silver compound (Hardwich); (*b*) silver haloid dissolved in, or combined with, the gelatine; (*c*) intensification of the silver reduced by the light alone (Dr. Liesegang). 2. The perfectly developable condition of the inorganic image is probably a molecular change only. 3. With different plates, as also under varied conditions of exposure, more or less molecules of silver haloid are broken up and the halogen liberated, causing a reduction in the development. 4. Reversal is mainly due to two causes: (*a*) directly, by loss of the halogen; (*b*) indirectly, by the injurious effect of the halogen upon the development of the remaining haloid salt. 5. When the conditions permit of part of the halogen being returned, either directly or from the gelatine, development is greater, and the tendency to reversal is delayed.

Mr. Chapman Jones made some remarks upon the subject of reversal and re-reversal, and expressed the opinion that Mr. Sterry's conclusions with regard to the retardation of reversal by the action of bromine were justified when one considered all the circumstances.

Mr. T. Bolas referred to experiments which he had made with regard to the development of images on collodion emulsion after fixation. He said that many years ago he bought, in Turin, a portable camera with two slides and four plates, and, having exposed the latter, he was unable to obtain a satisfactory result upon development of three of the plates, but secured an admirable negative on the fourth by developing after fixation. As applied to collodion emulsion, he thought the method was of great practical value, and if one could find a suitable physical developer the same would, doubtless, be the case with gelatine plates.

Mr. J. B. B. Wellington, referring to some difficulty which had been experienced in working with the intensifier mentioned by Mr. Sterry, pointed out that it was necessary that the excess of sulphocyanide of silver should be just redissolved, and no more, in the hyposulphite of soda, and that any want of success was mainly due to the use of too large an excess of hypo.

After further discussion, in which Colonel Waterhouse, Mr. Krohn, Mr. Marriage, and Mr. Haddon took part, Mr. Sterry briefly replied, and the proceedings concluded with the passing of a hearty vote of thanks to him.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 14,—Mr. E. H. Bayston in the chair.

Mr. J. E. Hodd, who acknowledgd the part he had played in speaking of the bad quantities of films, said he had recently come into possession of a packet of films made by Fry & Co. some eight or nine years ago. The results which he had obtained upon these, and which he brought forward, would show that, unlike many of the present day article, the films were not remarkably the worse for their long life; it was a fast film in its day, probably registering 80 H. & D., although it was not more than 10 at the present time.

Comparisons of Developers. [See *ante*, p. 230]

Mr. J. S. Teape said he had made a few further experiments in connexion with his paper read on March 31. He had continued the under-exposures to see how far one or two of the developers would develop up such images. Taking an exposure of one-eighth normal, he developed it with the hydroquinone and rodinal developer, the result showing a very practical range. The time of development was three minutes, the appearance of the image taking fifteen seconds, at the temperature of 60°. Three exposures, each of one-fourteenth normal, were made and developed respectively with (1) pyrogallol, (2) hydroquinone and rodinal, and (3) rodinal alone. The second and third of these were developed for sixteen minutes, and both yielded a very fair range, but the second (with hydroquinone and rodinal) was certainly the best in quality of image, and showed one or two numbers more than the third. The pyro-developed plate was some seven minutes behind the others. Bearing upon this subject, he recalled the announcement of Professor Burton, about five years ago, that he had developed good images from plates so much over-exposed as forty times normal. Mr. Teape at that time exposed and developed some plates, and showed them at the London and Provincial Photographic Association. He passed these round with the following particulars: Two plates (Ilford) exposed at mid-day, sun shining, even light, 1 second and 40 seconds respectively. It was a question in looking at the two as to which was which? The plates were developed with pyro. Platinotype prints of these were also shown. The principle of the method was that the plate was soaked in bromide (twenty-grain solution) first.

Polarised Light.

Mr. J. J. Briginshaw gave a demonstration of the phenomena of polarised light, including such information respecting theoretical matters as to interest the uninitiated. There was scarcely a branch of research capable of yielding such interest to the student as the study of light, and more especially that relating to polar phenomena. To many the question would arise, What is polarised light? The limitations of time and title precluded more than a mere dip into the nature of this kind of light, but all light was said to be polarised when it exhibited those peculiarities which ordinary light was not found in general to possess. Polarisation might be effected in four ways—by reflection, by refraction, double refraction, or the scattering of small particles. He would treat of tho two former only. It was described how it was decided that all reflected light, except from metallic substances, was polarised. A ray of ordinary light incident to a transparent plate was partially reflected and refracted. By the use of a number of plates superimposed a ray of light resulted, which was in an almost perfect state of polarisation. The reflecting angle differs with the substance, and is dependent upon the refractive index of the substance. Brewster gave it as a law that a polarised angle was that angle of incidence at which a reflected ray was at right angles with a refracted ray. It was generally considered that polarised light, belonging to abstruse physics, required much expensive apparatus. It would be seen, however, how simply it was produced. A bundle of glass plates is taken, and a ray of light allowed to fall upon it, with the creation at once of polarised light. The identity of the polarity of this ray is found by using one of the processes which causes polarisation, namely, another bundle of glass plates, which acts as an analyser to the polarised ray, and this polariser and analyser constitute the polariscope. In place of the analyser mentioned, he used a Nicol prism. There are many crystals which divide the light passing through them, the most notable being the crystal of Iceland spar. The ray is split in two directions, one the ordinary and one the extraordinary ray. One of these, it is found, possesses the property of polarisation in a very marked degree, but, owing to the close proximity of the two rays, the utility of it was limited. Nicol cut the crystal obliquely from corner to corner, polished the two cut surfaces, and united them again in their original position. By this means the whole of the front piece of that crystal was made available for use, and Nicol prism was undoubtedly one of the most perfect pieces of polariscope apparatus that we possessed. At this stage the lecturer showed the effect of projecting a polarised ray through a number of substances. Selenite, perfectly colourless in itself, assumed upon the screen an infinity of beautiful tints according to its varying thickness, and, by rotating the Nicol prism, these gave place to their complementary colours. Selenite and mica, in geometrical designs, showed very pretty effects, and, in turn, were shown several flowers fashioned out of these substances, and articles, such as grapes, the chameleon, with an approximation to its habit of changing its hue, and many other similar effects. Polarised light enabled one to trace the fine structures of some of the minerals by projecting it through their sections and in this way the natures of granite, quartz, and other substances were shown with their characteristics. The simple materials at hand in the shape of goose-quills, fish scales, and shrimp skins form admirable objects for examination. An interesting feature was the examination of a piece of colourless plate glass under stress exerted by two thumb screws. The pressure produces a kind of strain in the substance of the glass, and the consequent colours under the influence of polarised light are very remarkable. The colour disappears on the removal of the strain, and can be produced at will. A piece of glass was shown in which a permanent strain had been set up by suddenly chilling the highly heated glass.

Succinic acid and benzoic acid crystals were shown, and a slide of the latter to demonstrate the process of crystallisation. Polarised light is used commercially to determine the sacoharine property of sugar, and for testing the glass of which lenses are made.

The demonstration was followed with much interest and attention, and a vote of thanks was passed to Mr. Briginshaw.

PHOTOGRAPHIC CLUB.

PRIL 13,—Mr. H. Müller in the chair.

Mr. F. W. DOWELL showed some prints upon Nikko paper, and drew attention to the striped appearance of the pictures, due to parallel lines, by which ie same were marred.

Mr. A. MACKIE said it was one of the disadvantages of this glazed paper, nd was very common. The marks could, however, be removed, while the rint was still wet, by rubbing the parts with cotton-wool or soft sponge. It ad nothing to do with length of exposure, and, as regards the fact that they ad not shown so much in properly exposed prints, there was this to be said, hat development would not have been forced, as in the case of the under-xposed pictures.

Mr. MASON had met with the same effect on bromide paper, caused by one rint rubbing over another, but the marks readily yielded to friction with otton-wool.

Mr. Stretton handed round a portrait by the Daguerreotype process, and Ir. Dowell contributed a number of slides, notably of the Jubilee procession, ank Holiday scenes, zoological subjects, and a very perfect and complete eries of the University Boat-race and the crews at practice.

MANCHESTER PHOTOGRAPHIC SOCIETY.

PRIL 14,—Mr. J. Wood occupied the chair.

Mr. S. L. Coulthurst was unable to give his "Notes on Enlarged Negatives," wing to his recent labours in connexion with the North-Western Photographic xhibition, now being held in Manchester.

A selection of seascape carbon enlargements, by Mr. F. H. Worsley-enison, were on view, many of which were admired by the audience. The olour was exceedingly real, and added greatly to the beauty of the pictures.

After deciding upon places of interest at which the summer excursions could e held, the meeting came to a close, most of the members visiting the lantern cture at the North-Western Exhibition, which was being given by Mr. H. Woolley, a fellow-member.

Croydon Microscopical and Natural History Club (Photographic ection).—April 15.—An address was given by CAPTAIN D. WILSON-BARKER, f H.M. Training Ship, *Worcester*, the subject being

PHOTOGRAPHY IN RELATION TO NATURAL HISTORY.

aptain Barker, treating the subject in its widest sense, pointed out how seful photography could be in the various branches of natural history, llustrating his subject by no less than seventy-six slides. Some of these howed clouds, waterspouts, and lightning flashes, taken by him in various arts of the world. Some very characteristic clouds, it was explained, were ertain forerunners of storms or other atmospheric disturbances. Geological ections were also shown, by means of which the stratification of the earth's rust, the comparison of one district with another, and the changes which the rust is constantly undergoing, were well illustrated. Some beautiful and nteresting slides, taken in Brazil, showing the nests and habits of the trap-oor spider; others showing coral reefs in various seas; and others again llustrating the flight of birds, were greatly admired and appreciated by the udience. Nothing could be truer, as Captain Barker pointed out, that at ea photography is a great aid, by means of which glimpses of scenes and laces, habits of the fauna, peculiarities of the flora, geological formations, eographical distributions, astronomical phenomena, &c., can be secured which an be obtained in no other way.

Polytechnic Photographic Society.—March 25.—Mr. F. O. Bynoe gave a cture upon the

CAMERA AND THE WHEEL.

o make the lecture instructive and interesting to all, he commenced by ex-aining what photography was and how to do it, so that those of the audience resent who knew nothing about the subject should be able to follow him in s after-remarks. The lecturer then proceeded, by the aid of lantern slides, show not only what a lens is, but also the difference between long and ort and fixed-focus lenses Mr. Bynoe's explanation of magnifiers and their e was very explicit indeed. After describing various forms of cameras, the cturer proceeded to show the great utility of films and the various ways of ing them. As an illustration, he operated with a Frena, the system of hich he briefly showed the audience. His arrangement for making a tripod a cycle was very ingenious, and called forth great applause. Then came e or two tips as to how to handle a hand camera, saying that the best way expose was to stand at ease, and, when the breath was just out, to release e shutter. To show how to photograph in a room or at night, Mr. Bynoe ed up a flash lamp and exposed upon the audience. During the course of e lecture lantern slides were projected upon the screen, but, under the title *In Side-paths with Cycle and Camera*, these were eclipsed by a series of ally beautiful slides and lovely pictures. In spite of the stormy weather, ite 1000 persons were present.

Leeds Camera Club.—April 19.—Mr. W. T. Wilkinson (Wakefield Photo-aphic Society) gave one of his popular and instructive lectures, entitled

LANTERN-SLIDE MAKING.

e treated his subject in a lucid and chatty manner, commencing with the nd of negatives best suited for lantern slides. For spotting he recom-nded a small sable brush and Indian ink. Retouching was next explained, d he showed how a simple and inexpensive retouching desk could be made. contact work, the best results could only be got by using a good artificial ht and short exposure. The artificial light he liked best was the incan-scent gaslight. Backing plates was not necessary in contact work, but in duction it was absolutely necessary. It was impossible to give any guid-ce for exposure, as this could only be got by experience. Mr. Wilkinson o advised one developer, and sticking to it. After many experiments, the e that he recommends as being easy of manipulation, clean, and giving good black tones, was amidol, formula as follows: Stock solution, sodium sulphite, 4 ounces; water, 20 ounces; amidol, 20 grains; potassium bromide, 5 grains; 2 drops of saturated solution of citric acid: add 4 ounces of stock solution. For intensification he uses mercuric chloride and sodium sulphite, and find it most simple and ample; but, before using, he said the plate must be throughly fixed.

Portsmouth and Southsea Amateur Photographic Society.—April 6, the President (Mr. George Whitfield) in the chair.—Mr. F. J. MORTIMER read a paper and gave a demonstration on the

CARBON PROCESS.

He pointed out the great advantages of the process, and expressed great surprise that so little was known about the process amongst the members of the Society. The principal advantages he claimed were the undoubted permanence of the process, the admirable gradations of tones obtainable, the fact that practically any colour could be obtained, that it was a purely mechanical process as opposed to the more subtle chemical processes of nearly all the other printing methods, and lastly, but not least, the great ease of working. After briefly describing the manufacture of the paper, the sensitive and insensitive, and the respective advantages of each, and particularly recommending the Barnet tissue for its excellent keeping qualities, he proceeded to demonstrate the process, and pointing out failures and their causes, first carefully explaining the change undergone by the surface of the tissue becoming insoluble during exposure. A beginner, he thought, would find the chief difficulty in exposure. Two forms of actinograph were produced (Wynne's and Johnson's pattern), and their use explained, but, for ordinary work on a small scale, a slip of P.O.P., exposed beneath a similarly dense negative, would act as a rough-and-ready, but very reliable, guide after a little practice. The purpose of the safe-edge was explained, to prevent the picture washing up in development when first transferred, and it was recommended to bind pieces of clean glass, spoilt negatives, in fact, with lantern-slide binding, and use in front of the negative instead of applying the safe-edge to the negative itself, the same safe-edge then serving for several negatives. Several very successful prints were then produced by the single-transfer process, the tissue having been printed that afternoon. The development was followed with the closest attention and interest by all present, and many questions asked. Mr. Mortimer showed how, by increasing or decreasing the heat of the water used, over and under-exposure could be remedied, and advised the use of a very soft camel's-hair mop or flat brush to aid the removal of the soluble gelatine. The pictures were produced on different-surfaced papers, and the ease of the single-transfer process very clearly demonstrated. Mr. Mortimer then proceeded to show, by the aid of prints that he had previously prepared, the double-transfer process. He also showed the adaptability of carbon for transparency work, and explained the process of making enlargements in carbon, and, from the questions asked, the attention paid during the entire lecture, the deepest interest was apparent amongst the large gathering of members present. Mr. Mortimer exhibited, during the course of the demonstration, a number of exquisite enlargements in carbon, kindly lent him for the occasion by Messrs. Elliott & Son, of Barnet, including three medalled pictures from last year's Pall Mall Exhibition, and he also expressed his obligations to that firm for their kindness and courtesy in assisting him.

FORTHCOMING EXHIBITIONS.

1898.

April 22–30 ..... National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

„ 25–May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

COLOUR FILTERS.

To the EDITORS.

GENTLEMEN,—Referring to the paragraph in your last number, under the heading "Colour filters for three-colour work," in which Mr. Vidal describes the making of same, I should like to draw attention to a fact which seems to be contrary to one of Mr. Vidal's statements. Mr. Vidal recommends a thin glass commercial dry plate, which, after fixing and subsequent bathing in suitable colour solution, becomes a light filter. I have for several years made experiments in this direction, and have found that, if *a perfectly colourless plate glass* is not employed in the making of the filters, the image on the focussing glass will be *distorted, blurred*. Prof. Vogel proposes plain parallel glass plates of Zeiss, in Jena. I have endeavoured to make my filters cheaper, but have paid dearly for the experiment. I made about four dozen filters, and, when I tried to focus with them, found a more or less *unsharp* image, which I never noticed after using perfectly *colourless* plate glass. This unpleasant experience led me to the conclusion that ordinary dry-plate glass should not be used for colour filters.

As Mr. Vidal, whom we know as an authority in three-colour work

made the statement I refer to, I have grave fear that my conclusion will be a wrong one; but can any of your readers explain to me the strange fact, which has induced me to make this communication?—I am, &c.,

9, *Upper Brighton-terrace, Surbiton.* HENRY O. KLEIN.

HALATION: A MISUNDERSTANDING.

To the EDITORS.

GENTLEMEN,—Owing to absence from home, I did not see your issue for April 8 till last Saturday evening, therefore my delay in writing to say that I am very pleased to hear that Mr. Marlow did not mean what I (and probably others) thought he did, and gladly accept his word. As I do not think that this historical matter will interest many of your readers, I will not enter into the details of his letter of April 2. However, I may say that I do not think that it was the superiority of the optical over the chemical antidote for blurring (as we used then to call it) that caused my brother to give up the latter, but the fact of alkaline development superseding the acid method. I am sorry Mr. Marlow did not approve of my letter on the subject, but, as it brought forward his disclaimer of apparent unfairness, I gained my sole object in writing.—I am, &c., J. A. C. BRANFILL.

25, *Rosendale-road, West Dulwich, April* 18, 1898.

THE PHOTOGRAPHIC CLUB—AN INVITATION.

To the EDITORS.

GENTLEMEN,—Will you kindly allow me through your columns to remind professional or amateur photographers who may be in London for the Royal Photographic Society's Exhibition at the Crystal Palace that the meetings of the Photographic Club are held at Anderton's Hotel, Fleet-street, E.C., every Wednesday evening at eight, and we shall be very pleased to welcome any of our provincial friends who may favour us with a visit.—I am, yours, &c.,

F. A. BRIDGE, *Hon. Secretary and Treasurer.*

East Lodge, Dalston-lane, London, N.E., April 19, 1898.

"AMMONIA POISONING."

To the EDITORS.

GENTLEMEN,—May I, through the medium of THE BRITISH JOURNAL OF PHOTOGRAPHY, tender my most sincere thanks to "Ajax" for his kindness and courtesy in replying to my query. I am glad to say that his advice has been followed with beneficial results.—I am, yours, &c.,

April 19, 1898. ANXIOUS.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Captain Harcourt Rose, 4, Carlos-place, Grosvenor-square, W.—*Three photographs of Her Majesty the Queen, taken in the gardens of the Villa Liserb, Cimiez, Nice.*

H. S. NOAD.—Process work most decidedly.

PORTRAIT OF CARMEN SYLVA.—PYRO says: "I am in need of an ordinary cabinet photograph of Carmen Sylva, Queen of Roumania, in national costume. Can you tell me where I can obtain the same?"—In reply: The London Stereoscopic Company, 54, Cheapside, E.C., can, doubtless, supply the portrait.

GUM-BICHROMATE PROCESS.—W. H. Seager says: "Can you tell me where the book by Mr. Maskell on *The Gum-bichromate Process*, as quoted in your BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1898, page 687, can be obtained, and what is the price?—In reply: Of Messrs. Hazell, Watson, & Viney, Creed-lane, E.C., price 1*s.*

COPYRIGHT.—A. E. T. says: "Recently I had a glass photo to copy of a man who committed a murder and was hung in 1860; being a prisoner, can I be restrained from selling the same? I may add it was taken after being arrested."—In reply: If the original photograph was registered, you would be infringing the copyright, and would be liable to an action for damages.

LAZY SHUTTER.—CYCLIST The shutter you have is one of the best and most reliable of any on the market. It is probable that some particles of road grit have got into the working parts and thus retarded their action. If you are not sufficient mechanic to take the instrument to pieces and clean it, you should send it to the makers. The oil you have put upon it has probably made matters still worse—or will in time.

F. W.—We have carefully examined the mounted photographs left with us. It is impossible for us to assign a cause for the fading—one of the worst cases we have seen—but we incline to think that the mounts *per se* are not to blame, and that defective manipulation in the production of the photographs may have something to do with the matter. At the same time, this is merely an off-hand opinion which only a series of costly and exhaustive analyses could refute or confirm.

LENS.—F. C. asks: "Will you be kind enough to answer the following questions:—1. Can a 12 × 10 Ross-Goerz be used as more than one lens? 2. If so, which element would be the best to use—front or back? 3. Would it be better to have the stop in front or behind single element?"—1. Yes. 2. The lens being symmetrical it does not matter which element is used as a single lens. The convex side should be next the ground-glass. 3. The stop should be on the concave side and a small one employed.

LENS FOR HAND CAMERA.—C. BONSER. The lens you have is quite unsuited for hand-camera work. From your measurements it appears that the largest aperture is but about *f*·25. You must not expect to get a good lens for four shillings, although you "bought it of a respectable chemist." Possibly the chemist who sold it, through not knowing anything of the subject, might have thought he was selling you a good lens. Moral: If you want photographic goods, go to one who understands photography and its requirements.

BICHROMATE POISONING.—T. Jessopp says, "I am just going to try my hand at the 'bi-gum' process, but I am told that the bichromate of potash has a very poisonous effect on the hands, producing bad sores, &c. Can you tell me how to avoid it?"—Unless there are scratches or abrasions of the skin, it is very unlikely that any ill effects will be experienced when working on an amateur scale. The only precautions are to avoid the salt getting into cuts and scratches, and to wash the hands well in warm water and soap after the work is finished.

DAMAGED DAGUERREOTYPE.—AREMAC asks: "Can you kindly let me know through your Answers to Correspondents if there is any way of removing slight scratches from the surface of a Daguerreotype? I have had one sent me for copying, which has been slightly scarred on the silver surface, and I wish, if possible, to remove the marks before returning it. The face and hands, which are tinted, have escaped injury, but the coat and other dark parts show slight scars. A reply as soon as possible would greatly oblige."—The picture is permanently damaged. Any treatment that would remove the scratches would remove the image as well. Daguerreotypes require the most tender treatment in handling.

CAPTAIN.—The causes of your failures have sorely puzzled us and others to theoretically account for. Possibly the following hints from a very successful worker may be of service to you. He says: "Your correspondent has smashed my whole theory as to his failures. He ought certainly to be able to produce the best work possible with the outfit in his possession. With regard to the camera, good work can be done by holding it in the hand, but I consider it is much better to have it resting either on the stand or other solid support. Some use a cradle suspended from the boat mast. I should say that he could have nothing better than the focal-plane shutter. At the speed he has been working at he ought to overcome all movements and vibrations. I would recommend him to be very careful in focussing, and stop down to *f*-16 or *f*-22. Should he still fail, he should try another lens."

CARBON PICTURE.—W. J. F. asks: "Would you please advise me under the following circumstances? A carbon print, cabinet size, had got very dry and curled up, and, in straightening it out, cracked down the centre into two halves, and I undertook to squeegee it on glass I ke an opaline, which I did with solution of gelatine, and, while wet, was all that could be desired; but, as it dried, it stripped. How had I best do it? If I put a narrow border of gum round the edges, would that keep them down? But, then, how about the middle joint, and, when drying, will not the print shrink in all directions, and cause the crack to open out and spoil the result?"—The cause of the print leaving the glass when it became dry was evidently that the glass was not thoroughly clean. Gelatine would be the best mountant. It is doubtful if the crack can be entirely hidden: it certainly will not be by securing the edges of the print only to the glass.

LENS: COPYRIGHT.—STUDIO writes as follows: "Will you oblige by giving me information on the following subjects? 1. I have in use a cabinet portrait lens of a fairly good make in my studio, which I use for everything, including whole-plate groups, which, of course, I cannot get quite sharp. Now, if I had a whole-plate lens of same make, would it be as useful for cabinet heads and *carte-de-visite* heads and three-quarter figures as the cabinet lens? and, also, would it give me a whole-plate group of ten or twelve quite sharp? If not, what form of lens would be best for all-round work? 2. Some time since a gentleman lent a friend of mine some large etchings, the originals of which are copyright pictures. He has photographed them 12 × 10 size for himself, and hangs them in his private room. He, of course, will not attempt to sell, exhibit, or give away copies from the negatives. If he does not do this, but simply uses the prints as pictures in his private room, is he infringing the copyright laws?"—1. A whole-plate lens would probably give a better whole-plate picture, and better cabinet portraits than that you are now using, if its focus be longer and it is of the same quality. The terms "cabinet" and "portrait" lens simply mean nothing without the equivalent focus of the instrument being named. The covering power of a lens depends upon its focal length and its quality, and the stop used with it. 2. Certainly he does. He has no right to use another man's property—his copyright—for any purpose whatever. He certainly has infringed the law, and is liable for the consequences.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1982. Vol. XLV.—APRIL 29, 1898.

Contents.

	PAGE
Ex Cathedrâ	257
Local Treatment in Carbon Printing	259
Leaderettes:— Photography in War—Collotype with Bromide Plates—Colloidal Silver—Testing for Bromine—M. Villard's New Focus Tube—Boring Holes in Glass—The late Eclipse—The National Gallery—South Kensington Museum	259
The Diffraction and Pinhole Lens Theories in Half-tone Work.—II. By W. B. Tolton	261
The Passage of a few Salts used in Photography through Gelatine Septa. By A. Haddon	262
The International Photographic Exhibition	265
I. The Historical Section	266
II. The Pictorial Section	268
III. & IV. Apparatus and Material and Photo-mechanical	268
V. Portrait and General Technical Photography	279
VI. The Scientific and Industrial Applications	279
VII. Colour Photography	280
Photogravure. By A. E. Smith, F.R.P.S.	281
At the Camera Club	283
Photographic Exhibition at the Portman Rooms	284
Lecture Arrangements at the Crystal Palace Exhibition	285
Our Editorial Table:— The "Apek" Hand Camera—Catalogue Received—*The Story of Photography*	285
News and Notes	285
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—North Middlesex Photographic Society—Richmond Camera Club—Moseley and District Photographic Society—Rotherham Photographic Society	285
Forthcoming Exhibitions	287
Correspondence:— Influence of the Developed Image on an Unexposed Film—A Stand Wanted—London and Provincial Photographic Association—Lecture at the Bolt-court School	287
Answers to Correspondents	287

EX CATHEDRA.

We trust we may be pardoned for indulging in a feeling of personal gratification and pleasure at the magnificent success which has attended the organization and opening of the International Photographic Exhibition now being held at the Crystal Palace. The idea of that Exhibition was first definitely put forward in the pages of The British Journal of Photography. In the autumn of 1896 we devoted several articles to the subject, and pointed to the Royal Photographic Society as the one body which was obviously marked out by its position as the authoritative organization that should take the matter in hand. We argued that the time was ripe for such an exhibition, and we dwelt upon the importance of every phase of photography, past and present, being represented in the display—in short, that the whole sixty years' existence of photography should be adequately illustrated and set out for the enlightenment and the information of the world to-day.

* * *

For many months we were alone in our advocacy of the Exhibition, and, although the subject was officially brought before the Royal Photographic Society, there appeared at one time great danger of the suggestion being allowed to drop out of notice. But the matter was persisted in and the Council at length took it into serious consideration. A provisional committee for the discussion of the idea, upon which we had the honour of serving, was formed, and the result of its deliberations was a recommendation to the Council to hold the Exhibition. Since the Council's decision to make the experiment we have never wavered in our support of the course of action, and were always confident that it would lead to a successful conclusion. Cold water in liberal quantities was thrown upon the scheme, and our own frequent favourable references to its wisdom and desirability brought us the agreeable compliment of a certain amount of ridicule in return for our enthusiasm. A contemplation of the wonderful photographic Exhibition now to be seen in the naves and courts of the Crystal Palace amply rewards us for what, at one time, was by no means a popular advocacy in the photographic world.

* * *

Having, we believe, quite legitimately made the claim that this Journal is to be regarded as the source in which the idea of the great Photographic Exhibition at the Crystal Palace originated, let us proceed to pass a warm and hearty word of congratulation to those gentlemen upon whom the heavy work of organization has fallen. A committee of twenty was constituted by the Council as the executive body. Three or four members of the committee singled themselves out in their efforts to ensure success, and atoned for the unavoidable remissness of many of their colleagues. Mr. Wilmer, the ex-Hon. Secretary of the Society; Colonel Waterhouse, his successor; and Mr. George Scamell, the Hon. Treasurer, have not spared themselves in their efforts to promote the cause of the Exhibition. During the past few weeks at the Palace the two last-named gentlemen have toiled day and night to get matters well forward in time for the opening—with what results were seen by gratified crowds last Monday. The noble President of the Society, Lord Crawford, although he, the other day, modestly disclaimed to us any share of the credit for the success of the Exhibition, has, nevertheless, keenly interested himself in the details of the scheme, and in many ways has done a great deal of invaluable and unostentatious work on its behalf. It is no secret that to his Lordship's personal effort the presence of His

Royal Highness the Prince of Wales at the opening ceremony was due, and we are not exaggerating in the least in saying that the thanks not only of the Society, of which he is the President, but of the whole photographic world should be tendered to him for having been instrumental in securing photography the much-coveted compliment of Royal recognition and favour publicly made and bestowed.

* * *

But it is upon the shoulders of Mr. R. Child Bayley, the Assistant Secretary of the Society, that the heaviest load of work has been placed during many months past. Some little idea of the stiff task Mr. Child Bayley has had to face may be obtained from an inspection of the Exhibition catalogue. This is a superb production of over 240 pp., prepared with scrupulous care and accuracy, that will one day be highly valued, not only for its many instructive illustrations but for its wealth of historical and technical details. It, in fact, synopsises sixty years' photography. This catalogue, we say, gives some idea of what Mr. Child Bayley has had to do in connexion with the Exhibition, but it is only those who, like ourselves, have been personally conversant with the progress and growth of the labour of organization, who really know the tremendous mass of detail work he has had to grapple with and get through. The fine and strenuous efforts Mr. Child Bayley has put forth on behalf of the Exhibition have resulted in what we know he himself most desired in return for them, viz., a thoroughly good Exhibition. He has been most deservedly and widely applauded on the happy termination of a long and tiring task. For ourselves, we cordially congratulate our old friend in the moment of his success.

* * *

The foreign contributions to the Exhibition are not strikingly large, but they are, nevertheless, numerous and valuable enough to impart to it a marked character of internationalism. We are disappointed that machinery in motion and photographic manufactures in actual operation, such as collotype work, lens-grinding, camera-making, plate or paper-coating, and many other branches of production, go unrepresented; but we presume their omission was unavoidable. For years past professional photographers, whose work does not soar above the level of the superior "show-case" or "commercial" kind, have been complaining that they have been denied opportunities of exhibiting their work at Pall Mall each autumn. Their chance has come at the Crystal Palace, but it has not been accepted to anything like the extent that we anticipated. Professional men of the first rank, who are showing, are surprisingly few, and there is not among them one of the many who, in times gone by, have complained to us that the raising of the standard at the Pall Mall Exhibition has robbed them of a chance they dearly coveted—a London exhibit. We are surprised at this apathy.

* * *

The trade and the manufacturers have given a loyal and liberal support to the Exhibition, and this section is practically complete and entirely representative. Some few names of the first grade are absent, but we hope and believe that the next time the Royal Photographic Society determines upon holding an exhibition of this character the support given will be unanimous. Here let us say that, while in all probability another such complete and comprehensive exhibition as that at the Palace just now will not be held for some years, the subject of exhibitions generally is one that is constantly before the Council, and we have authority for mentioning the likelihood of the Society holding next year a Trade and Technical Exhibition, to which we are persuaded, after the remarkable results achieved this week at Sydenham, the photographic world will give a whole and undivided support.

* * *

The thousands of exhibits at the Crystal Palace render a complete reference to them in these pages quite out of the question; to do the Exhibition thorough justice we should require as much room as our annual Almanac affords. For this reason we have been compelled to pass over many important features of the Exhibition, to some of which, however, we may possibly allude in future numbers. The Exhibition is open until May 14, and we urge all who can to pay a visit, devoting as much time to it as possible. The historical and scientific collections in the courts are absolutely unique in their interest and value, and should not be missed by the earnest student of technical photography.

* * *

Mr. Frederick Hollyer has recently enlarged his studios at Pembroke-square and is holding an exhibition of many of Sir Edward Burne-Jones's original studies. Nearly two hundred of Mr. Hollyer's reproductions of the same artist's pencil sketches and studies are also shown. They are chiefly printed in platinotype, though, where the reproduction of colour has been sought, the carbon process has been employed. In a Foreword to the catalogue, Mr. Horace Townsend sympathetically refers to the translations rather than reproductions of finished pictures which Mr. Hollyer has effected by the aid of the camera. "It is a striking instance," he adds, "of what I may fitly call his artistic tact that in the present case he has given us literal transcripts of these pencil-and-chalk studies. Of the more technical aspects of the photographer's art I have no claim to be ranked as an expert, but I believe I am well within my right in saying that the difficulties of photographically reproducing the delicately varying tones of the pencil line have never before been more absolutely overcome than in the present instance."

* * *

It is the remarkably faithful and realistic way in which Mr. Hollyer has reproduced these delicate pencil sketches by photography that constitutes the chief charm of the Exhibition to the photographer. The display primarily appeals to the artist, but others besides could not fail to be interested by one of its strongest features, viz. the conjunction of numerous small detail studies by Burne-Jones with a reproduction of the finished picture. Thus Nos. 54 to 68 are studies from the well-known picture *The Golden Stairs* — details of figures, dresses, limbs, &c., — and show the infinitely painstaking methods of the artist in the conception and elaboration of his design. Mr. Hollyer's exhibition illustrates what we may term the higher photography, and deserves to be visited by photographers as well as artists.

* * *

We have received particulars of the Photographic Guild, a society intended for the benefit of isolated photographers, amateur and professional. The President is Mr. Warnerke, and some very well-known names are seen on the lists of

officers and council. Mr. H. Snowden Ward, of 6, Farringdon-avenue, E.C., is the Hon. Secretary. The objects of the Guild are many and far-reaching. Uniform tariffs at hotels; reduced railway rates; a circulating library; an international survey and record are only a few of the aims which the Guild has in view. The isolated worker in photography is distinctly a person to be taken in hand by some society that specially lays itself out to provide for his intellectual needs, and the Photographic Guild's plan of operations is so drawn up as to offer many and varied opportunities for individual photographers, unable to join existing societies, to take an interest in some congenial branch of photographic activity. We therefore wish the Guild every success. Particulars can be obtained of the Secretary at the address given.

LOCAL TREATMENT IN CARBON PRINTING.

As was seen by the report of the meeting of the Photographic Club in a recent issue, there was a very interesting and instructive chat by Mr. E. W. Foxlee, and a demonstration by Messrs. Burton and Platford, of the Autotype Works, on the latitude in development and of local treatment in carbon printing. Much has been said of late about the scope for local treatment in the Pouncy or gum-bichromate process, and the object of the demonstration was to show that, with the carbon process, there is still greater scope for local treatment without the same risk of losing the delicate details of the picture, even with rough treatment, than there is with the Pouncy process; also, that this can be done to almost any extent without having to spend perhaps hours over the work.

Allusion was made to what has been termed, in the gum-bichromate process, the "charm of uncertainty," though Mr. Foxlee characterised this as "a libel on Pouncy's process," which, he said, as we pointed out a few weeks back, was as certain as any other photographic process when understood. The carbon process, he said, does not possess this so-called "charm," as it is a certain process even in the hands of a novice. The worker has only to decide what effects he wishes to obtain, and he can, with little experience, get them; indeed, in the manipulations by local treatment, it is possible to obtain from inferior negatives, by subduing contrasts in hard ones or increasing them in flat ones, really good prints.

What could be done in this direction was well exemplified at the Club the other evening in a somewhat novel manner, six pieces of tissue had been exposed during the day, under the same negative, each having received an identical exposure. These were numbered by the Chairman and handed to the demonstrators. It should be mentioned that the subject chosen was Colonel Gale's excellent picture, *Sleepy Hollow*, and Mr. Foxlee said that any modification of the normal development would not be an improvement; but that was not the point. When the pictures were mounted ready for development, the Chairman was asked to write down what modification he would like in the different prints. They were as follows: "No. 1, normal; 2, clear the water in the foreground; 3, deepen the foreground; 4, clear the sky; 5, a general blackness; 6, a light-toned print." All these modifications were successfully carried out. We had previously asked that the results should be sent to us; but, as it was impossible to dry the prints at the Club, the Autotype Company have been good enough to send us a duplicate set of the prints, together with the Chairman's memorandum, and it is difficult to conceive that they are all from the same negative. The prints may be seen at our office by those interested.

During the lecture some practical hints were given on working the carbon process. Where modifications from the normal development are desired, a supply of tolerably hot water (180° Fahr., or hotter) will be required. This can, of course, be obtained from a kettle, and poured direct upon the parts desired to be lightened. At the Autotype Works, it was mentioned, the developing trays are each supplied with hot and cold-water taps, the foreman having attached to them a piece of indiarubber tubing with which, by pinching the end of it, the operator can direct a jet of the hot water on any portion of the picture he wishes to brighten up. It was pointed out by the lecturer that, in every house with a bath-room fitted with hot and cold water, the amateur has the same conditions of working as at large carbon-printing works, only one or two zinc dishes, and a piece of indiarubber tube for the hot-water tap being required.

Reference was made to the use of a camel's-hair brush for removing, mechanically, some of the unaltered gelatine from the parts to be lightened up, but at the demonstration such a delicate appliance was not employed—a large piece of sponge and the fingers and hand were freely used. This proved that the carbon image is not of the same delicate nature as that in the gum-bichromate process, as in that even a camel's-hair brush must be handled with extreme care, otherwise the delicate tones of the picture will be lost, as they are in many of the prints that have been exhibited at the Salon and other shows.

There is one hint we may give, which we do not see in the report, namely, that it is desirable to attack those portions that require to be brightened up at an early stage of the development, and for this reason, by removing the unaltered gelatine from those portions first, the parts it is desired to subdue or keep dark remain to an extent protected from the action of the warm water, while it is acting freely where the pigmented gelatine has been particularly got rid of; also there is less risk of injury to the finer details by rough treatment at an early stage when the gelatine is thick than at a later when it is thinner.

Not only is there an immense scope for local treatment with water alone in the carbon process, but there is another power at command that is not so generally known, namely, a chemical treatment. The addition of an alkali, such as ammonia, caustic soda or potash, or carbonate of soda, to the water, increases its solvent action on the tissue to a very great extent, and it may be utilised; but, as was pointed out at the Club, it renders the pigmented gelatine far more tender than does water by itself, consequently the picture must be dealt with more carefully. Still, however, as we have just said, it is a power at command, to be used with discretion, that may be utilised where extreme modifications from the normal are necessary. The alkali can, of course, be applied locally with a brush, and thus those parts will be rendered more soluble in the warm water as the development proceeds.

Photography in War.—War has at last been declared between Spain and America, and there is little doubt that photography will be well to the fore, gruesome as the pictures will be. It will also probably be largely utilised by each side for reconnoitring purposes, with the aid of tele-photo lenses. In the Military Section of the Photographic Exhibition at the Crystal Palace are to be seen a series of pictures, shown by the Italian War Office,

taken with the tele-photo lens at a distance, in some instances, of seven miles or more. One, a panorama of Rome, is something like twenty-three feet long. Such pictures as these would be of great service as showing the state of the coast defences of the enemy, as they can be taken at such a distance as to be well without the range of guns, and yet show the objects on a large and useful scale—a thing, till lately, an impossibility. Photography, from a captive balloon, will also, no doubt, be brought into requisition by both belligerents.

In no previous wars have photographs of the actual battles been forthcoming to the extent they doubtless will be in the present case. At no time has there been the facilities of obtaining them that there are now. In preceding wars the wet-collodion process only was available, and the comparatively long exposure required quite precluded anything like instantaneous results, to say nothing of the paraphernalia that had to be taken into the field. Now, with gelatine plates and hand cameras, the thing is totally different. The cinematograph will, there is very little doubt, be brought into use by some of our enterprising transatlantic cousins. In the Crimean War the late Mr. Roger Fenton took a large number of views by the wet-collodion process, and, if we remember rightly, by the wax-paper process also. These pictures were of large size, 15×12 or 18×15 inches, we believe. The late Colonel Stuart Wortley, we think, also took some; any how, he was in that war. It is not to be expected that the photographs in the present instance will be so large as those taken direct by Mr. Roger Fenton. War correspondents in the recent minor wars have usually been furnished with hand cameras, and there is little doubt that there will in this one be plenty of photographs forthcoming, notwithstanding the risk run in obtaining them, and their gruesomeness.

Collotype with Bromide Plates.—In our last issue is an article by Dr. Liesegang on collotype with gelatino-bromide of silver. It is tolerably well known to the majority of our readers that a gelatino-bromide film, developed with pyrogallic acid, is quite analogous to one of bichromated gelatine. For example, if a film of gelatino-bromide of silver be spread upon paper, exposed in the camera, and then developed with pyrogallic acid, it becomes similar in properties to an exposed carbon print. It can be mounted on a temporary or permanent support, and, after resting for the usual time, if treated with warm water, it may be developed again, as in a carbon picture. The original paper support of the film comes off, and the unaltered gelatine washed away, precisely as in carbon printing, leaving only the gelatine upon which the light has acted and rendered insoluble. This property of gelatino-bromide of silver was first pointed out by Mr. Leon Warnerke in 1881.

In collotype printing an ink-holding grain is necessary, and that is obtained by reticulating the film in the drying of the plates. With the ordinary bromide plates there is, of course, no reticulation, but it is produced by Liesegang in the same manner as the grain is produced in some of the other well-known mechanical printing methods, namely, by treating the film with a solution of nitrate of calcium. Now, here is a process that may be of interest to amateurs of an experimental turn of mind, as it involves no special outfit, like the collotype process proper, drying oven, &c. For the printing, on a small scale, an ordinary letter-copying press will suffice, if the paper be backed up with three or four thicknesses of printers' blanketing, or a thick pad of soft indiarubber.

Just now we used the term "amateurs of an experimental turn of mind," but we suspect there are not many nowadays in proportion to the number who now practise photography. These, as a rule, prefer to purchase everything ready prepared for their use, and do not trouble themselves to inquire anything about their preparation. In bygone days every amateur was more or less an ardent experimentalist, and he generally gave the result of his experience for the benefit of his fellow-workers. Now, if an amateur does experiment, and hits upon anything new, or what he thinks is new, it usually forms the subject of a patent, with the view of turning it to pecuniary advantage. That used not to be the case.

Colloidal Silver.—This remarkable form of silver has not been thoroughly investigated. Herren Lottermoser and Meyer purpose to study quantitatively the action of various reagents upon it. They find that acids precipitate it from solution in the "molecular" state, time and dilution being of great importance; also, according to the acid used, widely differing results are obtained as they have already found from experiments so far executed. Colloidal silver is not precipitated by chloride of sodium or hydrochloric acid in the presence of albumen, hence it is not likely to be made available in printing processes. Apparently, no silver albumenate is formed; but the investigators named propose to further study the action of salts of the halogens, and subsequently to publish the results.

Testing for Bromine. — Fluoresceine, which is already useful in photography as a base of the eosines used in isochromatic plates, forms an excellent reagent for the purpose. Paper is coated with a concentrated solution of this substance in acetic acid, and then placed in the mouth of a vessel or in a tube leading from it whence there is issuing the gas or vapour supposed to contain bromine. If the slightest quantity be present, eosine will be formed, and show itself by pink streaks of greater or less depth upon the paper. This method is not available when large quantities of free chlorine, mixed with small quantities of bromine, are present; but, in the case of a mixture of a chloride and a bromide, the bromine may be liberated by a mixture of permanganate of potassium and sulphate of copper.

M. Villard's New Focus Tube.—In a recent article in *La Nature*, entitled "Radiographic Notes," a full description is given of this new focus tube, which possesses features valuable beyond mere novelty. The leading points about it are the employment of iridium in place of platinum and the coexistence of two cathodes, which, by a simple arrangement, allow the resistance of the tube to be regulated. The current can be conveyed to either one or both cathodes; under normal conditions, when the current is passed through one cathode, the resistance is in excess of that which gives the best effect, but, when a part of the current is passed through the other cathode, the resistance diminishes and attains its minimum when the two cathodes are in direct communication with the origin. If a double image is produced when working the tube through the two sets of rays from the two cathodes not focussing on the right spot, the defect is remedied by enclosing one of the arms through which the current passes by a ring-shaped magnet, which can then displace the current in the required direction. The great advantage of the iridium plate is that it withstands a greater heat than platinum, its melting point being 1950° C. as against 1775° for platinum, and it is less liable to produce the gradual darkening of the tube through evaporation in the manner well known with platinum reflectors. An ingenious arrangement is made for applying the principle of a compensator. A subsidiary arm carries another anode furnished with a cylinder of magnesium, offering very little resistance to this passage of the current, so that, when the ordinary anode will not permit the current to flow, it can still be made to do so by passing it through the subsidiary arm instead of by the ordinary wire. By altering the polarity of the current when passing through this arm, the amount of gas in the tube can be arranged to a nicety, and again, if too much be present, it can be reabsorbed by reversing the current through the tube.

M. Chabaud explains the fog that accompanies radiographs by the production of altered X rays emanating from all parts of the tube. These he gets rid of by using a screen impermeable to them. He also for the first time describes another cause of fog. The make and break of the primary current needed to produce the

induced current gives rise to alternating changes in the direction of the current, so that each end of the vacuum tube becomes in turn anode and cathode and in consequence X-ray emitting, and there is then a double emitting centre, one being much stronger than the other. M. Chabaud gets rid of the weak one by placing a spark gap capable of transmitting one current only, the other being, as it were, lost.

Boring Holes in Glass.—It is often useful to be able to bore a hole in glass, but how to do it without applying to an expert is not always known. According to Mr. H. Jervis, who describes his method in the *Chemical News*, a hole may be bored by making a stellate group of cross scratches with the point of a three-cornered file, and then working out the glass with the sharp corner of a newly broken end of such a file, the boring portion being kept moist all the while with turpentine.

The Late Eclipse.—At the meeting of the Royal Society's Club, last week, Mr. E. Walter Maunder, member of Sir Norman Lockyer's Expedition to India for the purpose of observing the eclipse of the sun, last January, gave a lecture on the results obtained. The lecture was illustrated by between seventy and eighty photographs. Never before have so many successful photographs and observations been made of any previous eclipse. On Saturday, at the Royal Institution, Mr. W. H. M. Christie lectured on the same subject. The results obtained at this eclipse, by their success, will go a good way in compensating for the disappointment and failures experienced at several of the previous ones. Total solar eclipses are not frequent, even when thousands of miles have to be travelled to observe them, and that makes the disappointment the greater if the weather proves unpropitious. It is a great pity that the cinematograph film of the eclipse was stolen, because, even if it turned out faulty, the result would have been interesting. We wish Mr. Maskelyne better luck next time.

The National Gallery.—After twenty years as keeper of the National Gallery, Mr. Charles Eastlake has retired from the office, and on Thursday last week he was presented with a testimonial, in the shape of a handsome gold watch with an inscription, and an address, by the students. In returning thanks, Mr. Eastlake mentioned several matters of interest. On March 31, 1838, exactly sixty years before the date of his retirement, the Trustees of the National Gallery adopted a proposal to admit artists to copy the pictures in the collection, but then their number was limited to forty, and they were only allowed to work for two months. Then they had to retire in favour of forty others to work for a like period. Now the number of students is sometimes as many as 300 in a day. Mr. Eastlake mentioned that if one visits the Louvre in Paris, the Pinakothec at Munich, the Accademia at Venice, the Brera at Milan, or the Prado at Madrid, he would see many professional copyists at work, but very few amateurs. It will be remembered that two or three years ago there was a great outcry from one of the amateur photographic clubs because amateur photographers were not allowed to have the pictures down from the walls for copying, and great things were threatened; but, of course, all that soon "fizzled out." As we pointed out at the time, our national pictures are not "playthings" for amateur photographers.

South Kensington Museum.—All at once great interest seems to have been aroused with regard to the South Kensington Museum, though the same state of affairs had existed for years. Last week, in the House, a question was asked as to whether, in the new buildings, it was intended that the laboratories should be placed under the same roof as the works of art, and whether it had been ascertained that no damage to the pictures and silver could result from the generation of gases and other noxious fumes. In reply, Mr. Akers-Douglas said that it was not intended to place any laboratories under the same roof as the objects of art. The Select Committee of the House of Commons to inquire into the administration of the Museum of the Science and Art Department sat again on Friday last, and considered the suggestion that the Geological Museum should be transferred from Jermyn-street to South Kensington. There is one point the Committee have not yet considered, and that is a most important one, namely, how the large grants made to the department have been expended during past years, and whether the public have got full value for them. That is one of the chief things the Committee was appointed for, and it must not be lost sight of.

THE DIFFRACTION AND PINHOLE LENS THEORIES IN HALF-TONE WORK.

II.

In a previous article I endeavoured to show that the effects of diffraction are recognisable at such short distances between screen and plate as to preclude all possibility of their taking any part in the practical work of making a picture, in fact, except with very small stops, well within the thickness of the cover glass. But, although at such distances diffraction effects are obtained in the greatest purity and more strongly marked forms, they are not altogether absent at actual working screen distances; but, so far as they in any way influence the formation of the dot, I am going to try to show that the evidence is directly against them, and that any action they may produce is of a negative or harmful character. In fact, it is to diffraction—aided, no doubt, by error of exposure—that the "dumb-bell" joined form of dot and similar failures are solely due.

Since my previous article was written, I have modified my apparatus then described by the substitution of a Cooke lens of 2·35 inches focus as the enlarging objective, and this has enabled me to analyse still more closely the direct effects of diffraction. In order, however, to examine the effects to advantage, and more especially to photograph them, two principal conditions are essential, namely, a very small stop diaphragm in front of the screen that is to form the dot, and a source of illumination as powerful as possible. In the latter respect I am badly handicapped at present by being tied to an ordinary oil lamp, being miles away from gas or electricity. The use of a large stop with a feeble light is no remedy, as the small stop is essential to the production of the markings, and the strong light to rendering them visible. Hitherto I have been compelled, in addition, to use an enlarging combination severely stopped down in order to secure the definition given by the screen; and this, of course, intensified the difficulty. But the exquisite definition of the Cooke lens, with full aperture of *f*-6·5 opens up an entirely new series of markings not previously obtainable, and indeed scarcely suspected.

I have already briefly described the effect of a small circular stop, but under the new arrangement I have been able to successfully examine and photograph a still smaller one, namely, one-sixteenth of an inch, or one-third the diameter of the previous one. What this means in the way of comparative exposure may be judged by attempting to calculate the exposure required, with a distance of twenty inches between screen and diaphragm, assuming the screen itself to arrest three-fourths of the light falling on it, and enlarging to only a little over seven diameters (x 50) for re-enlargement, as already described, reckoning that, with a full aperture of a portrait lens and using the same source of illumination and rapidity plate, half a second would suffice. The relative exposure mentioned is a purely supposititious one, but it forms a basis for comparison, the remaining conditions being exactly as I work them.

When the screen is in sharp focus behind this stop, it shows extreme brightness of the edges of the apertures when examined with a powerful magnifier, and directly the focus is interfered with, however slightly, a strong bright line or band begins to detach itself from each of the four sides of the screen apertures. I call these "bands" because, though themselves extremely fine, they are bounded on the side, towards the centre of the aperture, by an exceedingly fine hair-like line that no degree of magnification appears to make any coarser. These lines cross one another, as I have already described, after the manner of an Oxford frame, and as the focussing surface is moved further away from the screen they

gradually approach one another, enclosing a constantly decreasing square, and with their extremities overlapping to a greater extent, until at last the approaching horizontal and vertical lines meet and form a clear sharp cross in the centre of each square.

This, I believe, represents the working-screen distance of such a stop when used alone, and at that distance the dots are relatively sharp and distinct. With a comparatively large stop the corners join up in chess-board form, but the central cross is not distinguishable, owing to want of definition. As the stop decreases in size the joining up partakes less and less of the chess-board character, and begins to show the dumb-bell form, that is to say the dots are neither properly joined up nor distinct from one another, but are connected by a fine line, or more frequently, if the exact distance be not fixed, a couple of very fine parallel lines. In fact, if with a sufficiently small stop a very strong illumination be used, the pattern formed will be found to consist of a series of fine black lines crossing one another in pairs, their distance apart depending upon the distance between the screen and plate.

Now, it will be remarked that it is only under very powerful illumination that the connected or continuous character of these lines is made manifest, that is to say, in a weak light or its equivalent with a short exposure the effect upon a photographic plate would be a series of detached dots; but, as the exposure is increased, the comparatively feeble line of light running between the diffraction bands gains power to act, and so produces the narrow connecting links that convert the dots into a series of dumb-bells or chain shot.

What takes place with the single aperture is exactly repeated in a multiplied form when a stop having several apertures is used. Thus, with the five-aperture stop, each dot consists of five pairs of diffraction bands crossing one another, and the elaborate "patterns" I have previously mentioned in connexion with such stops result from the varying distances apart of these bands at different screen distances; but at the working distance of such stops the effect produced is very different from that which occurs with a single aperture, although in both cases the light dot is identical in character, if not in size. In the one case, as I have just shown, the dot is formed by the crossing of single pairs of dark lines; in the other, each dot is formed by the superposition of five separate images of the aperture, and each of these five images brings with it its own individual bands, so that we have an effect similar to ordinary "cross-hatching" repeated possibly five times over. The final result, at any rate, is quite different from the single aperture, for, when the light dots are at their brightest and sharpest, they are enclosed in a solid framework of black without the least trace of the diffraction bands, always more or less present with the single aperture.

Since I commenced to write my previous article, with the intention of suggesting that diffraction is unfavourable to success in half-tone work, I find that Mr. Ives, Mr. Sanger Shepherd and I think also Mr. Max Levy, have all published similar views, as well as devices for overcoming the defect. In connexion with Mr. Shepherd's peculiar form of stop, with the clear centre and the etched corners, I may mention one that I used some time before adopting the multiple aperture, and which works somewhat on the principle of the latter. Let us suppose a "joining-up" stop is required for a lens whose full aperture, or the aperture it is intended to use, is one inch. On a piece of card or thin metal draw a one-inch circle with horizontal and vertical lines through its centre. Then on some point on each of these radii, between the centre and circumference of the circle, describe four smaller circles, all but touching one another, and cut out the space intervening between them, leaving the four circles solid. This leaves an opening somewhat resembling a Maltese cross, which, while it illuminates the centre of the dot and the junction between adjacent dots, entirely protects the portion of the plate representing the intersection of the dark lines of the screen. With a short exposure this forms a complete "network" pattern, and, with a much-extended one, an almost perfect system of transparent dots, when the multiple stop gives a perfect series of opaque ones; and the two worked in combination, for this is really on exactly the same principle as the multiple stop, give the best results I have got with dry plates, and entirely get over the troubles arising from diffraction. W. B. Bolton.

THE PASSAGE OF A FEW SALTS USED IN PHOTOGRAPHY THROUGH GELATINE SEPTA.

[Paper read before the Royal Photographic Society.]

Although dialysis is the basis of many of the operations in photography, yet our literature on the subject is very scanty. The property which gelatine possesses, among others, of allowing salts in solution to enter and leave it, renders it a suitable support for the salts of silver used in photography. Without this property it would be useless, as it would lock them up within itself and prevent any of the reagents we use coming into contact with the salts it contains.

The only information of recent date on this subject is given in a paper by Dr. Gaedicke, a translation of which was published in the *British Journal* of May 1897. In this contribution we have described a series of experiments made on the passage of hyposulphite of soda through gelatine, and the behaviour of this salt when it is allowed to dialyse into plain water and into solutions of chloride of sodium (common salt), the plate being placed horizontal, in some cases with the film upwards, and in other cases downwards. Unfortunately, I think, Dr. Gaedicke selected a thickness of gelatine, viz., 3·27 mm. ($\frac{1}{8}$ inch) seldom or ever met with in photographic practice. Gelatine films when dry on the surfaces of plates rarely exceed ·03 mm. ($\frac{1}{850}$ inch), for even the triple-coated Sandell plate, which I presume is the thickest-coated of all plates, cannot exceed ·09 mm. ($\frac{1}{280}$ inch). This excessive thickness of film cannot, therefore, throw much light on the behaviour of gelatine towards solutions of salts in every-day practice, but at the same time some useful hints are to be obtained from the study of this paper.

The diffusion and dialysis of salts were worked out most admirably by the late Professor Graham, and the results of his researches were published in the *Philosophical Transactions* for 1850 and 1862. Any one, therefore, taking up this subject must, of necessity, first become acquainted with the results he obtained. In the present communication or note, I might call it, I have adopted his nomenclature, and intend using the terms diffusion and dialysis strictly in the sense in which he employed them. By diffusion is meant the passage of a salt from one solution to another or to pure water, no medium intervening; by dialysis is meant the passage of a salt from a solution, *through a membrane*, into another solution, or into plain water.

In the case of his experiments on diffusion, a bottle with a ground mouth was taken, filled nearly to the top with the solution under examination and then placed in a beaker, into which water was gently introduced till the mouth of the bottle was covered to a depth of about one inch; at the end of the experiment, the time varying from five to sixteen days, a glass plate was placed over the mouth, the bottle removed, and the salt or other body which had passed into the water recovered by evaporation, or in some cases by precipitation.

I have selected and give from his list the weights of a few salts which diffused into water. The times are different, and the strengths of the solutions two per cent. The diameter of the mouth of the bottle was 1·25 inches, and that was constant in all his experiments, as all the bottles used were ground to the same size. These salts have been chosen because they are used in photography.

	Days.	Grains diffused.
Bromide of potassium	5·716	12·46
Carbonate of potash	8·08	11·93
Sulphite of soda	9·9	11·83
Carbonate of soda	9·9	11·70
Hyposulphite of soda	9·9	11·89

According to this table, potassium bromide diffuses more rapidly than any of the other salts.

Temperature has a very marked effect on the rate of diffusion, and Professor Graham draws attention to this in the case of hydrochloric acid. Taking the rate of diffusion for hydrochloric acid at

15·55° C. as	1,
at 26·66° C. it is	1·3545;
,, 37·77° C. ,, ,,	1·7732;
,, 41·88° C. ,, ,,	2·1812.

So that, with a rise of 26⅔° C., the quantity passed out is more than double.

When the salt has to dialyse through a septum the rate is not very materially increased. Thus from a two per cent. solution of chloride of sodium for three hours the ratio of the weights of the salt which passed out was at

10° C.	1;
20° C.	1·107;
30° C.	1·20;
40° C.	1·37.

From this it would seem that the statement frequently made that papers and plates need not be washed as long in summer as in winter is not quite borne out. There is a difference, but not as marked as in the case of diffusion. Taking the minimum time for washing paper in running water in summer as ten minutes, at the freezing point of water, 0° C., it only requires to be prolonged to fourteen minutes at the outside.

Unfortunately for us photographers, Professor Graham only experi-

mented, where dialysis was concerned, with one form of septum, *i.e.*, vegetable parchment. This is not employed at all as a support for any of the sensitive compounds used in pure photography, and we can only draw inferences as to what might happen if it were replaced by gelatine.

Professor Graham divided all substances that go into solution in water into two classes—crystalloids and colloids. Crystalloids pass easily through septa of different kinds, colloids only with great difficulty and slowness. In the manufacture of gelatine emulsions for dry plates, a certain portion of the gelatine has its setting power destroyed, and by the ordinary method of washing, *i.e.*, subdividing the emulsion into shreds, we only get rid of the portions of this changed gelatine where it comes into contact with the water at the exposed surfaces, that which is inside each piece of jelly is safely imprisoned, and no reasonable time of washing will remove it from its prison. If it is necessary to get rid of it, it must be removed by other means before the bulk of the gelatine is added.

Caramel is another body of this same nature; if it be mixed with gelatine and then applied to the backs of plates to prevent halation, very little will pass into the developer during development, and the colour of the developer will be but slightly changed due to this substance.

About two years ago, when I had the pleasure of reading a paper before the London and Provincial Photographic Association, I gave as my opinion that reversal was most probably due to the non-passage of the active constituents of a developer through those portions of the gelatine that corresponded to the over-exposed parts of the plate. I argued that the action of light on the bromide of silver was to set free a certain amount of bromine, and that this was taken up by the gelatine, and that, in consequence of the affinity of gelatine for bromine, gelatino-bromide emulsion was more rapid than collodio-bromide emulsion. When the developer came into contact with the plate, the bromised gelatine, water, and pyrogallic acid reacted so as to produce oxidised pyrogallic acid and hydrobromic acid, the oxidised pyrogallic acid combined with the gelatine and the hydrobromic acid formed a bromide with the alkali present. The compound formed by the combination of oxidised pyrogallic acid and gelatine was less absorbent of water and less pervious to the salts than was the unaltered gelatine, hence the non-development of those portions of the image. I was shortly afterwards told by a gentleman present that the bromide of silver under the developed and undeveloped portions fixed at the same rate, and therefore this could not be the case. On thinking over the matter I came to the conclusion that a reasonable reply to this argument would have been that most probably salts do not pass through gelatine in different states of hardness at the same rates. It was therefore in the endeavour to throw a little light on this subject, and also in response to the invitation of our late Honorary Secretary, that I have made a few experiments, which I shall now have the pleasure of bringing before you.

Before I began to work at the subject, I thought it would not be a very long business to determine the rates at which salts pass through gelatine, but I very soon found that the scheme I had proposed required considerable modification, and the greatest difficulty I encountered was in the preparation of films of gelatine of uniform thickness so that the results might be comparable the one with the other. In the first trials I made, I tied coarse muslin over the ends of four cylindrical glass chimneys such as are used for Argand burners, and then dipped the muslin and the chimney to a height of about half an inch in a twenty per cent. solution of gelatine, to which a small quantity of chrome alum had been added; the chrome alum was used in order to prevent the disintegration and separation of the gelatine from the muslin during the long soaking in water, to which it would be subjected, during the experiments. On trying these septa all went on smoothly, but when I had finished one set of experiments I wished to check the results by preparing a fresh set of septa, but the results were so different from those that I had already obtained, that I came to the conclusion that it was not possible to prepare at different times films of gelatine of exactly the same thickness by this method. I then tried to use gelatino-bromide paper, so as to have identically the same material as is used in practice, but this was so hardened with chrome alum that it would not go into solution, even at the temperature of boiling water. I next tried coating paper by drawing the under surface of a long strip in contact with a solution of gelatine of a definite strength, but this method also gave me non-concordant results when I came to use the material. I finally coated small pieces of paper 8·3 cm. ($3\frac{1}{4}$ inches) square with a definite quantity (3 c.c.) of a ten per cent. solution of Heinrich's gelatine. These gave me very consistent results, in many cases, with the same salt not varying more than two or three per cent. between the extremes, using three septa as a trial. The paper, after being cut to the right size, was soaked in water for some time and then placed on a warm glass plate; the measured quantity of gelatine solution was then spread over the paper just up to the edges; when the gelatine had set, it was removed from the glass and allowed to dry.

I should very much have preferred to dispense with the paper support, but that is impossible, as thin films of gelatine would not be able to support a pressure produced by even half an inch of water without considerable stretching or bursting.

Three chimneys were selected from a number, their internal diameters measuring 4·5 cm. ($\frac{35}{32}$ inch), and these same chimneys were used throughout all the experiments.

To prepare the dialysers the lower ends of the chimneys were dipped separately in a ten per cent. solution of gelatine, and before it had set placed on the centres of the pieces of dry gelatinised paper. After a few minutes, when the two, glass and paper, were fixed together by the setting of the gelatine, the paper was trimmed so as to leave a margin of about 1 cm. (·4 inch) beyond the glass. The excess of paper, and as much of the glass chimney as was equal to the width of the paper, were coated with gelatine, and the two pressed into contact, and then bound with twine. The paper and twine were then coated outside with more gelatine, and, when this was partially dry, it was covered with a saturated solution of chrome alum, care being taken that none of the chrome alum came into contact with the paper closing the bottom of the chimney.

I have dwelt at seme length on the description of the method I adopted in order to prepare these septa, as I frequently find results given without any mention being made of the apparatus used, and under those circumstances it is impossible for another person to repeat the experiments and verify the results.

I have used in all the experiments, except bichloride of mercury and pyrogallic acid, ten per cent. solutions of the salts to be tested; this, in some cases, is an abnormally strong solution, and in others rather weak; but, in order to compare results with each other, the conditions must be made as nearly as possible the same.

In order to determine the amount of salt that passes through a septum one or two methods can be adopted, *i.e.*, one can either determine the actual quantity of salt passed through in a given time, when the charged dialyser is placed in a given and constant volume of water, or the quantity of salt that remains in the dialyser per unit volume. I preferred the latter method, as I should then have to deal in each case with a smaller bulk of solution when determining the quantity of salt present, and in addition, the conditions outside the dialyser could be maintained more constant by using running water, and, moreover, this is the condition usually adopted in washing plates and paper. The septum, when charged with the solution of salt under consideration, was immersed in water in a beaker, so that the level of the liquid inside was the same as that of the water outside. The temperature of the water outside was, through the whole of the experiments, 15° C. (59° F.).

At the end of a certain number of hours, which varied a good deal, as in some cases the experiments were started in the morning, in others not till late at night, the solution was poured into a graduated measure, and the volume noted. A given volume was then removed by means of a pipette, and set aside for the determination of the percentage of salt left, and the remainder returned to the septum. I usually started three dialysers, charged with the solution of the same salt, at the same time, so as to find out the mean rate of passage through plain gelatine.

The estimation of the salt left could be made in two ways, by precipitation and the balance, or by volumetric analysis. The latter method was preferred, as it can be completed in a few minutes, and the result soon obtained. It was also necessary to adopt the latter method so as to be able to return to the dialyser a quantity of solution of the same strength as that which had been withdrawn, so that the conditions might be identically the same as would have obtained if none of the solution had at any time been removed.

Experiments with Hyposulphite of Soda.

The first salt in solution I experimented with was hyposulphite of soda, as this is an easy substance to estimate, and experience gained by working with it would afterwards be useful when dealing with bodies more difficult to estimate. A ten per cent. solution of pure hyposulphite was made by dissolving 10 grammes of the salt in water, and then making up the volume to 100 c. c. Ten cubic centimetres of this solution were taken, and after adding a small quantity of starch paste, such a quantity of a decinormal solution of iodine in iodide of potassium was run in from a burette as to give the blue colour due to iodide of starch. The end reaction is very delicate, a single drop of the iodine solution being sufficient, when all the hyposulphite has been converted into tetrathionate of sodium, to give a deep colour to 200 or 300 c. c. of solution. It is not necessary that the decinormal solution of iodine should be strictly correct, as, if we know what volume is necessary to convert the hyposulphite in 10 c. c. of the stock ten per cent. solution into tetrathionate, then, when a smaller quantity is required, by a simple by a simple calculation we can easily find out what percentage of the original solution was present, and by difference how much has passed through the septum.

Three dialysers, having been prepared and loaded with the solution (30 c. c.), were placed in three beakers, and so adjusted that the levels inside and outside were the same. A syphon was then introduced into each beaker, the delivery end being turned up so that the level of the water in the beaker could be maintained constant for a considerable time. Water was allowed to enter the top of the beaker, and the water with the salts in solution drawn off from the bottem; in this way the septum was always in contact, on the one side with the solution of the salt, and on the other with tap water.

At the end of four, five, or more hours, 5 c. c. were removed and tested for the quantity of salt left, using the same iodine solution as when testing the original ten per cent. solution. This was done for each of the dialysers, and so the equality or otherwise of the diffusion through the septa obtained. Having found the amount of salt in the 5 c. c., an

equal quantity of salt properly diluted to strength was returned to each, and another run given. If at the end of twelve or fourteen hours it was ascertained that the septa were practically the same, one was soaked in oxidised pyro, or in pyro or alkali, and exposed to the air; a second was soaked in chrome alum, saturated solution, and the third left untreated. The septa were then allowed to dry, and after soaking in water were re-charged, and at intervals the salt left, again and again estimated. In some cases the dialysis was allowed to continue for forty or fifty hours. In the case of the hyposulphite of soda, salt passed out into the water, and water passed in the opposite direction into the hyposulphite. In one ease, at the end of twenty-eight hours, the volume increased to 39·25 c. c., so that a correction has to be applied to each estimation before the correct weight left or passed through can be obtained. This increase in volume of the hyposulphite of soda solution reminds us of what goes on in an ordinary plate when fixed, *i.e.*, the bulk of the water is abstracted, and the film feels much more horny than it was when placed in the fixing solution; at the same time I was rather surprised to observe this large increase with a ten per cent. solution.

Taking the mean of several separate determinations for runs of twelve hours and subtracting the results from the amounts of salt originally placed in the septa, the results are as below:—

Septum soaked in				Plain gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
53	1·57	32 75	·98	38·25	1·15

From this it will be noticed that hyposulphite of soda dialyses more rapidly through a septum tanned with oxidised pyro than through plain gelatine, and that gelatine hardened with chrome alum allows least salt to pass through. As regards the pyro-stained gelatine and plain gelatine the result is just the opposite to what I expected.

Bromide of Potassium.

A ten per cent. solution of this salt was used, and the determinations of the salt were made by means of a decinormal solution of nitrate of silver, and, as both the bromide of potassium and nitrate of silver were neutral, chromate of potash was used as the indicator. The experiments were carried on in identically the same manner as in the case of hyposulphite of soda, and the same volume of solution used in each septum.

Though the salt passed through the different septa more easily than in the case of hyposulphite, yet the increase in volume was very much less, at the end of fifteen hours the volume had only increased to 31·5 c. c., but in eleven and a half hours, in the case of hyposulphite, it had increased to 33 c. c., so that osmotic pressure is very much less with bromide of potassium than it is with hyposulphite.

Again taking the mean of several separate experiments and determining from the curves obtained the percentage of salt left, and by difference the weights passed out in the same time (twelve hours), the following results were obtained:—

Septum soaked in				Plain gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
57	17·1	56	1·68	56·5	1·70

Bromide of potassium, therefore, passes at the same rate whatever the state of the gelatine, and I think we may safely infer that, in the case of a plate under development, as the bromine is removed from the silver and forms bromide with the alkali present, so it rapidly dialyses out into the bulk of the developer, leaving those parts which are being developed less restrained by the bromide thus produced than would be the case if gelatine, tanned with oxidised pyro, were less pervious than plain gelatine.

Carbonate of Soda.

Again a ten per cent. solution of this salt was prepared by dissolving 10 grammes of pure crystallised carbonate of soda so as to produce 100 c. c.; 10 c. c. were then taken and such a quantity of a decinormal solution of hydrochloric acid added till the solution was just neutral or sufficiently acid to change methyl orange from yellow to red.

The septa were again prepared and charged as before. At the end of four hours the quantity left per unit volume was determined, and, the working of the septa being satisfactory, they were tanned, dried, and recharged.

The percentages of salt passed through for twelve hours as in the previous cases were as follows:—

Septum soaked in				Plain gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
40·33	1·21	30·66	·92	37·66	1·13

Here, as in the case of hyposulphite of soda, the pyro-tannned gelatine allowed the salt to pass through more rapidly than in the other cases, but chrome-alumed gelatine allowed least salt to pass through.

These results are the mean of several runs with the apparatus, using new septa in each case.

The increase in volumes of the solution of the salt in the different septa amounted to 38 c. c. for pyro, 36·5 c. c. for chrome alum, and 36·5 c. c. plain gelatine at the end of twenty-four hours.

Sulphite of Soda.

The ten per cent. solution in this case was prepared from commercial sulphite of soda. When the solution of sulphite was taken from the stock solution, or the septa, it was increased in bulk to about 200 c. c. and a sufficient quantity of dilute hydrochloric acid added to set free the sulphurous acid, as soon as possible a quantity of a decinormal solution of permanganate of potash was run in till the colour was no longer discharged. At first the permanganate lost its colour, but, when the reaction was completed no change took place, so that the end reaction was easily observed. The bulk of solution was purposely made large so as to avoid loss of the sulphurous acid by its passing off into the air.

The change in volume in this case also was rather large; at the end of twenty-one hours it amounted to 35 5 c. c. for pyro, 34 c. c. for chrome alum, and 33 c. c. for plain gelatine.

Again, taking twelve hours as our time, the quantities passed through were:—

Septum soaked in				Plain gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
67·5	2·03	66	1·98	73	2·19

Sulphite of soda passes most rapidly through plain gelatine, next through pyro-stained gelatine, and least through chrome-alumed gelatine.

Bichloride of Mercury.

As this salt is not soluble to the same extent as the others already dealt with, and as I did not wish to introduce other bodies such as hydrochloric acid or chloride of ammonium in order to increase the solubility, I had to use a less concentrated solution and the maximum strength I could use at the temperature, without any of the salt crystallising out was a seven per cent.

According to Storer, the solubility of bichloride of mercury at different temperatures is as follows:—100 parts of water dissolve at

0° C.	5·73 parts.	60° C.	13·86 parts.
10 ,,	6·57 ,,	70 ,,	17·27 ,,
20 ,,	7·39 ,,	80 ,,	24·30 ,,
30 ,,	8·43 ,,	90 ,,	37·05 ,,
40 ,,	9·62 ,,	100 ,,	53·96 ,,
50 ,,	11·34 ,,		

The method adopted for determining the ratio of the amount of salt left in the septum to what was originally placed there was the following. Having removed the usual quantity of solution from each septum, and placed it in a beaker, a few c. c. of a solution of chloride of ammonium were added, and then a couple of drops of dilute ammonia, and then from a burette the necessary quantity of a solution of cyanide of potassium (about decinormal strength) was added so as just to redissolve the white precipitate produced by the ammonia.

Here the volume of the solution in the septum, instead of increasing, in most cases diminished, in one case at the end of twenty-four hours oxidised pyro 28·5 c. c., chrome alum 29·5 c. c., and plain gelatine 30 c. c.

(*Continued on p.* 281.)

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION,

CRYSTAL PALACE, APRIL 25 TO MAY 14.



Photographed by] CRYSTAL PALACE EXHIBITION: THE NORTH NAVE. [*Messrs Negretti & Zambra.*

THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION at the Crystal Palace was opened on Monday, April 25, by His Royal Highness the Prince of Wales. The day's attendance at the celebrated glass house at Sydenham probably reached a total of 15,000, and of that number a very large percentage were photographers. We ourselves never remember to have met and seen so many of the craft assembled under one roof. It was a great day for photography and photographers.

Shortly after one o'clock His Royal Highness was received at the North Tower garden entrance by the Earl of Crawford, K.T., President of the Royal Photographic Society, the Members of Council and Organizing Committee, and the Chairman and Directors of the Crystal Palace Company. A guard of honour was furnished by the 1st V.B. of the Queen's Royal West Surrey Regiment, under the command of the Lieut.-Colonel, John P. Fearon, V.D. The following constituted the Reception Committee, most of whom, we noted, were present on the arrival of His Royal Highness at the Palace:—

DIRECTORS OF THE CRYSTAL PALACE COMPANY.—Messrs. George T. Rait, *Chairman*; Arthur W. Biggs; Edward Clark; John M. Douglas; Samuel Green; Henry E. Milner, C.E., F.L.S.; the Right Hon. Sir Arthur Otway, Part., P.C.; Edward Leigh Pemberton, C.B.; Henry Gillman, *General Manager*; William Gardiner, *Secretary*.

OFFICERS AND COUNCIL OF THE ROYAL PHOTOGRAPHIC SOCIETY.—*President:* The Right Hon. The Earl of Crawford, K.T. *Vice-Presidents:* Captain W. de Wiveslie Abney, C.B., R.E. D.C.L.; Mr. T. R. Dallmeyer; Mr. Chapman Jones. *Treasurer:* Mr. G. Scamell. *Honorary Secretary:* Colonel J. Waterhouse, I.S.C. *Honorary Librarian:* Mr. H. Wilmer. *Members of Council:* Messrs. T. Bedding; T. Bolas; C. H. Bothamley; F. A. Bridge; J. Cadett; A. Cowan; R. W. Craigie; W. E. Debenham; A. Haddon; A. Mackie; J. W. Marchant; J. Spiller; J. W. Swan; L. Warnerke; J. B. B. Wellington. *Assistant Secretary:* Mr. R. Child Bayley. *Members of the Organizing Committee of the Exhibition who are not on the Council:* Messrs. Conrad Beck; F. Bishop; W. Gamble; F. W. Hindley.

As the Prince and party entered the North Nave a kinematograph was set in motion. A visit was then paid to the Artistic and Historical sections, his Royal Highness evincing much interest in the exhibits of the Photographic Association, Mr. H. Hallier (Sydenham), the Roll of Ministering Children (Messrs. F. & R. Speaight), the Historical Section, the Taber Bas-relief Syndicate, and Messrs. Negretti & Zambra. We remarked that the Artistic exhibits did not catch the Prince's eye, and that the entire loan collection of pictorial photography absolutely escaped Royal notice.

After luncheon, the Prince, accompanied by Lord Crawford and Mr. Henry Gillman, the Manager of the Palace, and other gentlemen, entered the Royal box, facing the Handel orchestra. The President of the Society, addressing those present, said that the Exhibition was promoted by the Royal Photographic Society, which was started in the early days of photography. That art had always received the patronage of all the royal families of Europe. When the Society was inaugurated in 1853, the Queen allowed her name to be associated with it, and since then the Prince of Wales had become a patron. Though the Society itself was limited in the number of members, yet, by its organization, he was able to state that the roll was greater than that of any other scientific society in the world, for, with the affiliated bodies, the membership exceeded 6000.

The Prince, who on rising was received with loud cheers, said: "Ladies and gentlemen, I have great pleasure in declaring the Royal Photographic Society's International Exhibition open to the public."

Immediately following a brief entertainment given in the centre transept, an adjournment was made to the theatre, where demonstrations were given of the latest results in colour photography by the Joly, Lippmann, and Ives processes, and Mr. Anderton's system of stereoscopic projection. Mr. R. R. Beard very efficiently worked the lanterns, and Captain Abney explained to his Royal Highness the theory of each colour process that was illustrated. We had opportunities for observing that the Prince was deeply interested in the projection of colour, his chief enconiums being reserved for the Ives process. The demonstrations were entirely successful and passed off smoothly and well, to the obvious pleasure of the illustrious visitor.

Escorted by Lord Crawford and the Reception Committee, the Prince then passed along the North Nave, many of the exhibits attracting his attention on the way. Some stereoscopic pictures were momentarily inspected; the vast camera exhibited by Messrs. Penrose was viewed and entered; Mr. Burdick produced a portion of a free-hand aerographic picture, to the manifest delight of his Royal Highness; and, after inspecting other portions of the Exhibition, the Prince departed from the south entrance of the Palace, obviously well pleased with his visit, throughout which he had evinced the deepest interest in the Exhibition.

As we have already remarked, it was a great day for photography and photographers. Such a remarkable photographic meeting has probably never been held before. Ireland, Scotland, and Wales sent representatives to the gathering, which included most of those whose names are prominently identified with modern British photography. On all sides we heard the opinion expressed that the Exhibition is a truly great one, and that this, conjoined to the Royal visit, will have a permanently beneficial effect on the future of photography.

In the course of the day Lord Crawford held a reception of the members of the Society, who subsequently lunched together in the Garden Hall, the company numbering several hundreds. At the conclusion of the formal proceedings a photograph of the executive was taken on the terrace by Messrs. Negretti & Zambra. At the time of opening, the Exhibition was complete almost down to the smallest detail, and the function passed off without a hitch of any kind.

I.—THE HISTORICAL SECTION.

IT is easy enough to find the historical section of the Exhibition in the catalogue—a wonderfully ornate and well-printed catalogue, by the way—for it happens to occupy the first few pages; but it is not so easy to find the section itself, and even an inquiry addressed to many policemen is of no effect, for historical sections the men in blue wot not of. Accident at length reveals this opening chapter of the Photographic Exhibition hard by the Egyptian Court, and we find the mighty figures of Rameses the Great glaring down with their great eyes upon historical photography, and laughing at it for being so modern a thing.

And modern it undoubtedly must seem to those accustomed to deal with ordinary history, for its entire life is almost comprised in the space of that sixty years which we call the Victorian Era. The first exhibits are by the Royal Photographic Society, and embrace a number of portraits of the early fathers of the art—Daguerre, Niépce, Archer, the Rev. J. B. Reade—that bold pioneer who had the audacity to produce studies in black on his wife's white kid gloves—Sir David Brewster, Thomas Sutton, and many more who have joined the majority, but who did much by their joint labours, "here a little and there a little," to fix the art on a firm foundation. The catalogue very rightly gives a little history of each man, what he did, where he was born, and where he died. Then we come to a later set of workers, many of whom have gone to their long rest so recently that even young men now living can remember them in the flesh: Woodbury, Major Russell, Sawyer, Berkeley, the Rev. T. F. Hardwich, Sayce, and even Dr. Hurter, whose death it was our painful duty to chronicle only the other day. It is pleasant to look upon the presentments of these good men, albeit some of the pictures have faded sadly since the images were formed by the lens.

The Daguerreotype process has a couple of pages in the catalogue all to itself, and it is interesting to note that visitors to the Exhibition can have their portraits taken by this old method by Messrs. Negretti & Zambra, who were among the pioneer workers with silvered plates of metal. Some of the old specimens shown are as good as the day on which they were produced in the early forties—and present a delicacy of detail which cannot be surpassed by any process of the present day.

Next we come to the Talbotype or calotype process, in which paper was used as a support for the negative—a method which was afterwards modified into the waxed-paper process, ceroline process, &c. And here again we have examples showing marvellous permanency. There are two pictures here which are worthy of special attention, because they have the appearance of platinotypes and are as fresh-looking as if done yesterday. One represents St. Mary's Abbey, York, and the other Whitby Abbey. They are dated 1863, and were produced on ceroline paper (a modification, as we have already mentioned of the waxed-paper process). Some of the old paper negatives are wonderfully perfect—and one is fain to admit that there are few modern gelatine negatives which will look so well after a life of half a century. Other later negatives on Morgan & Kidd's bromide paper and on Warnerke's negative tissue are interesting historically as processes which had, at one time, a short life.

The wet process is a method so recent, and one which is, as our readers know, retained for certain purposes, notably negatives for process work, that it does not arouse that interest which the more ancient pictures afford. Still it is advantageous to look back and see what excellent work was done under conditions which would at once frighten away half of the present day photographers. What should we think of the art now a days if we were bound to carry about with us a dark tent, a supply of water, glass plates, bottles of collodion, as well as developing and intensifying mixtures? And yet, with all these impedimenta, what spendid work was done. Look upon it, some of ye worthy amateurs—and it will take down your pride a peg or two. Here we have examples of that very beautiful application of the wet process—positives on glass, the precursor of the ferrotype process. Some of these images are of great delicacy, and, as for permanence, they are quite as bright to-day as they were forty years ago when pro-

duced. Variations there are of these old processes which some of us can well remember. Here, for instance, are examples of Burges's process 1865, which he called Eburneum Portraits. They had the appearance of monochrome miniatures on ivory, but were really produced by flowing over a collodion positive, which had been toned with gold or mercury, a gelatine emulsion of zinc oxide. When dry, the surface was coated with plain collodion and stripped from the glass. Such pictures require no mounting, and in the then fashionable *carte-de-visite* form could be easily slipped into the family album. We have also here examples of crystal portraits in which similar transparencies were cemented in optical contact with opal glass, a process which long ago was superseded by gelatine emulsion on the same kind of support. Some pictures by the collodio-albumen process, now only employed for lantern slide work, bring us to the consideration of that important change in photographic manipulations indicated by the introduction of collodion emulsion.

The very subjects of the pictures shown, interior of a church at Liverpool, *Broxton Hall, Cheshire*, &c., call to mind that the first dry plates issued to the public hailed from that neighbourhood, and were called the Liverpool dry plates. For the first time it was realised that large pictures could be made in the camera without a nitrate bath, and, although the time of exposure was so long that the operator could smoke a pipe full of tobacco while the lens remained uncovered, he complained not, seeing that he was relieved of that terrible silver bath and all its belongings. Some of these views printed more than twenty-seven years ago are in excellent preservation. Three negatives which exhibit the sensitiveness of the plate or the permanence of the latent image, are exhibited here, the work of Mr. J. Sterry. The plates were developed fifteen and a half years after exposure, a fact that speaks well for Mr. Sterry's patience, if for nothing else.

At last we arrive at the early days of gelatino-bromide, and one calls to mind the discussion which arose only a few years back as to the actual originator of the process. It is only necessary to study the annuals of the period to see how many workers contributed to the discovery that gelatine was the best medium which had yet been introduced for dry-plate work. Dr. Maddox is generally credited with having produced the first successful negatives by this process, the introduction of which marked such a revolution in the practice of photography. Among the early workers Mr. A. L. Henderson figures with various ingenious dodges in connexion with the preparation of the emulsion; and, giving him and Dr. Maddox all the credit for their valuable labours, it seems a pity that these are the only two names which figure in this section of the Exhibition, if we except the portraits of the pioneer workers, surely Mr. R. Kennett should be recognised as the man who issued the first gelatine plates to the public, and sold the emulsion by which plates could be coated, in the form of dry pellicle.

Thus is the story unfolded by various examples of the history of the photographic negative, from Fox Talbot's earliest production called by that name, to the gelatino-bromide negative by which to-day the majority of pictures are taken. And in like manner we can follow the history of the various processes by which those negatives are made to yield positives. Again, we are impressed by the fact that the early workers had to depend upon their own fingers for the preparation of the papers which they used. There was no commercial article to be bought by the quire or by the packet all ready for use—everything had to be done by the photographer himself. It will perhaps be startling to some modern and advanced photographers to note that the process which receives premier attention here is the gum-bichromate, especially if they are not up in their photographic history. But gum bichromate received much attention as long ago as the sixties, and one of the leading workers of that method was W. Pouncy, of Dorchester. There are here plenty of examples of that gentleman's productions, some of them being of extreme excellence; indeed, there are one or two which it would puzzle some modern experts to produce with the limited means employed by this early experimenter. It is interesting to note that some of these early carbon prints were submitted to the notice of H.R.H. the Prince Consort, and a letter from Osborne, written by the Prince's Secretary, is shown here, telling how interested the Prince is in this new method of printing photographs. The letter is dated 1858, and is marked "private" in the corner; to-day it is exhibited for all the world to see, the fate of many other letters, we fear, which the writers intended to be confidential. These gum-bichromate prints are not, for some occult reason, shown with the rest of the historical section, but on a screen by themselves. They certainly deserve attention as the prototypes of a process which has recently been revived, and which in a few hands is giving very hopeful results.

Of course there are plenty of examples of the single and double transfer carbon process as practised commercially to-day, and we see here some interesting pictures and models, many of them the work of Mr. J. W. Swan, which show the various steps which, in the past, led to the gradual perfecting of the process. Examples of the "continuing action" of light in carbon printing fill a frame sent in by Mr. Foxlee, and these are well worthy the attention of carbon workers. These pictures were originally prepared to illustrate a lecture delivered on the subject by Mr. Foxlee as long ago as May, 1879.

The dry bones of the beautiful Woodburytype relief process are here shown by some examples of "Nature Printing," in which fern leaves, &c. were impressed in plates of metal by pressure, and afterwards treated in the copper-plate press. The method was not greatly used, but was revived by Woodbury, who used a gelatine relief with which to impress the metal, and a gelatinous pigment for the production of positive pictures therefrom. Woodbury was a clever man, and it is most interesting to look at some of his experimental apparatus. One thing in which he was much interested, and which he strove hard to bring to perfection, was the production of lantern slides in a continuous ribbon or film, so that they could be used in the lantern panorama fashion, and thus dispense with heavy and brittle glass. His experimental results in this direction we can see here. We can also examine the earliest Woodburytypes which he produced, and can compare them with what is being done now by Messrs. Waterlow & Sons, one of the few firms who still practise the process commercially. Woodbury's simplification of the process which he brought out under the name "Stannotype," for tinfoil was used to form the mould, instead of a lead plate, is exhibited here, and we can also examine specimens of his photo-filigrane method of producing a pseudo-water mark on paper by pressure with a gelatine relief.

The name of A. L. Henderson again comes forward in connexion with photographic enamels, with which he was one of the most successful workers, and other minor methods of printing bring this sub-section of the Exhibition to a close.

Modern workers who require from dealers that cameras and apparatus generally shall be of feather-weight description, will be apt to laugh at some of the models shown of the massive boxes in the shape of cameras with which their forefathers had to be content. In the early days of photography, all wood and metal work had to be done by hand, and clumsiness and weight were necessary conditions. To-day the old-fashioned carpenter and metal-worker find themselves superseded altogether by machinery, and, what is more, the mechanical workers perform their task with greater delicacy, and with a speed which at one time would have been considered impossible. Still there are some old instruments here which cannot fail to interest the thoughtful man, for it is always fascinating to trace the beginnings and gradual advances which lead up to a successful issue. As a case in point we have here one of Dubroni's cameras for field work, which was perhaps the first attempt to dispense with the silver bath by mechanical means. The camera is formed of a tank of yellow glass, and the glass was collodionised and made sensitive as it rested therein. After exposure, the developer and intensifier were introduced by means of pipettes, the condition and general behaviour of the plate being watched through the yellow glass. We have recently seen the same method revived for the treatment of dry ferrotype plates and pictures by that process are now produced at most popular places of resort. We can also examine here specimens of early panoramic cameras, early finders, and archaic shutters, as well as ancient detective and hand cameras, some of the points in which should cause recent patentees to become sadder and wiser men. Again, the man ignorant of photographic history is able to learn here that a roller slide for use with a flexible film was introduced by Warnerke in 1874, long before celluloid came to the front, and he will also be able to look at the original sciopticon, the prototype of the modern oil lantern, which has done so much to popularise projection work.

Photographic engraving in intaglio forms another sub-section. It will be remembered that Colonel Waterhouse lately read a paper on this subject at the Camera Club, and illustrated it with a very complete series of examples. Many of these pictures are shown here by the Colonel, who has supplied an introductory note for the catalogue upon the subject about which he knows so much, and to which he has himself contributed so largely. These early examples of the beautiful art of photogravure will be found full of interest, and some of them, although bearing an early date, are really masterly productions.

Palmer's electro-tint, a photographic method of producing an intaglio printing plate, should be examined, for it is the parent of many modern processes, and its likeness to Professor Herkomer's process for producing a block by brushwork will readily be seen. From 1840 to 1860 many other processes were introduced, which formed steps by which the more modern engraving methods were gradually built up, and among the contributors to this experimental period were well-known names, including both Woodbury and Dallas—whose process, called Dallastint, is still worked by him, and is one of the few secret methods which yet remain untold. In this sub-section, too, we get a faint idea of the immense amount of work in this direction which was accomplished at the Survey of India Office by Colonel Waterhouse, whose name appears against so many of these exhibits. We must also note that Mr. T. Bolas occupies an honourable place in the same connexion.

Photo-lithography leads naturally to collotype, and collotype to that of photo-typographic engraving in relief, which has had the effect of robbing the wood-engraver of his work. In the very early days Niépce made printable plates by using bitumen as a resist, and it might be noted, although there is no mention of the fact here, that, many years before photography was heard of, the suggestion was made that plates in relief might be produced by making a drawing in resinous ink on metal, and etching away the bare places by means of acid. The proposition came to nought, for fine drawing in such a medium was out of the question; but directly it was found that a photographic image could be produced

from a negative on a zinc or copper plate, and could be made to resist the action of acid, the method assumed a new aspect, and photo-engraving displaced wood block cutting. This method has, during the past twenty years, grown into a vast industry, and has given an impetus to illustrated periodicals, and book illustration, which has brought grist to the mill of both printer and paper-maker. The use of the screen, with which the name of Meisenbach is linked, gave the coping-stone to the edifice, and the method has now been brought to an astonishing degree of perfection.

The catalogue of the Exhibition is adorned with various good impressions from blocks made by some of the early processes, and one can but admire the beauty of these pioneer attempts at automatic engraving. Step by step have these processes led up to the splendid examples of photo engraving which adorn our best publications to-day. The photographic experimenter has now taught us how to produce a most perfect block, and it is to the paper maker that we now look, and to the ink maker, and the printer, to give that block the attention it requires before it will yield the best impression.

II.—THE PICTORIAL SECTION.

No exhibition of photographs hitherto held has equalled in size or interest the Pictorial Section at the Crystal Palace. It is hung in the North Nave, of which it takes up about one-half, a space probably larger than any exhibition room we have entered. The hanging has been well done, "skying" and "flooring" having been avoided. Many large alcoves are occupied by individual exhibitors, and, as far as possible, each contributor's work is placed together. This part of the Exhibition during the last few days has been very crowded at times, and we do not remember to have seen a collection of photographs attract so much intelligent attention on the part of the general public.

The vastness of this great Exhibition of pictorial photography defies minute treatment at our hands. Of the catalogue the enumeration of the pictures takes up 128 pages, and there are some dozens of half-tone reproductions of typical photographs, chosen with admirable discretion from the works of the foremost exponents past and present. The greatest portrait photographer of all, David Octavius Hill, and Mrs. Julia Margaret Cameron, who perhaps comes second to him, are represented here by many works that are classical, and that have not been excelled in dignity and simplicity of treatment by any of their successors. It is a source of regret to us that Dr. P. H. Emerson's East Anglian landscape and figure subjects are not shown—the Pictorial Section is obviously incomplete without them—but they appear in his books, which are exhibited by Mr. Nutt and Messrs. Sampson Low & Co., so that it may be said he is in a way represented at the Exhibition. Large numbers of O. G. Rejlander's and H. P. Robinson's photographs are shown, and thus the student has the opportunity of tracing in the works of the five photographers we have named the principal styles or schools, if you will, of pictorial photography that have from time to time occupied attention. Messrs. Hollyer, Davison, Craig Annan, W. A. Cadby, Demachy, Colonel Gale, Puyo, Sutcliffe, and innumerable others send many of their best-known productions.

Detailed criticism of the many hundreds of contributions to the section is out of the question even were it desirable. Let us rather attempt to give the reader an idea of the impression made on our mind after a study of these photographs, with most of which we, of course, were already familiar. Modern pictorial photography, here seen at its collective best, appears to have reached a monotonous level of uniform prettiness, goodness, and elaboration. There is no Emerson among the landscape men, as there was twelve or thirteen years ago, to stand out by virtue of his originality of conception and power of execution. Similarly we have no successors to D. O. Hill or Julia Cameron in the relative positions that those photographers held when they flourished, who can make portraits with a distinct and daring freedom of style which lifts their work above that of their contemporaries. One or two of the Frenchmen—Demachy, Puyo, and some others—show great traces of unconventionality, but here at home we have a dozen men who can make a first-rate portrait as we so regard it, and several dozens who in other branches of work cannot be separated by a pin's point. Which, if any, of these will survive? Or, again, have we entered upon a time of commonplace excellence which is to be succeeded year by year by the same sort of thing, just as it is so now? Nowadays, reputations in photography appear to be very quickly made and retained without difficulty. This does not seem to have been the case formerly. Principles had to be laid down and fought for. There are no principles at stake to-day, and, except for purposes of self-puffery and self-advertisement, nobody writes or talks much about "pictorial" photography. The hackneyed debates over the question as to whether photography is a fine art, or art of any kind, have apparently ended, and in place of those aimless discussions a vast amount of work is done, the cream of which is seen at the Crystal Palace to-day.

To our minds the Pictorial Section of the Exhibition is chiefly interesting from the circumstance that it may be separated into three parts, covering, as it were, three distinct periods or epochs, viz., the Hill-Cameron period, the Robinson-Rejlander, and the Emerson. The latter headed what may be termed a *renaissance* thirteen years ago. The influence of his teachings and his work is plainly perceptible in hundreds of contributions to the Pictorial Section, and we are sure that, when in some remote century a history of pictorial photography comes to be written, what he did in stripping camera work of the silly conventions that had been unfortunately imported into it by pseudo-"artists" will be handsomely and ungrudgingly recognised as one of the greatest things for which photography is indebted to any single individual.

One more impression of a personal kind and we have finished. In our tour of the Pictorial Section we are not conscious of having seen a single obviously "blurred" or "fuzzy" photograph. We are happy to chronicle the passing away of a fad that at one time threatened to become a plague, and we congratulate the visitors to the Palace during the next fortnight upon having escaped an infliction which we humbly think we in the last few years are in some measure responsible for having saved them.

III. & IV.—APPARATUS AND MATERIAL AND PHOTO-MECHANICAL.

This section takes up the whole of the South Nave, and a considerable portion of the North. It includes apparatus and appliances of every sort used in the production and display of photographs, plates, papers, chemicals, &c.; illustrations of work produced by the apparatus and materials shown, and animated photographs and apparatus for their display. Elsewhere we remark that "machinery in motion, showing the various processes employed in the manufacture of lenses, cameras," &c., does not appear among the exhibits, but the section is, nevertheless, thoroughly representative, and it may be safely said that the trade section of British photography has never before been so largely and so worthily in evidence at an exhibition.

Before dealing with the exhibits themselves, a special reference may be directed to the stands and cases in which these exhibits are displayed. It is manifest that even at photographic exhibitions the glazed and gilded show-case that we have so long been accustomed to stare at and affect to admire is passing away, and that, even in this apparently minor detail, the refining influence of the best modern taste is exerting itself. This influence is plainly apparent at the Crystal Palace just now, where several firms have successfully attempted to evade the necessity of resorting to the "usual thing" of show-case architecture. A marked success in this respect has been achieved by Messrs. Wellington & Ward, whose "stand," if we may so refer to their very beautiful installation, is decidedly one of the features of the Exhibition. It is due to Mr. George Walton, who has designed and produced a simple, graceful structure, light in form, delicate and harmonious in white and green colouring. The "ceiling" is of canvas, and the wall is of Japanese matting, all three sides being, of course, neatly boarded in. Incandescent electric lights depend from the roof, and you enter beneath a somewhat mediæval-looking lamp, and find yourself in a beautiful little saloon, the walls of which are judiciously, but not excessively, covered with framed photographs on Messrs. Wellington's papers. Cool, light, and harmonious, the total effect is indescribably pleasing.

Messrs. Beck, too, have left the beaten track. In the centre of the large space they occupy they have erected an airy-looking pavilion, coloured and picked out in white and gold, and at the four corners of the space are connecting wings harmonising in design with the main structure. The very large alcoves of Messrs. Morgan & Kidd and Messrs. Elliott and Son are richly carpeted, and coloured in subdued tints that do not offend the eye, but serve to throw into relief the pictures that are hung in them. Messrs. Griffin have a large open lightly coloured pavilion-like structure for their exhibit, and in the centre of Messrs. Houghton's space is a similar erection, draped in blue and cream. Messrs. Zimmermann, Messrs. Dallmeyer, and others are also conspicuous by the good taste shown in the designs and colours of their stands. It is a hopeful and refreshing sign when so much care is expended on this branch of exhibition management, and justifies the belief that photography is rapidly catching up to other branches of industry which at exhibitions make a feature of doing the greatest justice to whatever is shown by singling out the "frame of the picture" for special consideration and treatment.

We append detailed references to the exhibits:—

Stand No. 1.—Mawson & Swan, Soho-square.

Messrs. Mawson's stand is 24 feet by 30 feet, and is erected upon a platform. A structure, 18 × 12 feet, has been built, at one end of which is an enclosure; the other end carries a frame holding a large variety of transparencies. A table, 18 feet long, is used for the principal exhibits, which include portrait photographs produced from negatives taken on the Castle, the Electric, and the Mawson plates by professional photographers. Photographs of views and general out-door work taken on Mawson & Swan plates, chiefly the Castle brand. Photographs of instantaneous work, represented by steamers and boats going at full speed. These photographs were taken under exceptionally difficult conditions, viz., on a constantly moving tug out at sea. The negatives were on the Mawson plate (special rapid emulsion). A series of lantern slides $3\frac{1}{4} \times 3\frac{1}{4}$) on the Mawson lantern plates. A series of lantern slides, showing the various tones which are obtainable on the Mawson lantern

plates by simple development and by toning after development. A set of transparencies (24 × 18) produced on Mawson & Swan's new dry plate, the Half-tone. A set of negatives ($8\frac{1}{2} \times 6\frac{1}{2}$) taken on Mawson & Swan's photo-mechanical plates. A set of specimen photographs, illustrating the results obtained on an ordinary plate as compared with those on Mawson & Swan's orthochromatised dry plate.

Chemicals.—Specimens of the principal chemicals used in photography: collodions, varnishes, mounting and retouching mediums, backing solutions, developing solutions, toning and fixing cartridges, and dry plates in their original wrappers as sold. Specimens of half-tone work (Swan-type process) by the Swan Electric Engraving Company, produced from negatives by Mawson & Swan's standard collodion. Specimens of three-colour work by J. Swain & Son, produced from negatives by Mawson & Swan's standard collodion.

Stand No. 2.—Marion & Co., Soho-square.

Messrs. Marion's large stand is advantageously placed near the centre transept, and is so constructed that it may be viewed from both sides of the South Nave, where it forms a very prominent feature. The great Soho-square house sends a well-selected collection of photographic requirements for display, the principal features of which are as follows:—

Mounts.—A pyramid of mounts, showing the various styles as used for the mounting of midget, York, *carte de-visite*, and cabinet photographs. Printed mounts of great variety arranged and displayed on a large board. Samples of blocking in gold, aluminium, blind, and in colour. Slip-in mounts, various styles and sizes. Gold bevel mounts for boudoirs, imperials, panels, and various sizes for views arranged to form a stack.

Dry Plates.—A series of negatives by various photographers taken on plates. A series of transparencies on Marion's gelatino-chloride and chloro-bromide plates. Electrical negatives, taken by Mr. Kenneth J. Tarrant, showing marvellous effects produced by exposing a Marion plate to the electrical discharge of a transformer. Röntgen rays on Marion's plates.

Marion's Papers.—Framed views on glossy Mariona paper; matt Mariona paper. Portraits on gros-grain Mariona paper. Prints on bromide smooth; on bromide rough. Ferro-prussiate tracing, white lines on the ground by exposure to light and simply washing in water. Gallate-de-fer tracing, black lines on white ground by exposure to light and development in one bath. Melagraphic paper tracing, with lines on white ground by exposure to light and simply washing in water. Prussiate tracing on linen by exposure to light and simply washing in water. Bromide enlargements.

The Sundries Section includes Ashford tripod stands. Tintograph: a box of three colours and medium, a process for colouring photographs, engravings, and opals. The perfect developing dish: by a very simple form air bubbles become impossible, and less solution is required in development. Cameras; the actinograph; adhesive films, carriers, and photographic materials of all kinds complete a capital exhibit.

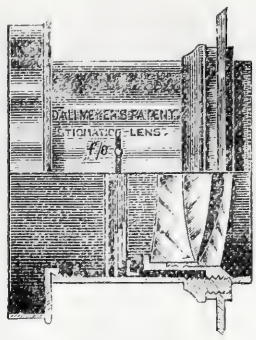
Stand No. 3.—W. Watson & Sons, 313, High Holborn, W.C.

Messrs. Watson have two cases well filled with apparatus of their own manufacture, the good qualities of which have long been recognised. The exhibit consists of Acme cameras with brass and aluminium mountings. Premier cameras, Alpha hand cameras; special hand cameras, fitted with focal-plane shutters for instantaneous exposures up to $\frac{1}{1000}$ of a second. They also show a new hand camera, the Fram; this is a magazine camera carrying twenty-four films, which are interleaved with cardboard or other backing, the operation required for changing being as follows—the magazine is pivoted at the top, and by a swinging motion backwards the film and the backing are together released and fall into a reservoir below, and when the magazine is pushed forward into its vertical position again another film is projected into position for exposure. Dark slides for the Lippmann colour process; Ives's Kromskop, also Ives's Multiple Back for taking negatives, transparencies from which are shown in a special kromskop in their natural colours, are features of the exhibit; and, besides a new panoramic camera, there are examples of studio stands and field tripods both in wood and aluminium.

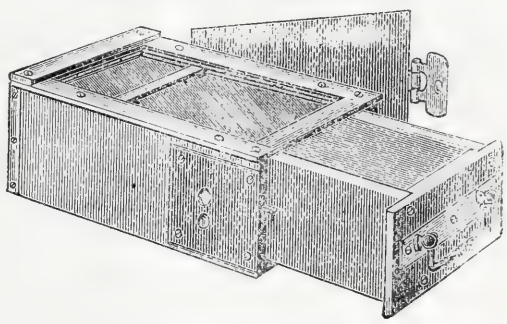
We believe we are correct in saying that Messrs. Watson are the sole exhibitors of the Kromskop at the Exhibition, and, if that be so, it may safely be concluded that Stand No. 3 will be well patronised during the Exhibition, as it is not possible to conceive anything more startling and realistic in its beauty of colour than a properly shown Kromgram. With the colour projections, according to Mr. Ives's method, the Prince expressed himself heartily delighted in the theatre on Monday, and we trust that Messrs. Watson will have many opportunities of popularising this system of colour photography among visitors to the Palace.

Stand No. 4.—J. H. Dallmeyer, Limited, 25, Newman-street, W.

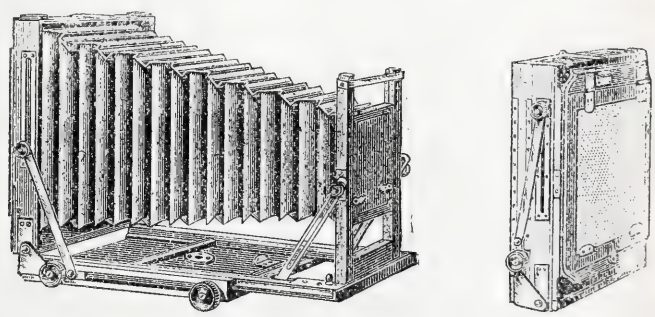
Messrs. Dallmeyer naturally give prominence to their recently introduced lenses, including the Stigmatic, *f*-6, Series II., angle 85°. The front and back combinations may be used separately as single landscape lenses, focus 1½ times, and twice that of the entire lens. Series I., *f*-4, is a portrait combination, and the merits claimed are great flatness of field and freedom from astigmatism over a much larger field than is possible with the ordinary portrait lens. The Dallmeyer-Bergheim lens, with variable length of focus, giving large images with comparatively short



camera extension, is also shown. In this lens a considerable amount of spherical and chromatic aberrations are introduced in order to secure softness of definition. The other optical exhibits include a special projection lens for cinematographs, *f*-2·2, 2-inch equivalent focus; tele-photo-

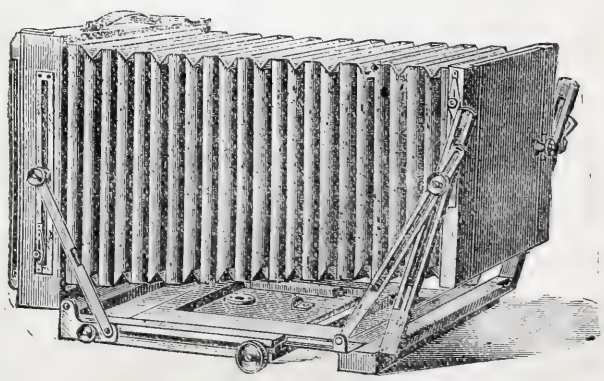


graphic lenses and De la Crouee's Selective Shutter, an instrument designed to equalise the illumination over the entire field of a photographic lens, reducing the intensity from the centre outwards, while allowing the whole of the available light to act upon the margins of the plate. It



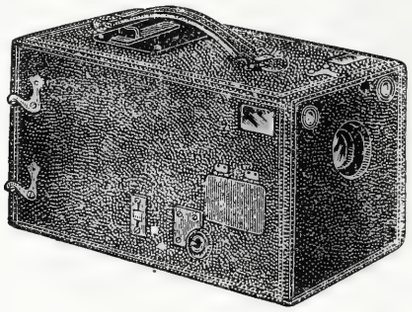
admits of a longer exposure being given to any particular portion of the picture.

The exhibits also include specimens of work with the Stigmatic lens, including some wonderful diving pictures by Signor Branchi, of Funchal,



as well as examples of other lenses. A couple of fine pictures taken with the Dallmeyer-Bergheim lens attract attention. The firm, moreover, show a new hand camera, fitted with the Stigmatic lens aperture *f*-7·5; this will be sold at a popular price; a new changing box for twelve

plates, somewhat on the principle of the Binocular camera; a new light model field camera; the Premo cameras, fitted with Dallmeyer lenses, an improved form of Sanderson's camera, with addition of swing back,



extending baseboard, and a very rigid front, and square and conical cameras of ordinary patterns. The firm's stand occupies a prominent position, and it is decorated and coloured in a tasteful and striking fashion.

Stand No. 5.—Messrs. Elliott & Son, Barnet.

Messrs. Elliott's alcove, one of the largest and most refined in decorative effect at the exhibition, is occupied by a number of carbon and bromide pictures, tastefully hung and displayed. The following is a list of some of the exhibits:—

Study, *Child's Head*, red carbon (Elliott & Fry). Study, *Child's Head*, red carbon (Elliott & Fry). Architectural, toned bromide (Bulbeck & Co.). Study (H. J. Elliott). Specimens, Barnet platino matt bromide paper, contact prints. Specimens, Barnet carbon tissues, direct prints. *Palais de Justice, Brussels*, Barnet snow enamel paper (Bulbeck & Co.). *High Crags and Head of Buttermere*, bromide (Green Bros.). Study of *Cattle, Thirlmere*, bromide (Green Bros.).

It seems only the other day that Messrs. Elliott took up the carbon department, but they have won a foremost position in this branch of photographic printing, and their work is always sound and good. Better specimens than those here shown it would be impossible to have. The bromides particularly take our fancy, calling to mind, as we do, what the leading characteristics of this process were some few years ago, viz., heavy shadows, hard whites, and shortness of gradation scale. The advance of taste and the skill of the manufacturers have changed all this for us, and there is evidence of the alteration in the Barnet bromide prints and enlargements. These have all the effect of soft and delicate engravings, and the transition from shadow to light is gradual, so that the pictures combine harmoniousness with softness. Messrs. Elliott's exhibit reflects the greatest credit on the Barnet house, and, if the experiences of the opening day be any criterion, is certain to occupy the attention of large numbers af visitors. We may mention that Messrs. Elliott are shortly issuing *The Barnet Book of Photography*, which contains fourteen articles on practical topics by well-known photographers.

Stand No. 6.—A. & M. Zimmermann, 9 and 10, St. Mary-at-Hill, E.C.

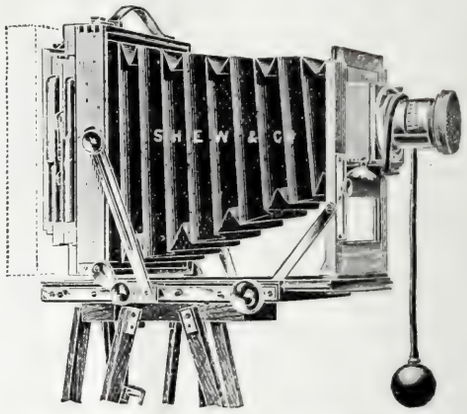
Messrs. Zimmermann make a fine display of chemicals for photography manufactured by the Chemische Fabrik auf Actien vorm. E. Schering, Berlin. Anthion, a hypo eliminator and photo-formalin, for hardening plates and films and prevention of frilling. Specimen prints on Schering's gelatoid and collodio-chloride paper. Collection of developers, &c., manufactured by the Actien Gesellschaft für Anilin Fabrikation, Berlin, including diogen, diphenal, and ortol, the new developers; also Röntgen-ray plates and films, coated on both sides and of great rapidity, requiring only one-quarter or one-third the exposure necessary in the case of ordinary plates. A collection of colours for photography and micro-photography. A collection of chemicals, specially prepared for photography. York Schwartz non-explosive smokeless flashlight foil, a patented process whereby definite time exposure can be gauged by cutting off a certain amount of foil. York Schwartz non-explosive smokeless magnesium cartridges of various sizes, giving off a broad and long sheet of light, with scarcely any smoke. York Schwartz non-explosive smokeless flashlight powder.

Stand No. 7.—J. F. Shew & Co, 87 and 88, Newman-street, W.

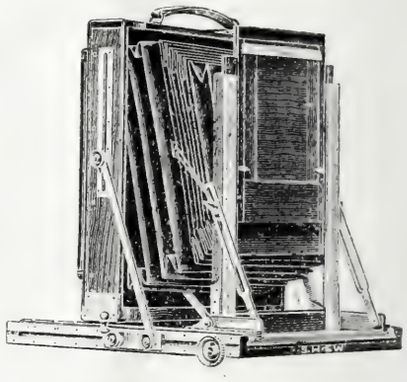
Messrs. Shew include in their exhibit a new series of cameras—the Xit—which are fitted with Dallmeyer Stigmatic and Zeiss lenses.

They can be had either with the Shew central shutter or the New Bausch & Lomb Pneumatic Time and Instantaneous; also with Eastman Daylight Cartridge-back Roll-holders. The special light Xit takes double backs for cut films or for glass plates; the Shewgraph changing back, which holds either twelve glass plates or sixty cut films without any preparation. This camera is made in ½-plate, the whole set weighing only 2½ lbs., whilst in the ¼-plate size it can be easily carried in the coat breast pocket.

The Junior Series for the half ¼-plate, $3\frac{1}{4} \times 2\frac{1}{4}$, or the Continental half ¼-plate, $3\frac{1}{2} \times 2\frac{1}{2}$, is a popular form of miniature camera.



The Xit Stereoscopic and Half-plate with Thornton-Pickard Stereoscopic Shutter, with adjustable separations and extra panel for ½-plate lens, measures only $8\frac{1}{2} \times 5\frac{1}{2} \times 2\frac{1}{2}$.

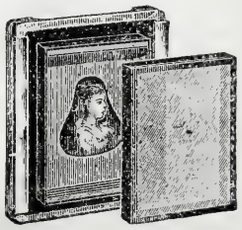


Stand No. 8.—Salmon & Son, 169, Hampstead-road, N.W.

Messrs. Salmon exhibit their patent portable magnesium ribbon lighting apparatus for portraiture, which is constructed to entirely remove

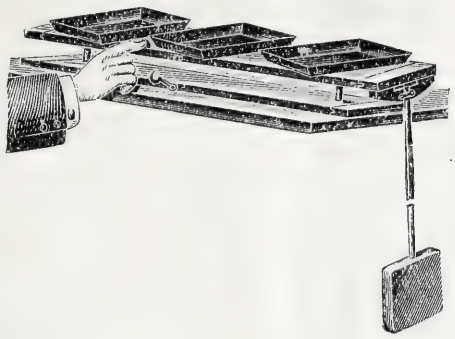


the products of combustion; also their adjustable vignetter, which is adjustable up and down or sideways, remaining clipped by aluminium



slides in any position. By means of metal grooves, the vignetting card

(not serrated) can be placed near or far from the negative, or at an angle,



and may be quickly changed. A new dish rocker, which is constructed for rocking several dishes simultaneously, is also shown. It can be made stationary at will, forming a rigid table.

Stand No. 9.—THE PRESTWICH MANUFACTURING COMPANY, 744, High-road, Tottenham, London, N.

Kinematographic apparatus monopolises this Company's exhibit, which is exceedingly interesting by reason of the mechanical excellence and ease of movement which the cameras and projectors possess. The exhibit includes cameras: Model 1 for lengths of film up to 75 feet; Model 2 for 75-feet films, which can be reloaded in daylight; Model 3, for 500-feet film, has automatic feed and winding arrangements, daylight changing boxes, rotary movements to all parts. Model 4 for films $2\frac{3}{4}$ inches width, having the same arrangements as No. 3. Projectors: No. 1 model for short lengths of films up to 75 feet, rotary movements; No. 2 model for 75-feet films, rotary movement and swing-out action, enabling the title of the next subject to be shown, quick-winding arrangement; No. 3 model for lengths of films of 2000 feet, having automatic winding-up feeding arrangement, adjustable masks and different diameter sprockets, enabling any make of film to be shown; No. 4 Model practically the same as No. 3, only for $2\frac{3}{4}$-inch films; No. 5, the Prestwich patent duplex, designed to overcome flicker. Nine different models of cameras, projectors, and printing machines—in all about fifty machines are shown—and an inspection of them will well repay those interested, as we doubt if there are more efficient machines on the market. We constantly hear high praise accorded to results produced in the Prestwich machines, which appear to us models of mechanical ingenuity and compactness.

Stand No. 10.—THE PLATINOTYPE COMPANY, 22, Bloomsbury-street, W.C

The Company's alcove is hung and draped with dark green cloth, upon which many choice examples of platinotype printing are placed. Mr. Histed, of Bond-street, shows some striking portrait effects, the solidity of the modelling being very marked. Other well-known photographers contribute examples by the Company's processes. Every day Mr. W. H. Smith is to demonstrate the development of platinum prints, and this will be the principal feature of the Platinotype Company's installation, and, as it supplies the public with one of the very few available opportunities for seeing an actual operation of photography in progress, we have no doubt that the alcove will draw interested crowds while the Exhibition is open. Certainly the popularisation of platinum printing is a thing to be encouraged on both theoretical and practical grounds.

Stand No. 11.—MORGAN & KIDD, Kew Foot-road, Richmond, London, S.W.

Messrs. Morgan & Kidd have an extremely handsome display, one of the largest in the Exhibition, and show superb examples of their work, worthy of their long-established reputation as manufacturers of photographic materials and trade enlargers and printers.

The centre of their exhibit is occupied by a bromide enlargement 96×50 inches, a full-length, life-sized portrait of Miss Julia Neilson. On either side hang similar enlargements, life-sized three-quarter figure portraits of Lord Roberts and Miss Maud Hobson. Between these and the centre picture fine examples are shown of enlargements on opal, finished in water colours, and in black and white, in the skilful artistic style for which the firm are famous. On the other side of each of the three-quarter lengths are further examples of bromide enlargements on paper. Amongst these are some most attractive examples of enlarging on cream-tinted bromide paper finished with chalks. Red chalk is used to give warmth and life to the flesh, and other parts of the picture are finished with black crayon, and the high lights touched in with white. The result is an agreeable suggestion of colour, obtained without elaborate hand work. The enlarging exhibits also include important examples of carbon and platinotype enlarging, rich in tone and full of delicate and soft gradation.

The wings of the stand are occupied with the artistic productions of the firm in other directions. On one side is a display of fine examples of printing by the collotype process, illustrating the widely varied applications of this useful process of printing. Amongst them are large show-cards, illustrations for scientific and artistic publications, and of high class commercial catalogues, reproductions of engravings, paintings, &c., imitation silver and platinotype view scraps—imitations so close as to require an expert to distinguish them from the real thing, and also (a great speciality of Morgan & Kidd's) albums of local views, bound in bright, attractive covers.

The opposite wing includes very fine proofs from half-tone process blocks etched on zinc. The remaining space is filled with specimens of untouched prints on Morgan & Kidd's series of bromide papers, including their platino-matt cream crayon, and enamelled-surfaced papers. The whole exhibit is a brilliant display of the resources of this widely known and progressive firm.

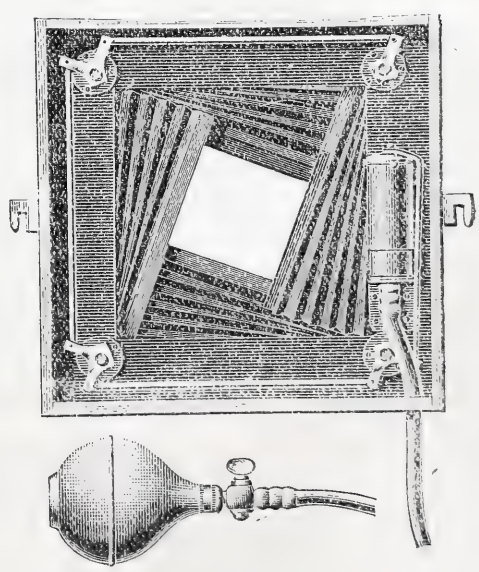
Stand No. 12.—JOHN J. GRIFFIN & SONS, LIMITED, 22, Garrick-street, Covent Garden, W.C.

On Messrs. Griffin's tastefully designed stand are placed specimen prints on Velox development printing papers. It is pointed out that Velox is a chloro-bromide paper with a slow emulsion, and requires an exposure, with an average negative, of from one to eight seconds to diffused daylight, or from twenty to forty seconds to an ordinary gas jet, at three inches, distance. Development can be effected with metol, amidol, or metol-quinol. There are also shown Climax sensitised albumen paper, manufactured in two qualities, soft and brilliant, adaptable to different densities of negatives. Rex printing-out-paper, a gelatine emulsion paper with a hardened film, which can be worked without alum or other hardeners in the hypo bath, and can be toned in a separate gold bath without sulphocyanide. The usual toning baths, such as those used for albumen paper, may be employed. A model of a photographer's studio, fitted with designs of backgrounds and accessories, showing Griffin's adjustable background carrier, new-pattern studio camera on stand, lighted with arc electric light, is made a feature of. While the Exhibition is open, Mr. W. J. Belton will give daily demonstrations of Velox at stated times, which will be found intimated on the stand. On the opening day several successful demonstrations of the paper were given in the presence of large numbers of the visitors, who were obviously interested in the beauty and simplicity of this method of printing, and the skilful manner in which Mr. Belton obtained the best class of results at apparently little expenditure of time and trouble.

Stand No. 13.—GEORGE HOUGHTON & SON, 88 and 89, High Holborn, W.C.

Well displayed on Messrs. Houghton's prettily designed stand, to which we have already referred, is a large assortment of popular and modern apparatus, including Sanderson's Improved Universal swing-front camera; the Triad folding pocket hand camera; the Shuttle, Holborn, Expert, Ranger, Stereoscopic, Sporting, Scientific, Binocular, and Vigilant hand cameras; the Victo and Empress camera sets; the Perfect studio camera; the Holborn cameras; the Ladder camera stands; tripod stands. Houghton's Studio shutter; pocket Kodak enlarger; Maloni's patent flash lamp; rockwash rocker; radiotint process for colouring photographs; ball-bearing roller squeegee; studio reflecting screens.

To most of the exhibits we have already referred from time to time in our pages, and in another part of the JOURNAL mention is made of several other novelties the firm are introducing. Here we may specially allude

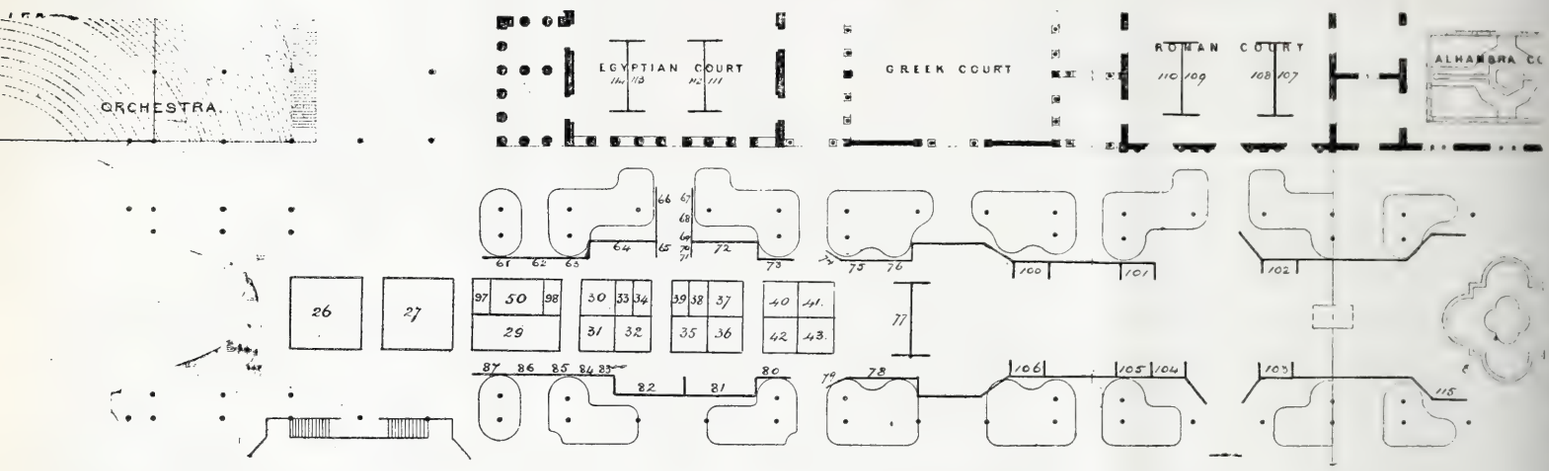


to the Holborn studio shutter, the working parts of which are shown by the illustration. It is constructed to work inside the camera, and, owing to its shape—*i.e.*, square—and the opening being perfectly central, with a minimum of space for the working parts, the smallest size (giving an

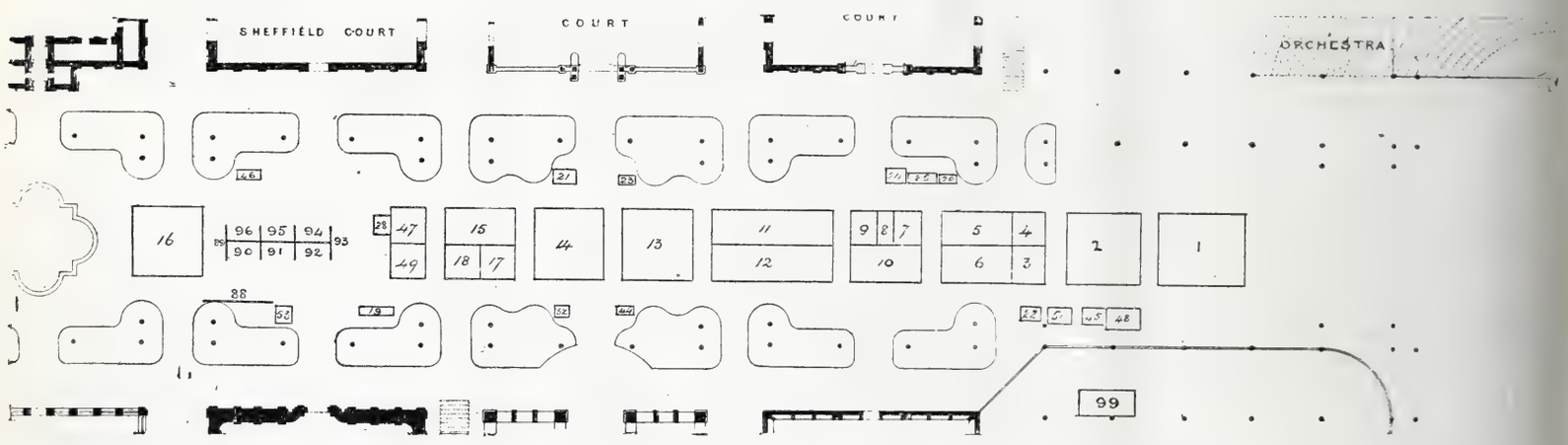
THE INTERNATIONAL PHOTOGRAPHIC EXHIBITION AT THE CRYSTAL PALACE.

PLAN.

NORTH NAVE.



SOUTH NAVE



LIST OF EXHIBITORS. [Sections 3, 4, & 5.]

Stand No.	Exhibitor.
1.	Mawson & Swan.
2.	Marion & Co.
3.	W. Watson & Son.
4.	J. H. Dallmeyer, Limited.
5.	Elliott & Son.
6.	A. & M. Zimmermann.
7.	J. F. Shew & Co.
8.	Salmon & Son.
9.	Prestwich Manufacturing Co.
10.	Platinotype Co.
11.	Morgan & Kidd.
12.	John J. Griffin & Sons.
13.	G. Houghton & Son.
14.	Penrose & Co.
15.	Aerograph Co.
16.	Waterlow & Sons.
17.	Jules Richard.
18.	Natural-colour Photo. Co.
19.	Graphic Art Society. J. R. Gotz.
20.	York & Son.
21.	Henry Lamplough.
22.	J. H. Steward.
23.	R. W. Thomas & Co.
24.	Carter's Ink Co.
25.	C. P. Goerz.
26.	Adams & Co.
27.	R. & J. Beck.
28.	Rotary Photographic Co.
29.	Wellington & Ward.
30.	Ross, Limited.
31.	Cresco-Fylma & Hannam.
32.	J. Lizars.
33.	Prosser Roberts Co.
34.	McKellen & Co.
35.	Iliffe & Son.
36.	British Journal of Photography.
37.	Photographic News.
38.	Metallic Photo-printing Syndicate
39.	London Photographic Supply Co.
40.	Gutenberg Press.
41.	Percy Lund, Humphries, & Co.
42.	Photogram.
43.	Amateur Photographer.
44.	Endolithic Ivory Co.
45.	J. E. Lockyer.
46.	Sampson Low, Marston, & Co.
47.	Mutascope & Biograph Syndicate.
48.	Rose & Coop.
49.	Smith's Acetylene Co.
50.	Underwood & Underwood.
51.	Perfectus Sensitised Paper Co.
52.	Gauthier Villars et Fils.
53.	W. T. P. Turner.
54.	David Nutt.
55.	
56.	
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58.	
59.	
60.	
61.	J. Thomson.
62.	Horatio Nelson King.
63.	Percy S. Lankester.
64.	J. Bulbeck & Co.
65.	Freeman Dovaston.
66.	Taber Bas-Relief Photographic [Syndicate.
67.	Graystone Bird.
68.	Frederick Downer.
69.	Frederick Graves.
70.	F. W. Muncey.
71.	Herman Cartheuser.
72.	Autotype Co.
73.	Chancellor & Son.
74.	William F. Slater.
75.	H. Bedford Lemère.
76.	Frederick Thurston.
77.	Photographic Association.
78.	William Walton.
79.	G. K. Batten.
80.	Edward Goodwin.
81.	Harry Hallier.
82.	Walford & Co.
83.	Husnik & Hausler.
84.	Harold Baker.
85.	H. J. Haviland.
86.	Herbert Mitchell.
87.	Negretti & Zambra.
88.	Meisenbach Co.
89.	Raithby, Lawrence, & Co.
90.	Typographic Etching Co.
91.	John James Bayfield.
92.	Douglas Pym.
93.	Art Reproduction Co.
94.	Strand Engraving Co.
95.	A. B. Fleming & Co.
96.	Lascelles & Co.
97.	E. D. Lavender.
98.	S. B. Bolas & Co.
99.	London County Council, [Bolt Court Technical School.
100.	J. Craig Annan.
101.	H. P. Robinson.
102.	A. Horsley Hinton.
103.	G. Davison.
104.	R. Demachy and C. Puyo.
105.	F. M. Sutcliffe.
106.	Lieut.-Col. A. Gale.
107.	
108.	W. Saville Kent.
109.	
110.	
111.	
112.	
113.	
114.	
115.	National Photographic Record Association.

aperture of 3 inches square) can be fitted inside any half-plate studio camera.

The particular features of the shutter are: Perfectly central opening; large dimension of aperture in proportion to outside size; rapid action in opening and closing; resistance in opening equally distributed (no vibration); no projections whatever, either closed or open; no trouble-some bellows, the pneumatic attachment being quite new in principle; silent in operating; easily attached to any form of studio camera; gives perfectly uniform exposure. To fit the shutter inside the camera, all that is necessary is to fix the two screws in correct position either on the rising front or framework of camera (according to the size of shutter selected), and to slip the two hooks fitted on each side of shutter over the projecting screw heads. The tube should be passed through a hole bored in the front framework of the camera, this making the most effective light-tight joint, besides being much preferable to dividing the tube in two pieces and connecting with brass fitting, which is very likely to cause a leakage of air sooner or later.

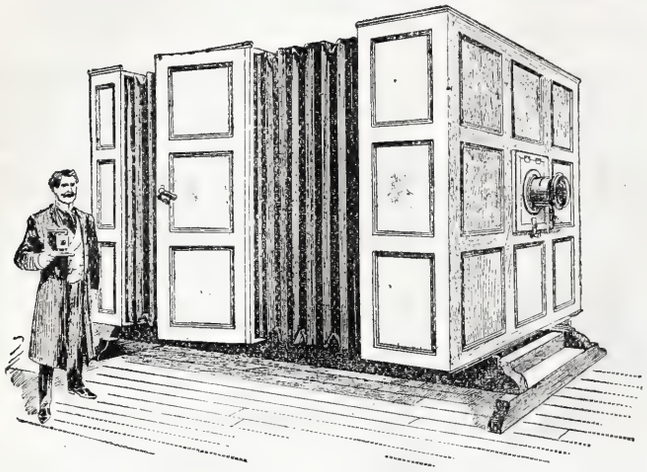
Stand No. 14.—Penrose & Co., 8 and 8A Upper Baker-street, Lloyd-square, London, W.C.

Messrs. Penrose make a leading and popular feature of *The Mam-moth Process Camera.* This camera, in which we ourselves, though over six feet high, easily stood upright, is believed to be the largest made, at any rate for process work. It takes a plate 6 feet by 5 feet, but this size can only be utilised for line work and ordinary copying, as the Levy screens necessary for the half-tone process can only be obtained up to about 40 × 30 inches. It is intended that the back part should be built into the partition wall of a dark room, so that the latter would really form the dark slide, otherwise a holder of sufficient dimensions would be extremely heavy and cumbersome. By enclosing



Photographed by] Crystal Palace Exhibition: The South Nave. [*Messrs. Negretti & Zambra*

the rear of the camera as a dark room, the plate would be placed direct into the back part of the camera, being held in position by adjustable bars, which take any size from whole-plate up to the full capacity of the



camera. The full extension of the camera is 12 feet, so that, when using a lens of about 60 inches principal focus, it is possible to copy same size as the original. To provide for the use of lenses of shorter foci, the middle body of the camera is provided with a plate-holder, and, by means of a door in the side, the operator can enter. This part of the camera forms a little room, about 7 feet by 3 feet, in which at least two persons can stand and watch the operation of focussing the image and exposure. The lens fitted to this camera is of the symmetrical type, specially made for copying purposes by Ross, Limited. It works at *f*-11, and has an equivalent focus of sixty inches. It is intended, during the Exhibition to allow visitors to enter the camera and view the interior, which the Prince of Wales inspected with much interest.

A Copyboard for Process Work is shown in conjunction with the process camera for centering the picture to be copied. It runs to and from the camera on rails. The centre portion of the board is provided with a rotary movement for turning the picture to different angles in three-colour work, so as to secure the proper crossing of the lines.

Electric Arc Lamps for Process Copying and Printing.—These have spherical reflectors for directing a constant and steady illumination upon the copy, or printing frame, dispensing with daylight altogether. They are provided with stands for making the necessary adjustments.

Messrs. Penrose's exhibit occupies a large space, and appears to be very popular with visitors.

Stand No. 15.—The Aerograph Company, 30, Memorial Hall, near Ludgate-circus, London, E.C.

A fine display of enlargements as carbons, bromides, platinotypes, &c., finished with the aerograph in water colours and monochrome. They will also give demonstrations each afternoon from three to five p.m., making drawings, finishing enlargements, &c. They are also showing some landscape work, finished in water colours, which will, we think, be of interest to amateur photographers, and are exhibiting for the first time a larger-size aerograph more especially designed for pottery and lithographic work, &c. They have specimens of ceramic art and decorations on fabric, &c. The stand is 24 × 12 feet, nicely decorated, and it attracted the attention of the Prince, who, as we remark elsewhere, paused to watch Mr. Burdick deftly manipulate the aerograph.

Stand No. 16.—Waterlow & Sons, Finsbury, E.C.

Messrs. Waterlow's exhibit consists of a series of very fine specimens of printing by the collotype, Woodbury, and heliochrome (colour work) processes, also zinc etching in line and half-tone, and copper-plate intaglio printing—practically all the known photo-mechanical processes, we are reminded.

The Company rightly point out that they are probably the only firm in the kingdom who can exhibit such a variety of process work. The exhibit is conveniently arranged in a handsome closed-in stand placed at the extreme end of the South Nave, and is sure to receive great attention.

Stand No. 18.—The Natural-colour Photographic Company, Limited, 12, Great Brunswick-street, Dublin.

The Joly Process of Colour Photography depends, as is well known, on the fact that compound colours may be produced by placing their constituents side by side in lines; these lines, if sufficiently fine, cannot be distinguished separately, and thus in the eye are automatically combined. The Company exhibit apparatus illustrating the theory and practice of the process. Natural-colour photographs, viz., flowers, birds, butterflies, pictures, landscapes, &c., and stereoscopic pictures. The photographs are to be shown by gaslight, daylight, and in the electric lantern.

We have little hesitation in saying that the exhibit will be a popular one. At Captain Abney's recent lectures at the Royal Institution and the Camera Club the projection of the Joly photographs on the screen and the transparency displays at the first-named largely interested the audiences. The process is unique and simple, and, having regard to possible fields of improvement which are open, probably has a great future before it.

Stand No. 19.—J. R. Gotz, 215, Shaftesbury-avenue, W.C.

Mr. Gotz shows two frames with specimens of his heliographic processes of ferro-gallic and of ferro-prussiate printing.

Stand No. 19.—The Graphic Art Society, Geneva.

This is an excellent exhibit, showing the perfection to which the Geneva house has brought its reproduction process. It includes samples of collotype printing, imitation albumen, platinum, carbon and copper-plate prints, portraiture in the style of platinum or of silver, reproductions of oil paintings, engravings, machinery, furniture, &c.; samples of half-tone etching, and samples of chromogravure in three colours for the reproduction of paintings, water-colour drawings, &c., and for advertising purposes.

Stand No. 20.—York & Son, 67, Lancaster-road, Notting-hill, W.

Messrs. York show two frames of optical lantern slides; one containing selections from technical education sets, the other selections from enlarging sets. All are from direct negatives, and were made by reduction in the camera. The process employed was wet collodion, toned with chloride of platinum, and varnished with spirit varnish. The slides are advantageously placed at the side of the South Nave for the inspection of visitors. A glance at them shows that Messrs. York well sustain the reputation they long ago established as producers of pure, crisp, and brilliant lantern transparencies.

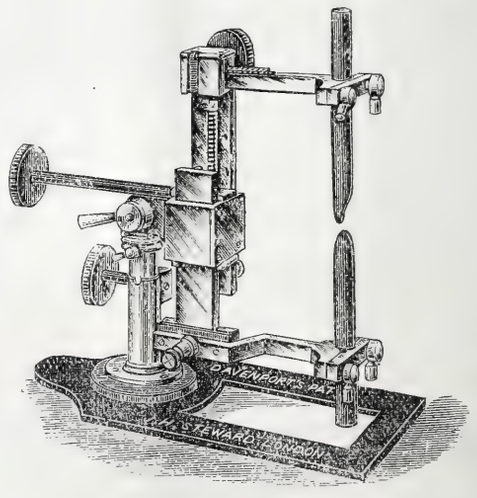
Stand No. 21.—Henry Lamplough, Ltd., 167, Strand, W.C.

The Avery backing, as our readers are already aware, is a preparation which dries hard in a few minutes, and that can be removed with sponge moistened with water. Messrs. Lamplough on their stall show a number of photographs made for the purpose of illustrating the efficacy of the Avery backing in reducing halation.

Stand No. 22.—J. H. Steward, 406, Strand; 457, West Strand, W.C.; and at 7, Gracechurch-street, E.C.

This exhibit consists of stand cameras of the improved Omnic form, with rectiform lenses of various kinds; the Steward hand and stand cameras, and various other hand cameras; optical lanterns and dissolving-view apparatus for electric and limelight, particularly biunial and triple lanterns; single electric lanterns; single lanterns for oil and incandescent gaslight; institution lanterns; the Club lantern; bellows-fronted lanterns; electric arc lamps; improved Davenport-Steward universal arc lamp; specially made portable resistances for use with same; cinematograph and films; projection microscope of improved pattern; high-power limelight jets of simple and mechanically centering patterns; improved cut-off, with and without screw-down valve fine adjustment for controlling light; automatic gas regulators for compressed gas; patent anti-glare jet of high power; lantern polariscope of best make; photographic and hand-drawn slides, artistically painted for dissolving views and effects; projection polariscope.

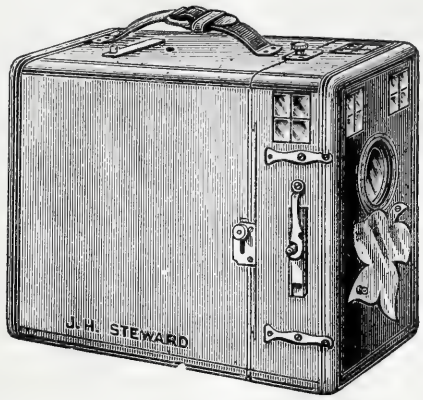
A special feature of the exhibit is a display of the new-pattern Davenport-Steward arc lamps for optical lanterns and general projection



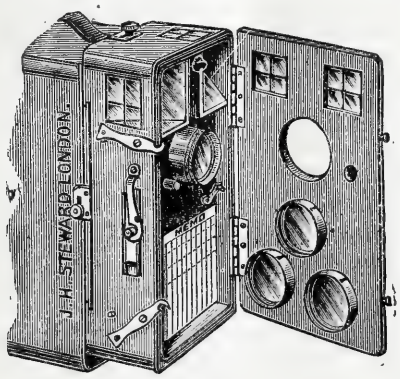
purposes. They can be seen working on the electric current supplied to the Palace by the Sydenham Electrical Company. This form of lamp seems capable of fulfilling all the requirements of lanternists and is suitable for stage lighting. The gearing of the racked bars at different ratio, *viz.*, three to two enables the light to be kept central with a

minimum of trouble or adjustment on the part of the operator; but, if this should be necessary, every movement can be obtained by the adjustment provided. We can recommend our readers interested in electrically lit lanterns to inspect this exhibit.

The Steward hand camera has many features of novelty which makes it a practical camera for either hand or stand work. It is convenient in size, takes twelve quarter-plates, or, in pattern B, thirty cut films. The changing arrangement is of a type well known and which has stood the



test of years of trial, and, being simple and effective, can be relied on. By pushing along a sliding piece on top of camera the plate is changed, the exposed one being guided to the bottom of camera by a runner and held there by a spring, a fresh plate goes into register and the number is recorded on the top. The rising front makes it useful for architectural



work, and the extra lenses permit of near objects being photographed. A rapid rectilinear lens is fitted, and the shutter is time and instantaneous and ever set. The exposed plates can be removed from bottom of camera without interfering with those unexposed; fittings for stand and a memo tablet are provided. Altogether this is a good type of hand camera.

The Omni cameras also in this exhibit are specimens of good workmanship and excellent design.

Stand No. 23.—R. W. Thomas & Co., Ltd.

This exhibit, although not one of the largest, is one of the most tastefully arranged and decorated, and contains much of interest to the amateur and professional alike. Some of the examples are a convincing proof of the superiority of isochromatic plates, and make us wonder why they are not more generally used, especially as this enterprising firm supplies them at the same price as ordinary plates, and the charge for backing is very moderate. The specimens showing latitude in exposure are really worth seeing. The enlargements and direct photographs made from negatives on their A1 plates speak for themselves. This firm has a new method of packing their plates, having entirely done away with wrapping papers, which in the dark room have always been a great inconvenience.

Other important specialities are their highly concentrated developers, which are sent out in neat cases, at such a moderate price that to mix one's own solutions does not pay for the trouble. A new feature is that their well-known Hydroquinone Developer may now be obtained in half-size cases.

Thomas's New Perfected Albumenised Paper should be a boon to amateur photographers, as it works easily at any temperature, has a brilliant surface, and does not frill or blister.

Among their many other specialities, we think their Encaustic Cereate, for the preservation and beautifying of silver prints, should recommend itself to the professional photographer.

Thomas's Collodion, introduced by the late Mr. R. W. Thomas nearly half a century ago, still maintains its high standard of excellence.

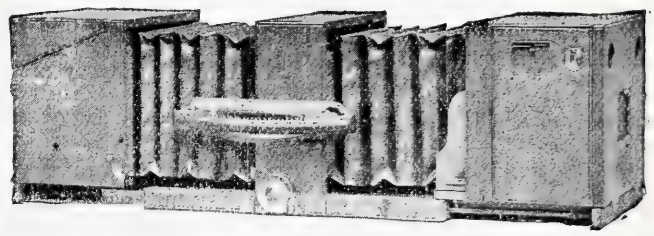
Stand No. 24.—Carter's Ink Company, 7, Bunhill-row, E.C.

The exhibits are Carter's Photo-library Paste: a smooth white paste containing an antiseptic, free from acid and specially made for the mounting of photographs, &c.; and the Gilson Adjustable Album for Photographic Views, the leaves in which are so arranged that they can be increased or decreased in number in a moment. The album will hold from one or two photographs up to its maximum number equally well, each being gripped by means of silk cords at the top and bottom which enter deep slots in the leaf.

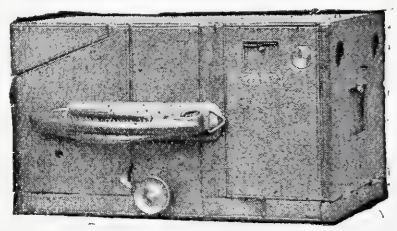
Stand No. 26.—Adams & Co., 26, Charing Cross-road, W.C.

Messrs. Adams' large stand or stands accommodate an imposing collection of apparatus. They occupy a complete block of 576 square feet in the centre transept, facing the organ. The principal article of attraction is their new Adams de Luxe series of cameras, and they show very good specimens of work done with the three-foci pattern. We can testify that these cameras are of a very high-class character, and possess important new and useful features, which are introduced for the first time. They also show their popular Yale instruments, which have been specially introduced for cyclists and others requiring a small first-class instrument. The Yalus is a somewhat similar series, but of a cheaper class.

A twin-lens Yale is shown, which is claimed as the smallest one made that will take twelve quarter-plates or twenty-four films. They have also



a large display of the Adams Brilliant View-finders, as well as their later Daza finders, and adjustable shutters made in aluminium. Of field cameras there are many varieties, including the Club, which is a high-class instrument. A very large number of specialities are shown, embracing probably the whole field of photographic apparatus. One novelty well worth attention, which we understand is shortly to be placed upon



the market, is a new brilliant view-finder, which has only been patented within the last few days. It has the great advantage of being of one piece of glass only, thus avoiding the usual troublesome reflections, and it shows an erect image, being correct from left to right. In this important respect it differs from other finders.

Changing boxes of various patterns, enlarging and reducing cameras, backgrounds, and numberless other photographic requisites, help to fill up a well-displayed exhibit. The new slides and screens by which any one can take negatives for the kromscop are shown for the first time.

The illustrations depict the Adams de Luxe cameras, which, after a very careful examination, we are able to pronounce as thoroughly worth the distinctive title that has been given to it. We hope shortly to speak of it in detail from a practical trial.

Stand No. 27.—R. & J. Beck, 68, Cornhill, E.C.

Special prominence among Messrs. Beck's exhibits, which include many examples of work produced with them, is given to the Frena series of cameras.

The Frena cameras all work on the same general principle and are distinguished by the following characteristics. They use flat films of celluloid or setoloid in a pack. The films are contained in a metal box, which is swung on centres within the camera, and is attached to the handle, L (fig. 1), with the first film facing the lens.

The films are notched along the edges, and are all stamped out in discs to exactly the same shape. The notches are so arranged that, if each alternate film of a pack is turned end for end, the notches, instead of being opposite each other, will be alternate in every consecutive film, as shown in fig. 2 and 3. The films are supplied by the makers with the notches thus alternate in every consecutive film, and with a piece of opaque card between each films to prevent light passing through one

film to the next. The pack of films thus supplied is placed in the metal-holder of the camera and pushed forward by a spring board till it rests against a series of pins or teeth which project inwards from the sides of the box; these are situated in those portions of the edge of the foremost film where the notches do not exist, so that the entire pack is supported against these teeth or pins, and held in position in the metal box. When the first photograph has been taken, and it is required to remove the exposed film, the camera is held with its lens pointing upwards, and

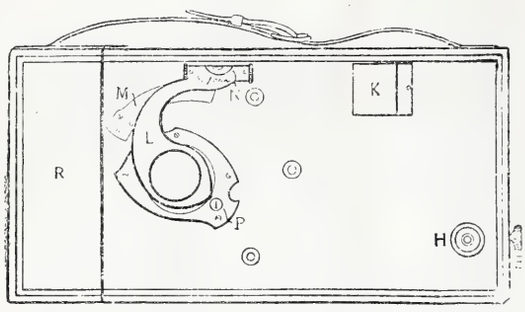


Fig. 1.

the handle, L (fig. 1), is revolved half a revolution, thus turning the metal holder which carries the film until the foremost film faces the back of the camera. As the holder is turned round in this manner, the pins are automatically moved along the edges until they are in the notches of the first film, which, being no longer supported, falls into the back of the camera; the second film, and therefore all the rest of the pack is, however, supported by the pins, because the notches of this film are in an alternate position to that of the first, and therefore one film only, together with its interleaving card, is dropped for one turn of the handle, and the handle being returned to its original position, the next photograph may be taken when the handle is turned a second time; the pins or teeth are moved back to their original position, and the second film is dropped, and so on, each turn of the handle depositing one film in the camera back, an indicator at P (fig. 1), records how many photographs have been taken. The fact that the films are from the nature of the design carried in a swinging metal holder has been utilised to provide with each camera a swing back, in the handle at N (fig. 1), a spirit level is provided, and, if the camera be pointed up or down the handle, L, may be released from its catch, M, and moved either one way or the other until the spirit level is correctly levelled. This, then, indicates that, at whatever angle the camera itself may be, the film itself is plumb, and no distortion will appear in the picture. This swing back may be used about 20° either way. To remove the exposed films and to reload the back of the camera at R is taken off. All Frena cameras are provided

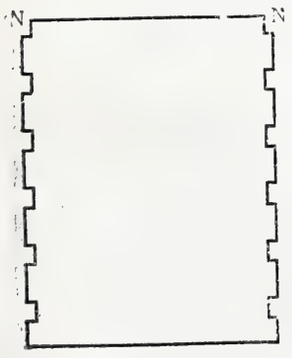


Fig. 2.

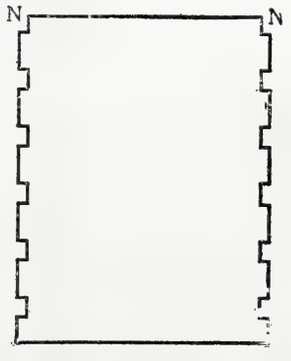


Fig. 3.

with two view-finders, giving accurately the picture included. The Frena shutter works between the lenses, and consists of a pair of identical superimposed circular plates with a large aperture some four or five times the diameter of lens aperture. These plates always revolve at the same speed whatever the length of exposure required, and, as the plates are revolved, the aperture before mentioned passes across the aperture of the lens and makes the exposure. With this large aperture the exposure given is one-fifth of a second, by turning one of the two superimposed plates. With reference to the other, the aperture is reduced in size, and thus a shorter exposure is given. In this way speeds from $\frac{1}{5}$ to $\frac{1}{80}$ of a second are made. It is claimed that this method is superior to those where alteration in speed is dependent on brakes, because, depending only on the relative sizes of an aperture, the relative speeds must be strictly accurate. Instantaneous exposures $\frac{1}{5}$ to $\frac{1}{80}$ second are made by pushing in the trigger, H (fig. 1; time exposures by pulling it out and then pushing it in.

Stand No. 28.—The Rotary Photographic Company, 10 & 11, Austin-friars, E.C.

This exhibit consists of rapid bromide printing for advertising purposes generally, more especially for show-cards, catalogues, posters, and also for reproduction in photography of pictures and statues generally up to life size. There are five-feet reproductions of the well-known statues *The Discobolus* and one of a *Venus*, from the Italian galleries.

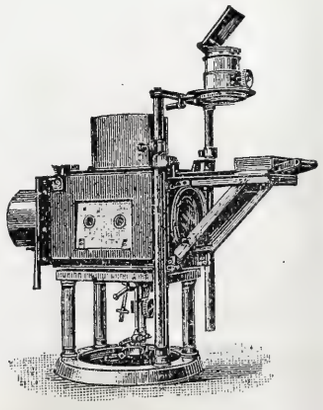
It was the Company's intention to show a roll of life-sized photographs from the roof of the Palace, but an awning had been placed over the Exhibition, which prevented the full extent of the roll from being seen. The Company is intended entirely for the production in large quantities of reproductions from any negative for commercial purposes, and in no way affects the ordinary photographic business. The work shown on the exhibit is exceedingly good, and there is no doubt that, for the purposes mentioned by the Company, the adaptation of bromide printing to the production of large quantities of impressions in a great range of sizes has a wide commercial field open to it.

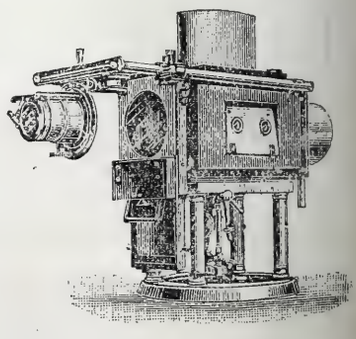
Stand No. 29.—Wellington & Ward, Elstree.

Messrs. Wellington & Ward, on their very beautiful stand to which we have previously referred, make a most effective display of work in platino-bromide. The undoubted improvement in the surface of bromide papers by giving it a fine grain resembling, as it does, the delicate matt of a platinotype print has made this printing process a very popular one. It has undoubted advantages over any other method of printing, owing to its extreme sensitiveness to artificial light, whereby work may be carried on in spite of bad weather, and it is specially applicable to automatic machine printing in a continuous band where large quantities of prints (purely photographic) are required for book illustration and other publication purposes. It is possible to print 5000 to 10,000 per day by this method. The tone of the image is of a beautiful grey or rich black, according to the density of the negative and exposure of paper, and in this respect the quality never varies. The following grades are manufactured by Messrs. Wellington & Ward:—smooth surface, suitable for small contact work; rough surface, suitable for enlargements; tinted rough, a delicate cream crayon; special thick, like thin card. The firm's other exhibits include choice examples on Enammo: a highly glazed surface paper, possessing very great richness in the shadows, tinted bromide, coated on both sides, suitable where prints are required on both sides of the paper, such as copies of books, &c. Sylvio: a gelatino-chloride paper that is free from double tones, and is especially suited for the phosphate toning bath, giving rich, warm tones. Sylvio Special: recently introduced to suit the popular taste of the sulphocyanide toning bath; this is also free from double tones. The chief characteristic of this paper, however, is being able to judge of the progress of toning by the surface colour, and not by being obliged to view the tones by transmitted light. Sylvio Matt also possesses the same features, only with a delicate matt surface. They have a negative paper, which is claimed to have many advantages over glass, especially where large sizes are concerned, for not only is the prime cost considerably less, but the weight and the risk of loss by breakage is reduced to the smallest possible amount. It is recommended for enlarged negatives, which may be printed from either side, whilst for landscape work even in small sizes, the fine grain of the paper in printing can barely be detected even by a practised hand. For interior work it is freer from halation than a backed plate.

Stand No. 30.—Ross, Limited, 111, New Bond-street, W., and 31, Cockspur-street, S.W.

In addition to their lenses, Messrs. Ross have a large show of scientific and enlarging lanterns, which possess many novel features, and are



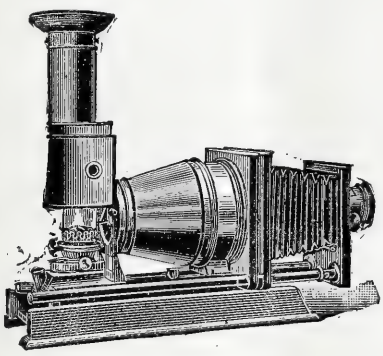


entirely different in construction from the patterns which have been previously before the public. In the first first place, the bodies of these lanterns are made of aluminium, cast into such a shape that, no matter how long the instrument may be in use, it always keeps perfectly cool.

These bodies are beautifully finished, and greatly contribute to the very handsome appearance of the lanterns. In the patent science lantern, which we illustrate, it will be seen that it is possible to use it for either vertical or horizontal projection, and the change of position is effected instantaneously. The lantern is double-fronted, one side being adapted for parallel beam work, and, as the body revolves, while the light remains stationary, a change from one point to the other can be made in a moment.

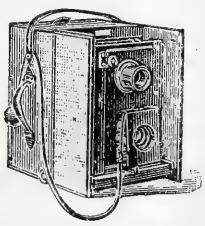
Amongst the other lanterns made by Messrs. Ross, is their new improved model enlarging lantern. In this lantern the tubes which support the front run into very large sockets, and they fit so exactly that great rigidity is obtained, and perfect parallelism is secured. The illuminant is obtained from a powerful duplex burner; but, if preferred, an incandescent gas lamp or a limelight jet may be fitted. The body or jacket enclosing the light, and supporting the chimney, has a patent lifting attachment, a point of considerable importance, and making the operation of lighting up or removing the lamp a perfectly easy one.

Closely allied to the use of the lantern is the Ross arc lamp. This model has a new motion in the method of lateral adjustment, and which ensures the best portion of the light being directed at right angles to the



condenser. This lamp will take carbons of different sizes, according to the amount of current available or the light desired. The rigidity of all its parts is very marked, and the ease of working and simplicity of its adjustments call for praise.

Ross's portable divided cameras are shown in entirely new patterns, and they are made exceedingly small and light. Many photographers who desire to see and focus their object right up to the moment of exposure will



always prefer the certainty of a twin lens to any other form of hand camera. This camera is fitted with dark slides or the Grundmann changing box, which takes twelve plates or twenty films, and only occupies the space of three dark slides.

The exhibit of Ross's Goerz lenses, which Messrs. Ross manufacture, is a very interesting one. Here we have specimens of the Series III., those adapted for all forms of work, and working at *f*-7·7; and the Series IV., a fine lens for architecture, copying, and process work, but rarely used by the amateur, as the smallest size at present made is twelve inches in focus. The Series III. are unequalled at the aperture at which they work. A five-inch lens, which is intended for a quarter-plate, will almost cover a whole plate, and is sharp up to the edge of the circle of illumination. One or two enlargements show the capabilities of this lens for hand-camera work.

Messrs. Ross also manufacture all the Zeiss lenses, and great interest naturally centres round the Planar, the latest optical achievement. The Planar lens works at the large aperture of *f*-4, and gives a sharp picture over the whole of the plate. The introduction of this lens will probably assail the position of the old portrait lens, which, since the days of Petzval, has held its position for purely studio work. The Planar is very suitable for instantaneous work, and when stopped down slightly is strongly recommended for copying purposes. A reproduction of a large picture on Messrs. Ross's stand emphasises this latter point. Two pictures of a flea magnified about forty diameters are also shown, one protected with an aplanat and the other with a Planar, both working at *f*-10. The difference in the two results is very marked, and shows how perfectly the marginal pencils are corrected.

In concluding our notice of Messrs. Ross's interesting exhibit, we must not omit to notice the Ross-Zeiss Convertible Lenses. These lenses are extremely portable, and are of great value because three or more rapid lenses are complete in one tube. For example, the No. 8, Series VII. P is of 7 inches focus, and is very suitable for a half plate, and works at *f*-7. Not only do the combinations of this lens give lenses of 14 inches and 11½ inches respectively, working at the large opening of *f*-12·5, and therefore quite suitable for instantaneous work, but they also cover plates 10 × 8 and 8½ × 6½ with this stop. Messrs. Ross claim that no other lens fulfils so many requirements of the photographer. Some results taken with these lenses are exhibited; but, although they are of an architectural character, we were not able to see any distortion in them. They are excellent examples of the powers of the Convertibles.

Stand No. 31.—"Photo," Limited (late Cresco-Fylma & Hannam, Limited), 72 & 74, Gray's Inn-road, W.C.

The exhibit includes work done with Cresco-Fylma, which, as our readers know, is a solution which, when applied to a gelatine film on glass or celluloid, causes it to strip and expand. The expanded film is remounted, and the photograph in this way is enlarged. Demonstrations are daily given of the process.

Uranotype, a method of printing in Bartolozzi red, green, blue, &c., will also be demonstrated.

Stand No. 32.—J. Lizars, Glasgow.

Mr. Lizars' exhibit comprises the model "C" hand camera, a small folding camera, complete, for both hand and stand work. The quarter-

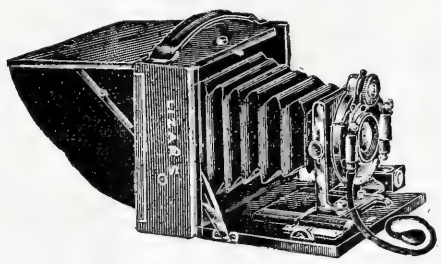
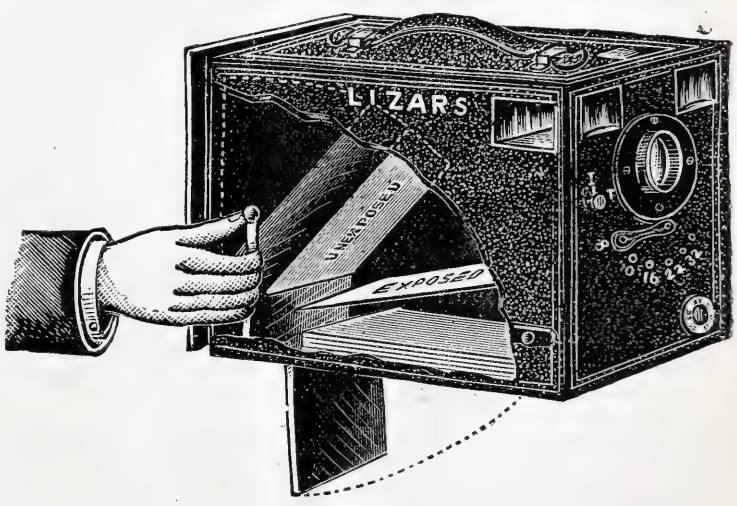
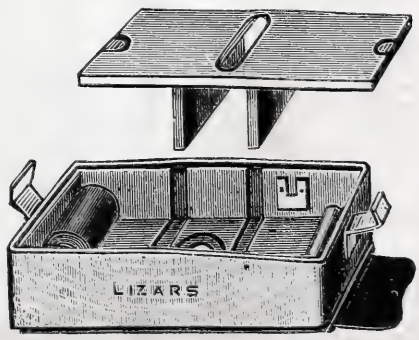


plate size measures only 5½ × 4½ × 2¼, though it comprises all necessary adjustments and fittings, fitted with Bausch & Lomb shutter, three dark slides, and rapid rectilinear lens. The Challenge film camera: a maga-



zine type of camera, constructed to carry fifty cut films or twenty-four glass plates at will. The films are used without any special preparation of the edges, and may be of any make. The daylight attachment: a



neat and compact attachment, allowing daylight film cartridges to be used in any hand or stand camera carrying dark slides.

Stand No. 34.—McKellen & Co. (formerly Thompson & Co.), 4, Bull's Head-yard, Market-place, Manchester.

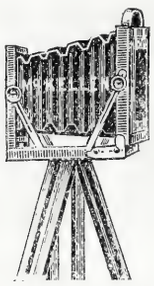
Chief among Messrs. McKellen's exhibits may be mentioned:—

The McKellen "Infallible" Automatic Magazine Hand Camera.—There are many additions to, and improvements in, the internal working parts of last year's type. The gripper is now constructed entirely of aluminium instead of, as formerly, in wood. By this one modification the weight and bulk are reduced, and the rigidity of the camera increased. There are also added automatic safety appliances.

The McKellen "Infallible" Automatic Magazine Hand Camera.—Stereoscopic size, fitted with automatic apparatus for removing the stereo division whilst the plate is changing, and replacing it after the plate has been changed. This is effected by the same movement of the handle which actuates all the "Infalliable" mechanism, and in this camera, as in all other sizes and types of the "Infallible," having set the shutter and exposed the plate, one complete turn of the handle does everything else.

The McKellen Double Pinion Treble Patent Camera which, in 1884, obtained the first medal for apparatus ever awarded by the Photographic Society of Great Britain (now the Royal Photographic Society). It was in this camera that the popular turntable, now so universally adopted, made its first appearance.

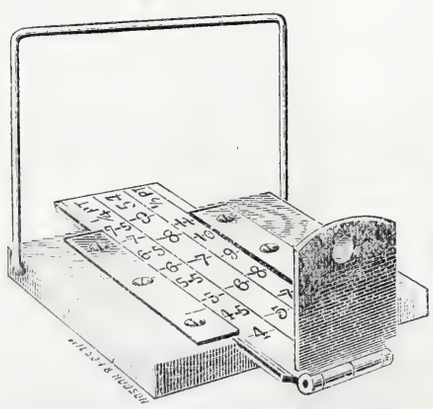
The McKellen Double Pinion Treble Patent Camera.—Constructed to meet the requirements of those to whom a minimum in both bulk and weight is an indispensable condition. Every part of this camera, the dark



slides, and the tripod, has been carefully studied down to the smallest detail to reduce the size in every possible direction, and in this manner, together with the use of aluminium for all the metal work, Messrs. McKellen have reduced tho weight to nearly one-third of the original.

McKellen's Special Camera.—In this camera there is no ground-glass focussing screen, and it does not require a focussing cloth. It is fitted with a Heywood direct-vision view-finder the full size of the picture. A pointer on the travelling frame travels over an engraved scale fixed upon the baseboard, and, when the camera is racked out so as to bring the pointer to any particular figure on the scale, the camera is in focus for objects at that distance away. The exact position of the picture at the moment of exposure may be viewed through the eyepiece and frame of the Heywood finder.

The McKellen-Heywood Pocket Folding View-finder and View-meter.—A novel arrangement of Heywood's direct-vision view-finder in convenient form for use either with or without the camera. This little instrument—which, although arranged for four different sizes of plates,



and for lenses of from four to fifteen inches foci, when folded only measures $2 \times 2 \times \frac{1}{4}$ and goes easily into the waistcoat pocket—has been designed to enable the photographer to decide (*a*) where to plant his camera and lens to obtain a given view without the trouble of first setting up the camera; (*b*) what lens to use to obtain a given view from a given position.

Stand No. 38.—The Metallic Photo-printing Syndicate, Limited, New Southgate, N.

The *rationale* of this beautiful system of printing is thus briefly described: The bichromated film containing honey and dextrine is exposed to light under the negative. The image is formed by dusting on finely powdered metal, and is subsequently transferred to a wooden panel, and coated with a varnish. The specimens shown are in gold, silver, and copper, and the Company's little exhibit certainly strikes the eye, as the effect of a lustrous metallic image on a dark ground is very pleasing and agreeable. We have before now spoken in terms of praise of these metallic photo-images. For decorative purposes they have a high artistic value, and their probable permanency should ensure them great favour among those to whom that property in a photograph is a desideratum.

Stand No. 44.—The Endolithic Ivory Company Limited, Pomona-buildings, 61½ Fore-street, E.C.

The Company show a series of ivory and bone address labels, descriptive tablets, and numbered discs for dark slides, lettered by the Endolithic process.

We believe that most of the principal camera-makers adopt these tablets and discs. They are permanent, and that is the highest praise that can be bestowed on them.

Stand No. 46.—Messrs. Sampson Low, Marston & Co., St. Dunstan's House, Fetter-lane, E.C.

The firm shows the Works of Dr. P. H. Emerson, including pictures of East Anglian Life, which is illustrated by means of thirty-two plates in photogravure and fifteen text illustrations; also Life and Landscape on the Norfolk Broads, by Emerson and Goodall, which is illustrated with forty photographs from nature in platinotype, mostly mounted on plate paper. *Wild Life on a Tidal Water* contains thirty copper-plates by Dr. Emerson and T. F. Goodall, with letterpress, a chart of Breyden Water, and a scientific list of birds shot there. Emerson's other books are shown by Mr. Nutt, and we could wish that they were bought and perused by all visitors to this great Exhibition, the pictorial part of which owes so much to his influence and teachings.

Stand No. 47.—The Mutoscope and Biograph Syndicate, Limited, Piccadilly-buildings, 18 and 19, Great Windmill-street, Shaftesbury-avenue, London, W.

A number of mutoscopes are placed on view. The mutoscope, which is described in two forms in our Almanac for 1898, carries about a thousand separate parts made from kinematographic negatives. The parts are placed round a spindle; a penny is dropped in the slot, a small incandescent electric lamp is set going, and, the spindle being revolved from the outside, the prints in their revolution catch against a projection, specially placed for the purpose, and, as we look through the magnifying ocular, one obtains the phenomena of photographs showing the objects in motion.

Stand No. 48.—Rose and Coop, the West-end Photo Stores, Beak-street, Regent-street, London, W.

The exhibit comprises stereoscopic views and general photographic apparatus and sundries. It was at this stand that the Prince stopped to examine some stereoscopic slides. If His Royal Highness could be induced to take a direct interest in this fascinating branch of photography, it would unquestionably again become fashionable. As it is, however, judging by what is shown at the Palace, stereography still has a large hold upon the public.

Stand No. 49.—Smith's Acetylene Company, Limited, 44, Blackett-street, Newcastle-on-Tyne.

This Company are the only exhibitors of acetylene apparatus, and they show, as well as specimens of comparative photographs and prints taken by acetylene and other lights, drawings of the spectra of various lights, &c.

Stand No. 50.—Underwood and Underwood, London and New York.

The firm show a large number of original stereoscopic views, which, so to speak, "paper" the exterior and interior walls of their stand. Thus any visitor who has acquired the useful accomplishment of seeing stereoscopically without a stereoscope can pause and contemplate a gallery of photographs showing the wonderful relief and realism only to be found in a properly prepared binocular photograph.

Stand No. 51.—The "Perfectus" Sensitised Paper Company, 60, London-road, Croydon.

Specimens of prints on "Perfectus" abumenised sensitised paper constitute this exhibit. We have recently put the paper to practical trial, and can therefore speak well of it from experience. Of the many reflections that occurred to us during our progress through the Exhibition was one that, judging by the numerous prints on albumen paper that are there shown, this oft-killed process is far from going into desuetude.

Stand No. 53.—THE TURNER MANUFACTURING AND TRADING SYNDICATE LIMITED, 157, Whitfield-street, W.

The Company show a combined Davenport and Dark Tent, which, when closed, resembles an ordinary Davenport, being fitted with spaces for ink and stationery in the usual way, but when opened, by lifting up the top, it is converted into a dark tent, fitted with curtains, lead-lined sink, water cistern with tap, tube, and spray, and space for bottles, &c. At back is a ruby window with fall-down bracket for lamp outside (if it is wished to work at night). In the cupboard below the sink is a receptacle for the waste water, holding three times as much as the supply cistern. This piece of apparatus was recently described in the columns of the JOURNAL.

Stand No. 72.—THE AUTOTYPE COMPANY, 74, New Oxford-street, W.

The Company's Alcove contains the same exhibit which secured the Grand Prix at the Brussels Exhibition last year. Having, however, secured a rather larger space than at Brussels, they are adding a couple of 48-inch portrait enlargements, which form excellent end pieces. The Company give a typical display of carbon work, for the production of which they have so long been rightly renowned. The exhibit is varied in nature, and is thus well qualified to show the range of power which pigment printing places in the photographer's hands. The exhibit embraces the following examples:—

(1) *South Processional Aisle, Winchester Cathedral.* Enlargement from negative by J. Bulbeck & Co. (2) *The Sun of Venice Going to Sea.* Reproduction from the picture by J. M. W. Turner in the National Gallery, London. (3) *The Alhambra Theatre, London (by Night).* Enlargement from negative by Paul Martin. (4) *Head of Girl with Scarf.* Reproduction from the picture by J. B. Greuze in the National Gallery, London. (5) *The Morning of the Festival.* Reproduction from a water-colour drawing by Henry Ryland. (6) *Portrait Studies.* From negatives by W. J. Byrne & Co. Printed in eight varieties of autotype tissues. (7) *Portrait of Herman Vezin, Esq.* Enlargement from negative by J. Caswall Smith. (8) *Mrs. Sheridan as "St. Cecilia."* By Sir J. Reynolds. Autotype reproduction. (9) *The Ducal Palace, Venice.* Reproduction of the painting by J. M. W. Turner. (10) *Trafalgar-street, London (by Night).* Enlargement from negative by Paul Martin. (11) *The Nave, Lincoln Cathedral.* Enlargement from negative by Messrs. J. Bulbeck & Co. (12) *The Chief's House, Lagoon Village of Tupuselei, New Guinea.* Enlargement from negative by J. W. Lindt. (13) *View of Jerusalem from "Ecce Homo."* Enlargement from negative by Major Fortune Nott. (14) *Monte Civetta and Lake Alleghe, Tyrol.* Enlargement from negative by Charles Lord. (15) *Colombo Breakwater during the S.W. Monsoon.* Enlargement from negative by Captain F. Bayley. (16) *Compton Wynwards, Warwickshire.* Enlargement from negative by Dr. Page May.

Stand No. 88.—THE MEISENBACH COMPANY, West Norwood.

The Company's exhibit chiefly consists of large portrait specimens of what are termed "poster-grained portraits," an example of half-tone engraving, consisting of a facsimile reproduction of the copy, and reproductions by the Meisenbach Improved American Half-tone Vignetted Engraving, also specimens of reproductions of designs from vignetted photographs of bicycles. This class of half-tone engraving is very much in advance of the ordinary square and oval finish, and is what may be taken as typical of the very best style of present-day half-tone engraving.

They also show a novelty in the way of price-list cover designs.

Any kind of fabric or material can be reproduced in a similar manner. The idea is to utilise this novel reproduction of fabric, &c., for the display of artistic design, together with a portrait or view of the particular manufacture in question. Two printings only in any colour of tinted or black ink are required.

It is an idea which can also be adopted with advantage for any kind of special list, as it is not only artistic but at once attracts notice.

All the Company require is a pen-and-ink drawing of the design, and a photograph or wash drawing for the portrait or view, &c., with instructions as to the kind of background required. The exhibits are shown in a series of eleven frames. The poster-portraits and the half-tone reproductions on specially chosen backgrounds are effective, and the Company's exhibit is decidedly interesting.

V.—PORTRAIT AND GENERAL TECHNICAL PHOTOGRAPHY.

As in other sections, we can only briefly indicate the principal features of this section, which would require more space than we can afford to do it thorough justice. The principal exhibitors are:—

Mr. H. N. King, prints and transparencies, *The Royal Palaces of England.* Percy S. Lankester, portraits, a large collection of work entitling Mr. Lankester to a foremost place among portrait photographers. J. Bulbeck & Co., Strand, London, W.C., architectural photographers, one of the finest and best arranged collections of architectural and general work in the Exhibition. Freeman Dovaston. Taber bas-relief Photographic Syndicate, bas-relief photographs, chiefly portraits, Chancellor & Son, Dublin, portraiture. We welcome Messrs. Chancellor's beautiful work; it is too seldom seen this side of the Channel. William F. Slater, 169, Southampton-street, Camberwell, S.E., a collection of patterns of mouldings suitable for exhibition and other photographic frames, very suitable and good, as we know from practical experience of Mr. Slater's work. H. Bedford Lemère. Edwin Goodwin, 63, Anerley-road, Upper Norwood, S.E., shows examples of portraiture, direct and reproductions, landscape and architectural subjects, and has work of a very high order of merit. H. Hallier, 41, High-street, Upper Sydenham, S.E., examples of portraiture of children and groups, architectural, equestrian, and canine photography, a collection of pictorial photographs (mostly Norwegian), mountain and water studies, and light and shade effects. Mr. Hallier well sustains the credit of local work. Walford & Co., Limited, coloured photographs, a very large and interesting collection. Husnik & Hansler (Prague), process work and three-colour prints. Harold Baker, architecture and portraits. Mr. Baker's work needs no commendation at this late date. Mr. Herbert Mitchell's pictures of sporting dogs at work are the best we have seen. Negretti & Zambra, studies from life, by the exhibitors. Raithby, Lawrence, & Co., Limited, Queen-street, Leicester, show four frames of prints from half-tone blocks, three frames of prints from blocks by the three-colour process, five frames of prints from blocks by photo-chromotype processes in various colours. This firm's colour work is exceptionally good. The Typographic Etching Company, 3, Ludgate Circus-buildings, E.C., show photogravures from paintings, photogravures from nature, photogravures printed in oil colours at one operation, relief blocks by swelled gelatine from various originals, relief blocks from pencil and grained originals. Mr. J. J. Bayfield, 37, Gipsy-hill, Norwood, S.E., portraits and views, two alcoves filled with admirable direct and enlarged photographs. Mr. Douglas Pym, Belle Vue Studios, Streatham, S.W., set of large child studies in red carbon, direct photographs in carbon, and platinotype, animal studies in platinum bromide, enlargements in platinum bromide and carbon tints. The Art Reproduction Company, Limited, 3 and 4, Plough-court, Fetter-lane, E.C., photo-mechanical reproductions. The Strand Engraving Company, 146, Strand, London, W.C., photo-engraving process work, colour printing, photogravure. A. B. Fleming & Co., Limited, printed specimens and samples of three-colour, half-tone, and collotype printing inks manufactured by Messrs. A. B. Fleming & Co., Limited. Lascelles & Co., Limited, photographs, portraits, &c., photo-mechanical half-tone, oil painting from photograph, wood-engraving on photograph from picture, mezzotint from photograph of painting. Messrs. Lascelles' work is of the highest excellence. S. B. Bolas & Co., architectural photographs. Richard Keene, Limited, All Saints, Derby, architectural and other photographs.

The work of the National Photographic Record Association, is illustrated by fifty-nine contributions from Sir J. Benjamin Stone and others, and the progress of the photographic survey of Warwickshire is indicated by fifty examples of work sent in by Mr. Baynton, Mr. Fowler, Mr. Greatbach, and other members of the Birmingham Photographic Society. These two features of the Exhibition are interesting beyond cavil, for the work that such bodies as contribute it are doing is assured of universal appreciation now and in the future by reason of its utility and informativeness.

VI.—SCIENTIFIC AND INDUSTRIAL APPLICATIONS.

THIS Section of the Exhibition is sure to attract a large number of visitors, and they will find themselves amply repaid by a close examination of the apparatus and pictures here displayed. For years it has been the fashion to describe Photography as "the handmaid of Science," and here we see that it would not be untrue to alter that definition to "maid of all work," for it would seem that there is no branch of technical work in which the art does not lend its valuable aid.

The first sub-section here embraces engineering photography, and we see by the examples how valuable the camera must be in recording from day to day the progress of any large engineering work. Look, for instance, at the twelve photographs, by F. W. Webb, of the various types of locomotives built by the L. & N. W. Railway Company, at their works at Crewe, and compare these giants of the iron road with the curious and clumsy "Puffing Billy," and "Rocket," photographed long ago by Col. Stuart Wortley. Or cast a glance at the excellent series of pictures of the great Atlantic liner the *Campania*, from which we can note her progress from the time when her keel was laid to that in which she slid down the ways, a thing of life.

Astronomical photography is splendidly illustrated here, and we must admit that progress has been extremely rapid, when we remember that this particular application of the art was not possible until gelatine dry plates had been placed on the market. But, although a thing of yesterday, the pictures of sun, moon, stars, planets, comets, and nebulæ are of the most perfect description, and the Exhibition is, too, quite up to date, for we have here many photographs of the solar eclipse of 1898. Among the pictures may be especially noted some by Professor Barnard, exhibited by the Royal Astronomical Society: one, a view of Holmes's Comet, in which the object looks like a smoky torch carried by invisible hands amid the stars, and another, a picture of part of the milky way, in which the "starry dust" is as well defined as a carefully focussed picture of any earthly object. Photographs of the moon and sun were certainly produced in the old wet-plate days, and some of the original negatives of the queen of night by De La Rue are here shown; but, as we have pointed

out, astronomical photography generally is quite recent. Of course we have here Mr. Common's famous picture of the great nebula of Orion, the beautiful photograph of the Pleiades, and many other fine examples of stellar work by the same competent hand. Spectroscopic photography naturally finds a prominent place here, and we have contributions by Captain Abney, Colonel Waterhouse, and other well-known workers.

Geological photography has called forth excellent contributions from Professor Watts, the Secretary of the Geological Society, and the pictures are a bright contrast to the rude sectional drawings of rock structure with which students, a short time ago, had to be content. As an addendum to these, we have the excellent subterranean pictures taken by Mr. Hughes and Mr. Burrows in the bowels of the earth by means of burning magnesium. These pictures have been so recently seen at various exhibitions that we need merely note their presence here.

Meteorological photography is here translated into photographs of lightning, for, under this heading we could discover nothing else. The subsection would have been more complete had it included examples of damage done by lighting—markings on flesh, &c. We also miss those admirable pictures which have been taken in recent years of different types of clouds, and the method employed of measuring their heights from the photographs. The miscellaneous pictures attached to this section of the Exhibition include the wonderful flying-bullet pictures of professor Boys.

X-ray work is still in its infancy, and is new enough to attract much attention. The collection of X-ray tubes, old and new, exhibited by A. W. Isenthal, is especially interesting to workers, as is also the set of pictures shown by Dr. Gladstone exhibiting the relative absorption of the mysterious rays by a variety of chemical compounds. Mr. Wilson Noble comes to the fore with a number of X-ray pictures, the most interesting of which is the series showing the hands of children at different ages, and marking the gradual growth of the bony structure by the presence of those little buttons between the phalanges which anatomists call "epiphyses." Mr. A. Londe also shows a number of pictures in which foreign bodies in the flesh have been revealed by the Röntgen rays—a hand with revolver bullet, a dog with a nail in its gullet, &c. Mr. R. N. Wolfenden occupies newer ground in the application of the rays to the study of natural history, and he has submitted fish, crustaceans, and many other denizens of the deep to their analysis. The application of ordinary photography to medical purposes is illustrated by five frames sent in by Dr. Fallows—the pictures being useful, no doubt, to the faculty—but rather unpleasant to look upon.

Photographic recording instruments form a very large family, and here we have the thermograph and barograph at Kew, and the lens-testing apparatus from the same observatory.

Of more popular interest are the zoological and botanical photographs, for, while they are of scientific value, there is also pictorial merit attached to them. Mr. Kearton's illustrations to his recent book on bird life are here, and we see various birds sitting on their nests, together with a representation of the extraordinary means which it was sometimes necessary to adopt to procure the pictures. Mr. William Green, and Mr. R. B. Lodge have also done first-class work among the birds, and their pictures are too well known to need any description. To Mr. Saville Kent—recently of the Fisheries Commission of Australia—must be awarded the palm for the most complete and varied exhibit of photographs illustrative of natural history. This gentleman does not confine himself to one particular branch, but touches all, and, moreover, his pictures are of great technical interest. First he shows a number of admirable pictures of the great barrier reef and other coral formations, besides a number of individual coral specimens. He has also hit upon a method of photographing various marine organisms, "in their habitat, as they live," if we may misquote Hamlet. One of them is quite a triumph of ingenuity, being a vertical snap-shot of a brood of newly hatched turtles taking their first swim in a basin of sea water. Then we have a number of queer-looking Australian fishes, fern owls, and the remarkable lizards which the photographer lately exhibited at the Camera Club. Various animals have fallen to the camera of this most energetic worker, and butterflies, caterpillars, and other small creatures have also sat to him for their portraits. The white ants—those most destructive of wood-eating insects, are shown here in their curious nests, and a new kind of subject is found in the photographing of spiders' webs hung with hoar frost and dew. A brief description of Mr. Kent's work occupies, and worthily too, no fewer than five pages of the catalogue.

One of the most interesting sub-sections in the Exhibition is that devoted to military photography, which embraces far more than the title would suggest, photo-surveying and balloon photography being among the subjects included within it. Pictures taken at the Redan, and at Sebastopol form notable mementoes of the Crimean War, and we can compare them with snap-shots of to-day taken by Mr. Rene Bull during the recent Greco-Turkish dispute. Pigeon-post films, used during the siege of Paris, carry us back to another chapter of European history. The School of Military Engineering at Chatham have always employed the camera largely to make records of their operations, and they have sent some of these pictures to the present Exhibition which are well worthy of examination. The explosion of a charge of 600 pounds of gunpowder buried fifteen feet below the surface of the ground, *i.e.* a land mine, has a very curious appearance in the photograph, the upraised mass of earth looking like a hemispherical tree, clipped close in the Dutch fashion.

But the gems of this sub-section are to be found in the most wonderful series of tele-photographs contributed by the Italian Minister of War, the work of Captain Mario Moris. These are certainly the finest examples of such work ever exhibited, the magnification being enormous, and the plates printed from without any retouching or other manipulation. It will be noted too, that, in many instances, the view as taken by an ordinary lens—and in every case such a picture hangs beside the corresponding one made with the tele-photo lens—is full of atmospheric fog. This quite disappears in the enlarged views, which are, moreover, full of wonderful detail. One of the most remarkable of these pictures is the view of Rome taken from a distance of twenty-eight kilometres, the enlargement being fifty diameters.

Photo-micrography is illustrated in this section by a number of good examples, the earliest of which are the work of Dr. Maddox, while such well-known modern workers as Dr. Charters White, Mr. Spitta, Mr. Nelson, the President of the Microscopical Society, and others are well represented by the excellence of their productions. A complete apparatus for photo-micrographic work is exhibited by Carl Zeiss.

It will thus be seen that this section of the Exhibition dealing with the scientific and industrial applications of photography is a very full one, and there will hardly be any one who is engaged in technical work who will not find here something to attract his attention and interest.

VII.—COLOUR PHOTOGRAPHY.

The Society is to be congratulated on the collection of examples which it has succeeded in getting together in this department. Naturally, one takes the whole thing in chronological order, and we ought, therefore, to consider first, probably the two examples by Nièpce de St. Victor on the violet subchloride of silver. These are, of course, attempts at the direct reproduction of colours, and should be seen for this reason. Considering the enormous importance at the present time of colour photography, the lantern slides used by Clerk Maxwell in his lecture at the Royal Institution in 1861 are priceless; we have here the protoplasm or primordial utricle whence have grown such processes as those of Ducos du Hauron, Ives, Joly, and even the bichromatic printing processes.

Of the direct reproductive processes, the only examples to be seen are those of Veress, of Klausenberg, and one example of Vallot's process, of which, unfortunately, we know so little.

In this (direct reproduction) category we ought, of course, to include M. Gabriel Lippmann's interferential process, of which the early specimens, made in 1891, should be compared against the later specimens by Professor Lippmann and MM. Lumière. Those which were exhibited to H.R.H. the Prince of Wales on Monday, and considerably interested him, are very fine, and we should advise visitors to the Exhibition to make a point of seeing them.

Trichromatic printing is well represented, the early work (1869) of Ducos du Hauron and Cros being shown; we may say, in fact, that the advance in this method of reproduction is as well illustrated as any subject in the Exhibition; but it is here that the catalogue fails, for it would have been far better to have arranged these in chronological order, irrespective of the exhibitors, than in their present somewhat higgledy-piggledy style. M. Vidal has been very kind and sent some examples, which have not hitherto been shown in England, dating from the work of Ducos du Hauron and Cros to Chaupe of Toulouse and Geisler of this year.

Germany is well represented by a loan exhibit by the Technische Hoch-Schule, under the directorship of Professor H. W. Vogel; and American work, in the shape of the carpets which are lent by the Photogram, Limited, will rank with the best work on this side of the Atlantic.

There are many exhibits, notably those of Mr. E. J. Wall, which are not described in the catalogue, where it is stated that details are given on the prints themselves; but on the prints there is nothing. Doubtless, this will be remedied this week; but amongst this exhibit we recognise the first chromo-collotype and the first chromo-typographic prints produced in England.

We miss from this section any examples by the Ives and Joly processes, and, although these are to be seen in the Apparatus Section, they should certainly be shown here.

Scattered throughout the exhibits will be found numerous examples of colour printing, but the palm is certainly borne off by the heliochrome reproductions of Waterlow & Sons. There are others in the photo-mechanical section which are worth noting, and one complete alcove in the North Nave is filled with reproductions in colours, but they are crude and obtrusive in colouring, and not due, we should say, to photography alone.

There are many exhibits in other sections which really belong to this subject; for instance, the spectroscopic results of Dr. Vogel, his spectrograph, and the screens and negatives of Mr. Sanger Shepherd.

We miss examples by Hübl, Eder, Valenta and others of the Austrian school; in short, when one comes to think, there is absolutely no Austrian exhibit—a fact which, considering the very complete researches which have been carried out there, is somewhat surprising.

The weights of salt passed through from a seven per cent. solution at the end of twelve hours were as follows:—

Septum soaked in				Plain Gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
50	1·05	37·5	·79	40	·84

Again oxidised pyro heads the list, and plain gelatine comes second, while chrome alum allows least to pass.

Pyrogallic Acid.

As pyrogallic acid at a strength of ten per cent. exerts a powerful solvent action on gelatine, I had to use a much weaker solution, and I brought it down to two per cent., a strength somewhat greater than is usually employed in practice.

I was very glad of the hint thrown out by Messrs. Hurter & Driffield in their paper for the determination of pyro. I, therefore, after preparing the two per cent. solution of pyrogallic acid, made up to a per cent. solution of ammonio-nitrate of silver, and to the necessary quantity of this the pyro solution to be tested was added, making sure when testing the stock solution that there was an excess of silver after the reaction was completed, and in all subsequent experiments using the same volume of ammonio-nitrate. The mixture of pyrogallic acid and silver solutions was set aside for some time, and then the metallic silver filtered off, washed, and redissolved in nitric acid. To this solution, after dilution, a small quantity of ferric sulphate was added and a quantity of sulphocyanide of potassium (about decinormal strength) till the solution began to turn red, due to the combination of the ferric salt with the sulphocyanide.

As each estimation of silver required time for completion, I could not proceed, as in the previous experiments, but had to start with fresh solutions in the septa after each determination.

Another plan which I think ought to give equally good results, and would have been more rapid, is first to add to the pyrogallic acid solution an acid, say sulphuric acid, and then such an amount of permanganate of potassium as to just leave an excess, as indicated by the colour.

The pyrogallic acid during the time the dialysis is proceeding gradually absorbs oxygen from the air; to reduce this to a minimum, the tops of the chimneys were covered with pieces of ground glass, and in addition tap water contains free oxygen in solution, this also oxidises the pyro as it passes out, so that, on the whole, the gelatine in each case is slightly coloured by absorption of oxidised pyro.

I was very much astonished to find the intense brown colour which was produced on dissolving the precipitated and washed silver in nitric acid, showing that the silver carries down with it a large quantity of oxidised pyro. This had to be got rid of, and was removed by boiling the solution with an excess of nitric acid, the excess of acid having no detrimental effect on the results when titrating with sulphocyanide of potassium.

Pyrogallic acid behaved very much the same as bichloride of mercury; in some cases the volume of the solution in the dialyser decreased, in other cases it increased slightly. At the end of twelve hours the volumes were oxidised pyro—29·2 c. c., chrome alum 30 c. c., plain gelatine 31 c. c.

At the end of twelve hours, with a two per cent. solution, the quantities of pyrogallic acid passed out were as follows:—

Septum soaked in				Plain gelatine.	
Oxidised pyro.		Chrome alum.			
Per cent.	Weight of salt in grammes	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.
28	·167	44	·263	37	·221

Active pyrogallic acid, I think we may say, passes more readily through plain gelatine than it does through gelatine combined with oxidised pyro, but most rapidily of all through gelatine hardened with chrome alum, which is a result we should scarcely have expected.

These results are as I, to a certain extent, anticipated, and of sufficient interest to encourage me to pursue the subject further when time will allow, as I am of opinion still that in the solution of this problem will be found the answer to the cause of reversal.

Pyro stains in a negative are of two kinds, that produced where the silver is reduced, and that brought about by the combination of the pyro in the solution with the oxygen in the air; both combine with gelatine. The stain caused by the latter can to a certain extent be removed, but the former cannot. The best example I can give of this is a pyro-soda developed negative; a certain amount of stain derived from the solution can be removed, but, treat the negative as you like, the greenish yellow stain where the image is developed will remain or return after sufficient washing.

It was for this reason that I treated the gelatine septum to be tanned with oxidised pyro in a slightly different manner to what I did in the other cases. After the first run with the septa to prove their qualities and washing, one septum was treated with a few c. c. of a dilute solution of bromine water; this was then washed, and alkaline pyro poured into it and exposed to the air; it was afterwards washed and dried. I proceeded in this manner to imitate as nearly as possible, without the presence of silver, what would happen on the assumption that the action of light on bromide of silver is to cause a liberation of bromine. The bromine liberated would combine with the gelatine, and when the developer came in contact with it oxidised pyro would be produced by the action of the pyro, bromine, and water. In this manner each separate grain of bromide of silver would be surrounded by a coating of tanned gelatine less pervious to the solution than other parts, which had only received the correct exposure, and which would be surrounded by a less thick skin.

If this be not the true cause of reversal, how is it that it is possible to prevent reversal by soaking the plate before exposure in solutions of certain reagents? Those bodies which prevent reversal are more powerful absorbers of bromine than is gelatine, and so the tanning does not take place to the same extent and development of the image is possible.

I have here added for reference all the results given in the previous part of the paper in tabular form.

Salt.	Septum soaked in				Plain gelatine.		
	Oxidised pyro.		Chrome alum.				
	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	Per cent.	Weight of salt in grammes.	
Hyposulphite of soda	53	1·59	32·75	·98	38·25	1·15	10 °/o
Potassium bromide ...	57	1·71	56	1·68	56·5	1·7	10 ,,
Sodium sulphite... ...	67·5	2·03	63	1·98	78	2·19	10 ,,
Sodium carbonate ...	40·33	1 21	30 66	·92	37·66	1·13	10 ,,
Mercury bichloride ...	50	1·05	37·5	·79	40	·82	7 ,,
Pyrogallic acid	28	·167	44	·263	37	·221	2 ,,

I also give in tabular form the ratio of some of the salts passed through in terms of hypo; this can be done with some, *i.e.*, in those cases where the diameter of septum and strength of solutions were the same.

Salt.	Septum soaked in		Plain gelatine.
	Oxidised pyro.	Chrome alum.	
Hyposulphite of sodium ...	1	1	1
Potassium bromide	1·075	1·710	1·477
Sodium sulphite.....	1·273	2·015	1·908
Sodium carbonate	·761	·936	·984

Although the results I have obtained and have had the pleasure of bringing before you will not help much in every-day practice, yet they throw a small amount of light on a subject which has received but little attention up to the present. The study of this subject from a slightly different point of view, however, may yield more interesting results; by this I mean ascertaining whether the salts we use in development enter as a wave of full strength, or whether in all cases water enters first, followed by a solution of the salts. Also, if we have in solution different salts, whether the ratio of the one salt to the other is maintained, or whether these pass into the gelatine in different proportions depending on the normal rates at which they dialyse. It is a well-known law that one solution of a salt is to another, as regards diffusion and dialysis, as pure water, so that we may constitute our solutions as we like; but, if this law comes into play, then that salt which has the higher rate will dialyse more rapidly than the other, and the salts will not enter the gelatine film as we should like them, but as nature has ordained they should.

A. Haddon.

PHOTOGRAVURE.

[Paper read before the Photographic Club.]

I will begin at once by showing you one or two negatives taken by myself, and which I think are suitable for the process. They were all taken during the Photographic Convention of 1895 held at Shrewsbury. One is a view of Ashes Valley, Little Stretton, one a view at Ludlow, which some of the Conventioners present may recognise, and the other was obtained far from the madding crowd—of Conventioners (and the

cries of "Cheer Up"), at Madeley, not far from Buildwas Abbey, and represents the Gateway to the Old Manor House, now in ruins. The last is the subject I hope to etch before you this evening. I think that a negative which will yield a good bright albumenised silver print is just the one you want for photogravure. Some workers prefer to have them very thin and flat, but I do not. Commercially we have to use all varieties, and a good photogravure has to be made no matter what the customers' negative is like. If we take the negative ourselves, of course it's a very different matter, we can get it to suit the process perfectly. I have worked at this process for the Autotype Company now over twelve years, and I may say here that I am still more engraver than photographer, and work entirely from the engraver's point of view. If a little retouching is necessary either to negative, positive, or plate, I do it—if I am *certain* that the result will be benefited thereby.

The first thing to do, then, is to get a fairly good negative, for this is the foundation stone of the process, I may tell you. Retouch it where necessary and spot it carefully. Then place round it what is termed the safe-edge. You will notice that some of the negatives have a mask of red paper round them; this acts as the safe-edge, and prevents the carbon transparency, during development, from washing up or frilling at the edges. This edge can be put round equally as well with Bates' photographic black varnish.

To make the transparency, obtain a piece of special transparency tissue made by the Autotype Company, and expose it behind the negative to daylight, in a stout printing frame where plenty of pressure can be obtained, for the requisite number of tints. The negative from which this transparency was made required twelve tints, *i.e.*, a little over three times the exposure you would give the same negative to get an ordinary carbon print. I need hardly tell any of you here that an actinometer is used to see how the printing is progressing, as it is impossible to judge by looking at the face of the tissue what is being done.

Mr. Burton and Mr. Platford were here but a short time back giving you a chat on carbon printing, so I need say very little now on that head. The reason the extra exposure is given to obtain the carbon transparency is that it has to be received by transmitted instead of reflected light.

Here is the carbon transparency and also a dry plate, one of the subject I am going to etch. A good plate could be engraved from either, but, if I used the dry plate, my picture would appear, when printed in the copper-plate press, the wrong way about; for some subjects, of course, this matters very little.

It is as well to remember that on looking at the film of the negative, transparency, or the negative image on the copper plate, all appears reversed as regards right and left.

The piece of transparency tissue after exposure is laid in clean cold water together with the glass upon which it is to be developed (the glass having been previously coated with a weak solution of gelatine and bichromate of potassium and exposed to light to render it insoluble). When the tissue becomes quite limp, it is brought into contact with the coated side of the glass plate under the water, lifted out, and evenly and firmly squeegeed to get all the air from between the surfaces. It is then placed between blotting-boards to dry for ten or fifteen minutes; longer will not hurt it. Next place the glass with tissue firmly adhering to it in hot water to soak, strip off the paper support, and develop until all the soluble gelatine has been washed away. Then place the transparency in cold water to set for a short time, and afterwards rear it up to dry either in a rack or with the bottom edge resting on a piece of blotting-paper. Keep it as free from dust as possible. When dry, it is ready for printing, and it is from this positive that we get our negative image again on to the copper plate.

Copper plate suitable for photogravure can be obtained now from 1*s.* 6*d.* per pound. It should be well polished and fairly hard. Scratches or holes in the copper would be fatal if they came in the delicate parts of the picture. If you get troubled with "devils" when dabbling in this process, do not lay *all* the blame on the copper, please, as it is quite innocent. Don't have your negative, transparency, or resist on the copper plate, too thin and flat, and last, but by no means least, do not have your etching baths too acid, and then you will be *delighted* with the copper you are using, no matter where you have obtained it.

When you have your copper plate, the first thing to do is to clean it with finely washed whiting mixed to a creamy paste with water and a few drops of ammonia added to it. This is best done with a dab of cotton-wool, working it in a circular fashion all over the plate; this operation may have to be repeated to entirely free it from grease. If the plate is tarnished, a weak solution of nitric acid will remove it. Well wash afterwards and dry with a clean rag.

The next operation is to grain the plate to give it its ink-holding property when etched. To clearly show you the use of this grain, I have here a plate etched, half of which has been grained and the other half ungrained. I will pass the plate and two rough proofs round which will explain pretty clearly why a grain is necessary. You will see that the portion grained holds the ink and in the other half the ink is wiped clean away, it is only relief in the plate that allows it to print even as it does. The grain which is distributed evenly over half of the plate protects the copper from the etching baths, and it is these little projections standing up in the various tones that give to the plate its power of holding the ink.

To grain a plate the size of the one I have handed round you require a box of the following dimensions: twenty-four inches high, eighteen inches long, and eighteen inches wide. My graining box is rather large or I would have brought it along.

At the bottom is a drawer, which can be taken out, so that a temporary lid can be placed in its stead. Into this box is put about one pound or one and half pounds of finely powdered bitumen.

The box with its contents, and the temporary lid in its place, is then shaken up or revolved slowly like a churn; this kicks up no end of a smother inside.

It is then brought to a standstill and allowed to rest for one minute, after giving it a few vigorous thumps on the top and sides to remove any large particles that may be there waiting to drop in lumps on your nicely polished plate.

The temporary lid is then removed, and the drawer with the clean plate introduced in its place and allowed to remain for three minutes. On removing it you will see that the copper plate is covered with a very fine dust. This operation may have to be performed more than once to get the requisite quantity of grain on the plate. When you think you have sufficient dust on the plate, the next course is to fix it there. This is done by holding the plate with a small hand vice over the flame of a Bunsen burner "buttered side" up, until the brown dust changes to a decidedly bluish bloom all over the plate. If not fixed sufficiently, you will be able to wipe it off when cold, and if you over-heat the plate the grain will be too coarse and open.

Here is a plate prepared on one side with a fine grain and on the other with coarse. The coarse grain is obtained by simply giving half as much again dust as the fine. The fine grain would allow of the etching being carried on for ten minutes without its being underbitten in the shadows, and the coarse would permit of twenty minutes' etching.

The first you would use for a delicate subject, and the latter for a larger and more vigorous one, such as a copy of an oil painting in which heavy shadows predominate.

It is always a good plan to give the bitumen, even if it is bought ready powdered, an extra rub in a mortar. It should have the appearance of very fine snuff when ready for the box. In lump it is quite black, but the fine powder is, as you see, decidedly brown.

I may add here that, if a finer grain is required, all you have to do is to wait longer after shaking up the box before you introduce the plate. If you require a very coarse grain, then the plate may go in almost as soon as the box is brought to a standstill.

Some operators use resin, and some again use bitumen and resin mixed. I prefer bitumen.

Our plate being grained it is now ready for the resist. The resist, as I have before stated, is the carbon and gelatine negative image which is to be developed upon the grained plate, and through which we are to etch. This is printed in the following manner: Put the transparency in the printing frame, and upon the face of this lay a piece of autogravure tissue. (Here are specimens of the three colours made specially by the Autotype Company for this kind of work.) Expose to daylight for the requisite number of tints. This transpareney only required one and a half tints. Take it out of the frame and lay it, with the copper plate, in clean cold water. When the tissue uncurls itself and lies flat, bring into contact with the grained surface of the plate, getting it as square as possible, take out and squeegee, but not too roughly, or the grain or any large particle of dirt may penetrate the tender film and ruin it. Blot off the superfluous water, and rear up to dry in a cool, draughty place, if possible, or fan it with a piece of cardboard.

After a rest of ten minutes or so, develop it in hot water, just as the carbon transparency was done, *i.e.*, allow it to soak in the hot water until the colouring matter is seen creeping from under the edges of the paper support, then strip this off, and rock the dish or lave the plate with the hand until all the soluble gelatine has been washed away. Make sure of this by allowing it to soak in another lot of hot clean water after it is apparently developed. Then place in cold water to set for a minute or less, and rear up to dry on end with a piece of clean blotting-paper. Always allow the resist to get *thoroughly* dry before attempting to etch through it.

This resist was printed yesterday morning, and has since been kept in as dry a place as possible. It is printed, as I consider, to the right depth, and is exactly similar to the one I shall etch before you this evening. You will see that the margins and back are protected with black varnish, so that the plate will have a perfectly clean unbitten margin after it has been etched. The straight edge round the picture is first obtained with a ruling pen charged with the black varnish, and the other portion of the margin is then covered carefully with a brush, taking care, of course, not to overlap the ruled line. When this varnish is quite dry, the plate is ready for the etching bath. Stop out any transparent spots or blemishes with the black varnish.

The etching baths used are different strengths of perchloride of iron. Dissolve the iron in water, and stir up with a wooden rod, adding very little water at a time, so as to keep it from becoming too weak. When I get a fresh quarter cwt. of iron perchloride in, I generally pour over it half a gallon of water, and let it dissolve as much up as it will. Pour out some of this thick brown liquid into a testing glass such as I have here, and you will find, if you place in the hydrometer, that it registers about

45° to 47° Beaumè. The baths I am going to use this evening are of the following strengths: 43°, 40°, 38°, 36°, 34°, and 32° Beaumè.

By adding water to the strong stock solution you can easily get your different baths made up to their proper strengths. If there is too much free acid in the baths, it is as well to put into each pint bottle of your etching bath about two ounces of thick hydrate of iron. This you had better purchase, as it is rather messy to make up yourself, and takes up a lot of time. This is sure to weaken the baths a little, so you must make them up again to their proper strengths from the stock solution.

These two plates have very fair specimens of "devils," upon them. I brought them up to show what you might expect if everything from negative to etching bath is not suitable for the process.

Before etching, see that the baths are not too cold; a good temperature is between 60° and 70° Fahr.

You will notice that when I start to etch this plate I shall begin with 43° Beaumè, the strongest bath. The shadows of my picture, being represented by bare copper, will be the parts first affected by the etching bath. After the shadows have had what I consider the proper time of etching, say two minutes (but you cannot etch by clockwork), I shall pour off the 43° and flow over the 40° bath, this will gradually eat its way into the next tone; after a time this will come off, and be replaced by 38°, and so on through the whole tones of the picture until the high lights only are left. I want to get the whole etching through in ten minutes, because I know my grain will stand that length of time without its being bitten away in the blacks of my picture. It is only by long experience that you can judge to a trifle how long each bath shall be allowed to remain on the plate.

Sometimes it may be necessary to stop a plate altogether, at others it may be advisable to "try back" to a stronger bath if you find it etching too quickly. The rule to remember is, never to let it stay too long on any one tone after the principal blacks have been etched in, but to keep the ball rolling along without too long a stoppage anywhere. This, I consider, is the most important point in the prccess, and it requires great care and judgment.

When the etching is completed, *i.e.*, when the whole of the plate has darkened under the tissue except the high lights, take it out of the bath and wash under the water tap, cleaning off the gelatine image at the same time. Rub over with a mixture of whiting and water with ammonia added, a little stronger than that used for cleaning the copper plate in the first instance. This stops the action of the iron at once, and cleans it well out of the plate. Dry up and clean off the black varnish with turps, and the bitumen grain with benzole. Fill in with some liquid copper-plate ink, and wipe off with canvas, and you will see what the etch looks like.

The plate is now ready for the printers to pull a proof, after the usual trimming and bevelling is done. If this plate was now laid down on the bed of a copper-plate press with a piece of damped paper over it and rolled through, you would get your photogravure impression.

Most plates are improved by a little skilful retouching, and I have brought you up some of the tools used. These are roulettes of varying sizes, a mezzotint scraper used to scrape off the excessive burr raised by the roulette, etching needle, burr-scraper, burnisher, emery paper, &c.

Sometimes it is necessary to scrub off the old work and start again, and it is a very convenient thing to be able to clean out your bad etching and prepare the surface of the plate for regraining. To those who would like to do so I recommend a careful study of this plate. A portion of the work has been first roughly cleaned out with snakestone, then with charcoal, and finally polished up with the oil rubber. I have brought the tools with me to show you, as you will find them most useful during your first attempts at photogravure. The cleaning and polishing is just a little tedious at first, but you can soon get used to it. Before the plate has many impressions taken from it, it is necessary to get it steel-faced, or the work would wear away under the hand of the printer.

A. E. Smith, F.R.P.S.

AT THE CAMERA CLUB.

The usual Thursday-evening lectures were resumed last week after the Easter holidays, when a strong muster of members assembled to hear Mr. J. Thomson tell of his travels in China—a country to which many eyes are directed at the present moment. But the would-be audience was disappointed, for a placard in the lobby of the Club announced that through unforeseen circumstances the lecturer was not able to put in an appearance, with the comforting further announcement that another, in the person of Mr. Middleton, had kindly come to the rescue and would discourse about "History in Stones."

Before Mr. Middleton was half through his lecture the members had forgotten all about the other subject—for they became really interested in what they heard—and some very admirable examples of architectural photography were thrown on the screen as illustrations. Mr. Middleton had his subject at his fingers' ends and spoke without notes; and, considering that he had undertaken the work at very few hours' notice, it was an admirable performance.

With a view of Stonehenge on the screen, Mr. Middleton commenced by pointing out that the history of all countries was most imperfect, and must be supplemented to a great extent by a study of the buildings in which the people lived, or which they reared for other purposes. We are thus able to trace the inner life of a nation better than we can by any other means. First we had the period of no history, when the workers of flint implements represented the human family—a period the duration of which was unknown, and which we could only rudely guess at by gauging the thickness of the deposits in the Kentish caves and elsewhere. Apparently England was colonised in the same way that we colonised Australia, the people at first occupying the open spaces, and afterwards the woods and forests. Millstones had been found on Dartmoor of the exact pattern used in Eastern lands, and it is thought probable that King Solomon's ships came to Britain in search of tin and copper.

The Roman occupation of Britain might fairly be compared to the way in which we at present occupied India, not as mere colonists, but as actual rulers. In this way the Romans settled in the land, and have left copious evidences of their presence in the remains of their ornate villas. The Romans taught us the art of building, and after they retired they left the impress of their sojourn here in much Anglo-Roman work. Then came the gradual advance of the Saxons, and a war which was almost one of extermination. Place after place fell before them, and the British were driven to Wales and Ireland. Christianity was driven out by Paganism, until, later on, England was re-Christianised. The events were recorded more or less in the buildings, which took a simple, solid form, without beauty and without any structural skill. And so things went on until the eleventh century was reached, just before which a common belief came about that the world was shortly to come to an end. This belief for a time stopped all building operations.

Next came that most important event—the Norman Conquest. William the Conqueror brought with him those who knew how to build castles. Many priests also followed in his train, and there came a great revival of building in England. Castles, each with its chapel attached, and churches sprang up all over the land, and the buildings had naturally the same design as those in Normandy; that is to say, they were massive. But there was very little science in their structure, and a massive building is not necessarily strong. Some indeed were built without any foundations, and at Chichester and Peterborough were examples of jerry-built work. The axe was used for any ornamental stone work, for the masons had not yet learnt the superior merits of the chisel. This ornamentation was well seen in the horseshoe arch of St. Mary's Church, Dover.

A curious discovery was made at this church some years ago during its restoration. Beneath the floor, among many bones, was found a strong chest, within which was a leaden coffin. Inside this was the body of a man, so well embalmed that the flesh was still soft and lifelike. It is believed that this was the body of King Stephen, who died in Normandy; that his body had been brought over here, placed in sanctuary in the church, and amid the troubles of the time altogether forgotten.

There were very few examples of domestic architecture remaining, and the earliest to which the lecturer could refer was the Jews' house, at Steep Hill, Lincoln. This was, no doubt, rightly called the Jews' house, for at the time people were not allowed to use stone for building purposes without special permission, for which they had to pay. This house showed that the Jews at the time were rich and influential in Lincoln.

Norman work in England gradually became enriched with ornament, and the chisel took the place of the axe. Colchester Priory showed the use of Roman bricks and flint, while freestone, which could be carved, was used for ornamentation. Here we had interlacing semicircular ornament, which is believed by some to have suggested the pointed Gothic arch. The origin of Gothic architecture is somewhat hard to determine. Pilgrims to the East, before the time of the Crusades, certainly saw pointed arches, and they would be apt to apply it to buildings on their return both in France and England. Moreover, certain difficulties in building construction were surmounted by its employment.

A view of the interior of Canterbury Cathedral gave opportunity of showing how a building was sometimes contracted towards its extremity in order to give, by false perspective, an erroneous idea of its size. The same thing was done in many buildings in Italy, in certain Egyptian temples, and in the Parthenon at Athens. It was a deliberate attempt at deception.

The thirteenth century saw the rising of the monastic system, and the originators of the movement were pure and high-minded men, whatever their successors may have been. They had renounced all pomps and vanities, and were bound to live simply and build simply. Whitby Abbey and Furness Abbey were examples of the beauty to be obtained from mere lines and good proportion. Salisbury was entirely thirteenth-century work, and much of its beauty, and that of other buildings, was due to the circumstance that the designers did not attempt to do too much at one time. They concentrated their energies upon one particular portion, and did their very best, leaving another generation to take up the continuance of the work in the same spirit. As we reach the fourteenth century carving becomes more ornate, and there is one noticeable feature about the capitals of the columns, &c. which is worthy of attention. In the thirteenth century we have spring foliage represented, the leaf half opened. In the next century we have summer foliage, with the leaf expanded and birds introduced; this is followed in the fifteenth century by autumn foliage: the vine leaf, &c., and later on, in Germany

more especially, examples can be found of stump tracery, twigs without leaves such as we find in winter. There is no abrupt line of demarcation between what are known as the different styles of architecture; the transition from one to the other is quite gradual. One of the richest pieces of the stone carving in the country is that of the Angel Choir at Lincoln, thirteenth-century work, earning its name from the figures of angels in the spandrels of the arches.

The fourteenth century was a period of rest. The religious houses had became firmly established, and their building operations were completed. The greater luxury of living became reflected in the architecture, and there was a tendency—especially in France—for ornament to break into the Flamboyant style, which led, in many instances, to weakness of structure. The beautiful cloisters at Gloucester showed a further change of style, and the vaulting shows beautiful cone work with flat filling in.

The west window of York is decidedly French, and we can trace its origin to the Wars of the Roses, when French mercenaries settled in this country. These so-called wars were more of the character of faction fights, and the people took little interest in them; certainly building operations went on as usual. Very different was the civil war of Cromwell's time.

In the reign of Henry VII. the religious orders began to deteriorate and decay, and the time seemed ripe for a much needed reformation. The carved miserere seats in some of our churches and cathedrals, which were intended to be seen only by the priests, and were probably carved by priests, are of a very extraordinary type, and their subjects are very mildly described by the word "secular." The dissolution of the monasteries—otherwise called the Reformation—entirely stopped architecture in England for a time; but a revival came, and it is not too much to say that our present-day buildings do much to reflect the character of the people, as they have done always in the past.

The illustrations to Mr. Middleton's excellent lecture were mostly taken by himself, and they well brought out the various points to which he directed attention.

PHOTOGRAPHIC EXHIBITION AT THE PORTMAN ROOMS.

Under the management of Mr. A. C. Brookes, the National Photographic and Allied Trades Exhibition opened at the Portman Rooms, Baker-street, W., on Friday, April 22. It is to close to-morrow (Saturday), April 30. Nearly fifty firms engaged in the photographic apparatus and material trade took stands, and the large and small halls of the Baker-street suite were well filled with a varied display of practically everything required in the production of photographs. Music, lectures, and animated photographs were provided for the entertainment of visitors during the week, and we understand that the Exhibition has been well attended.

The exhibit of Messrs. Johnson & Sons attracted very considerable notice. It consisted of a case in which a few photographic and other chemicals were shown in large quantities. Thus in one receptacle there were crystals of silver nitrate weighing 1057 ounces; some of them were of abnormal size, one being at least 8 inches long and showing the characteristic formation of the crystal very markedly. Beautifully coloured masses of crystals consisting of 270 ounces potassium chloroplatinite; 378·6 ounces bromide of gold; and 335·70 ounces gold chloride completed Messrs. Johnson's exhibit, the value of which, we suppose, made the gentleman in charge of it at the time of our visit somewhat chary of giving information about it.

The most imposing and well-filled stand in the room was that occupied by the Thornton-Pickard Manufacturing Company of Altrincham. A complete selection of the Company's apparatus was displayed, and the very clever instantaneous photographs taken by the late Mr. Edgar Pickard and Mr. J. E. Thornton attested not only the skill of these gentlemen as photographers but also the rapidity of the shutters employed. Prominent among the varieties on hand were plate-holders fitted with aluminium shutters; aluminium boxed shutters; and metallic film-carriers ribbed transversely, thus making them extremely rigid. We were also shown a sample of a new turntable head made of a special composition analogous to xylonite that prevents cracking or splitting, a defect to which wooden turntable heads, on account of the great strain put upon them, are somewhat liable. The Company's stand was a source of wonder and delight to the photographic eye.

Messrs. Fuerst Bros., 16, Philpot-lane, E.C., had a compact exhibit consisting of Lumière's cinematograph special camera for projection only; cinematograph blank negative and positive film, perforated to either Lumière or Edison gauge; cinematograph film views, Lumière or Edison gauge; cinematograph accessories; negative and positive films; photographic dry plates, extra-rapid, orthochromatic, panchromatic, and special X-ray plates; citos paper, glossy and matte; bromides for contact printing and enlargements; pyro-acetone developer; Lumière's yellow screens; Hauff's developers, ortol, amidol, metol, glycn, &c.; Hauff's thiocarbamide, stain remover; Hauff's toning and fixing cartridges; hydroquinone, eikonogen, rodinal, &c.; chloride of gold in 15 grain tubes, Axe brand, English make; nitrate of silver, crystallised and fused, Axe brand, English make.

Messrs. Spratt Brothers showed a large collection of cameras and stands. Their S.B. patent self-fixing tripod stands were shown in full array, examples being included of six different sizes of the three-fold kind, and two sizes of four-fold varieties, besides a long list of every other kind of tripod for cameras, embracing a range of every possible grade, numbering twenty-six varieties; added to these was a cinematograph stand, which we are told has been highly spoken of. The same stand has a top provided, which takes the place of the table-top used for projection, fitting on the legs in the same manner, and accommodating the cinematograph camera in a most admirable way, doing its work without suspicion or vibration. A feature was made of the show of best cameras, and a range of lower qualities down to the guinea set, comprising camera, lens, dark slide, and tripod. Messrs. Spratt Bros. are manufacturers, wholesale, and to the trade only.

Messrs. W. Butcher & Son's stand was filled with a very large stock of photographic apparatus, among which we noticed the Duplect, a compact and simple form of twin-lens hand camera; the Express and Junior Express, two simply actuated hand cameras, taking sheaths, and the Swift series of shutters on a well-known model.

We are always confident that when Messrs. Houghton, of High Holborn, W.C., take space in an exhibition, they will produce some handy and novel little bits of apparatus. Such proved to be the case at the Portman Rooms, where we were shown a portable developing cabinet which, when not in use, packs and folds up into a very small space. Open, it takes bottles in a back rack, has a sink with waste pipe, and room for a lamp and other conveniences. It is a good idea, which will be welcomed by many a travelling amateur photographer. Another piece of apparatus of a similar nature is intended for use in a bath-room, to the wall of which it is supposed to be fixed. As it unfolds it displays room for bottles, dishes, &c., and gives every other facility for development. A ball-bearing squeegee was another of Messrs. Houghton's novelties, the remainder of which we shall notice in detail on another occasion.

Mr. Ashford, of Birmingham, had a stand set apart for a series of his well-known tripod stands. The Ashford stand has had a career of ten years, and still is recognised as the acme of rigidity and adaptability to the requirements of the tourist photographer.

Mr. W. Tylar had by far the prettiest stand in the room. It was of a delicate and somewhat arabesque design, and was picked out in white and gold. We understand it was made by a Birmingham artisan. The stand was well filled with a collection of those attractive little novelties of which Mr. Tylar, like some potent magician, appears to possess an inexhaustible stock. Racks and syphon tanks; time and instantaneous shutters; flap shutters; revolving print-trimmers; glass-bottom levels for placing over hand camera finders; four-sided lamps; perforated filters in aluminium, all having some point of novelty, were shown us.

Mr. Walter Tyler, of Waterloo-road, relied upon his Helioscopic lantern and a show of slides and sundries as constituting the attractions of his stand.

Mr. W. Middlemiss, of Bradford, showed a very fine studio camera and stand called "The Anglo," made of selected Spanish mahogany, and of perfect workmanship and finish. The back, to which the slide is attached, has vertical and horizontal swing, each independent. The camera has long extension (the 15×12 opening out to 54 inches), and has rack-and-pinion movement both back and front. Each camera has a roller slide the full size of camera, fitted with carriers for smaller sizes; it is also fitted with an adapter, having focus frame for 9½×9½ size, and 9½×9½ single slide with carriers down to quarter-plate; this slide is made 9½ inches square so that two half-plates may be used side by side. The bellows is of varnished leather and is supported in the middle to prevent sagging. The stand is made of ebonised Spanish mahogany; it has worm screw and rack for raising and lowering, and also a screw arrangement for tilting the camera to any angle. The instrument has a very handsome appearance, and would be an ornament to any studio. Mr. Middlemiss's work appears to be of a very high-class kind.

Mr. Otto Scholzig, of 31, Binfield-road, Clapham, showed specimen prints on Otto P.O.P. consisting of numerous show-cards, with twelve prints on each, showing the range of tones to be obtained by both the separate and combined method of toning and fixing without previous washing. He also showed transparencies and opals made with Novitas stripping film P.O.P. Paper negative taken on Telos anti-halation rapid-negative paper. Specimen prints on Dr. Jacoby's platinotype papers, three-star cellodio-chloride paper, Scholzig's sensitised papers, the Brilliant plates, the Beernaert plates, the Brilliant developer. Allan and Adamson's new electric incandescent studio light and accumulator and specimen negatives and prints taken by this light with one second exposure, taken on Brilliant plates, developed with Brilliant developer, and printed on Scholzig's papers.

The Albion Albumenising Company, of Glasgow, were represented by a variety of useful apparatus, including the Albion outfit and the Albion changing box, the latter, which we have before noticed, being a very light, simple, and effective changer. Messrs. Verel, makers of the Cathcart plates, also figured among the exhibitors.

Great pressure on our space obliges us to conclude this brief notice with

mention of the fact that among the remaining exhibitors were Messrs. Lowthime (albums); Lonsdale (cameras and accessories); Borland; Maguire & Baucus; R. W. Paul (cinematograph films); Airs & Co; Levi, Jones, & Co.; and others. It was an excellent little Exhibition, and we are pleased to hear it has been well supported.

LECTURE ARRANGEMENTS AT THE CRYSTAL PALACE EXHIBITION.

The fixtures for Saturday, April 30, are as follows:—

Lantern Slides	6.15.
Colour Photography	4 0 and 7.30.
Analyticon	4.45 „ 8.15.

For next Week.

Lantern slides every day at 6 o'clock. Monday, Tuesday, Wednesday, and Friday:—

Colour Photography	3.0 and 7.30.
Analyticon	4.0 „ 8.15.

Thursday:—

Analyticon	at 8.15 only.
Colour Photography	at 7.30 „

Saturday, May 7:—

Colour Photography	4.0 and 7.30.
Analyticon	4.15 „ 8.15.

Our Editorial Table.

The 'Apek" Hand Camera.

Wilfred Emery, 3, Soho-street, W.

Mr. Emery has sent us specimen prints from negatives taken in the "Apek" hand camera, which is evidently a very efficient instrument. It is specially suited by its lightness and size for cyclists. The lenses used are specially selected for hand-camera work. Each camera has two view-finders, time and instantaneous shutter, rotating diaphragms, and plate register. Either films or plates can be used. *One* movement changes the plate and registers the number, and *one half turn* of knob on the front of the camera changes the shutter from instantaneous to time exposures.

Catalogue Received.

George Mason & Co., 120-124, Buchanan-street, Glasgow.

Messrs. Mason signalise their removal to new premises by the issue of an enlarged edition of their catalogue. This is now a production extending to about 430 pages, a glance through which convinces us that it omits reference to nothing likely to fall within the requirements of the modern photographer. There are hundreds of illustrations which in themselves constitute an education in photographic manufactures, and many pages are devoted to hints on printing, developing, toning and other operations which are of great value. Altogether a book which well bears out its claim to be considered a daily reference guide for professional and amateur photographers.

The Story of Photography.

By Alfred T. Story. London: George Newnes, Southampton-street, Strand. 181 pp. Price 1s.

Mr. Story has written a little book which the general reader who is unacquainted with photography may take up and peruse without having to cudgel his brains for the meaning of what he is being told. The story is related in simple language, and the theme is treated throughout with great conciseness. Without any pretensions to being ranked as a text-book, Mr. Story's narrative, nevertheless, is well capable of serving the useful purpose of an introduction to the study of photography, and as such should be a success among the large section of the public which is constantly "going in" for photography, and is apt to be frightened at the technicalities that are employed. The illustrations to the book are useful and informative, and Mr. Story draws upon the soundest authorities for his principal facts. The volume is a worthy addition to the publishers' "Library of Useful Stories."

Received.

The Mezzotint Enlarging Company, Manningham, Bradford.

Trade price-list of enlargements of every description in bromide, platinotype, on paper, opal, and canvas; finishing in all styles, monochrome, oils, water-colour, &c.; printing in silver, P.O.P., platinotype, &c.

Wholesale price-list of chemical for photography prepared and sold by Harrington Brothers, 4, Oliver's-yard, City-road, E.C.

News and Notes.

Photographic Club.—Wednesday evening, May 4, at eight o'clock, Trade Night. Manufacturers and dealers desirous of exhibiting novelties please address the Hon. Secretary, Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.

A technical meeting of the Royal Photographic Society will be held at 12, Hanover-square on Tuesday, May 3 (postponed from April 26), at which Mr. Howard Farmer will read a paper with experimental results, illustrating: I., Development in ordinary white light; II., A function of alkaline sulphites in developers; III., Some methods of preparing and using orthochromatic plates with the colour filters on the film.

The Photographic Association, of 16, Brook-street, W., writes: "Referring to the distinction conferred upon the Photographic Association by the Prince of Wales, at the Crystal Palace on Monday last, we may remark that, in addition to the picture ordered by H.R.H. (taken by Mr. Le Couteur), the Prince especially praised the beautiful platinotypes of Miss de Brienen (daughter of one of the guardians of the Queen of Holland, Baron de Brienen) the Duchess of Bedford's animal studies, Colonel Scott's pictures of the Golden Temples, the Marchioness of Ormonde's Irish pictures, the radiograms of Captain Thomson and others. Quite a pathetic interest was shown by H.R.H. in the photographs of the late Colonel Sir Vivian Majendie. The Prince remarked that the news of his death had caused him quite a shock."

Proposed Field and Camera Club for Swindon.—A further meeting in connexion with the formation of the above Club was held in the Technical Schools, Swindon, on Thursday, April 21. Mr. W. H. Stanler took the chair, and amongst the fairly good attendance were the Rev. J. Stroud Williams, Messrs. W. J. Ainsworth, W. R. Bird, T. C. Davison, F. W. Shurlock, W. F. E Seymour, and others. Previous meetings have been held during the present month, but on April 21 a draft of the proposed rules of the Club was laid before the meeting and considered. The Club, which is to be called "The North Wilts Field and Camera Club," is to have its headquarters at the Technical Schools, and all specimens and articles of interest given by the members and others to become the property of the Technical Committee, and to be held in trust by them for the furtherance of the Club. The objects of the Club will be the practical study of all branches of natural history, a compilation of a list of the present fossil fauna and flora of the district, and eventually the collection of objects will be formed into a local museum. The photographic survey of the district is also contemplated.

A Canvasser in Trouble.—At the Rotherham West Riding Police Court, on the 18th inst., a photographer's canvasser, named Arthur Douglas Thompson, of Rotherham, was charged on remand with having obtained 20*s.* by false pretences from Mrs. A. L. Coucom, wife of Joseph Coucom, miner, Terrace-road, Rawmarsh. According to the evidence of prosecutrix, orders for a portrait and a group were given to the prisoner, the total amount being 95*s.* A sum of 15*s.* was paid on account. On March 12 the prisoner asked for more money, stating that it was usual to deposit half the sum agreed upon before the orders were executed, and the prosecutrix accordingly paid him 20*s.* In consequence of a communication made by Arthur Johnson, of Rotherham, prisoner's employer, she took out a warrant. Prisoner's employer said he was authorised to receive fifteen per cent. on account of the orders he obtained, and he had to account for the money paid him once a week or once a fortnight. He produced a book containing the entries of accounts received by prisoner, which he said were entered up after the issue of the warrant, and after Mrs. Coucom had found that her 20*s.* had not been accounted for. When Mrs. Coucom went to the shop with reference to the 20*s.* that had been paid, prisoner admitted having received the money, and after the issue of the summons paid witness 7*s.* 6*d.* on account. Witness was under the impression that the warrant was going to be withdrawn. Prisoner, who reserved his defence, was committed to the sessions, bail being allowed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

May.	Name of Society.	Subject.
2	Bradford Photo. Society	*Something from Nothing.* P. E. Newstead.
2	North Middlesex	Informal: Fifth Lantern-slide Competition.
2	Putney	Annual General Meeting.—*Portraiture.* Harold Baker.
2	Stafford Photo. Society	Print Competition.
3	Gospel Oak	*How to Make an Enlarged Negative.* W. J. Ramsey.
3	Hackney	*Killarney.* W. A. Hensler and W. Fenton-Jones.
3	Rotherham	Lecture: *Photographic Advances.*
3	Royal Photographic Society	Technical Meeting. Howard Farmer.
4	Borough Polytechnic	Printing in Skies.
4	Edinburgh Photo. Society	*The Hand Camera.* P. M. Macintyre.
4	Leicester and Leicestershire	*Elementary Optics.* R. Child Bayley.—*A Chat about Lenses.* Rev. F. C. Lambert.—*The Colour Sensitiveness of some Commercial Plates.* T. Brown.
4	Photographic Club	Trade Night.
5	Leeds Photo. Society	Auction of Photographic Goods. G. H. Robinson.
6	West London	Technical Meeting.
7	Hackney	Excursion: Greenwich Park. Leader, W. L. Barker.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 21,—Mr. S. H. Fry in the chair.

The Committee have received a proposal that the meeting on May 5 should be held at the Crystal Palace at eight p.m., the members to meet at the offices of the Royal Photographic Society, the idea being to look round the Exhibition just opened. The suggestion was favourably received, and after some discussion it was decided to circularise the members, informing them of the arrangements.

Mr. TEAPE, in answer to some inquiries, said his continued experiments bore out his conclusions regarding the development of the latent image. He accounted for the halation in some of his results by the fact that he was out of his usual caramel backing, and had to make use of another material. He had not yet tried the Avery backing, and preferred his own formula for personal use. Regarding the quick-drying formula of Mr. Haddon, there appeared to be a little more trouble required in making it, but for large quantities the method was very good.

Some discussion ensued on the question of the apparent discontinuance of the stocking of ready-backed plates, and the fact that they were only procurable to order, in which the Chairman, Mr. Hodd, Mr. Drage, and others took part. The discussion developed into one on supposed ill effects due to improper coating of the backing upon the plate, and on reducing methods for lantern slides, after which the meeting closed.

PHOTOGRAPHIC CLUB.

APRIL 20,—Mr. E. W. Foxlee in the chair.

Mr. A. ERNEST SMITH, F.R.P.S., who it will be remembered was the winner of the first prize in the competition arranged by the Society of Arts some time ago for the best photogravure reproduction of an oil painting, gave a lecture and demonstration upon this process of photo-engraving [see p. 281]. A very successful plate was etched at the meeting, and members will have an opportunity of seeing pulls, both in its original state and when finally touched up and improved. The plate itself, with its depressions filled in with ink, was passed round on the completion of the etching.

Mr. H. WILMER had hoped to have detected differences between the lecturers' and his own procedure, but they appeared precisely the same. He noticed that Mr. Smith was contented with the immersion of the plate, after etching, in water to arrest further action, whereas Mr. Wilmer employed a strong alkali. Regarding the making up of the etching solutions, at one time he adopted a similar method to Mr. Smith's, adding the red oxide of iron, but he found it troublesome because he thought it necessary to filter out the oxide before using the solution. Mr. Sanger Shepherd published a method of making up the solutions, which was a convenient one. Rain water was added to the perchloride of iron, and, when the solution was of something like 45° Beaume, he put it out in large dishes in the sunlight for two or three days, getting rid of the free chlorine, and obtaining a solution of a beautiful yellow colour. Such solutions acted very satisfactorily. He should like to hear how Mr. Smith proceeded in re-etching a plate. On several occasions had he tried it, but it was a more difficult thing than was generally supposed. Mr. Wilmer noticed a defect in the plate, best described by the term halo, running round the edge of the roof of a building; he suggested perhaps it was owing to the gelatine film. He also asked whether the author of the paper had worked with a single etching solution by dilution. It was a simple matter, and was to be recommended by the fact that in the alternative method, though a solution of one strength might work well, the next might not be in condition, whereas, by the dilution of one solution which was known to be good, one would be assured of its behaviour throughout.

Mr. J. R. WILLIAMS inquired whether, supposing one could dispense with the grain of the plate, which he knew was an impossibility, would it add to or detract from the artistic effect? Would the absence of grain, that is, apart from its necessity from the printing point of view, improve the result artistically?

Mr. A. MACKIE spoke of the process worked by the Rembrandt Intaglio Company, in which there is a kind of network grain in addition to the dust grain. This modification allows the printing to be done on machines without the extensive hand work necessitated by photogravure.

Mr. SMITH replied to the points raised. In his ordinary work, alkaline treatment after etching was not necessary, the plate being transferred instantly to water. He had tried the dilution method, but there was an uncertain element about it in his hands, and he preferred to have the graduated strength. Re-etching a plate was a dodge he had never attempted, and would not try, preferring to stone his plate and make a new start. Mr. Smith thought the presence of the halo might be due to the drying. This particular part would have been the last to dry, and long drying seems to make the film more insoluble, and so influence the etching. Referring to Mr. Williams's remarks, of course the grain was indispensable, but its effect was often minimised and the result improved by dragging over the inked plate with a piece of muslin. As regards the advantage of the special etching tissue over the ordinary, it was to be noted that there was a deal of difference, being chiefly in its more careful preparation with filtered materials, and in being coated on such a smooth paper that no grain could be seen.

After some discussion on squeegeeing methods and other details, in which Mr. SMITH advocated the polished copper plate for glossing the tissue, a vote of thanks was passed to the lecturer for his communication.

Croydon Camera Club.—In our days nearly every one who takes photographs uses a quarter-plate camera, with which delightful little pictures are to be got, perfect enough in all ways, except that they are too small to be seen. How to make these oftentimes charming records of "actuality and art" visible without the use of a magnifying-glass to view them with, was the subject-matter of a capital demonstration-lecture given on Wednesday, April 20, by Mr. W. H. ROGERS, at the above Club, before a large proportion of the members. The method advocated and subsequently demonstrated, was to obtain a transparency from a quarter-plate negative by contact, employing for the purpose a slow plate. This positive was then used in an enlarging lantern. An exposure of about twenty-five seconds was given with an average negative enlarged to 12×10, the light being an incandescent gas burner. Development proceeded much upon ordinary lines, rather keeping down the proportion of pyro, or otherwise using a somewhat weak reducing agent. In this, however, regard should be paid to the printing process which one has in view. Before calling upon members to offer their remarks, the PRESIDENT (Mr. Hector Maclean) inquired whether, using a lantern slide which had been made for exhibition on the screen, it was possible to get therefrom a good-class enlarged negative? In reply, Mr. Rogers handed round a print from an excellent negative so produced. Mr. JAMES PACKHAM spoke of the large proportion of exhibition work which had come under his notice as being made from quarter-plates enlarged into huge negatives. Not only does an enlarged negative often make much fine detail visible, but it frequently results in a more pictorial atmosphere being present than if a large direct negative were obtained. Bromide paper was well spoken of, Eastman's ordinary thin being recommended. Mr. Packham had lately seen some splendid 30×20 negatives upon this paper, which was preferable to negative paper as having greater latitude. In order to obtain printing translucency, the negative should be saturated for twenty minutes in paraffin oil; it is, however, needful to reimmerse the paper every few days, as the oil evaporates out. The possibility of printing enlarged negatives without buying large printing frames was also adverted to. Mr. KOUGH showed and explained his procedure, exhibiting original negative, contact transparency, enlarged negative, and carbon print therefrom all of which were admirable examples of technique. Amongst others joining in, we may mention Messrs. Watson, Holland, Smith, Noakes, Carley, Taylor, and Wratten, the latter of whom remarked upon the rectification of obliquely rendered perpendiculars possible by using the enlargement screen, as a swing back is employed for a similar purpose with a camera. The manipulations were all gone through by means of apparatus belonging to the Club, which is always at the disposal of any members who wish to get big pictures from little ones.

North Middlesex Photographic Society.—Introduction Evening, Mr. Mattocks in the chair.—Mr. F. W. COX delivered a most interesting and instructive lecture to the younger workers in the Society upon

THE MANAGEMENT OF THE CAMERA IN THE FIELD.

He dwelt upon the movements desirable in a well-constructed camera, and lucidly explained the use of these movements in difficult work. He showed how lenses of different foci might be used to advantage, exhibited examples of pinhole work taken by himself some ten years ago, and pointed out that a pinhole might be usefully employed when a lens of the desired focus was not at hand. He then entered upon the subject of composition, and enforced his remarks by exhibiting a drawing in which the angle of view included was almost panoramic in extent, and by means of a movable mask demonstrated how, by moving the camera laterally and by judicious use of the rising and falling front, a pleasing composition might be effected which would happily fill the area of the plate in use. The close attention given by the audience, and the discussion which followed, attested the interest taken in the lecture by all present.

APRIL 18.—The fourth monthly Instruction lecture of the season,

THE LENS AND ITS CAPABILITIES,

was given by Mr. MCINTOSH. Intended chiefly for beginners, Mr. McIntosh dealt with his subject in so clear and conversational a manner, omitting all "text-book" language, that it could not fail to be of considerable interest and profit, both to the novice and the more advanced student of photographic optics. He commenced by describing and illustrating, with the aid of the blackboard, the principal features of several of the most commonly used types of lenses, pointing out the advantages and disadvantages of each, and the particular work for which they were designed. Thus, the portrait lens was constructed to give great rapidity at the sacrifice of depth of focus and marginal definition; the R.R. to give improved marginal definition, but at the cost of rapidity. The single lens left little to be desired so far as landscape photography was concerned, but was as a rule unsuitable for architectural subjects. Continuing, the lecturer explained the meaning of the terms "focal length," and "equivalent focus" as applied to single lenses and to doublets. Various methods of ascertaining the focus of any given lens were explained and demonstrated, some accurate, others approximately so. One apparently simple method was to focus an object in the camera—taking care that the image on the screen was exactly the same size as the object itself—carefully measure the distance from the object to the focussing screen and divide the same by four, the result being the focal length of the lens employed. Mr. McIntosh, however, pointed out that the difficulty of getting the image upon the screen precisely the same size, as the object itself was so great that the amateur would do well not to attempt this method unless he had very considerable time and patience to devote to the work. The use of negative lenses in conjunction with the R.R. was also explained, the lecturer showing a doublet for which he had had a special mount made, enabling him to insert between the combinations ordinary concave lenses of different foci—such as can be bought of any optician for a few pence—thereby changing his 8-inch lens into one of 12 inches, 16 inches, or 20 inches focus at will. He then touched upon the "stops," their relation to the focus of the lens and to each other, also their effect upon marginal definition and depth of focus. On the uses and abuses of short-focus and wide-angle lenses Mr. McIntosh was also very clear. He said that the somewhat popular notion amongst beginners that the wide-angle lens gave undue prominence to foreground objects—that their use, in fact, introduced distortion—was erroneous. The size of all objects on the screen was governed solely by the distance they were placed from the camera. Long-focus lenses included an angle of view more nearly that included by the human eye than those of shorter focus, and consequently the results were as a rule more generally pleasing. Mr. McIntosh was careful throughout his lecture to explain not only how to do a thing, but why it became necessary—a point greatly appreciated by his audience.

April 25, Mr. W. B. Goodwin in the chair.—A good muster of ladies and gentlemen assembled to hear Mr. E. W. Hickcox give his second lecture on

Through Eastern Lands with a Hand Camera.

He started at Athens with views of the Capitol and Parthenon, Constantinople and views of the Dardanelles and the Bosphorus, Ephesus, Damascus, Cairo, the Pyramids, and the shipping on the Nile. He interspersed his description with many anecdotes and amusing experiences, which the audience seemed to appreciate. Mr. Mummery (the President) moved that a hearty vote of thanks be passed to the lecturer, Mr. Beadle seconded, and it was carried unanimously. It was announced at the meeting that a visit to the Crystal Palace Photographic Exhibition had been arranged for Saturday, the 30th, and members were to meet at the Exhibition.

Richmond Camera Club.—April 18.—Mr. Gibson presided, a demonstration of the capabilities of

Acetylene Gas

was given by representatives of the Sardis Patent Gas-generator Syndicate, Limited, of 25, New Bond-street, City. The apparatus shown consisted, in the first place, of one of the Company's patent generators, for which they claim, with apparent justice, the utmost simplicity in working together with absolute safety. The gas-holder is suspended in a tank of water, much like an ordinary gasometer, and it was shown by experiment, that should generation be too rapid, the gas simply escapes through the water, with no worse result than a very bad smell. A table lamp with generator combined was also shown, and the Company also manufacture bicycle lamps for which their special inodorous preparation of calcium carbide will be particularly adapted. The value of the acetylene light for photographic purposes has recently been fully recognised in the photographic press. Its purity was shown by comparison with the electric light, which appeared yellow by contrast, and by the fact that different shades of colour were distinguishable exactly as by daylight. Not only can it be readily employed as an illuminant for the optical lantern, but photographs can be taken by it with short exposures, and it is even claimed that it can be used for printing on gelatino-chloride papers. The cost of the gas, was stated to be equal to coal gas at 2*s.* 6*d.* per 1000 feet, and will be considerably reduced when the price of calcium carbide, at present 20*l.* per ton, comes down to something like the figure for which it is sold in America, 6*l.* to 7*l.* per ton.

Moseley and District Photographic Society.—Dr. Hall-Edwards being prevented by professional engagements from giving his lecture on "Developments of X-ray Photography," the Hon. Treasurer (Mr. W. J. Spurrier) showed a specimen of the latest, being the stereoscopic effect the Doctor has obtained by means of the X rays, a broken needle in a hand standing out most prominently. Mr. Spurrier further illustrated the intimate connexion of photography with the illustrated publications of the day. He just explained the production of an illustrated magazine from the manuscript, and handed round an article in manuscript, with the same in galley proof, quite a number of photographs from which half-tone blocks had been produced, with also one of the blocks and a printed sheet as it came from the printing machine, explaining the different processes through which all have to go, and, finally, a complete copy of his *Birmingham Magazine of Arts and Industries*, which he had just got from the binders, in which there were twenty-one reproductions from photographs exhibited at the late Birmingham Photographic Exhibition, the frontispiece to the No. 4 being a very fine colour photograph by the three-colour process.

Rotherham Photographic Society.—April 19.—Mr. W. T. Wilkinson (President of the Wakefield Photographic Society) gave a chat on

Lantern-slide Making.

He recommended the use of a special frame for the production of slides by contact, the advantages being protection of the negative and easy adjustment of the lantern plate. The source of illumination he used was incandescent gaslight. In reducing by artificial light he showed, by means of lantern and camera, the importance of an evenly lit disc. The processes demonstrated were collodio-chloride, collodion, and gelatino-bromide. A favourite developer for ordinary lantern plates was amidol. Thorough fixation was absolutely necessary, and he expressed the opinion that hurry in this particular accounted for some of the indifferent results when intensification had to be resorted to.

FORTHCOMING EXHIBITIONS.

1898.

April 29, 30..... .. National Photographic and Allied Trades Exhibition. A. C. Brookes, Temple House, Temple-avenue, E.C.

,, 29-May 14..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

There will be Open Classes at the above.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

INFLUENCE OF THE DEVELOPED IMAGE ON AN UNEXPOSED FILM.

To the Editors.

Gentlemen,—I read with interest your article of the 22nd, "On the Alleged Influence of the Developed Image on an Unexposed Film." The allegation is perfectly true. A great many years ago I made (and published the results of them somewhere), a great many experiments on this subject. I think one portion of them you have quoted wrongly. I am writing "without the book," but my recollection is that I proved exhaustively that a film which had not been exposed could be made to "hold an image" on development, derived from one beneath it, if the two were in what may almost be called "molecular contact." In fact, at the Society of Arts, and Photographic Society, I showed two such films separated, each containing an image. A film of albumen *between the two* sufficed to give an exactly opposite result. Further, somewhere I have stated that, if a gelatine plate, after development, was coated with collodion emulsion, and a suitable developer applied, increased opacity would be given to the image through the reduction of the silver in the collodion film. I am sorry that I have not my books at hand to turn up the exact references, but they will be found in one of the "more than half a thousand signed papers" on photography that I am authoritatively told I have been guilty of writing. What I have stated above I thought was well known, and I have frequently referred to it in discussions on the theory of developments of the photographic image,—I am, yours, &c.,

W. de W. Abney.

A STAND WANTED.

To the Editors.

Gentlemen,—Can you or your readers say if any of the alpenstock camera stands are really efficient for use in Switzerland as alpenstocks? Something of this sort is much wanted by photographers, who, with the light cameras of the present day, are able to ascend many of the higher passes and mountains, and often find occasions when a stand is necessary for certain views. To carry both a stand and an alpenstock is too much. Such a combination would require that the feet of the stand when closed should be protected by a strong hollow shed of some kind, and that the legs should be firmly fixed together to act as one pole. There is room for invention here.—I am, yours, &c., B. J.

April 19, 1898.

[Some of our mountain-climbing readers may like to give their experiences on this subject.—Eds.]

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the Editors.

Gentlemen,—It is proposed that the meeting of the Association for Thursday, May 5, instead of being held at Tudor-street, the members shall meet at the Crystal Palace at eight o'clock outside the Royal Photographic Society's room by the turnstile, High Level.

By inserting this you will greatly oblige.—I am, yours, &c.,

April 25, 1898. T. E. Freshwater.

LECTURE AT THE BOLT-COURT SCHOOL.

To the Editors.

Gentlemen,—I have pleasure in informing you that Colonel J. Waterhouse has kindly consented to deliver a lecture here on Monday evening, May 2, at eight o'clock, on "Photo-Engraving in Intaglio." We shall be very pleased to see any one interested in the subject, and no ticket is required. I shall be glad if you will kindly announce this matter in the columns of your Journal.—I am, yours, &c., Charles W. Gamble,

Director of the School.

The London County Council Technical Education Board, Bolt-court Technical School, 6, *Bolt-court, Fleet-street, E.C., April* 25, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries, must be addressed to* "The Editors, The British Journal of Photography," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 24, *Wellington-street, Strand, London, W.C.*

Received —Chas. Haigh; Pastel; Cyanide; Bolton; T. J. Kelly; and others. In our next.

Horst Dietrich.—Some very good prints by the process were shown us at the time of its introduction, but so far as we can discover the paper is not obtainable commercially.

W. L. Breare.—1. We do not know the address. You must consult the official Patent Journal, at the Patent Office, Southampton-buildings, London, W.C. 2. Ninepence post free from the address given.

ETCHER.—Legally we believe you would be liable. You practically sell a reproduction, and this, according to the Act, renders you liable to a penalty. We can, however, recall no case in which the engraver has been proceeded against.

COLLOTYPE.—HARROW. An oven for drying collotype plates, heated by gas, will do quite well, provided that none of the products of combustion gain access to the plates. If they do, they will have a decidedly deleterious action on the films.

FLASHLIGHT POWDER.—S. R. We have made no comparative experiments with flashlight powders composed, respectively, of mixtures of chlorate of potash and magnesium powder, and chlorate of potash and aluminium powder, so cannot answer the question authoritatively. Both, however, give a brilliant light for photography.

LENS FOR GROUPS.—SIGMA. For taking groups *quickly* out of doors of the whole-plate size, we should advise a lens of the "rapid" or anastigmatic type of about fourteen or fifteen-inches focus. Such a lens may be used with its full aperture on that size plate, and will cover it to the edges. Stopped down, it will, of course, cover a considerably larger plate.

GUM-BICHROMATE.—DOUBTFUL. Examples of the gum-bichromate process, produced forty years ago by the late Mr. John Pouncy, are to be seen in the historic section of the Royal Photographic Society's Exhibition at the Crystal Palace. Some were shown last year there in the Photographic Section of the Victorian Exhibition. The process was fully published in 1859.

BOOK ON PHOTO MECHANICAL PROCESSES.—G. W. S. says: "I should be much obliged if you would kindly inform me through the JOURNAL the latest and most practical work on 'Photo-mechanical Processes,' with, if possible, name of publishers and price?"—Wilkinson's book on the subject will give you a general insight. It is published by Hampton, Judd & Co., 17, Farringdon-street, E.C. The price is 3*s.* 6*d.* we believe.

COLOUR PHOTOGRAPHY.—V. RISCH writes: "As I should like to make some experiments with Mr. McDonough's method, as described in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, please let me know where the screens ruled with alternate lines of red, green, and blue are on sale, or where I could have one made for me."—The screens are supplied by the Natural Colour Photo Company, Dublin.

RENOVATING STUDIO CAMERA.—IMPECUNIOUS PROF. As the camera is entirely of wood, it is a very easy matter. First carefully wash off all the dirt with soap and water; then, when thoroughly dry, apply one or other of the furniture polishes supplied at the oil shops, according to the directions on the bottle. Unless all the dirt is cleaned off before the polish is used, the camera will really look worse than at first.

LENS.—N. BALL.—The lens is an early form of the doublet, but the glasses are, evidently, misplaced. The shorter focus one should be at the back, that is, nearest to the ground glass. It is, doubtless, a very good lens, but that form of instrument does not give such an evenly illuminated field as do lenses of more modern construction. It will give straight lines, but requires a small stop to remedy spherical aberration.

COLLODION PROCESS—EXPERIMENTER. In the ALMANAC will be found formulæ for pyroxyline, and also for collodion; but, if, as a beginner in process work, you take our advice, be content for the present to purchase your collodion ready-made. You will then have what you can rely upon. You will find that you will at first have enough to learn in making good process blocks without learning to make pyroxyline and collodion.

DISTANT PHOTOGRAPHY.—H. CROSS. The only way to get a distant object large on a small plate is either to use a very long-focus lens or the tele-photo lens. The latter is, of course, the more convenient, as it does not entail a long extension of the camera. Either way you would be able to photograph herds of deer without disturbing them from their natural groupings by reason of the distance you may be away.

CARBON PRINTING.—R. A. S. H. Whatever may be the cause of the trouble, we should say it was not the bichromate of potash. As you have only developed about a dozen prints, it is very unlikely indeed that you are suffering from the bichromate. It is only after weeks or months' *constant* use that any ill effects need be expected. With some persons many years of continual use do not produce any ill effect. It depends upon the individual.

SHUTTER.—S. BROWNING. If the three negatives from which the prints forwarded were made were taken immediately one after the other, it is pretty clear that the shutter is not regular in its action. That is evidently due to some disturbing cause—a particle of grit in the cylinder, for example. The more delicate a piece of apparatus is, the more carefully it must be protected, particularly when carried on a bicycle on dusty roads.

BLINDS FOR STUDIO.—R. CURTIS. 1. The darker of the two fabrics would be the better. It would, however, be desirable to have a thicker and better quality. It would prove more durable, and would the better stop off the light on the south side. The sample enclosed is really too thin for that purpose. 2 We should say have spring blinds for the roof, and curtains for the sides. Had the glass at the sides been of the same length as at the roof, it would have been ample.

THE ICONOSCOPE.—W. F. WILSON says: Could you kindly inform me, through THE BRITISH JOURNAL OF PHOTOGRAPHY, whether the American iconoscope, advertised and described in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, can be purchased anywhere in London; or, if not, whether there are any agents in London for American goods through whom I could order an iconoscope?"—In reply: So far as we know, it is not on sale in this country. Fallowfield will probably procure it for you.

OLD NEGATIVES.—COLLODION writes: "I have just come into possession of nearly a thousand collodion negatives—portraits, quarter plate size—all taken on patent plate some thirty or more years ago. Can you tell me the best way to realise upon them, as the glass must, or ought to be, valuable?"—We should say the most profitable thing would be to consign them to the dust cart. It would certainly not be worth while to clean them off with the idea of selling the glass, or, at the present price of silver, with the view to recovering that as residues.

JUBHAR.—The answer to your first question is that all will depend upon the intelligence and perseverance of the amateur himself. We should advise you to write to Penrose & Co., Upper Baker street, Lloyd Square, W.C., for their catalogue. From that you will see the cost of the necessary apparatus and requirements, and also the works published on the different processes, which they supply. Get those. It would take up more than an entire journal to fully answer all your queries, as you are apparently entirely ignorant of all the different subjects.

FADED PHOTOGRAPHS.—WANTS writes: "How can I revive a very badly faded photograph? It has faded through not being sufficiently washed, and the people wish me to get them a few copies of it. Would it be wise to try myself or send it away?"—There is no really satisfactory way of restoring a badly faded photograph. Any professional photographer would copy the picture for you if you are unable to do it yourself. Some faded photographs yield better copies than their appearance would seem to warrant. If the print was toned by gold, treatment with a dilute solution of bichloride of mercury will generally remove some of the yellowness.

PORTRAIT LENS.—INTERESTED says: "Some few weeks ago you answered a query from me for which I am obliged; will you allow me to repeat the one you did not answer. In a portrait combination which should have the longer focus, front or back half? or is it material which to the proper performance of lens? In grinding a lens 2 inches diameter, what size should the tools have been—much larger than the lens required?"—In all modern lenses of the Petzval form the back combination is of longer focus than the front, and it is found advantageous to have it so. It is well to have a good margin to the tools, so that the figure of the lens is maintained to the edge.

DEVELOPING.—TONING—WEEKLY READER says: "1. I should be obliged if you would tell me if, when a negative is viewed by transmitted light, it is thin, whether it is over or under-exposed? The image comes up slowly, and is clearly seen through the developer in the dish; but, after fixing, it is extremely thin. 2. Can you also let me know of a good and cheap combined toning and fixing solution?"—In reply: 1. It may be either, but probably the latter, as the image comes out slowly. The cause of the thinness may, however, be due to not allowing the developer to act long enough to get density. 2. Formulæ for combined toning and fixing baths are given on pp. 1019, 1020, of the ALMANAC. We do not answer through the post.

DEVELOPER: SILVER BATH.—FERROTYPE asks: "Will you kindly answer the following questions and oblige. 1. I used to work with a developer in which pyrogallic acid, methylated spirit, glycerine, and bromide of potassium were used; I forget the formulæ now: can you give? 2. How to test a silver bath for ferrotypes to tell whether it is acid enough or too acid. Your advice will be esteemed."—1. Here is a formula that contains both methylated spirit and glycerine, but whether that is the one you worked with we cannot, of course, say. A: pyrogallic acid, 1 ounce; methylated alcohol, 7 ounces; glycerine, ½ ounce. B: bromide of potassium, 120 grains; distilled water, 7 ounces; ammonia, ·880, 1 ounce. 2. Litmus paper will show whether the bath is acid or not. Have the bath only acid enough to yield clean pictures, more than that will make the plates slow.

SPOTS ON PRINTS.—PUZZLED writes: "If you can enlighten me as to the nature and cause of the spots on the enclosed print, you will greatly oblige. I tone in the sulphocyanide and gold bath, and am very careful in the working, and keep dishes clean and to their own use. As the toning is done where no chemicals are kept, it is very puzzling to account for the spots, which, as a rule, appear before fixing. Some batches will be almost free—only one or two in a lot of thirty or forty prints, whilst in one or two cases the whole lot have been spotted more or less severely. Some of the spots are large, and appear as if some colour had been dropped on to the face of print and then rubbed on one side."—The spots are clearly due to particles of extraneous matter coming in contact with the prints while they are moist or wet. They are not in the paper, but simply on the surface. What the particles are you will be better able to judge than we can be.

TONING: LENS.—S. D. says: "1. I have lately used some —— P.O.P., and think it a good paper. I cannot understand why —— give instructions to tone without washing, because all others make washing before toning as important. Would you please say if you think any way is equally good for prints? I see by JOURNAL of July 29, 1895, p. 466 you there lay stress on washing before toning. 2. I have a *carte-de visite* lens marked as follows, 16,433; no other marks, only 'Quick-acting Patent Lens.' Who would be the maker?"—In reply: 1. We certainly prefer to wash out the free silver before toning, but probably the makers of the paper referred to have reasons for giving the instructions they do. Of course, we do not know how this paper is prepared, so cannot give an authoritative opinion. 2. We do not know who is the maker of the lens. It is probably of French manufacture, and bears the trade mark of the vendor, though we do not recognise it as that of any English dealer.

*** Besides several answers to correspondents, many other communications are unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Cathedrâ	289
The Action of Light on the Salts of Cobalt	290
Soirettes:— Enlarged Negatives — Cinematography and the War—Exhibitors at the Crystal Palace—A New Acetylene Generator—Acetylene—Röntgen-ray Notes—Apparatus for Exact Determination of the Position of Foreign Bodies in the Flesh—The Nature of the Rays—Röntgen Literature—The Paris Exposition of 1900—Opening of the Royal Academy	293
Note on Early Dry Plates. By W. B. Bolton	294
Foreign News and Notes:— Stain in Gelatine Dry Plates—Pyrocatechin—Dry-plate Factories in Germany—Broken Dishes—The X Rays in Natural History—Oxalic Acid and Light	295
Crystal Palace Exhibition Notes	297
Fading Photographic Prints whilst they are being Trimmed	298
Schwarz's Method of Developing Photographs in Lengths	299
Brownell's Tripod Stand	300
Methylated Spirit in Photography. By J. Rutherford Hill	300
The International Congress of Applied Chemistry. By G. E. Brown	300
Our Editorial Table:— *Handbook of Imperial Plates and Papers—Practical Half-tone and Tri-colour Engraving*—"Auro-type" Enlargements	301
News and Notes	301
Patent News	302
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Liverpool Amateur Photographic Association—Newcastle-on-Tyne and Northern Counties Photographic Association	302
Forthcoming Exhibition	304
Correspondence:— Society Excursions and Dinners	304
Answers to Correspondents	304

EX CATHEDRÂ.

Several visits that we have paid to the Royal Photographic Society's Exhibition in the interval since the memorable opening ceremony on April 25 by H.R.H. the Prince of Wales have enabled us to perceive that its initial success has been fully sustained and increased from day to day. Not a dissentant note, not a sound of dissatisfaction, either from visitor or exhibitor, has reached our ears. It stands out plainly as the finest, the completest, the most instructive and interesting photographic Exhibition yet held in this country. The long and elegant naves and three spacious courts of the Crystal Palace hold a collection illustrative of what has been done in photography in the past, and what is being done in it at the present moment, from which no representative example is conspicuously absent. From the little snap-shot, taken in a camera costing only a few shillings, up to the moon photograph made in the twenty-six inch refractor at Greenwich Observatory; from the ordinary commercial cabinet portrait up to the most aspiring artistic effort of a Crooke or a Craigie; from a box of dry plates up to the finest optical productions of Zeiss, Steinheil, Voigtländer, Dallmeyer and Rudolph, nothing has been omitted to carry out the endeavour which animated the promoters of the Exhibition eighteen months ago, viz, to make it completely illustrative of the present position of photography.

* * *

On Saturday last, after we had passed the principal part of the morning studying the Historical and Scientific Sections in the courts, and recording a few notes for future use, we spent a pleasant hour or so among the interested crowds that thronged the naves of the Palace up to nearly closing time. The Pictorial Section in the North Nave was very liberally patronised by the visitors, among whom we had the pleasure of meeting some scores of well-known photographers. We cannot too highly praise the way in which the Loan Collection has been arranged and hung. The spaciousness of the nave, and the freedom of movement one may enjoy in the great area of space, combined with the position of the exhibits all virtually on the line, quite render the task of examining them an easy and pleasant one.

* * *

The trade exhibits in the North and South Naves drew large bodies of visitors throughout the afternoon and evening, and the demonstrations of Platinotype and Velox printing in particular appeared to excite much intelligent interest. As for the apparatus stands, we have not before seen so large an amount of notice, at an Exhibition, bestowed on this branch of photographic production. Messrs. Beck, Messrs. Ross, Messrs. Dallmeyer, Messrs. Watson, and other exhibitors must surely have reason to be pleased at the attention which their stands attracted. The printing-paper firms, Messrs. Wellington & Ward, Messrs. Elliott & Son, and Messrs. Morgan & Kidd supplied quite artistic and well-displayed little photographic exhibitions in themselves. It was easy to observe that not only on the part of the many photographers present, but also on that of the general public, the delighted attention bestowed on these sections of the Exhibition was not instigated by mere curiosity, but had for its underlying cause a real and genuine interest in photography and its many beautiful productions here shown.

* * *

Since the Exhibition opened some new and important additions have been made to the list of exhibitors. We have heard many expressions of regret emanating from firms and individual photographers, who are not showing, that they have

held aloof from this truly great display, the success of which has enabled the Crystal Palace to well regain the reputation it temporarily lost as a suitable venue for a photographic exhibition. We are justified in reminding those who predicted disaster on account of the unpopularity of the Crystal Palace as an exhibition hall, that their gloomy prophecies have been completely falsified all along the line. We have been unable to discover a single supporter of the Exhibition who is not delighted with the intrinsic success of the Exhibition and the material benefits derivable therefrom.

* * *

We are also extremely happy to be able to point to the Royal Photographic Society as having thoroughly vindicated its ability and its right not only to organize an exhibition of pictorial, scientific, and historical photography, but also to cater for the requirements of the manufacturers and the trade in respect of an exhibition. The support given by the trade and the manufacturers on this occasion, as we remarked last week, is unprecedently great, and for the first time a thoroughly representative display of photographic manufactures has been successfully organized, to the satisfaction of all concerned. In future efforts of this nature the Society will undoubtedly have, as it deserves, the entire confidence of the photographic trade. It has confirmed its unquestioned claim to be regarded as the one authoritative national and representative body for all classes of British photographers, and those interested in the practice and advancement of photography.

* * *

Mr. W. H. M. Christie, the Astronomer Royal, was to have delivered a paper on the recent solar eclipse before the members of the Royal Photographic Society at No. 12, Hanover-square, W., on Tuesday evening, May 10. We understand that the paper will instead be read at the Crystal Palace on the date and evening named. The occasion is to be utilised for holding a *conversazione* of the members of the Society and their friends, and also members of affiliated societies, who will have free admission to the Palace. The Earl of Crawford (President) will receive the guests at 7.30 in the Crystal Palace Concert Room, which, with the Theatre, has been placed at the disposal of the Royal Photographic Society for the evening. It is anticipated that a very large number of members and others will attend the gathering.

* * *

A welcome and regular spring visitor, in the shape of *Penrose's Pictorial Annual*, otherwise the *Process Year-Book for* 1898, has made its appearance on our table this week. The Editor is Mr. William Gamble, of whose enthusiastic devotion to the progress of process work this *Year-Book* is a splendid manifestation. The scope of the book is well indicated by its sub-title, which is, "A Review of the Graphic Arts." In a prefatory note the editor tells us that the *Process Year-Book* records a year's progress in the kindred industries it represents by the merit of its pictorial contents. The record includes about a hundred illustrations, mostly full-page ones, and it is safe to say that the various methods of engraving, in tone, line, and colour, could not, within the limits indicated, have had a more adequate representation or one which could do the different processes greater justice. Here, almost at a glance, you see process work represented at its present best.

The book is bound in excellent taste, and the printing a paper are above reproach. We note one somewhat irritati superfluity, viz., the excessive amount of printed particula placed underneath each full-page picture. First of all, the is the title, sometimes running to two lines, then the proce next the engraver's name, and finally an imprint—in all fi or six lines of type which utterly mar the beauty of otherwise irreproachable book, the excellences of which, ho ever, are sufficient to wipe out even greater defects.

* * *

The articles are of great interest and value. The edit writes fully and suggestively of Pictorial Telegraphy, a among the other contributors are Mr. Max Levy (Screens Three-colour Work), C. Ashleigh Snow, F. M. Sutcliffe, W. Wilkinson, J. Husnik (Gelatine Reliefs for Overlays), C. Zander, William Weissenberger (Negatives of Natural Obje for Trl-colour Printing) Leon Vidal (Polychrome Impressio by the aid of Photography), W. D. Richmond (Half-to Negatives and Dry Plates), Chapman Jones, W. B. Bolt (Multiple Aperture Stops for Half-tone work), G. Fritz, D. Dallas, Thomas Bolas, G. Holzhausen, M. Wolfe, and Colo Waterhouse (Useful Notes and Tables for Printers for Proc Workers). It is altogether an invaluable book for proc workers.

* * *

A friend in the East writes to inform us that at t Greek ceremony of the Washing of the Feet in Jerusalem, April last, he counted from the spot where he stood ni stereoscopic cameras, seven stand and two hand, two half-pla three 12 × 10, and fourteen hand cameras (Bullseye, Kod Facile, &c.). He says he was unable to move in the crowd he would probably have seen more. "And yet," he ad "some say stereoscopic photography is dead." It is very mu alive, as we pointed out last week. Our friend says that arrived at the scene of the ceremony at 6 a.m., and most of t cameras were then set, although the service did not take pl until 8.45. Tourist photographers would appear to be deficient in enthusiasm—and bad taste.

ON THE ACTION OF LIGHT ON THE SALTS OF COBALT.

The elements manganese, iron, cobalt, and nickel, whet existing in the free state or in chemical combination with ot elements, are remarkable for a curious inter-relation of prop ties which has earned for them the popular appellation of metals of the iron group.

Bestowed, in the first instance, perhaps, for mere convenie of chemical terminology, the name, for many reasons, i particularly appropriate one. Its suitability is seen in t that the analogy or coincidence of properties which it imp is a reality, and an important reality in the domain of phy as well as in that of chemistry.

What is still more striking is, that the bond of un between these four metals is of a nature so many-sided a make itself apparent as an influence in each of the c branches of physical science.

If we care to look for it in thermodynamics, we may t the relationship in the tables of melting points, of ther conductivities, and of specific heats. If we seek it in electric we find it in the consecutive position of these elements in

ectro-chemical series. Passing thence to magnetism, we note em acting as the very types, so to speak, of those bodies that ve been denominated paramagnetics.

In chemistry the connexion is exhibited in isomorphism—ing that word in its widest sense—as well as in a number of her ways. In optics, at first sight we would seem to miss a nk in the chain of evidence. This, however, is speedily rthcoming, when we learn that, under the influence of the lar radiations, the compounds of these elements are decom-sed in a manner so regular and invariable as to demonstrate e existence in the group of a definite, common molecular stability, made apparent to us as such by the reactions hich ensue when these compounds are exposed to actinic tion.

On reviewing this extensive series of phenomena, it will be en that only those included under the heading last men-oned need concern us at all as photographers. They, how-er, demand our fullest attention, and that for two excellent asons: firstly, because of our very imperfect knowledge of e facts themselves; and, secondly, because a knowledge of em cannot fail to be of utility in one or other of the many partments of technical photography.

In order to obtain trustworthy results in an inquiry of any agnitude demanding a treatment founded on strictly scientific ethods, the investigator must, for the time being, be content follow in the footsteps of the specialist. On that account, erefore, we trust we shall not seem the advocates of an im-rfect scheme of deduction, if in the present and following pers we attempt to deal with but a portion of what properly rtains to the subject under review. The action and effects light upon the salts of cobalt will therein engage our ex-usive attention, and, as the result of a large number of ex-riments on the compounds of that metal, we are happy to y that we are in the position of any one who is able to make ditions to the knowledge that we already possess in regard light-sensitive bodies.

We have above referred to the decomposition effected by ht on the members of the iron group as definite and in-iable. It is now necessary that we should devote a few rds to describing the precise nature of the change which is is brought about. The group, as already said, consists of r metals only, chromium and uranium, though sometimes luded as members thereof, being so regarded on insufficient unds. Of the compounds of manganese, cobalt, and nickel, far as these are susceptible to change by the action of light, le or nothing of practical value is known. To the salts of n, on the other hand, a certain importance attaches, due inly to the part which they play in the various platinum nting processes. To these salts, then, when seeking infor-tion, we naturally turn. Thanks to the devoted labours of late Sir John Herschel, Dr. Eder, Pizzighelli, and others, photographic properties of the salts in question have been efully studied and recorded, and the results of investigation accessible to all. We have thus at hand a vast body of rmation of a character fitted to facilitate our studies, not y of the ferric and ferrous compounds, but also of the salts the varlous analogous metallic oxides comprised in the up, of which iron is principal member.

What, then, are the points that should most impress us in behaviour of the iron compounds to actinic action? In first place, the fact deserves a more than superficial ice, that, in our iron printing processes, we invariably em-ploy, when sensitising, a ferric salt. The reason for this, as may be very readily guessed, is that the ferric salts are highly sensitive to the luminiferous radiations, whilst, on the contrary, with the salts of the lower oxide, the case is re-versed. The latter, as Chastang and others have shown, are indeed sensitive to light, but—and here is the really im-portant point—very much less sensitive than the salts of the higher oxide.

Unlike the ferric series of compounds, they are incapable of being made the basis of a satisfactory printing process, and therefore, considered from the purely practical standpoint, they may be termed insensitive without impropriety.

We trust our readers will note and bear in mind this charac-teristic difference between the salts of the two oxides, as we shall have to refer to it more than once in the course of our remarks.

In the second place, as regards the effect produced by the impact of light on the sensitive salts of iron, it has long since been ascertained that the change effected is a form of chemical decomposition due to the abstraction of part of the oxygen present, in the course of which the particular ferric compound employed as a sensitising agent is reduced to the correspond-ing ferrous compound. This is found to hold for all the ferric compounds that have hitherto been examined. It holds, too, for combinations of two or more of these compounds, and like-wise for those combinations in which the salts of certain other metals—platinum, for instance—play an auxiliary part. The reaction, then, is to all appearances a universal one.

Now, as we have already indicated, the knowledge of what holds in the case of one of the metals of the iron group will be of assistance to us when we pass to the study of the other members of the group.

Let us take the case of cobalt. Knowing that light reduces a ferric to a ferrous salt, and knowing, too, that cobalt forms two oxides in all respects analogous to the oxides of iron, we should, on the assumption that the cobalt salts are sensitive to light at all, naturally anticipate two things: firstly, that the cobaltic salts are much more sensitive to its action than the cobaltous salts; and, secondly, that it will reduce the cobaltic salts to the cobaltous state. Experiment shows that such is indeed the case, thus affording us a fresh and beautiful instance of the remarkable relationship existing between cobalt and iron.

Before describing the series of experiments which afford proof of the statements which we have just made, we should like to call attention to the work of an earlier investigator, namely, Robert Hunt.

In the second edition of his celebrated *Researches on Light in its Chemical Relations* he gives an account of some experiments made by him with the object of testing the effects of light on certain of the more common salts of cobalt. Unfortunately for us, his record of the facts observed is scanty in the extreme, and altogether it is evident that he attached but little importance to the results of his inquiry. We shall, neverthe-less, here quote his exact words for the benefit of those who, like, ourselves, are interested in the early chapters of photo-graphic history.

After a brief reference to what has no direct bearing on the subject of the discourse, namely, to the peculiar effects due to dehydrations produced by heat on the cobalt salts he goes on to say:—

"Another kind of change is apparent under the spaces on

which the blue rays fall, and which, very different from that produced by the heat rays, is permanent. On paper the nitrate, muriate, and carbonates of cobalt have been found to deepen in colour very considerably under exposure. In a few instances, when the sun has been very fervent, the pale blue of these salts changed to a good violet; but, when removed from the light, this colour passes into a deeper blue. Washed with nitrate of silver, the blue passes into a brown, and, if again, exposed, positive images are produced." *

It is apparent from what is here said that Hunt made his experiments on the *cobaltous salts*. The three salts that he names, viz., the nitrate, muriate, and carbonate, are in fact just the three salts of cobaltous oxide that are kept in stock by the chemical dealers.

The cobaltic salts, on the contrary, are not and never have been articles of commerce, and it is perhaps even doubtful whether Hunt was acquainted with their existence, seeing that even nowadays this series of compounds is unknown outside the laboratory.

Taking into account the fact that he was experimenting with members of a series of salts little sensitive to light, salts analogous in constitution and behaviour to those of ferrous oxide, it is hardly to be wondered at that the facts elicited were of an insignificant character.

Hunt was, in this particular case, the victim of circumstances, or of an unlucky choice. Far otherwise would have been the result had he been able to devote the time thus spent to the study of the salts of cobaltic oxide. In these, as it will be our object to show, there lies a rich mine of material that, sooner or later, is certain of being turned to account by the practical photographer in his daily printing operations. Notwithstanding, the phenomena observed by Hunt, considered from an analogical point of view, are highly instructive, as they serve to demonstrate that the cobaltous salts possess a feeble degree of actinic sensitiveness, precisely similar to that with which experiment proves the ferrous series of compounds is endowed.

We now come to speak of the cobaltic salts, the subject proper of these articles.

These, as we have said, are products of the laboratory; for, being mostly of an unstable character and in very little demand, their preparation has been voted an unprofitable operation by those on whom, in the ordinary course of affairs, we are content to depend for our chemical supplies.

Accordingly, we must be our own manufacturing chemists if we intend to investigate and formulate the photographic properties of these compounds. Fortunately, this is no very difficult matter, though it is one that demands a little nicety in the necessary manipulations and also a slight knowledge of chemistry.

As is the case with the ferric salts, those of the higher or sesquioxide of cobalt may be produced in a number of different ways. Their formation is, however, perhaps most easily effected by the action of solvent acids upon cobaltic hydrate. This is the mode of formation which we adopted in the preparation of the salts for the series of experiments about to be described, and we can recommend it to others on account of its simplicity and convenience in practice.

Cobaltic hydrate possesses the molecular formula $Co_2H_2O_4$, and is a dark-brown flocculent body, practically insoluble in water, and readily convertible by dehydration into the sesquioxide, Co_2O_3, sometimes confounded with the hydrate. It may be prepared by dissolving ordinary bleaching powder—the so-called chloride of lime—in hot water, so as to form a concentrated solution, filtering off the insoluble residue, and adding the clarified liquor to a strong aqueous solution of cobaltous chloride or nitrate in sufficient quantity to precipitate all the cobalt present.

After the brown hydrate has completely subsided, which is generally a matter of some hours, the clear liquid is decanted by means of a siphon tube. The vessel is then refilled, this time with clean water, and well agitated so as to wash the precipitate, which is then allowed again to subside, and afterwards the water is drawn off as before. This washing process must be repeated three or four times in order to remove all trace of chloride of lime and other contaminating bodies.

When a large quantity of hydrate is being washed, six or seven successive washing waters may be required to effect the entire removal of the soluble salts. Cold water should be employed in preference to hot in the washing operations. The greater portion of the last washing water should be decanted, and the washed hydrate preserved for use in a glass jar or wide-mouthed bottle covered with a glass plate to keep out dust and prevent desiccation. It will keep for two or three months or longer without change, and, by agitating the precipitate now and again with the supernatant residual water, a syrup-like liquid will be obtained, a portion of which may be easily withdrawn whenever it is desired to prepare a salt.

We shall now pass to the description of the experiments made by us on the different cobaltic compounds.

For convenience of reference it has seemed desirable to bring together under one head all the facts noted in regard to each particular salt. As this arrangement will conflict with the order in which the experiments were made, and as this order is occasionally an item of some little consequence, as exhibiting the logical development of a line of inquiry, we shall, whenever there seems anything to be gained by the addition, complete the information given under different headings by supplying the missing chronological data.

Experiments with Cobaltic Citrate.

When cobaltic hydrate is added to a solution of citric acid and a gentle heat is applied, the hydrate dissolves, and a pale pink solution of cobaltic citrate is obtained. This, if preserved in the dark, free from access of air, is remarkably stable, and may be evaporated to a gelatinous consistency without decomposition. The dilute solution, after keeping for several months, will still give all the reactions of a cobaltic salt; but in the presence of free acid or a haloid salt of another metal, it is somewhat more readily reduced to the cobaltous state than is the case with the freshly prepared solution. As a general rule, the cobaltic salts in course of time are reduced to the cobaltous state even in the dark. Cobaltic citrate, probably, is no exception, but its conversion (if conversion there be) is effected so slowly that the term "unstable," so frequently and indiscriminately applied by high chemical authorities to the cobaltic series of salts, is here an inadmissible one.

Unsized paper having been sensitised by a four minutes' immersion in a solution of cobaltic citrate (strength about fifteen grains per ounce) was allowed to dry in the dark, and then exposed to light under a negative. The experiment was repeated several times, both in sunlight and in diffused daylight

* *Researches on Light*, 1852, page 183, section 312.

The exposures given varied from five minutes to as many days' In no case was the slightest trace of an image discernible after exposure. In some cases it was noticed that the paper became damp from the absorption of atmospheric moisture. This, however, could not be attributed to the action of light, as the hygroscopic properties of the citrate were equally manifested in absolute darkness.

Successive portions of the fully exposed paper were then developed with aqueous solutions of the following reagents, but no image resulted: Potassium dichromate, potassium ferricyanide, dilute ammonia, gallate of soda, sodium nitro-prusside, plumbic nitrite, and potassium sulphocyanide.

These results were somewhat discouraging, as seeming to point to the conclusion that cobaltic citrate, *per se*, could not be classed among light-sensitive salts.

One of our latest experiments, however, satisfactorily establishes the fact that the citrate really is sensitive to light. A piece of sensitised paper, after a rather prolonged exposure to diffused light, was soaked for a quarter of an hour in an aqueous solution of potassium sulphocyanide, and transferred, without washing, to a tray containing very dilute nitric acid. A faint, but distinct, blue image was almost immediately obtained, and the paper assumed a bluish tint all over. The sulphocyanide solution having been mixed with the dilute acid, another piece of paper, exposed as before, was immersed therein, but this time no image was obtained, even after long soaking.

The *rationale* of these phenomena may, perhaps, be that the sulphocyanide acts on the reduced citrate of cobalt, forming at first an invisible sulphocyanide image, which is, in its turn, decomposed by the acid, and so rendered visible, whereas, when the development is effected with the mixed solutions, the acid at once attacks the reduced citrate, and the sulphocyanide has no opportunity of combining with the cobalt salt.

More interesting results were obtained by exposing the citrate to light in the presence of a second salt. These, owing to lack of space, we must reserve for a future article.

Enlarged Negatives.—During the past winter season the subject of enlarging from small negatives has probably received more attention than any other. Sometimes enlargement direct on to bromide paper has been advocated, and sometimes the making of an enlarged negative through the aid of a transparency. This was the method favoured at the last meeting of the Croydon Camera Club. Both plans have their advantages. The former is less trouble when only one or two enlargements are required, but the latter has the advantage that, when once the enlarged negative is obtained, it may be used for printing on any kind of paper or by any process. It is usual, in this method of procedure, to make the transparency by contact printing; but a far better method is to make, when the size does not exceed, say, 12×10 or 15×12, the enlargement direct as a transparency, and from that print the negative by contact.

The advantages of this method of procedure are many. For example, the greatest possible sharpness is secured in the finished picture, which is not the case if the negative is on uneven glass, or the glass upon which the transparency is printed is not perfectly flat. With a small transparency any defects or imperfections in its film are necessarily amplified in the enlarged negative, and therefore show conspicuously. Any defects due to the original that have to be touched out in the transparency can the better be done on a large than in a small one, as the retouching has not to be amplified, and made conspicuous if unskilfully done. The enlarged transparency may be easily retouched—lights subdued and shadows strengthened—without its showing in the negative, whereas, if this be done, however skilfully, on the small transparency, it will become very manifest when magnified in the enlargement. By working in this way—retouching or modifying on the enlarged transparency, and on the negative—it is remarkable what may be done, and without much skill, too, in ameliorating the shortcomings of faulty negatives. It is surprising that amateurs have given so little attention to this method of procedure, though it is frequently advocated in these pages.

Cinematography and the War.—Last week, when alluding to photography in war, we mentioned that, in all probability, the cinematograph would be brought into use by the enterprising photographer to portray some of the battle scenes of the near future. At the time that our surmise appeared in print, the first lot of cinematograph films had arrived in this country, and are now, nightly, being shown at one of the London variety theatres. One of these shows the dismembership of the battleship *Maine;* one, a regiment of volunteers marching to General Blanco's palace; another depicts the s.s. *Olivette* sailing out of Havana Harbour; while another shows the departure of General Lee. These, of course, only depict incidents of the war, and are in no sense battle pictures proper; they may, however, be to come. It will, we fancy, be a little difficult to secure cinematographic pictures of actual engagements by the lenses with which cinematographs are now supplied, unless they are fitted with tele-photo attachments (by reason of the distance they necessarily must be from the spot), and that will render them slower. Smokeless powder, as alluded to at the Academy banquet the other night, will aid the cinematographer considerably.

Exhibitors at the Crystal Palace.—It may be interesting to mention the number of members of the Royal Photographic Society who have contributed to the show at the Crystal Palace. The catalogue shows that there were nearly 400 sources from which exhibits have been obtained. There are 46 credited to Fellows of the Society, and 43 to members of the Society. This makes a total of 89 as contributed by the Society itself, unaided by extraneous sources.

In connexion with the Crystal Palace, and its suitability for exhibitions on a large scale, photographic or otherwise, it is pretty generally known that there is a scheme afloat to remodel the Company, and that cannot be done without a special Act of Parliament. The Bill with that object in view was read the first time in the House on Thursday last week.

A New Actylene Generator.—Mr. Ernest Hopkins, of Weston-super-Mare, has recently described an entirely novel and apparently successful generator. It is so simple that it can be worked by a young child. Its principle of action appears novel, and there is practically nothing to get out of order or to become jammed. It may be described as a large watering can, but with the top closed and the rose removed from the spout. Attached to the domed top is a tube, fitted with a tap, for exit of gas to a gas-holder. The spout of the can is made much wider than usual, and its lower part projects for some distance into the can. There is a manhole also for cleaning purposes. To set it in action, all that has to be done is, after filling it with water, to drop small lumps of the calcium carbide down the spout. These at once fall to the bottom, any gas evolved in the spout being pushed forward as the carbide drops, and at once rising to the dome when the carbide reaches the body of water. When the water rises in the spout through the evolution of gas, the tap in the exit tube is opened, and the gas permitted to enter the holder. No air can be admitted. No undue heating, and consequent polymonsation of the gas, is brought about. As the volume of water is large, and the lime need only be removed at distant intervals of time, an explosion is impossible; and, finally, even the charging with carbide can be made automatic. We learn that a patent has been applied for.

Acetylene.—Ever since acetylene, as a source of illumination, has been practically demonstrated, it has, what with the County Council and the insurance companies, been under a ban which has much retarded its development. It is therefore interesting to learn that the executive of the Imperial Institute are arranging to hold an Exhibition, at the Institute, of apparatus and appliances for the generation of acetylene gas, and its application for lighting purposes. In this work it will be assisted by the Council of the Society of Arts, who have appointed a Committee, who will test, prior to the admission to the Exhibition, all apparatus intended to be shown in operation. Unless the apparatus fulfils what in the Committee's opinion are the requisite conditions of safety, it will not be admitted to the Exhibition. For the purposes of the Committee, the County Council have placed at its disposal a portion of their premises in the Harrow-road. The Exhibition of apparatus at work will be opened on June 1, and remain open until the end of August.

It is to be hoped that this Exhibition will be the means of restoring confidence in the minds of the public in regard to acetylene, and also lead to the removal of some of the restrictions now imposed upon its employment by the County Council, and the insurance companies, also in demonstrating how the material can be used with safety, and the best appliances for the purpose. There is no denying the fact that, beautiful as the light is, there have been many serious accidents resulting from its employment. If the element of danger can be eradicated, the acetylene light would, at times, be of great service in photography as well as for the lantern, where gas is not available.

Röntgen-ray Notes. — While with what we may term photography proper we can with a fixed amount of illumination increase the rapidity of action upon the plate by using lenses of large angular aperture, there have hitherto been no means of concentrating the effects of Röntgen radiations, unless indeed the additional action of a suitably placed fluorescent screen be considered as embraced under such a description. But, at a recent meeting of the Paris Academy of Sciences, M. Garrigon presented a paper describing an ingenious method of doing this, which, if what is claimed be justified by the facts, should be a great gain. He proposes to confine the radiations by a cylinder of glass or of metal, and thus concentrate them on to the plate, the result being to shorten the required exposure. The idea is good in its way, but, if we are to believe previous investigators, the rays are incapable of reflection, and if not reflected they cannot be concentrated. In the case of M. Garrigon's method, however, it would be interesting to know what becomes of the radiations if they be not reflected.

Apparatus for Exact Determination of the Position of Foreign Bodies in the Flesh.— In the current number of *La Nature* will be found a valuable illustrated article describing an apparatus invented by Dr. G. Mergier for carrying out this determination. The apparatus consists of two separate frameworks. The first, the tube-carrying frame, consists of tubes fixed upon cross pieces attached to an upright rising from a shallow box to hold the plates. Upon the surface of the box are two wires at right angles, and rising from it another wire. The portion of the body to be radiographed lies upon the box, and two radiographs are taken. The wires pressing upon the skin leave an impression, which is fixed by passing a special skin pencil over them. The second piece of apparatus, which is somewhat like the first, is termed the radientometer. The hand, limb, or other part, is replaced by a tracing from the negative, and the tube's place by thin, hollow rods fixed on movable arms, so articulated as to work from the focus of each tube as a centre, and directed to the tracing of the shadow image. We thus have materialised the rays which, at the time of the first series of operations, produced on the plate the shadow of the opaque object whose position will be found after that reconstituted on the tracing paper.

The Nature of the Rays.—"Who shall decide when doctors disagree?" In last week's *Nature* will be found a note by Lord Rayleigh discussing this point. Referring to the theory propounded by Sir G. Stokes, and recently developed by Professor J. J. Thompson, his Lordship says: "I cannot see that it carries with it some of the consequences which have been deduced as to the distinction between Röntgen rays and ordinary luminous and non-luminous radiations. The conclusion of the authors above mentioned 'that the Röntgen rays are not waves of short wave-length, but impulses,' surprises me. From the fact of their being highly condensed impulses I should conclude, on the contrary, that they *are* waves of short length."

Röntgen Literature.—The same journal says new magazines devoted to the discussion of Röntgen rays appear to be springing up in every direction. "From St. Louis we have received the *American X-Ray Journal*, which is stated on the cover to be "a monthly journal devoted to the practical application of the new science and to the physical improvement of man." It is illustrated by very fair radiographs of fractures or dislocations, and a somewhat striking "skiagram" of a loaded Lebel rifle. Then, again, Part II. is out of the *Annales d'Electrobiologie, d'Electrotherapie, et d'Electrodiagnostic.* Electro-therapeutics and the use of Röntgen rays are dealt with in this journal, published by M. Felix Alcan, Paris."

The Paris Exposition of 1900.—In the arrangements of the exhibits on this occasion there will be a marked difference from the plan usually adopted in placing the various classes. The subjects will be arranged in groups, according, not to nationalities, but to the nature of the objects. There will altogether be one hundred classes. We shall thus be enabled in the Photographic Section to compare the works by the various photographers of the world there represented, instead of going from country to country to find the photographic collection of each country.

Opening of the Royal Academy. — The doors of the Royal Academy were opened to the public on Monday last, the private and press views were on Friday, and the banquet on Saturday. The latter is an important function on account of the company always present. On this occasion, the Prince of Wales, the Duke of Cambridge, Princes Christian, Edward of Saxe Weimar, Christian Victor, and several of Her Majesty's Ministers, the Foreign Ambassadors, the Lord Mayor, &c., were present. A good deal of humour was imported into some of the speeches; for example, Sir F. Bedford (Second Naval Lord), in responding for the Navy, spoke of the unpromising material afforded to artists by modern warships. He said he sometimes wondered how the artist would get on with the naval battle picture of the future, when fleets were using nothing but smokeless powder, for smoke was so useful in covering up irritating detail. Although the smokeless powder will be a loss to the painter, it will be a great gain to the photographer who desires to depict a naval battle. He will want to show it in every detail.

In responding for the Lord Mayor and Corporation, his Lordship announced that a valuable loan collection of works of the French School would be opened this year at the Guildhall. These annual loan Exhibitions are quite a modern innovation in the City, and the return of the numbers who visit them proves that money-making is not the only thing thought of within its boundaries.

It is to be regretted that, on the morning of the Academy banquet, Mr. P. H. Calderon, R.A., Keeper of the Royal Academy, died at his official residence. The sad news, however, was kept back, in order that it might not interfere with the proceedings at the banquet.

A NOTE ON EARLY DRY PLATES.

In the report of the opening of the Royal Photographic Society's Exhibition at the Crystal Palace in last issue, the writer is not strictly accurate in his allusion to the Liverpool Dry Plates, and "the important change in photographic manipulation indicated by the introduction of collodion emulsion." Just now, when so many

will be renewing their acquaintance with past historical events, or perhaps studying them for the first time, it is a pity to allow a false impression to get abroad, hence I venture to offer the following brief remarks.

The report says: "The very subjects of the pictures shown—interior of a church at Liverpool, *Broxton Hall, Cheshire*, &c.—call to mind that the first dry plates issued to the public hailed from that neighbourhood, and were called the Liverpool Dry Plates.' The collodio-bromide process was introduced in September 1864, and, although the Liverpool Dry Plates, issued by the Liverpool Dry Plate Company, of Seaforth, were undoubtedly the first *emulsion* plates issued to the public, they were preceded, to my personal knowledge, by at least two other brands of *bath* plates, and, very possibly, by more, for I am not sure that collodio-albumen plates were not an article of commerce in those early days.

The earliest commercial dry plate of which I have any definite recollection, and perhaps the only one that had any real "vogue" before the days of the "Liverpool" plate, was the well-known brand sent out by Dr. Hill-Norris, of Birmingham. His method of preparation formed the subject of a patent, and, quoting from the abridged specification, was as follows: The "sensitive iodide of silver" having been formed in the film, the latter was immersed, after washing, it is to be assumed, "in a solution of gum arabic or of dextrine, starch, gelatine, albumen, gum tragacanth, vegetable mucilages, caseine, gluten, or other suchlike substances, which will by occupying the pores of the collodion film, prevent its condensation on drying, and retain it in a sensitive and pervious state." In fact, according to the specification, an *iodised* collodion film sensitised in the bath, and, after washing, treated with a gummy or gelatinous "preservative," to prevent the collodion shrinking on drying into a horny and impervious film. As I knew the films, however, they were bromo-iodide of silver, and were supposed to have a gelatine preservative, but it was more probably a mixture of gelatine with some kind of soluble gum.

When these films were first issued I am unable to say, but the earliest advertisement of them I can find is in 1863, though I can say, from my own recollection, that at that time they had been in use some time, and were certainly not "new." As the patent is dated September 1856, it is more than probable that Hill-Norris plates had been in commercial use for six or eight years previous to the introduction of the collodio-bromide process, and probably ten years before the Liverpool Dry Plate Company started.

But, in and previous to September 1864, when collodio-bromide first saw the light, there existed in Liverpool another commercial dry-plate company—the "Tannin Plate Company" or the "Liverpool Tannin Plate Company," I forget its precise title. As far as I remember, the Company consisted of John Glover, Richard H. Unsworth, and Peter Mawdsley, all original members of the Liverpool Amateur Photographic Association and well-known dry-plate men of the day. The two first were respectively Hon. Secretary and Treasurer of the Liverpool Amateur Association—Glover from its formation in 1863 until his death the following year, and Unsworth succeeding Mr. J. A. Forrest when he became President in 1866. I just remember the Company's "laboratory" and the offices where the plates were distributed, but I am not sure whether they were prepared there, or only partly. The process was, of course, Major Russell's tannin, with, I dare say, modifications of John Glover's own, for he was one of the leading dry-plate experimentalists of the day.

After Glover's death within a month or so of the introduction of collodio-bromide the Company tried hard to adapt the process to their purposes, recognising fully the immense saving of trouble it would be; but, curiously enough, they could not "hit it," although my old friend Peter Mawdsley, in after years, has probably used as much collodion emulsion as any half-dozen other men, dead or living. I can only attribute the result to what has been called the "conservatism" of photographers, but which seems to me rather an overweening self-confidence that leads men to believe that they can work a new process better their own way than the proper one. Anyhow, Mr. "Dick" Unsworth was one of the greatest antagonists collodio-bromide had to fight against in its early days, and *I* have reason to know he could be very sarcastically facetious when the mood was on him. For instance, he said to me at one of our meetings, "I have managed to make a very nice-looking sample of that new porridge of yours, at least it looked all right over night, but next morning it was nearly clear at the top. What's up with it?" I replied innocently, "Shake it up." With almost a scream of laughter he ejaculated, "Oh, I say, here's an innovation! The latest is, Shake your collodion just before using!" Those who remember how strong an article of a photographer's faith it was to avoid disturbing the sediment at the bottom of the collodion bottle will be able to appreciate the point of the joke and also how particularly "small" I felt as the laugh went round.

I do not remember when the Tannin Plate Company ceased to exist, but it dropped out of sight; and later, I think in about January 1866, Mr. Mawdsley, on his own account, started the Liverpool Dry Plate Company, to make and issue collodion emulsion plates, and how well known the Liverpool dry plate became all the world over will be within the recollection of many of your older readers. But it is worthy of the remark that, so great was the prejudice in some quarters against collodio-bromide, that it was a long time before Mawdsley dare let it be generally known that the plates were prepared without the bath; indeed, it was only when they had firmly established themselves by their own merits alone that the embargo was taken off and the public were allowed to know their real nature.

I do not know that it possesses any value as a comparative test of the keeping qualities of the two kinds of plates—*i.e.* bath plates and emulsion—since the precise conditions under which they had been kept are unknown; but I may relate an experience with some of the early dry plates that at least show that collodion emulsion films will keep. Some two or three years back I came across three packets of dry plates that I had had for a good many years, waiting an opportunity to try them; they were respectively "Hill-Norris," "Liverpool," and "Uranium Dry Plate Company." The first, a packet of stereo size, in the original lead packing, were given to me in the early "eighties," I think by Mr. Warnerke, who said he had had them *eleven* years. The "Liverpool" plates were given to me by Mr. Friese-Greene a year or two later, and they also had been several years in his possession; but the "Uranium" plates I can tell nothing about, unless, as I suspect, they had formed part of an odd "lot" I had at some time picked up at Stevens's.

At any rate, it was, I think, in 1895, when I came across them in a general clearing up, that I resolved to try them, and, with the exception of a slight iridescent discolouration round the edges, the Liverpool plates were, I think I may say, absolutely as good as when newly made; but the Hill-Norris were far from satisfactory under any form of development. Indeed, some of the plates would give no image at all. The Uranium plates were even worse than the Hill-Norris, which is, as I should have expected, if my theory be correct, that it is the action of free silver upon the collodion, that is, slight traces of free silver imperfectly removed from both the Norris and Wortley plates, that would naturally shorten their lives. A collodion emulsion film in which sensitiveness is got by free silver acting for a while, but neutralised before the plate is coated, can be relied upon as containing no free silver; but a film—whether emulsion containing free silver at the time of coating, or a bath film—that has to rely upon mere washing for the removal of the soluble silver salt, is, I am convinced, doomed sooner or later, and the former most probably.

From the data I have given I think it will be clear that the Liverpool Dry Plates were not the first *dry* plates issued to the public, though they were the first emulsion plates. W. B. Bolton.

FOREIGN NEWS AND NOTES.

Grain in Gelatine Dry Plates.—The *Photographische Mitteilungen* publishes an article by Dr. Carl Kaiserling criticising the misuse of the term grain as applied to enlargements. We are not unaccustomed to hear it said that an enlargement shows the grain of the negative, even if the magnification does not exceed two diameters. But the particles of silver are very small, and, assuming them to be ·005 mm. in diameter, it would be impossible to see them, as it requires very fine eyesight to see a point of ·1 mm. diameter at

the normal distance of 25 cm. Yet such a point is twenty times the diameter of the enlarged particle of silver referred to. Dr. Kaiserling gives illustrations of the grain of a dry plate, a negative, and an intensified negative, magnified 950 times. The particles of bromide of silver measure actually between ·00073 and ·0016 mm. in diameter. The majority of them measure ·0013 mm. They are unevenly scattered, and the intervening spaces frequently measure ·006 mm., or five times the diameter of the grain. The particles of bromide have the appearance of semi-transparent spheres. The particles of silver in the enlarged negative (developed with rodinal) are opaque and black. They are no longer round, but lengthened and irregular in shape; frequently in groups with intervening spaces. They may be said to measure from ·001 to ·0034 mm. in length, and from ·00063 to ·002 mm. in breadth. The particles in the intensified negative are rounder and about twice as large, compared with the unintensified negative. But, if these particles are so small that we cannot see them under conditions of ordinary enlargement, to what is the appearance of granularity due? Dr. Kaiserling attributes it to interference and diffraction, the light having to pass through a net, or very fine, irregular screen, formed by the groups of silver particles. He thinks "structure" would be a much better term.

Pyrocatechin.—In the same periodical Drs. H. W. Vogel and P. Hanneke report upon a new preparation of pyrocatechin manufactured by Dr. Ludwig Ellon & Co. This developer has not found much favour hitherto, probably on account of its cost and want of uniformity. The latter was, doubtless, due to impurities. The new preparation is chemically pure and much cheaper.

The first workable formula for pyrocatechin was composed as follows:—

SOLUTION I.

Water	500 c. c.
Sulphite of soda	20 grammes
Pyrocatechin	10 „

SOLUTION II.

Water	500 c. c.
Carbonate of potash	100 grammes.

One part of each to be added to one part of water. The developer is excellent, but rather slow.

Messrs. Lumière recommended tribasic phosphate of soda as an accelerator to shorten the time of development, and Poulenc frères gave the following formula:—

SOLUTION I.

Water	500 c. c.
Sulphite of soda	50 grammes
Pyrocatechin	10 „

SOLUTION II.

Water	500 c. c.
Tribasic phosphate of soda	100 grammes

One part of each to be added to one part of water.

Unfortunately the tribasic phosphate of soda is expensive. Messrs. Ellon have overcome this difficulty by substituting phosphate of soda and caustic soda as follows:—

SOLUTION I.

Pyrocatechin	5 grammes
Sulphite of soda	25 „
Water	250 c. c.

SOLUTION II.

Water	250 c. c.
Phosphate of soda	47 grammes
Caustic soda	5 „

For use take one part of each and one part of water.

Although more rapid in action, this developer does not fog, and gives negatives of excellent quality. With time exposures it is recommended to use a little bromide. Pyrocatechin has the advantage of being uninfluenced by temperature. It does not stain, and gives brilliant negatives of good colour.

It may be used for bromide paper with excellent results, according to the following one-solution formula:—

Water	1000 c. c.
Sulphite of soda	25 grammes
Carbonate of soda	50 „
Pyrocatechin	10 „

Dilute with an equal quantity of water.

Dry-plate Factories in Germany.—The *Wiener Freie Photographen-Zeitung* gives particulars of the profits made last year by some of the leading firms. Westendorp & Wehner, of Cologne, made a net profit 11,180*l.* Schleussner, of Frankfort o/M, 11,800*l.* The Chemische Fabrik auf Aktien (vorm. E. Schering), Berlin, 6000*l.* The latter has declared a dividend of only seven and a half per cent. against eleven per cent. in the preceding year, but the other firms show rather improved profits. It must be remembered that the prices of dry plates are higher in Germany than in England.

Broken Dishes.—The *Photographische Chronik* recommends the following cement for broken porcelain dishes:—

Water glass	60 c. c.
Fish glue	40 c. c.
Precipitated chalk	10 grammes.

The whole is rubbed down to a paste. The broken surfaces are brushed over with it, pressed into contact, and allowed to dry at a moderate heat.

The X Rays in Natural History.—A curious application of the X rays is mentioned in the Belgian journal *Helios*. M. Levrat wished to ascertain the sex of the chrysalides of some cocoons, and had recourse to radiography. The eggs, being composed largely of mineral salts, cast their shadow on the plate, and the cluster could be distinctly seen in the abdomenal region of the females, whilst the males were comparatively transparent.

Oxalic Acid and Light.—The *Moniteur de Photographie* publishes a very interesting communication by M. and Mme. Vallot to the Académie des Sciences. At the suggestion of M. Duclaux, experiments were made simultaneously at two stations at different altitudes, with a view to studying a new method of chemical actinometry, invented by M. Duclaux, based upon the decomposition of oxalic acid prepared under certain conditions. It was desired to investigate the following conclusions arrived at by M. Duclaux:—(1) Heat alone decomposed but slightly, and in a negligeable degree. (2) The actinic power of light was greater in northern than in temperate countries. (3) The actinic decomposition was inoperative at the beginning of exposure, was not in proportion to time of exposure, but increased progressively. M. and Mme. Vallot make the following deductions from their experiments:—(1) A series of observations made simultaneously at Chamounix (1095 m.) and at Montauvert (1925 m.) during nine fine days constantly, gave us much more chemical decomposition at the higher station. For the days most comparable, the proportions varied between 1 and 5 and 2 and 9, the mean being 2 to 1 for a difference in altitude of 830 m. Chemical actinism therefore increases rapidly with the altitude, much more than could have been anticipated from the variation in the heat rays. (2) From observations made at Chamounix, glass obstructs a large proportion of the chemical rays. This absorption is variable; the average of seven days shows that a very thin bell glass absorbed one-half. (3) Heat, which of itself has very little decomposing action, acquires very considerable power in the presence of light; thus, a solution exposed only to the sun showed a consumption of 10 per cent., but another solution, simultaneously exposed and kept artificially at 12 degrees higher temperature, showed a consumption of 50 per cent. These observations show that temperature plays a more important part than was thought, and acts supplementary to light. The heat rays, inert of themselves, increase the effect of the chemical rays, and, if vegetation is affected in the same way as oxalic acid, the law of their growth must be looked for in the combination of light with heat, and not in one of these factors only, as has been done in the method of total temperature. In this combined action of light and heat, light produces the preponderating effect. In fact, if the glass vessels containing the solutions are placed upon sheets of paper of different colour, one white and the other black, the chemical decomposition is nearly double with the white paper, and produces more brightness and a lower temperature than with the black paper, which does not reflect the light, and increases the temperature by several degrees. The marked intensity of chemical decomposition produced by light at high altitudes explains the effects of sunburn on the skin of those who remain on high mountains. On the other hand, Professor Mosso has shown experimentally that these noxious effects are much reduced if the skin is blackened with smoke, which at first seems paradoxical. The experiments give the key to this phenomenon, for the black, although increasing the temperature, diminishes the action of light, and reduces very considerably the chemical power of the sun. It will thus be understood that negroes are able to withstand a tropical sun better than white men.

CRYSTAL PALACE EXHIBITION NOTES.

Messrs. R. & J. Beck's Stand.

As will be seen by the accompanying illustration, the stand of Messrs. R. & J. Beck, Limited, consists of a central kiosk, tastefully p cked out in white and gold, and panelled from top to bottom with a large number of pictures from Frena negatives.

On each of the four sides is a neatly-curtained doorway, filled with a large pile of Frena cameras, representative of the four sizes of the instrument supplied by the makers.

Below and slightly in front of these piles are arranged the three sizes of the Frena film-holder for use on ordinary cameras.

The above is surrounded by a square enclosure, at each corner of which a handsome screen, in keeping with the whole, leads up to the corners of the central kiosk.

The screens, besides carrying enlargements from Frena negatives, have some hundreds of prints, showing the extensive scope of work of the Frena, arranged at eye-height, so that they can be carefully examined by passers-by.

Here are examples of almost every class of work, landscapes, seascapes, quaint and curious figure studies, tropical vegetation in Kew Gardens, animals, flowers, and even copies of plates in books taken with Frena magnifiers almost full size.

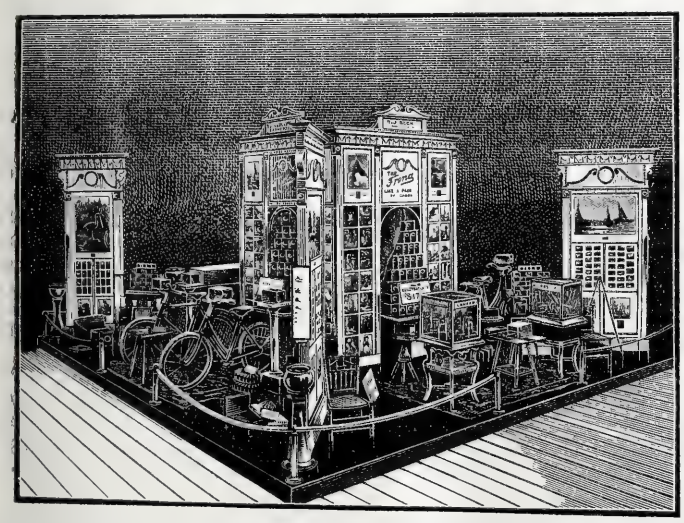
Some of the enlargements are ten times the length of the original (a very severe test for a negative), and yet they are almost as sharp as if taken direct. This is well exemplified by *The Miracle Church at Lourdes*, which is especially fine, as also is a picture of *Daffodils*, taken with magnifiers.

A Wherry Lying off the Norfolk Broads, *Snow Scenes in Switzerland*, very striking cloud and sunset effects in Venice, attract considerable attention.

The almost life-size picture of a terrible animal that lives in Regent's Park, which goes by the name of wart hog, and the head and shoulders of a rhinoceros, are particularly interesting. So interesting is this collection of Frena pictures that a visit only can give an adequate idea of the various phases of hand-camera work to be seen here.

Upon the floor of the enclosure, which is carpeted with two shades of green, are arranged various pieces of apparatus for use in connexion with the Frena. Here will be seen four cycles, to which are fitted Frena antivibration carriers with cameras attached to the machines in almost every position.

Frena film store albums, containing transparent envelopes so that negatives can be examined without their removal, the new improved skate-blade trimmer in three sizes with metal handles, the Perfection



flash lamp, the Bynoe printing frame, which enables the whole print to be examined at one time, and sundry other pieces of apparatus, too numerous to mention. In the enclosure are also marble pedestals and Turkish tables, supporting examples of the presentation model Frena camera in brown leather.

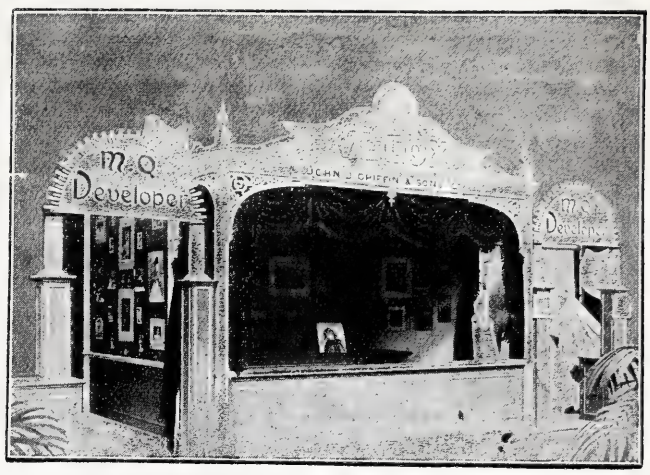
Some very compact developing and printing cabinets are shown, which are especially useful for travellers, and those who require a complete set of apparatus in small compass. Between the corner screens and central kiosk are blocks with tiers of apparatus surmounted by a wedge-shaped pile of celluloid and setoloid Frena films by all leading makers, showing that Frenographers can have a selection that should meet every requirement.

On the side of the stand opposite to the counter are two artistic show-cases, one containing a collection of Beck's autograph lenses, and the other a small selection of Beck's microscopes, limited to a few of the smaller stands suitable for micro-photography. Amongst these are noticeable a petrological instrument with all adjustments for the study of rocks, a pathological instrument suitable for the study of micro-organisms, and also a very compact folding binocular.

A good display of Beck's pecrops and square model cameras and examples of enlarging and optical lanterns are on view, and at each end of the counter, and on the show-cases in the rear, are to be seen some lantern slides from Frena negatives.

On the edge of each screen is a tablet describing the new magnifiers for copying, giving the proportionate size produced by each of these supplementary lenses. The whole exhibit is full of interest.

The Thornton-Pickard Manufacturing Company have taken space at the Crystal Palace Exhibition and a complete collection of the Company's specialities in shutters, cameras, &c., is now being shown there. We are sure the stand will attract the interested attention of the many visitors to the Exhibition.



Messrs. J. J. Griffin & Son's Stand.

The above illustration shows the Velox demonstration room, and represents only the central portion of the exhibit.

If any visitor has any questions to ask in regard to the working of Velox, Mr. W. J. Belton, who is in charge at the Palace, will be pleased to give any information in his power. Demonstrations, showing the working of Velox, are given under his direction at intervals during each day until the close of the Exhibition.

The exhibit of the Bolt-court Technical Schools at the Crystal Palace includes the following :—

Case 1.—Collection of the more important substances used by process workers. Thirteen examples showing stages in the preparation of gelatine from the raw material to the finished substance. Seven examples showing the purification of a sample of commercial gelatine. Cellulose and nitro-cellulose (pyroxyline). The principal solvents of pyroxyline, with one per cent. solutions of this substance arranged for comparison. Iodised collodions and the principal iodides and bromides used in the manufacture of collodion for photographic purposes. The combinations of the chief colloids with chromium oxide, isolated. Meta-gelatines in the form of fish glue of various kinds, and the sensitive fish glue and albumen solutions, with composition of the latter shown quantitatively. The foundations of photo-mechanical photography—silver, potassium, bichromate, and gelatine. A silver ingot. An agglomerate of crystals of potassium bichromate. Sheet gelatine.

Case 2.—Set of examples showing the various stages in the preparation of a zinc-line (type-high) printing block, from the original drawing to the block ready for the press. Set of examples for a half-tone block on zinc. Set of examples for a half-tone block on copper. Set of examples showing the preparation of copper plates for photo-engraving from the rough sheet to the finished plate. The stages in the making of a set of zinc blocks to reproduce a sketch in colours. Three workings ; photography combined with hand work.

Case 3.—The reproduction of a page printed in three colours by transfer photo-lithography, assisted by hand work as under : The original, the film negative, the exposed transfer, the inked and developed transfer, the black stone ready for printing, the blue and red on one stone for printing by means of double-inked rollers, and the finished proof. The original and a finished proof are shown side by side in one frame. Examples of photo-zincography, plates and proofs. Specimens of film negatives. Specimens of prints obtained by the line-zinc and half-tone zinc process and photo-lithography.

Case 4.—Set of examples showing the production of a print by the collotype process, from the negative to the finished print. Specimens of work (prints) by students in collotype and photo-lithography.

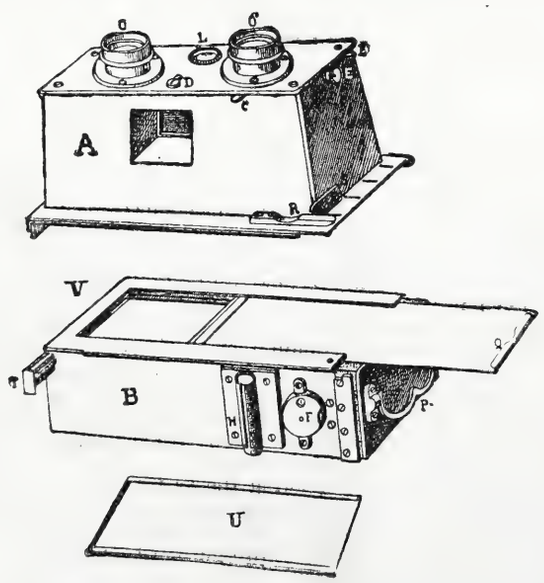
Case 5.—Set of examples showing the reproduction of a sketch in flat colours—black, yellow, and red—by means of *direct* photo-lithography, assisted by hand work. The original sketch in black outline. Reduced photograph of above, coloured by the artist as a guide for colour. The black outline, or key, printed direct on stone, partially developed. Ditto, fully developed. Ditto, fully developed, rolled up ready for printing. "Off-set" from same, for transfer to stone as guide for drawing in the colours. The yellow and red stones ready for printing rolled up with the printing colours. An example showing the method of fixing the film negative by means of petroleum and vaseline on the stone coated with bichromated albumen, also off-set transferred to stone with the yellow drawn in, both on the same stone. Proof of each stage, and the finished proof. Example of direct alagraphy or aluminium printing, using aluminium in place of a litho stone or zinc. One stone with pictures on the surface obtained by ink transfer. The ink from one portion has been removed, to show that the surface of the stone has been changed by contact with the fatty ink of the transfer, and that the image forms part of the stone. Inked transfer and proof, together with specimens of the substances forming the image—palmitate, stearate, and oleate of calcium. The substances forming the image obtained by greasy ink on zinc—palmitate, stearate, and oleate of zinc. The technology of ink-making for photo-engraving. Specimens of all the important kinds of beeswax, including imitations. Specimens of the substances used in the adulteration of beeswax. Starting and finishing inks, with the proportion of each constituent in a given weight, shown quantitatively. The active principles of greasy inks—the oleates, palmitates, and stearates of sodium and potassium. Oleic, palmitic, and stearic acids. Three frames containing bromide enlargements from half-tone screen negatives. High magnification, to show formation of tone.

The Verascope (Crystal Palace Exhibit).

Agents: Negretti & Zambra, 38, Holborn-viaduct, E.C., and Crystal Palace, S.E.

The Verascope is a stereoscopic hand camera and magazine, with an automatic changing action, taking twelve stereoscopic or twenty-four single pictures, which are produced on plates measuring $4\frac{1}{4} \times 1\frac{3}{4}$ inches. The pictures may be viewed through an ordinary-sized stereoscope or the camera itself, and the effect is as realistic and pleasing as that obtained by the larger pictures.

The apparatus consists of two parts—the camera proper, with its pair of rapid rectilinear lenses, shutter (instantaneous and time), and a view-finder; the magazine, containing metal sheaths for twelve plates, a sighting glass, an indicator by which to mark the number of plates exposed, and the automatic changing box. The apparatus complete fits into a neat morocco satchel, with shoulder strap.



Figs. 1 and 2 illustrate the instrument, and the letters indicate its working parts. A, body of the camera; o and o', rapid rectilinear lenses, centered $2\frac{1}{2}$ inches apart; L, a small single lens between the last two, is part of the view-finder, G; E, on being pulled out, sets the shutter; I releases the shutter for instantaneous exposure; D, keeps the shutter open for time exposures, and C closes it; R, spring catch, which locks the magazine to the body of the camera; B, the magazine, contains twelve metal sheaths, U; T, covers the opening, V, through which the sheaths are fed into the changing box; Q, steel band, sliding in grooves, serves as a cover to the magazine when it is loaded with plates, and is to be drawn out on exposing the plates; P, handle attached to the changing box; F, counter; H, sighter.

The Verascope is made of metal throughout, and is a very ingenious instrument.

The total number of visitors to the Exhibition during the first week amounted to 42,090.

The arrangements for the last week are as follows:—

Monday:—		
	Analyticon	3 and 7.30.
	Photography in Colours	4 ,, 8.15.
Tuesday:—		
	Analyticon	3 p.m.
	Photography in Colours	4 p.m.
Wednesday:—		
	Analyticon	3 and 7.30.
	Photography in Colours	4 ,, 8.15.
Thursday:—		
	Analyticon	7.30.
	Photography in Colours	8.15.
Friday:—		
	Analyticon	3 and 7.30.
	Photography in Colours	4 ,, 8.15.
Saturday:—		
	Analyticon	4 and 7.30.
	Photography in Colours	3, 5 and 8.15.

Lantern Slides will be shown every day at 6 o'clock, the fixtures being as follows:—

May 9 (Monday)	Mr. Henry Sandland.
May 10 (Tuesday)	Mr. T. M. Brownrigg.
May 11 (Wednesday)	Mr. J. R. Williams.
May 12 (Thursday)	Mr. Harold Baker.
May 13 (Friday)	Mr. Gustave Bird and Messrs. Newton & Co.
May 14 (Saturday)	Mr. John Bushby.

Arrangements have been made to hold a *soirée* at the Exhibition on Tuesday, May 10, when members of the Society and their friends, and members of affiliated societies, will be received by the Earl of Crawford in the Concert Room at 7.15 p.m. At 8 o'clock the Astronomer Royal will deliver a lecture on the photographs of the recent solar eclipse, and there will be displays of photographs in natural colours, music, and other amusements during the evening.

An invitation and free ticket for the Exhibition will be sent to every member of the Royal Photographic Society, or of the Affiliated Societies, who wishes to be present.

The tickets will admit to the Crystal Palace at any time during the day, and, if the numbers justify it, special late trains will be arranged for in the evening.

The Ordinary Meeting and Council Meeting, which would otherwise have been held on Tuesday, the 10th, are postponed.

HOLDING PHOTOGRAPHIC PRINTS WHILST THEY ARE BEING TRIMMED.

At the present time, when trimming photographic prints to a required size, it is customary, says Mr. A. E. Hancock, to lay the photographic print upon a flat surface, and to hold the print by the pressure of the operator's fingers on a glass plate or template of the same size and shape as that to which the photographic print is to be trimmed, and then to cut round this glass plate with a knife. It is rather difficult to cut round all four sides of the glass template without moving the same, and, when many photographs have to be cut, it is very tiring to the hand of the person pressing upon the glass plate.

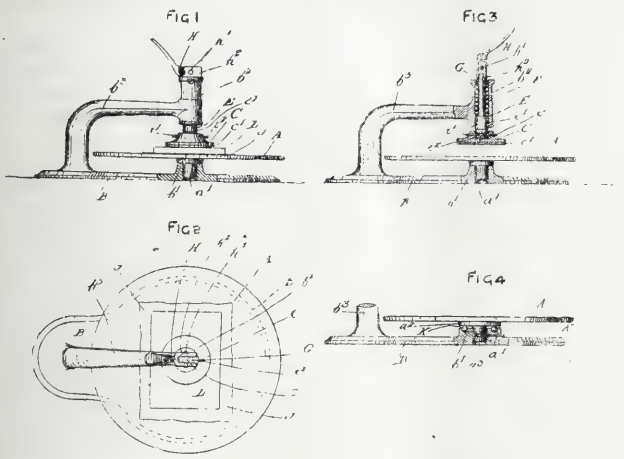
The object of this invention is to provide an appliance which will effectually hold and press the glass template and photographic print upon the table or cutting board, and prevent the glass template moving relatively to the print, and also allow of the template and table and print being turned round to bring all four sides of the print in position for trimming.

Fig. 1 is a side elevation, fig. 2 is a plan of the same, and fig. 3 is a side elevation partly in section of the same, and fig. 4 shows an alternative form of bearing for the table of the same.

The patentee provides a table, A, which is by preference of circular form, as shown, or it may be of any other shape, and is somewhat larger than the largest photographic print which is to be trimmed by the appliance. This table, A, is provided with a central vertical pin, a^1, underneath, which fits and turns in a hole in the boss, B, of the base, B, of the appliance so that the table, A, can revolve about this pin, a^1, or the table, A, may be otherwise suitably arranged so that it will revolve about its centre. The table, A, has a smooth top surface, and may be made of metal or wood, or may have a glass plate let into it for cutting on, or be otherwise constructed. Above the table, A, he provides a platten or pressure plate, C, which is also by preference of circular form, and is somewhat smaller than the smallest-size glass template, D, which is to be used. The under side, c^1, of this platten or pressure plate, C, is by preference covered with leather or with indiarubber, to bear upon the glass template, D, and prevent the same from slipping. The platten or

pressure plate, C, can turn freely on the upwardly projecting stem or spindle, E, which is immediately over the centre of the pin, a^1, on which the table, A, turns, this stem, A, being supported in a vertical bearing, b^2, in the arm or stand, b^3, which is formed with the base, B. He provides suitable means for bringing down the pressure plate, C, on to the glass template, D,—such, for instance, as the coiled wire spring, F, contained in the bearing, b^2, in which the stem, E, moves, and which spring acts between a cap or collar, G, fixed in the top of the bearing, and the enlarged collar part, e^1, of the stem, E, and thus tends to force the platten or pressure plate, C, against the table, A. He also provides suitable means for acting upon the stem, E, of the pressure plate or platten, to lift the same off the template, D, when required. What he prefers to provide is a lever, H, which embraces and is jointed to the top of the stem, E, by the cross pin, h^1, the said lever being shaped as a cam at h^2, so as to bear against the top of the bearing, b^2, so that the lever, H, is turned in the direction shown in fig. 3, the cam portions, h^2, of the lever, H, act upon the top of the bearing, b^2, and lift the spindle, E, and platten or pressure plate, C; and when the lever, H, is turned in the other direction, as represented in figs. 1 and 2, the shape of the cam portions, h^2, of the lever, H, allow the spring, F, to act upon the pressure plate, C, and force the same down towards the table, A. The pressure plate, C, is free to turn about the spindle, E, and is connected thereto by the pegs, i^1, i^2, which engage in the groove, e^2, turned in the lower part of the spindle, E.

In using the appliance above described, the platten or pressure plate, C,



has first to be raised a short distance from the table, A, as shown, which is done by turning the cam lever up, as represented in fig. 3. The untrimmed photographic print, J, with the glass template, D, upon it, are then placed in position on the table, A, as shown in figs. 1 and 2 underneath the platten or pressure plate, C, which latter is then, by turning the lever, H, to the position shown in fig. 1, caused to descend on to the glass template, D. The untrimmed photographic print, J, will now be held firmly on the table, A, by the glass template, D, which is pressed down by the platten or pressure plate, C, and will not be liable to move. The edges of the photographic print, J, which project beyond the glass template, D, can now be trimmed off by a knife in the usual way, the table, A, with the photographic print, J, and the glass template, D, and the pressure plate or platten, C, pressing upon it, being turned round as may be required, to bring the sides of the photographic print, J, in position to be trimmed. The glass plate, D, and the trimmed photographic print are free to be removed as soon as the platten or pressure plate, C, has been raised by turning up the lever, H, to the position shown in fig. 3.

In order to reduce friction, the table, A, may be arranged to turn on a ball bearing, the balls, K, being introduced in a ball race turned in the top of the boss, b^1 (fig. 4), so that the boss, a^2, of the table will rest and turn on the balls. In order to prevent the table rising and the balls getting out of place, the stem, a^1, may have a groove, a^3, turned in it, with which a peg, L, in the boss, b^1, engages.

SCHWARZ'S METHOD OF DEVELOPING PHOTOGRAPHS IN LENGTHS.

In the apparatus hitherto used the feeding of the moist paper through the several baths presented the disadvantage, that special feeding mechanism is required, which increases the cost of the plant as well as the working expenses, as, owing to their operation in the several solutions, such feeding mechanism is exposed to great wear.

Mr. Schwarz has devised an apparatus whereby the feeding mechanism operating in the baths is dispensed with, and to this end he has provided his developing apparatus with peculiar feed rolls of a simple and cheap construction.

Fig. 1 shows an elevation of the new feed roll.

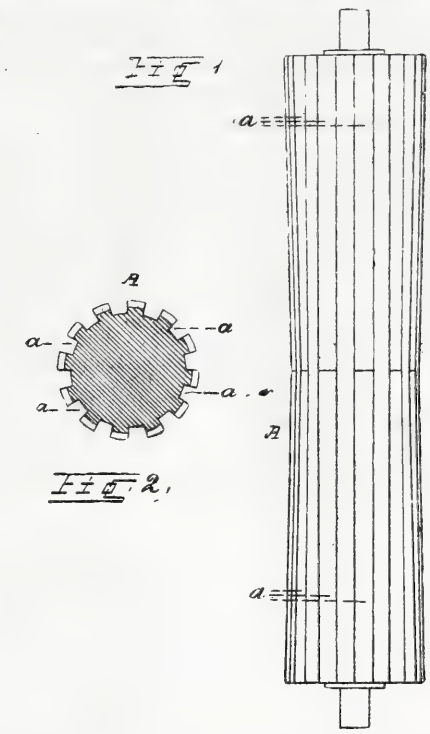
Fig. 2 shows a transverse section of same.

Fig. 3 shows a longitudinal section of the apparatus, provided with the new feed rolls.

Fig. 4 shows a transverse section of one of the baths on an enlarged scale; and

Fig. 5 shows an end view of the feed roll on the same scale.

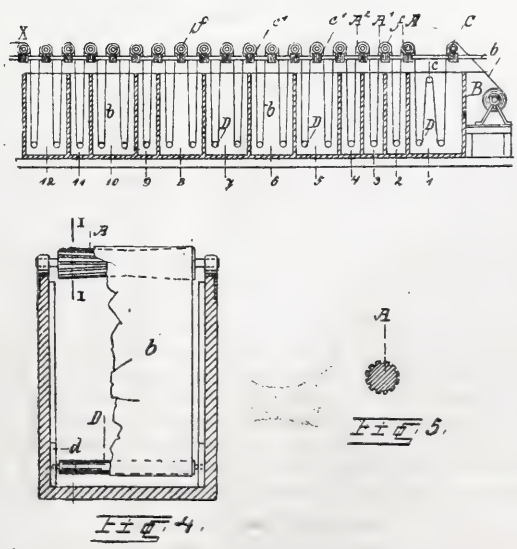
As shown in fig. 1, the roll, A, is provided over its entire length with grooves, a, and the roll is not cylindrical, but is slightly tapering toward



the centre from both ends. These rolls will hold the paper when it reaches same from the bath with a slightly lateral pull sufficiently strong to prevent the formation of folds without injuring the paper.

As the roll, A, has a larger diameter towards the end than in the centre, and the whole roll turns uniformly, the ends have a larger peripheral speed than the centre, so that they exert a certain pull on the corresponding sections of the paper. As the diameter becomes smaller toward the centre, the peripheral speed also decreases, and is smallest in the centre. The pull on the sections of the paper varies in accordance therewith, and consequently the paper is advanced by the rolls absolutely without any folds being formed.

FIG 3



These rolls are mounted above each bath, as shown in fig. 3, and the exposed paper, b, drawn from the reel, B, over the roll, C, into bath 1, and after passing through same is conveyed by the feed roll, A, into bath 2, and so on until it is fed through the entire series of bath 1 to 12, by the propulsion of the feed rolls, A, and carried off over a roll, X. The loops of

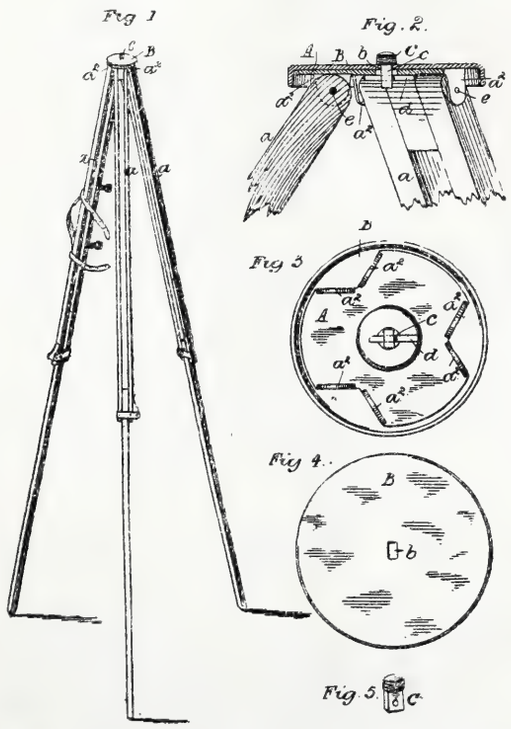
paper hanging down into the baths are weighted down by means of small rolls, D, the journals of which are housed in longitudinal slots, *d* (fig. 4), provided in the side walls of the baths, so that the length of the loop of paper in the bath may be changed at will.

The feed rolls, A, are rotated with equal speed by a common shaft, *b* preferably by the medium of a worm, c^1, and worm gear, *f*, so that the strip of paper is fed without any guiding device through the baths, and is only weighted down by the small rolls, D, so as to obtain a perfect immersion in each bath.

It is obvious that the rolls, D, merely rotate, and are not subjected to any strain whatever. Consequently they can be made of a material not affected by the liquids and solutions in the several baths.

BROWNELL'S TRIPOD STAND.

This invention consists in making a tripod, or stand, for supporting photographic cameras, in such a manner that the camera can be very readily secured thereto and removed therefrom, and also so that, when in place, the camera, can be, with great facility, turned into any position upon the centre by which it is secured to the tripod, or stand. Fig. 1 is a perspective view of the tripod or stand complete. Fig. 2 is a section of the upper part constituting the support for the camera or the like. Fig. 3 is a plan of under side. Fig. 4 is a plan of the upper plate. Fig. 5 shows the screw separately. The upper legs, *a*, of the tripod or stand are secured to a lower plate, A, upon which is mounted a table, or plate, B, for the camera, or the like. A screw, C, for screwing into the camera, or the like, is combined with these two plates, so that the screw and upper plate, B, can be rotated together upon the lower plate, A. The edge of the upper plate, B, may be milled, or roughened, so as to allow of its being easily rotated by the operator. By placing the



camera, or the like, in position so that its screwed hole is upon the screw, C, and then rotating the upper plate, B, as the screw, C, rotates with it, the screw, C, is screwed into the said hole, and the camera, or the like, is firmly secured to the tripod, or stand; and,as the upper plate, B, and screw, C, can be rotated relatively to the lower plate, A, the camera, or the like, can be turned round into any position, on the tripod or stand. The screw, C, made be made in one with, or separately from, the upper plate, B. For example, it may be squared at a part, *c*, which passes through a squared hole, *b*, in the upper plate, B, the portion of the screw, C, which passes through the lower plate, A, doing so in such a way that the screw can be rotated in the said lower plate. The parts can be secured together by a pin, *d*, passed through the part of the screw, C, which protrudes below the lower plate, A. The said lower plate, A, can be slit and parts thereof turned down as shown at a^2 to constitute brackets for the centre pins, *e*, upon which the upper ends of the legs, *a*, of the tripod or stand are hinged.

METHYLATED SPIRIT IN PHOTOGRAPHY.

[Paper reprinted from the *Pharmaceutical Journal*.]

Certain objections to the use of methylated spirit containing rock oil, in photography, have been brought under my notice by a professional photographer. Thus, in the process of enamelling, collodion is used. As received, the collodion is too dense, and has to be diluted in the proportion of one part of collodion, one part of ether, and one part of methylated spirit. Before the addition of rock oil to the spirit, this process was in constant use, and gave uniformly satisfactory results. After the addition of the oil it was found that the finished picture was spoiled by a white hazy opalescence, particularly at one corner.

The process of enamelling is as follows: The diluted collodion is made to flow over a plate of glass, and is then drained off at one corner and allowed to dry. The print is placed in a bath of hot solution of gelatine in water and then "squeegeed" on to the collodion-coated plate. After it is dry the print is peeled off, the resultant picture possessing a highly glazed or enamelled surface. But, after the use of the rock oil spirit, a very large proportion or the pictures were completely spoiled in the way above indicated. At first no explanation of this untoward circumstance was thought of, and it was assumed that the fault lay in the collodion. After several new quantities of collodion had been tried without any improvement, suspicion was ultimately attached to the methylated spirit. This was found to be the source of the evil, and, on using methylated spirit free from rock oil, the results were again uniformly satisfactory. The explanation arrived at was that rock oil in the spirit and the water in the gelatine were the cause of the opalescence complained of.

It may be interesting to note that a liquid called "pyroxyline solvent" is extensively sold for the foregoing and other technical purposes. To all appearance it is simply a mixture of ether and methylated spirit, free from rock oil. This, of course, is quite free from objection for the purpose, but the legality of the sale of such a mixture is surely a point that requires to be cleared up.

It frequently happens that a picture is wanted in a hurry, and in such cases, after the negative has been developed and washed, it is dried in a very short time by dipping it into methylated spirit, and then removing it and letting it dry, sometimes in a warm place. In this way what would take several hours may be done in fifteen or twenty minutes. But one difficulty that occurs if methylated spirit with rock oil is used is that the negative is covered all over with a white fog, which is objectionable, and may interfere with the printing, especially in the case of delicate or faint negatives. This white fog appears to be caused by contact of water in and on the film with oil in the methylated spirit.

Another objection in this dipping and drying process, which is in constant use in every large studio, is that the spirit very soon becomes muddy from precipitation of rock oil by water. It cannot, therefore, be used again and again, as was the case with the old methylated spirit. Considering that the addition of rock oil seems to have been quite ineffectual for the purpose for which it was added, and that so much may be said against the addition, it certainly seems as if some good reason should be given to justify the retention of the existing regulation, or it should be abolished.

J. Rutherford Hill.

THE INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY.

Photographic Section.

The third Congress of chemists and others interested in applied chemical science will be held this year at Vienna, from July 28 to August 2. An influential organizing local committee has been formed, one of the Vice-Presidents of which is Dr. J. M. Eder, the eminent Director of the Imperial Photographic Institute in Vienna. The Commitee is making every arrangement for affording visitors opportunities to inspect the numerous objects of interest in the way of art, manufacture, or history in the old Imperial town. Vienna is this year celebrating the Jubilee of the Emperor Franz Joseph I. by a great exhibition, and during the week of the Congress other meetings are being held on chemistry of food, methods of sugar analysis, experimental agriculture, &c., so that those interested in these subjects also can kill two birds with the proverbial stone. The membership fee, which admits the visitor to all Congress meetings and other fixtures, is ten florins, which may either be remitted to the Secretary, Herr F. Strohme, Vienna IV/2, Schönburgstrasse, 6, or paid on arrival. English, French, and German are the languages permitted in the various debates. The work of the Congress is conducted in a number of sections, the most important of which, from a photographic point of view, is Section V., devoted to the graphic industries including photo-chemistry, photographic and chemical printing, and colour printing. This Section meets under the presidency of Dr. Eder. Professor Eduard Valenta is Vice-President, whilst amongst the members of the Deliberation Committee are Baron A. Hübl and Professor Alexander Lainer. The presence of these eminent photographic authorities will ensure the meetings of the Congress being of no mean order. The questions, among others, which the Photographic Section will bring forward for discussion are the following, though members are at liberty to bring other matters forward if due notice is given:—

Best principle to adopt in the construction of a standard sensitometer. The relation between the constitution of organic bodies and their powers of developing the latent image in silver bromide, chloride, or iodide. The necessary experiments to be made with regard to the use of artificial light (magnesium, aluminium, gas, acetylene) for photographic purposes. Possible method of producing a grainless, structureless paper for the support of gelatino-bromide emulsion in place of glass for negative

purposes. Preparation of a paper for manufacture of a celloidin paper which, while tough, will not curl in the bath. Colouring matters for photographic baryta paper which will be more suitable than the fugitive aniline dyes now in use. Methods for quantitatively estimating noble metals in photographic solutions. Most advantageous methods of recovering noble metals from photographic residues. Technology of tri-colour printing.

Arrangements have been made for visits of inspection to be paid to the Imperial Court and State Printing Works; Imperial School and Experimental Institute for photography and reproduction processes; establishments of Messrs. Angerer & Göschl and of J. Löwy. G. E. Brown.

Our Editorial Table.

Handbook of Imperial Plates and Papers.

Published by the Imperial Dry Plate Company, Cricklewood, N.W.

One of the articles in this little handbook, entitled "Common Flaws in Negatives," deserves to be committed to memory by every plate-user, for it passes in review the various superficial defects to which negatives are liable, and points out how they may be avoided. A careful study of the words of wisdom here volunteered will tell the photographer how to assure the production of clean negatives, thus obviating the correctional attentions of the spotting brush, &c. Other useful features of the book are a series of exposure notes and Imperial developing formulæ, and there are a number of capital illustrations from negatives taken on Imperial plates.

Practical Half-tone and Tri-colour Engraving.

158 pp., price 2 dollars. By A. E. Austin. Buffalo, N.Y.: The Professional Photographic Publishing Company.

If we mistake not, Mr. Austin's book is largely a reprint of articles that have appeared in one of our American contemporaries, It professes to give instruction in practical half-tone and tri-colour reproduction by such methods as are used in his every-day practice. Both branches of his subject are dealt with concisely, and the information appears to be sound, and to proceed from a practical man. There are numerous illustrations and formulæ. We note one loose bit of advice in the chapter on "The lens and other tools," viz., the recommendation to take the "back focus" as a guide in selecting a lens. It is the "equivalent" and not the "back" focus that should be taken, of course. "Back" focus is an absurd and almost obsolete term. Mr. Austin eschews theoretical considerations and wordiness in his book, which, as it professedly appeals to practical men, can be recommended on that account. It is well printed and bound.

"Aurotype" Enlargements.

Henry M. Ward, 37, Belgrave-avenue, Leicester.

Mr. Ward has shown us a number of specimens of his "Aurotype" enlarging process, which are undeniably effective. They have an agreeable warm colour, and thus, at a time when warmth of tone is so much in favour with the public, they should strongly appeal to professional photographers. At first sight these enlargements appear to be produced by the carbon process, but closer inspection shows that they are not. No matter by what process the colour is obtained, the pictures struck us as singularly attractive, and we can recommend them. Mr. Ward does excellent enlarging work.

From the *Art Journal* office, 26, Ivy-lane, E.C., we have received *Pictures of* 1898. Most of the principal pictures at the Royal Academy, the New Gallery, and the New English Art Club are capitally reproduced in half tone in the book, a glance through which gives one a very good idea of what the year's art is like, and doubtless suffices with many instead of a personal visit to those Exhibitions.

News and Notes.

A Photographer's Suicide.—Arthur Beck, a well-known Belfast photographer, committed suicide at his studio on Friday. It appears that he was found in a dying condition in his studio in Castle-place, Belfast, and before a doctor could be summoned he expired through having taken a dose of cyanide of potassium.

The Exhibition at Portman Rooms.—On Wednesday, April 27, the exhibitors at this Exhibition had a very pleasant meeting together, including supper, which was well catered for. Several speeches were made, and every manufacturer and dealer present appeared to be on the best of terms. After the usual toasts had been proposed, a very pleasant incident occurred, a presentation being made on behalf of the exhibitors of a very beautiful gold watch to the worthy Secretary, Mr. Arthur C. Brookes, as a token of their appreciation of his efforts in organizing the Exhibition. One and all of the exhibitors expressed themselves as perfectly satisfied with the success of the Exhibition, and they were pleased that their appr ciation had taken definite form.

Photographic Club.—Wednesday evening, May 11, at eight o'clock, Members' Open Night. Exhibition of Cycling and General Animatograph Pictures, by Mr. Walter D. Welford. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

Röntgen Society.—The next General Meeting of the Society will be held at 11, Chandos-street, Cavendish-square, W., on Tuesday, May 10, at eight p.m., under the presidency of Professor Silvanus P. Thompson, F.R.S. Papers will be read as follows:—"Notes on the Description of a New Induction Coil in *Electrical Review*, February 4, 1898" (with demonstration), by Mr. A. Apps, M.I.E.E. "Some Notes on Contact Breakers," by Dr. J. Macintyre. To be followed by a discussion.

Messrs. Lonsdale Brothers, of 22, Goswell-road, E.C., recently offered in competition three prizes for the best and most appropriate couplets rhyming with the following: "Lonsdale's cameras are practical cameras," and of which those words formed one line. The successful competitors were, First prize, H. Bryant, 23, Church-street, Slough, Bucks; second prize, R. Paterson, 51, Bank-street, Hillhead, Glasgow; third prize, W. Jarrett, 86, Glebe-street, Walsall.

Advertising Exhibition.—An exhibition of advertising devices, appliances, and notions will be held in June, at the Agricultural Hall, on the occasion of the annual Chemists' Exhibition. Among the exhibits will be found examples of British and foreign colour printing, in posters, show cards, calendars, tablets, &c., special photographic and engraving processes; enamelled, glass, and other letters; mechanical appliances for exhibiting advertisements; electric and other illuminated signs, and numerous special devices, including inventions which have never yet been publicly shown, the whole forming a display of great interest to all directly concerned in public advertising. The exhibition offices are at 44, Bishopsgate-street, Without, London, E.C.

Mr. Bynoe, of Frena fame, on Friday, 22nd ult., gave a most interesting lecture in connexion with the Cyclist Touring Club at the Royal Institution, Liverpool. His subject was *The Camera and the Wheel*. In the absence of the Lord Mayor (absent on the Continent) Councellor Hampson took the chair, and the lecture hall was well filled. Mr. F. V. A. Lloyd ably manipulated the lantern that was used to throw the pictures on the screen that illustrated the lecture. Mr. Bynoe is a master of his subject and a most interesting lecturer. He bored none of the three sections of the community that went to form the *personnel* of his audience. He was simplicity itself to the wheelmen and wheel-women; he was technicality personified to the camera-cum-wheel-men and women, and he even interested those that merely came, like overgrown boys and girls, to see a magic-lantern show. Anybody that came, saw, and heard, and did not take away either fresh knowledge, or something to think about, must have been dense indeed.

The late R. Freeman Barnes.—It is with regret we have to announce the passing away of one more of the pioneers of photography in the person of Robert Freeman Barnes, who died on the 25th ult., after a short and painful illness. He was one of the earliest photographers, an enthusiastic dry-collodion worker; in fact, his work on that subject is still the standard. He was also one of the first and most successful workers in the Daguerreotype and vitrified enamel processes. For many years chief operator to Maull & Polybank, he afterwards opened a business in New Bond-street, which he transferred to New Cross, where he has conducted a high-class business for the last thirty years, and, although seventy-five years of age, may be truly said to have died in harness. It is only a few years since we announced the death of his younger brother, George Green Crawford Barnes, who was also one of the earliest photographers. Mr. Barnes leaves a widow and family of one son, William H. Barnes (late of Messrs. Edwards & Son, Hackney), who is now lying seriously ill, and five daughters to mourn his loss.

It will not be the fault of Sir Benjamin Stone, M.P., says a daily contemporary, if posterity does not have a much fuller and more exact record of our *faits et gestes* than we have of those of our forerunners. Sir Benjamin is an expert photographer, and was instrumental in founding the National Photographic and Historic Research Department at the British Museum. His latest records consist of some unique pictures of the ancient ceremony known as the distribution of the Queen's Maundy Money, which took place recently in Westminster Abbey, in the presence of the Lord High Almoner, and many other officials, including Her Majesty's Yeomen of the Guard. The Hon. Member has also completed his series of Parliamentary photographs, 300 of which he has presented to the new department, and he is now devoting his attention to the interior of some of the better-known public buildings in the metropolis, such as the Mint, the Tower, the New Record Offices in Chancery-lane, and the War Office in Pall Mall. Many of his latest productions are included in the Photographic Exhibition at the Crystal Palace.

In regard to Dr. P. H. Emerson's forthcoming book on *The English Emersons, Emmersons or Embersons*, it is announced that the baptisms of the children of Thomas and Elizabeth (who emigrated to Ipswich, Mass., U.S.A.) in 1638, and from whom Ralph Waldo Emerson is directly descended, were found on Saturday, March 12. A very important genealogical problem is thus solved, and the book (which is printing) will be a little delayed so that full details of this discovery may be included. The publisher has decided to still further limit the addition from that announced in the prospectus already sent out. There will be fifty copies of the *édition de luxe*, price 3*l.* 3*s.* and 16.00 dollars respectively, but only 250 copies of the ordinary edition, price 1*l.* 11*s.* 6*d.* and 8.00 dollars respectively, our other conditions being the same as those printed in the large prospectus. It is hoped that the book may be now published on May 16, 1898. Up to that date subscriptions on the above terms will be accepted, but immediately after publication all unsold copies will be advanced one-third in price. Orders and cheques should be sent therefore at once to Mr. David Nutt, Publisher, 270, Strand, London, or to any bookseller.

COLOUR HEARING.—Dr. W. S. Colman describes a number of cases of "colour hearing," such as are well known to psychologists, in which a sensation of colour associates itself with certain sounds, the colour seen being definite and invariable for the same sound. In one class of cases a crude colour sensation, often very beautiful, is associated with each of the vowel sounds, musical notes or particular musical instruments, the appearance being usually that of a transparent coloured film, similar to a rainbow, in front of the observer, but not obscuring objects. In a second class there are colour sensations whenever letters or written words (symbols of sound) are spoken or thought of, so that when a word is uttered the subject visualises the letters, each having a distinctive tint. Dr. Colman is of opinion that the phenomena are "associated sensations," analogous to the cutaneous sensation of shivering in certain parts of the body, which varies in different individuals. The tints excited are very definite and characteristic, each for its own sound, and they do not vary as time goes on. The colours are scarcely ever the same in two individuals.—*Lancet.*

A NOVEL COMPETITION.—A prize of six guineas, given by Mr. J. Morgan, is offered by the Hastings and St. Leonards Photographic Society for the three selected photographs of Fairlight Glen and the Lovers' Seat, illustrative of two unpublished poems on these subjects. The scheme of the competition is as follows:—1. The competition is open to both professional and amateur photographers, and is not confined to members of the Society or residents in Hastings. 2. The size is to be not less than half-plate. A competitor may send in any number of views. 3. An unmounted print of each view must be sent to the Secretary of the Society on or before May 28. Each view must be marked on the back with a motto, or *nom-de-plume*, selected by the competitor, and such motto or *nom-de-plume* must be filled-in on the entry form, together with the competitor's name and address. The entry form so filled up must be placed in a sealed envelope and handed in with the prints. 4. The award will be made within one week of May 28, and the Judges shall be: (1) The President of the Society; (2) the donor of the prizes; (3) some one chosen by the competitors at a meeting to be duly called not later than May 21, or, in default, by the Committee of the Society. 5. The prize will be given in sums of two guineas, that sum to be accepted for any one view sent in. 6. The prize negatives are to be handed over on payment of the above sums, and the copyright shall become the property of the Society. 7. It is intended to publish the poems and views, and every competitor shall be entitled to a copy of the work.

THE South London Photographic Society have just entered upon another year of their existence, and, at their annual meeting, the Secretary announced that the advance of the Society had been steadily maintained throughout the past year, and they now had a record of membership of 181 in addition to honorary members. The meetings being held bi-monthly at which papers, &c. have been read, and the excursions throughout the season have been carried out more extensively than former years. The trial experience of conducting two separate weeks' excursions, one to the north of Ireland and the other to Hamburg, met with much greater success than was anticipated, so much so, that it was arranged to continue them this season. The cycling section, inaugurated for the first time, was a success, and the arrangements for this branch of the Society during the coming year are to be more extended than before. The annual Exhibition held in March last received good support and resulted in a profit to the Society. Considering the Society is conducted on an annual subscription of only 5*s*., the finances are in a flourishing condition, with 39*l*. 12*s*. 4*d*. cash in hand, the balance in favour of the Society, taking into account the accessories at marketable value being 77*l*. 17*s*. 11*d*. During the year the Society has held its previous reputation for awards at the various exhibitions, and, in addition, winning the *Scientific Siftings* cinematograph. Several new features are proposed for the coming season, and gentlemen desirous of joining are requested to apply to the Hon. Secretary, Mr. A. E. Allen, 27, Princes-square, Kennington Cross, S.E., who will be pleased to answer any inquiries.

NORTH-WESTERN PHOTOGRAPHIC EXHIBITION.—This Exhibition at the City Art Gallery was brought to a close on Saturday evening by a lantern show of upwards of 300 slides, the work of seventeen of the combined societies, the slides being selected from over 1200 sent in. The number was in this way brought within practical limits, and the standard of excellence was naturally high. During the interval, Mr. J. W. Wade, Chairman of the Executive, made a few remarks. He said that the Exhibition had in itself been a marked success, and had served the purposes for which it was intended, namely, to give the combined societies an opportunity of exhibiting their work in rooms which were pre-eminently suitable for the purpose, and in a populous centre. It had also given the exhibitors the chance of comparing their individual productions with those of other workers, and the general public had received a liberal education on art and matters connected with photography. It was unfortunate that the audiences at the lectures had not been so large as was expected, this being the main source of revenue. The Exhibition was open to the public free during the day, but they were in hopes of making both ends nearly meet. The utterances of the Lord Mayor and Councillor J. Ernest Phythian at the opening of the Exhibition had given rise to a misconception as to the generosity of the Art Gallery Committee. He wished it clearly understood that the executive had paid for the rooms, both at the Art Gallery and at the Athenæum, and, if any one was entitled to praise for generosity, he thought it was the executive and exhibitors for providing for the benefit of the citizens of Manchester and their neighbours an exhibition which has been unequalled in this part of the country. At the close of the Exhibition it was announced that 13,780 persons had visited the rooms.

SEEING UNDER WATER.—An engineer of Cracow, Malachowski, has devised a valuable instrument, by means of which plant and animal life can be studied under water, and ships' hulls and bridge piers be examined. The instrument is practically a binocular with a long tube. It consists of three parts—the lenses, the diverging tube made of zinc, and the closed box into which the zinc cone fits. This box is made of sheet iron, has a diameter of about one foot, and is closed below by a strong glass plate packed between rubber washers. In order to protect the plate from stones, the box is provided with iron feet. The field of view under the plate is illuminated by an electric incandescent lamp, which is held by a bent arm. Another lamp can be fixed in a short branch tube starting from the box. This branch, which is hermetically closed, is needed, because the moisture would condense on the inner face of the glass plate, if this face were not carefully painted with pure vaseline. To do this, the box must be accessible. Weights are required to overcome the hydrostatic pressure. That pressure might crush the glass plate, and the water rushing up damage the lenses and the eye of the observer, were it not that such water would find an exit through an opening in the upper part of the tube. Captain Muzyka, whose short description in the *Mittheilungen über Gegenstände des Artillerie und Genie-Wesens* we follow, states that Malachowski has experimented with tubes fifty feet long. The electric wires are carried down inside the tube. When lateral observations are to be made, as will generally be the case on board ship or for operations connected with hydraulic engineering, the inventor employs a different box, in which a mirror is placed at an angle of 45°. We do not know how far the experience of the inventor extends, but he seems to have overcome the more apparent difficulties. —*Engineering.*

Patent News.

THE following applications for Patents were made between April 12 and April 23, 1898:—

LENS SYSTEMS.—No. 8512. "Improvements in Anamorphotic Lens Systems." P. RUDOLPH.

COLOUR REPRODUCTIONS.—No. 8698. "An Improved Method of Reproducing the Shaded Effects of Pictorial Designs in more than One Colour." J. WALKER.

CALCIUM CARBIDE.—No. 8756. "A New or Improved Process for Removing the Fœtid Odour of Carbide of Calcium and for rendering the same air-proof." H. SEZ.

HALF TONE SCREENS.—No. 8895. "Improvements in Screens or Gratings for the Half-tone Photo-mechanical Engraving Process." H. LYON.

ANIMATED PHOTOGRAPHY.—No. 8951. "Improvements in Apparatus for Taking and Projecting Photographs of Moving Objects." F. E. HOFFMAN.

X RAYS.—No. 8999. "Improvements in or relating to the Application of X Rays." Complete specification. H. J. WAGG.

SHUTTERS TO DARK SLIDES.—No. 9110. "Improvements in Shutters to Photographic Dark Slides, Roll-holders, Changing Boxes, and the like." H. LONSDALE.

DAYLIGHT PLATE-CHANGING.—No. 9222. "Improvements in the Mode and Means for Placing and Replacing Photographic Plates in the Dark Slides while in the Daylight." E. W. ROGERS.

PROJECTION APPARATUS.—No. 9374. "Improvements in or connected with Optical Projection Apparatus." Communicated by the Northern Advertising Company, Nordisk Reklame Kompagni Aktieselskab. Complete specification. J. G. LORRAIN.

ARTIFICIAL LIGHT APPARATUS.—No. 9439. "New or Improved Apparatus for producing Artificial Light for Photographic and the like purposes." C. KLARY.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

May.	Name of Society.	Subject.
9.....	Bradford Photo. Society	*A Travel in Norway.* Dr. Nutter.
9.....	North Middlesex	*Some Facts about Focus* W. E. Debenham.
10.....	Hackney	*Photographing the Total Solar Eclipse.* A Taylor.
10.....	Isle of Thanet	*Portraiture.* Harold Baker.
11.....	Croydon Camera Club	Conversational Meeting.
11.....	Photographic Club	Members' Open Night: Exhibition of Cycling and General Animatograph Pictures. Walter D. Welford.
11.....	Southsea	Excursion: Lyndhurst.
12.....	London and Provincial	Discussion on Mr. Trape's Paper. Opened by A. Haddon.
12.....	Manchester Photo. Society	*Multiple Films, their Theory and Practice.* J. T. Sandell.
12.....	Oldham	Demonstration. J. Wrigley.
14.....	Borough Polytechnic	Excursion: Wellhall to Chislehurst.

ROYAL PHOTOGRAPHIC SOCIETY.

MAY 3,—Technical Meeting,—The Right Hon. the Earl of Crawford, K.T. (President), in the chair.

DAYLIGHT DEVELOPMENT.

Mr. HOWARD FARMER read a paper, in which he detailed the results of experiments, conducted with a view to ascertaining whether any means could be found to avoid the discomfort and strain on the eyes, entailed by working in the ordinary light of the dark room, and by the frequent changes from bright daylight to the blackness of night, and *vice versâ*. The chief uses of the dark room being to protect the film from actinic light during development, and during its transfer to or from the developer or dark side, he had attempted, by experimental trials with every likely colouring material, to make the first of

these purposes a function of the developer, either partially or entirely. No one colouring matter gave complete protection, except in the case of substances which, like Indian ink and lamp-black, absorb all rays, and only then when in sufficient quantity to give an opaque fluid; the ferrous-oxalate developer, which was supposed to be very non-actinic, was found quite useless in this respect. A combination of two colouring matters (one of them specially selected to stop ultra-violet rays) gave much better results. His investigations soon led him to devote prominent attention to the use of caramel, and, after a considerable number of practical tests, he regarded it as a most valuable addition to developers; its complete inertness, its power of stopping actinic light, its transparency, freedom from staining, and facility of preparation, all combining to render it an extremely convenient light filter when a liquid is required. To prepare caramel, Mr. Farmer said he mixed four parts of the best powdered cane sugar with one part of water, and gradually raised the temperature to 380° F., taking care not to go beyond 400° F.; he then stirred the mass for half an hour or longer until it thickened and showed an inclination to solidify; but before this was allowed to take place he poured the mixture into cold water, when it congealed in solid lumps, and he finally digested it with boiling water until wholly taken up. This caramel was brilliant ruby in colour, and of such strength that the product of four ounces of sugar added to 500 ounces of developer, allowing a quarter-inch section of fluid above the sensitive film, enabled the illumination of the dark room with oil or candle to be at least fifty times greater than at present. The red colouring matters formed by the oxidation of developers showed a tendency to stain the film, but gave good protection to the plate, and, as the solubility of the compound seemed to determine the degree of staining, an attempt was made to get a soluble product, and this was found in a combination of pyrogallol with uranium nitrate, a quarter-inch section of the fluid enabling development to be carried out in the direct rays of a 3000 candle-power arc lamp, the protection afforded being fully equivalent to stopping 99·9995 per cent. of the actinic rays. Mr. Howard Farmer said that since November last he had been developing with a sixteen candle-power incandescent lamp at a distance of two yards immediately over the developing dish, the developer being made by adding 120 minims of a ten per cent. solution of uranium nitrate to four ounces of pyro-soda developer. With regard to the protection of the plate during its transfer to and from the dark slide and developer, he hoped some enterprising plate-maker would issue plates in paper or card cases so that they might be placed in the developer without the aid of a dark room; in the meanwhile this operation could be safely carried out in a sheltered recess, and when once in the developer all need of protection ceased. With regard to the function of alkaline sulphites in development, the results of his experiments led him to the conclusion that soluble sulphites, by neutralising the restraining effects of the oxidised products formed during development, enabled developers to retain their full reducing power for several plates, providing the soluble haloid formed was also neutralised with extra alkali. He thought it possible that further experiment would reveal an adjustment of chemical forces which, while allowing development to proceed, would prevent any further action of light, so that development could be carried on in white light with a colourless solution. Mr. Farmer's paper was illustrated by the development of plates, in the ordinary light of the Society's room, with mixtures of rodinal and caramel, and pyro soda and uranium nitrate; and an unexposed plate, after ten minutes' immersion in the latter developer in full light, was fixed out quite clean and colourless and free from veil.

The Rev. F. C. LAMBERT remarked that the communication was of an exceedingly valuable nature, but he thought difficulty would arise when dealing with plates which had received varying or unknown exposures, as it would not be practicable to examine them during development, unless working in a dark room.

The PRESIDENT pointed out that that difficulty might be met by using a glass developing dish with an inner rib, so that a quantity of the developer was beneath the plate, in which case the dish could be tilted for the examination of the negative.

Mr. SANGER SHEPHERD remarked that the Spectrum plate, which had an extreme range of colour sensitiveness, might be developed in very weak white light, which would do very little more harm to it than would be caused by the ordinary dark-room light. He could quite understand that the addition of aniline scarlet to the developer would form a useful protection to the plate, as most aniline scarlets were mixtures of two dyes, and the bands of absorption would probably cut out the whole of the spectrum, which it was almost impossible to do with any single dye. He asked whether Mr. Farmer had made any experiments with regard to the effect of chemical staining matter on the ultimate range of graduation given by the plate.

Mr. W. E. DEBENHAM alluded to some remarks in the paper as to the addition of ferrocyanide of potassium to the developer, which was said to slow the development to a considerable extent, and asked whether the image would eventually come up as completely as in its absence.

The PRESIDENT asked whether the addition of colouring matter prevented the use of a developer for several plates in succession.

Mr. HOWARD FARMER, replying, said he regarded the examination of a negative during development as a "fad," and as of no practical value. He agreed with Mr. Sanger Shepherd that two colour bases were necessary, and they might be either separate or combined; but, so far as he yet knew, no one colouring material would give safety. Oxidising agents undoubtedly affected the image, but only when not used with sulphite of soda; directly the sulphite was added the action of the oxidising agents was completely neutralised. Both caramel and nitrate of uranium could be used, so far as he knew, with any developer, and would not affect its repeated use.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 28,—Mr. Walter D. Welford in the chair.

Mr. E. H. Bayston showed a piece of a commercially backed plate. This was in reference to a previous discussion on the point whether a brush or roller was used in coating the back of the plate. The material seemed to answer wall enough, and came off easily in the developer.

Some notice was taken of the sparse quantity of the backing on the plate, and a discussion ensued as to what might be accepted as an efficient minimum.

Mr. A. HADDON was of opinion that the backing in the quantity shown would reduce halation, but a little more would be more effectual. The coating appeared to him rather thin for the quality of the backing.

Mr. J. S. TEAPE thought that it would not prove to be enough for an interior with a prolonged exposure, although for anything within ordinary limits its effect would be for the good.

The CHAIRMAN said it then became a question whether these plates, so backed, were issued as effectively backed, as it seemed to him that backed plates were to be used more for extreme cases than for ordinary work.

Mr. F. RÜSE mentioned a backing which he used, consisting of blackened aristo paper, dipped in glycerine and water, and applied to the back of the plate. With such a backing he obtained good results, always removing the backing before development.

Mr. HADDON observed that the disadvantage of paper for backing purposes lay in the difficulty of securing perfect contact between the paper and the glass completely over the whole of the plate.

Regarding the practice of some who held that the backing should be removed before development, there was this to be said, remarked the CHAIRMAN, that, in the case of soluble backings, the solution of them in the developer rendered its colour of a more non-actinic colour, and proportionately more and stronger light could be admitted into the dark room. In fact, some years ago, a solution was put upon the market expressly for addition to the developer to make it of a red colour and to answer the same purpose.

Mr. S. H. FRY found there was a decided superiority of backed plates over non-backed plates, notably in some harbour work amongst shipping. It was useful also to know that backed plates might be safely changed in one's bedroom by the light of the street lamp when necessity arose. Backed plates were also specially useful for hand-camera work, and often enabled one to make shots on subjects which were otherwise more often unsuccessful than successful. He instanced a view of Rochester Cathedral on a backed plate, in which the extreme distance was quite clearly rendered in addition to the cathedral, whereas there would have been a blurred mass with an unbacked plate simply due to over-exposure.

Some discussion took place on a question which inquired for a good developer for producing upon partially printed P.O.P. or collodio-chloride paper, such results as to dispense with gold toning. This gave rise to a subsidiary question as to whether the development of printing-out papers was a practical success. It was thought that the complicated constitution of such papers at the present time was against it. The old type of paper, of pure chloride of silver with a little acid, lent itself with greater ease than did the later makes, although the fuss about the development process was made after the era of the complicated papers.

Mr. FRY mentioned the great difficulty there was in producing by development, even passably alike, a dozen prints on partially printed P.O.P.

The CHAIRMAN related a case where, in a certain cinematograph film, the doorposts of a building were plainly visible through a horse standing to the front of them, the effect appearing on and off during the passage of the film. No explanation was offered, but a parallel case, in which the low horizon line of a marine picture clearly showed through the dark sails of several fishing boats, attracted some attention.

PHOTOGRAPHIC CLUB.

APRIL 27,—Mr. W. Thomas in the chair.

A hearty welcome was extended to Mr. Frederick Rüse, of Copenhagen, now visiting England.

Mr. A. Ernest Smith showed the copper plate etched at his demonstration of photogravure, together with three impressions therefrom. The plate, it appeared, wanted but little touching, and the difference which was visible between the print from the untouched plate and those after it had been improved was very slight.

Mr. LEWIS MEDLAND entertained the meeting with his series of lantern slides on

FAIR LIFE,

accompanying the same with a humorous and realistic account of the experiences which attend a visit to the great Barnet fair, in which his work chiefly centered. Mr. Medland had obviously spared no pains or allowed considerations for personal safety to deter him, his pictures embracing not only the comparatively harmless traders and their wares, but also those rougher elements of society—gamblers and sharpers—which infest, as a rule, gatherings such as these. Mr. Medland's work well merited the reception accorded it and the concluding vote of thanks.

Liverpool Amateur Photographic Association.—The monthly meeting was held in the club rooms, Eberle-street, on Thursday evening, April 28, the President (Mr. W. Prior Christian) in the chair.—After the formal business had been disposed of, Mr. PAUL LANGE exhibited in the lantern, and explained Dr. Joly's process of colour photography, showing several examples, and also the special colour screens through which the pictures are taken. Mr. J. T. SANDELL, of London, then proceeded to give his demonstration on

MULTIPLE-FILM PLATES, THEIR THEORY AND PRACTICE.

This proved to be very interesting, and clearly showed the advantage of a multiple film for photographing objects with striking contrasts, also demonstrating the immense latitude in exposure, freedom from halation, and simplicity of development allowable by this system. A number of examples of pictures taken on multiple films were shown by Mr. Sandell, and by Mr. J. A. Kay, of Southport.

Newcastle-on-Tyne and Northern Counties Photographic Association.—April 26, Mr. J. S. B. Bell in the chair.—Mr. W. Milburn gave a demonstration of

IVES'S CHROMOSCOPE PROJECTION.

The beauty of the examples and the perfect rendering of colour which they exhibited drew forth the admiration of every one present, several of whom then saw the results of Mr. Ives's labours for the first time. Mr. Milburn was cordially thanked for his demonstration.

FORTHCOMING EXHIBITION.

1898.
May 6-14 ..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

SOCIETY EXCURSIONS AND DINNERS.

To the EDITORS.

GENTLEMEN,—Of late one or two remarks have appeared in the photographic press relating to society excursions and annual dinners. With reference to the former, I believe that many societies have a great difficulty in getting a respectable, or any, attendance at the outings arranged; whether it is because the members imagine that serious photographic work cannot be done on these excursions, or whether they prefer to find tit-bits for themselves, and keep them up their sleeve, so to speak, to be produced on some future occasion, or the management being faulty I cannot say, but my experience has been that, excursions organized and carried out properly, introducing a certain amount of social spirit into them, the result must be good.

The Society, as mentioned below, carry out a most extensive programme throughout the summer season in this respect, and I think gentlemen of the press and others will admit, when I say that the majority of awards gained by this Society during 1897 were taken on Society excursions, that serious photographic work can be done on these outings as well as on one's own trips.

Repetition, no doubt, occurs, but does this not encourage, rather than the reverse, to excel one another in a society? Societies are for the advancement generally of photography, and the members in particular, and I think with a good executive, a well-arranged programme of excursions, societies should prosper, and amateur photography would benefit by having a larger quantity of good pictures adorning the walls of our exhibitions.

As to the combined annual dinner question, I see no reason why two or three societies should not arrange something of the sort, for, if it does no other good, it will keep us in touch with one another, and permit the exchange of ideas that might be at some future period of benefit to a society or member.—I am, yours, &c. A. E. ALLEN, *Hon. Secretary, South London Photographic Society.*

27, *Princes-square, Kennington Cross, S.E., April* 27, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Walter Hall, 1, Avenue-place, Southampton.—*Photograph of two children dressed as clowns.*

T. R. Dallmeyer, "Eversleigh," Purley, Surrey.—*Photograph of a painting of the late Andrew Ross, Esq.*

R. F. Bertolle, 6, Station-road, March, Cambs.—*Photograph of Market Place, March, Cambridgeshire, about* 100 *years ago.*

E. S. Baker, 154, Bristol-street, Birmingham.—*Photograph of group, "English League," International Football Match. Photograph of group, "Scottish League," International Football Match.*

RECEIVED.—W. A. T.; S. THORN; AMATEUR, and others. In our next.

W. T. W. (Wakefield).—Many thanks. We note for future guidance.

HARRY.—You omitted to enclose your name and address. We do not answer questions emanating from anonymous sources.

EDWARDS & BRYNING (Rochdale).—You are liable, but to what extent can only be decided in a court of law. You had better consult a solicitor conversant with the Copyright Act. We do not answer questions through the post.

ENVELOPES.—We do not know if there are any firms in England that confine their manufacture entirely to envelopes. We should scarcely think there are any such. With many large houses the manufacture of envelopes is an important feature.

FIXING PASTELS.—PASTEL asks: "Will you tell me what is the best fixation for pastels and crayon black-and-white enlargements, so as not to affect colours or whites? also where I can obtain the spray for blowing it on?"—Messrs. Newman, Soho-square, supply an excellent fixative, with the best methods of using it.

MARKS ON PRINTS.—BOLTON. The marks appear to be due to the prints being scratched by rubbing together while they are developing. They might possibly have been removed by rubbing them gently with a pledget of cotton wool while they were wet. If the prints be now soaked in water till quite soft, the marks may be removed.

WOODBURYTYPE.—B. WALLACE. So far as we are aware, no firm supplies Woodbury moulds ready for printing from negatives supplied. You might, however, apply to Eyre & Spottiswoode or to Waterlow & Sons. If you obtain them, they would have to be handled with the greatest care, otherwise they get slightly bent, and are thus rendered useless for printing from.

THE EXHIBITION.—ONE WHO DOES NOT KNOW writes: "I should be pleased if you would tell me if the Photo Exhibition is open on Sunday; that is the only day I can leave the business; it seems also funny that the Crystal Palace authorities don't advertise in your JOURNAL, and give proper information of time and price, &c. They seem to be perfectly satisfied, that all the trade papers give a big descriptive account?"—In reply: The Exhibition is not open on Sundays.

SULPHOCYANIDE TONING.—CYANIDE asks: "1. Would you kindly let me know if the sulphocyanide toning bath is injurious to the tones? As I put through about 600 prints daily, I am rather anxious about the matter. 2. Also if there is any agency in England for procuring situations in India and the colonies? Thanking you in anticipation. I wrote some time ago."—1. Your query was answered in the JOURNAL for April 15, to which we refer you. 2. There is no such agency.

LENS.—T. J. KELLY writes: "Would you oblige by advising me on the following matter through the Correspondence column this week. What focal length of a whole-plate lens will I require, using the same lens for cabinets, in a studio measuring twenty-two feet in length? You might oblige by letting me have the information this week, as I intend beginning business next week."—For that length of studio, to take a full-length cabinet portrait, a lens of eleven inches equivalent focus will be required. But such a lens will not cover the whole plate properly unless it be one of the newer types, such as the Stigmatic. That is a portrait lens with an aperture of *f*-4.

COMPARISON OF LENSES.—THOMPSON says: "It does not appear to be fashionable for the photographic press nowadays to criticise apparatus in the open way that was formerly the case. As it is difficult to get satisfactory and unbiassed opinions from dealers, and as it is obviously rather expensive to experiment oneself, I would be much obliged for an answer to the following questions?"—The answer to the series of questions that follows is that that it is quite against our rule to express an opinion on the comparative merits of different makers of lenses, or any other goods. Even if it were not, we are not in possession of lenses of identical foci, by the different makers named, to make the comparison. We, however, may say that all the lenses are in good repute.

VARIOUS QUERIES *re* EMULSIONS. — QUISQUAM. 1. It depends as much upon the condition of the emulsion as upon its composition. 2. Here, again, conditions of the emulsion and its manufacture are the principal factors. 3. In some cases yes, in others no. 4. The reduced silver in a collodion negative is in a finer state of division than it is, as a rule, in a gelatine one, unless the latter is a very slow plate. 5. It is more in some plates than in others. It is not dependent upon the developer used. 6. Some makers use a substratum and others do not. We have not tried using the film a second time. It would be cheaper to purchase new. 7. We think it might be possible. It will depend upon the emulsion itself as to whether it would be slowed by orthochromatising for various colours, also the materials used for the purpose. 8. There is no work on the subject of mechanically coating films with emulsion.

SENSITISING PAPER.—C. N. writes: "Would you be so kind as to favour me me with a reply to the following? For some years I have given up using home-sensitised paper, but, having changed my situation, am called upon to go back to it, and also to do the sensitising myself. I understand the composition of the bath, the floating of the paper, &c., but one difficulty arises—the assistant who washed it before me let it get into an acid state, so that I am not sure how to proceed. I have added a few pinches of bicarbonate of soda, but find it still remains acid. Can you tell me how much I may add without danger to the paper, and also if it is essential to filter after each addition of bicarbonate? After I had added the bicarbonate and filtered, I tested it with litmus paper. The effect was that it still turned the paper a slight bluish-red, and marks somewhat resembling grease marks appeared also. To make you understand what I mean by grease marks, I may say that they were more transparent than the surrounding paper where they did not occur, precisely the same appearance as grease would have on an albumen print when looking through to the light. If you can help me in this matter, I shall be greatly indebted to you."—Add carbonate of soda until it gives a permanent precipitate; then filter. The bath will then be neutral, and may afterwards be acidified if desired. We do not think the so-called "grease marks" are due to the silver bath, as we have met with some papers that were prone to this appearance when the bath has been in perfect order.

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Contents.

	PAGE
Ex Cathedrâ	305
Some Lessons of the Royal Photographic Society's Exhibition	306
Leaderettes:— Rapid Proofs—A Dry Developer—Submarine Photography—Electric Prints by Mr. W. Friese-Greene—Mr. Geo. H. James and the West Surrey—Paris Exhibition—Women's Rights	307
On Things in General. By Free Lance	308
Photographic Workers at Work:— XX. Messrs. Schott & Genossen, Jena	309
Glasgow and the Photographic Convention	309
Photographic Cameos. By C. G. Mann	310
Meyer's Camera for Producing Negatives for Use in Three-colour Printing	310
The Studio of the Future. By John A. Randall	311
The Lesson of the Photograph. By R. S.	312
Enlarged Negatives	314
Polar Photography	314
The Hand Camera	314
Camera Club Dinner	315
Royal Photographic Society's Conversazione	315
The Crystal Palace Exhibition	315
The Sepac Company	315
Death of Mr. S. W. Rouch	316
Our Editorial Table:— *The Barnet Book of Photography—Paget Prize P.O.P. and How to Use it—The Gum-bichromate Process*—The Avery Stripping Solution—*Illustrated Catalogue of the Royal Photographic Society's International Exhibition, Crystal Palace*, 1898 Catalogue Received	316
News and Notes	317
Patent News	317
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Brixton and Clapham Camera Club—Croydon Camera Club—Hackney Photographic Society—North Middlesex Photographic Society—Bath Photographic Society—Bradford Photographic Society—Portsmouth and Southsea Amateur Photographic Society—Sheffield Photographic Society	317
Forthcoming Exhibition	319
Correspondence:— Concentrating Röntgen Radiations—Early Dry-plate Processes—Photo-telegraphy—The Exhibition—"Aurio" Enlargements	319
Answers to Correspondents	319

EX CATHEDRA.

A NOTEWORTHY feature in the Exhibition now being held at the Crystal Palace is the interest taken in it by photographers in far-distant parts of Europe, and particularly from Russia. Unfortunately most of these exhibits arrived too late to be well placed or fully catalogued. They will be found on screens adjoining the Historical Collection in the Egyptian Court. Foremost among them is the fine series of carbon photographs sent by M. M. Dimitrieff, of Nijni Novgorod, who has taken the greatest interest in the Exhibition, and even sent a telegram with his greetings and felicitations on the opening. Several of his pictures are of interest in connexion with the famine of a few years ago, and show the public kitchens or eating-houses established by private persons for the relief of the suffering peasantry. Others are views in the neighbourhood of Nijni Novgorod, and are good pictures, pictorially and technically. There are also some portraits, including some of the artist and his wife, the latter in various fancy costumes. We are glad to recognise the kindly feeling which has prompted M. Dimitrieff to send his pictures so far and take so much interest in the Exhibition. Another series of interesting and unpretentious work is the collection of views of Finland (No. 226, p. 225), sent by several contributors, including Frau Anna Lilius from Helsingfors.

* * *

IT is not improbable that some of the more prominent and unconventional of the stands at the Exhibition may be sent to Glasgow for exhibition purposes during the Convention week, July 4—9. We offered this suggestion to several of the exhibitors at the Palace last week, and there appeared to be on the part of some of them a disposition to embrace it. The large saloon in the building of the Glasgow Fine Arts Institute will, doubtless, be well filled by visitors on those evenings when the Convention meetings are being held, so that there is every prospect of a material advantage resulting from the outlay incurred in dispatching the exhibits to the north.

* * *

PERHAPS one of the most valuable exhibits at the Palace is that of Messrs. Johnson, Matthey, & Co., the well-known assayers, refiners, &c., of Hatton-garden. It is contained in a small glass case which occupies an unobtrusive position in the south nave. Metallic osmium, iridium, and rhodium are shown in comparatively large quantities, and there is a nugget of metallic platinum weighing 157·5 ounces. There is also a slab of metallic palladium weighing 1000 ounces Troy. At 7*l.* per ounce the value of this "piece of plate," which the visitor might easily omit to notice, as it is by no means the most prominent object in the case, is 7,000*l.*

* * *

A CORRESPONDENT who is a member of a learned society sends us a copy of a circular which he has received from a firm of photographers asking for sittings. The circular runs as follows: "For some time past we have annually invited you to favour us with a sitting for your photograph; unfortunately, however, without result. We therefore now make a special application, and shall be much obliged if you will make an appointment to sit to us at an early date, or, if you have an insuperable objection to doing so, kindly advise us to that effect, so that we need not unnecessarily trouble you further in the matter. The negatives will be taken at our own risk and cost; proof prints submitted to you for approval."

* * *

THE letter we have quoted appears to be the last of a long series of similar communications that our friend has received

That series commenced eleven years ago. Last year, he tells us, four other firms were also anxious to take his portrait on various pretexts. In one case, some years ago, he was bothered to give a sitting for inclusion in a view of Rotten Row. He escaped by saying that it was fifty years since he had been there. One plea for a resitting was made to him on the ground that ten years had elapsed since the original sitting was given. Our correspondent, an eminent man of science, resides at the West-end of London, and is therefore peculiarly liable to receive such communications as we are referring to. He very emphatically calls the system a nuisance.

* * *

THE practice of photographers sending out invitations for sittings is a very old one; but, unless we have erred in our observations, it has not been adopted by the very best photographers. Judged by modern business ideas, however, the system can scarcely be condemned for any reason besides the one that it is annoying to the unwilling recipients of the circulars. The photographer who asks you to go and sit for your portrait is exactly on the same footing as the tradesman who sends you circulars about his wines, furniture, clothes, jewellery, drapery, or bacon and butter. The aim of all these enterprising people is to make money out of you, and that, we take it, is also the object of the photographer, however elegantly and politely worded his invitations to you "to walk into" his studio may be. To tell him he is a nuisance is equivalent to paying him a compliment.

* * *

BUT as we have just said, the best photographers do not invite sitters to go to them, and we constantly hear professional photographers speak unfavourably of the practice. It is obviously one of those things about which much may be said for and against. It may reasonably be argued that there is no loss of honour and dignity in touting for sittings—"one must live," to quote the celebrated remark—but, on the other hand, it is conceivable that the photographer who respects his profession and is devoted to its highest interests may take the view that he occupies a somewhat loftier position than a shopkeeper—is, in fact, a professional man—and therefore is precluded by instinct and position from adopting unprofessional methods of increasing his business. Perhaps some of our readers may care to let us have their views on the subject.

* * *

AMERICAN commercial enterprise is characteristically illustrated by the following advertising dodge which a Chicago correspondent tells us he recently witnessed from his office window:—"A sharp 'fall-in' blast on a bugle brought every one to the window, with Spain on the brain. On the street with a great crowd surrounding him was a fellow on extra long stilts, with black pants to cover, evening-dress cut above, and stove-pipe hat complete. He had planted in front of him a huge tripod with imitation camera, a terrible lens tube, cap, and long black focussing cloth. He got under the cloth and adjusted the crowd, invited them in dumb show to keep perfectly still and look pleasant, and then removed the cap and 'took' them. They were 'took' sure enough. He fished out from the back of the camera, under the focussing cloth quite a large framed picture of George W. Childs, with the legend that the cigars bearing his name cost only five cents a piece, which he was careful that every one high and low should see. The man then lifted his stove-pipe hat, bowed very gracefully, and departed for fresh ground."

SOME LESSONS OF THE ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THERE are now no two opinions that, from all points of view the Exhibition of the Royal Photographic Society at the Crystal Palace, which closes on Saturday next, is the most successful it has ever held. In it are seen the most recent developments of all branches of the "up-to-date" art-science, while it also contains examples "down to date"—some of the first camera pictures ever produced—works by Nicephore Niépce, Talbot, and Daguerre themselves. The Historical portion of the Exhibition serves as several excellent object-lessons to those who have only enlisted in the ranks of photography within the last decade or two, or since the gelatino-bromide process has been almost the only method by which negatives are produced. Most of those who read the journals have from time to time been told that there is little if anything in photography done now that was not done, and equally as well, thirty or more years ago, and before gelatine plates were invented.

In this Section of the Exhibition the modern worker has the opportunity of seeing the results and judging for himself. He has also the opportunity of seeing the appliances with which they were obtained, and of appreciating the difficulties and inconveniences that the past generation of workers had to contend with, particularly in the case of outdoor photography with wet collodion, when all the chemicals, as well as a bulky dark tent, had to be taken into the field. At that time the silver bath alone in its water-tight case, with perhaps a second in reserve, would probably weigh as much and be almost as bulky as some modern cameras with three dark slides for the same size plates. Yet work still unsurpassed, and instantaneous views even, were taken quite as good as those taken nowadays on gelatine plates. Examples of these, by the late Mr. William England and by Mr. Valentine Blanchard—taken 1856-1865—are shown which prove it. Some of the primitive apparatus used in the Daguerreotype process and the calotype and wax-paper processes have been quite a source of amusement to some, yet withal the older workers managed to obtain excellent results with it, and it is doubtful if they could have surpassed them even with the most modern of apparatus, though, of course, they would have obtained them with far less inconvenience to themselves.

Even in these primitive times there were enthusiastic photographers, who had, perforce, to prepare for themselves all the plates and papers they used, and in some cases even the materials with which they were prepared. While mentally comparing the amateur photographer of the past with the present, one cannot help speculating as to how many of the present-day amateurs would continue to practise the art if commercial dry plates and ready-sensitised papers were suddenly withdrawn from the market, and they had to prepare everything for themselves, as did their elder *confrères*—a very small proportion, we opine.

With regard to the earlier processes, the Historical Section serves as an admirable object-lesson to modern workers if they compare them with the results by similar processes that are being worked at the present time. Of course, the Daguerreotype process is not worked now, therefore it may be classed as an obsolete one. Yet some of the Daguerreotypes show what an exceedingly beautiful process it was; particularly is that the case with some pictures of the Crystal Palace itself taken in the early fifties, and which are still as perfect as the day they were produced. For delicacy, beauty, detail, and last,

though not least, permanency, the Daguerreotype is still unsurpassed by any other silver process. Paper negatives are still taken now on emulsion papers, and it is interesting to compare these with those taken by the old calotype and wax-paper processes for detail and half-tone, and more particularly for granularity, and it will be seen that prints from negatives taken by both methods in the early fifties will not suffer by the comparison.

Film photography—with transparent rollable films and roller slides—is now looked upon as quite a modern invention, but it is not so. In the Exhibition are some negatives, and transparencies therefrom, taken by Mr. Warnerke so long ago as the early seventies, and for excellence they are not surpassed by anything done now. Again, the glass-positive process we still have with us, and a very beautiful process it is. In fineness of detail, delicacy in tones and brilliancy, it is second only to the Daguerreotype, for at that period it was handled by skilful workers. Where, it may be asked, would one now be able to get glass positives taken equal to some of those shown in the Historical Section at the Crystal Palace that were taken something like forty years ago? Yet the process was precisely the same as that still worked, the only difference being in the workers.

Another object-lesson is this, Have we improved the quality or the permanency of our silver prints? In the Exhibition are silver prints thirty, forty and more years old that as yet show little or no signs of fading. Can the same, judging from the experience of the past few years, be claimed for modern silver prints, now that a print only a few years old without change is looked upon as a thing quite out of the common? Silver printing, with modern papers, is certainly more simple than it used to be; but, if this convenience is purchased at the expense of permanence, it seems paying a high price for it, and at the same time it does not conduce to the credit of photography.

Still another object-lesson. There are in the Historical Section examples of many processes, and applications of them, that are now obsolete or dormant, though good, and it may be possible that under a new name they may some day be disinterred and made useful. Take a case in point: Pouncy's carbon process: of which examples produced forty years ago are shown, and which are technically more perfect than the majority of those produced now. This process became obsolete a few years after its introduction; but two or three years back it was disinterred, and under a new and utterly misleading name a pamphlet upon it was exploited. The process was brought forward as if it were a new one, and no credit whatever was given to its inventor. Just recently another pamphlet on the process has been published, but in this the author (Mr. W. J. Warren), to his honour, gives full credit to the inventor. In his pamphlet he says, "The method Pouncy demonstrated in 1859 is practically the gum-bichromate process of to-day." Seeing the prominence this old process has recently acquired, who will say that the same would not be the case with other extinct processes in the hand of would-be inventors seeking notoriety? We may have something more to say on the subject later on.

Rapid Proofs.—M. L. Dooms operates as follows in obtaining rapid proofs on bromide paper from wet negatives. A piece of bromide paper of the required size is placed in a dish filled with clean water, and, when thoroughly soaked, the wet negative is also placed in the dish; the two films are brought into contact, carefully squeezed, and then allowed to lie at the bottom of the dish with the bromide paper underneath. The dish is then exposed to light for the necessary time, the paper and negative separated, and the former developed.

A Dry Developer.—M. Banis, of Pisa, recommends the following as a useful dry developer:—

A.

Metol	152 parts.
Hydroquinone	48 „
Eikonogen	40 „
Boric acid	10 „

Mix well, and keep in an orange-coloured, stoppered bottle.

B.

Sodium sulphite	100 parts.
Borax	25 „
Sugar of milk	25 „

For use, take—

Powder A	3 parts.
„ B	4 „
Water	100 „

Submarine Photography.—Professor Louis Boutan, lecturer on zoology at the Sorbonne, contributes to the *Century Magazine* (May) an account of his experiments in submarine photography. To procure photographs under water, Professor Boutan uses a camera enclosed in a water-tight case, a blue glass being arranged in front of the lens to suit the conditions of submarine illumination, and so give a picture having pleasing contrasts. He descends under water in a diver's costume, and the camera is sent down to him from an anchored boat. The spot to be photographed is then selected, and the exposure is made in precisely the same way as on land. When no artificial light is used, submarine photographs require a rather long exposure, the time often extending to twenty-five minutes and depending upon the depth of the water. Four reproductions of photographs obtained at depths from six and a half feet to sixteen and a half feet accompany Professor Boutan's article, and they are sufficient to show that submarine photography can produce useful results. It is estimated that not more than one hundred square metres of area can be photographed under water; but, even with this limitation, the pictures obtained will contain more valuable information than divers can furnish. The problem to be solved is to construct an apparatus which will take photographs in artificial light in any depth of water without needing a submarine photographer to manipulate it.

Electric Prints by Mr. W. Friese-Greene.—The President of the Croydon Camera Club writes: "The publication on Wednesday, the 18th inst., at the Croydon Camera Club, of Mr. W. Friese-Greene's interesting researches upon 'Electric Prints with Photographic Reagents' is likely to prove so valuable that the Club will issue a few cards of admission to members of affiliated societies sending a stamped directed envelope to the Hon. Secretary, Mr. W. H. Rogers, 106, Holmesdale-road, South Norwood, S.E. Tickets will be allotted in order of application."

Mr. Geo. H. James and the West Surrey.—The West Surrey, in losing Mr. Geo. H. James as their President, for he has resigned, have received what to a less vigorous society would be a rather severe blow. Fortunately he remains a member, and will play his old *rôle* of guide, philosopher, and friend, as he has so long done, and in recognition of which the members last week presented him with a silver cigarette case at a special meeting. There were complimentary and congratulatory speeches exchanged, as is usual at these functions, and all went off happily. Mr. Geo. H. Seward, an old member and worker, and aforetime Secretary of the Society, was elected President in the room of Mr. James.

Paris Exhibition. — In the big Exhibition which is to be held in Paris in 1900, Class XII. is devoted to photography, and some attempt has been made to define the sections, which was not the case at the Brussels Exhibition. The sections are to be: No. 1, Scientific Photography; No. 2, Historical Photography; No. 3, Professional Work; No. 4, Amateur Work; No. 5, Photo-mechanical Processes; No. 6, Apparatus and Materials.

Women's Rights.—According to a German contemporary, there are 17,000 women in Vienna who work for their living, and they, or at least some of them, have formed an association for maintaining their rights, amongst which they claim the founding of a special course of technical instruction in the famous K.K. Lehr und Versuchanstalt für Photographie, presided over by Riegerungsrath Professor Dr. J. M. Eder. Our contemporary sarcastically remarks that, as time runs on, the woman is forsaking the home more and more, and seeking competition with the inferior being man; the editor will wait and see how things eventuate.

ON THINGS IN GENERAL.

One of the most important papers of the month has been that of Dr. W. J. Russell, upon the action of certain metals and other bodies upon photographic plates. It supplies much food for thought, and at the same time carries the reader's mind back to the early days of photography, when the whole body photographic was excited by the process of "bottling sunlight." Certain substances placed at the bottom of a cardboard tube and exposed to light were found to be capable of bringing about photographic action upon sensitive surfaces afterwards placed at the mouth of the tube. After considerable discussion it appeared to be proved that the result was owing, not to bottled light, but to vapourous emanations from the substance used to impregnate the tube. Dr. Russell takes the same ground. These various bodies he names are supposed to act by reason of some emanation of their own substance. The experiments are of the greatest interest, and have evidently occupied a great deal of time in their execution; but I must confess to a certain hesitancy in accepting all his conclusions, and to a further sympathy with M. Le Bon's "dark-light" theory. Dr. Russell would seem to prove too much. If metallic zinc in a comparatively short time is vapourised as to so act upon a gelatine plate that a developable image is produced, it would be interesting to hear the experience of those who have used zinc plate boxes to store their negatives in. Do they find the outer plates fogged when developing when they have used such zinc boxes with well-cleaned or sand-papered surfaces, as I presume would be their normal condition with clean workers? I make these remarks in no carping spirit, but merely to elucidate the truth.

Truth, we know, is "hid in the bottom of a well," but we seem gradually to be nearing it in the matter of development. When Messrs. Hurter & Driffield's first experiments and the conclusions they drew from them were published there was a perfect chorus of dissent, not to say derision, analogous in its small way to the manner in which Darwin's *Origin of Species* was received. All this has died down just as, virtually, has the opposition to the latter. Yet, if we are to accept their theory in its entirety, how are we to explain the results obtained by Mr. Teape as shown in his late communications to the London and Provincial Photographic Association? If a negative with an exposure of one second could not be differentiated by the naked eye from one of forty seconds, clearly there is something to be explained away in the Hurter & Driffield theory. It is a question of vast importance. Those who remember the sensation caused by Bennett's historical snap-shot picture of a girl pouring water and how it was shown that ammonia helped to bring out further detail, find it hard to give up their belief in the principle which has grown up with the further practice of dry-plate work. On the other hand, it has been recorded in these pages how a well-known successful photographer adopts the H. & D. theory in practice by putting all his plates in one dish, giving a certain number of minutes' development, and then fixing. There are not many who would have the courage to acknowledge such a mode of procedure in their own daily practice.

If all these theories have startled photographers, they have had quite enough revolution in other directions to throw them off their balance. I refer to the remarkable series of lenses produced since the Jena glasses have given such power into the hands of the working opticians. There seems to be a new lens every month almost, and the marvel is that all of them are really good, though the effect produced—the flattening of the field without production of astigmatism, the sharpness of the margins with full aperture, the marvellous covering power even of single lenses, &c.—upset every preconceived idea, and nullify every *ex-cathedra* dictum, as to the possibility of optical achievement in such directions. The lenses are expensive, it is true, but, compared with the cost of the older lenses with (generally) fewer components, they are by no means dear. The remembrance of this cost raises a smile with the reader who peruses the editorial remarks to a correspondent who is evidently complaining of his lens. He had bought a lens for the magnificent sum of four shillings from a respectable chemist. Poor chemist! The editor is very hard upon him, forgetful of the time when he alone was the storehouse for things photographic. Yet I am in entire sympathy with—"Moral: If you want photographic goods, go to one who understands photography and its requirements." *Autre temps, autre mœurs.* This, of course, means, Go to a respectable photographer who deals in photographic materials.

I have been interested in the correspondence on "ammonia poisoning;" but no one need be afraid of the continued use of ammonia for fear of its producing some injury. It is true that the idiosyncrasies of certain subjects render them more susceptible than others to the effects of ammonia vapour; but, to the best of my belief, there is no case on record of any injury being received through such a quantity of ammonia vapour as could possibly be given off during developing operations—granted, of course, no abnormal conditions through previous injury by an accidental "overdose" of the gas. The greatest danger from ammonia lies in the possibility of injury to the eye through spirting when taking out the stopper of the bottle containing it. A very slight elevation of temperature creates the danger of spirting—*verbum sap.*

In reading the editorial comments upon the Tichborne case there was recalled to mind a real case of cruelty to photographers by the presiding Judge. A photograph was brought forward as evidence (taken, no doubt, with a wide-angle lens), and the Judge himself intervened, more like a biassed witness, and accused the poor photographer who took the picture of dishonest misrepresentation. I always felt sorry for that poor man.

The projected Acetylene-gas Apparatus Exhibition, under the auspices of the Society of Arts, should be very beneficial, alike to the makers of the apparatus and the photographer who uses it. The fire insurance people still hold a stiff back on the subject, and render void the policies of those using a generator on their premises, if (as I believe would be the case if a fire occurred) they exercised their full powers.

There has lately been a correspondence in the *Standard* on the subject of fire-insurance policies, one writer going so far as to recommend that all insurers should first have their policies read by an expert before accepting them. Very good advice indeed, for, if there is one subject more than another upon which insurers are ignorant, it is the policy under which they believe themselves protected. Honest men lose money when a fire occurs; it is only the knaves who make money at such times.

Every tyro should read the article upon spotting photos on p. 213. As a rule, it will happen that, even in expert hands, far too many pinholes are spotted that need no treatment at all. The golden rule to remember to guide the judgment in this direction is that "a light spot on a dark ground (by reason of irradiation) appears larger than it really is, and that a dark spot on a light ground looks smaller." Hence a spot fairly large to the eye when scrutinising a negative does not show at all on the print unless specially sought for.

Was Mr. Hector Maclean jesting, I wonder, when, at the Croydon Camera Club dinner, speaking of the best examples of the bi-gum

prints, he said all could rejoice to know that the picture produced was an absolutely permanent one. I suppose we must take the prints shown at a certain well-known exhibition as being the best examples; but, to me, it is a matter of profound sorrow that they are permanent, except we may take them to be utilised, like the drunken helot, at the Greek feasts. FREE LANCE.

PHOTOGRAPHIC WORKERS AT WORK.

XX.—MESSRS. SCHOTT & GENOSSEN, JENA.

IT would appear very improbable to most photographers, that the Exhibition, held in London in 1876, could have any connexion with the important improvements made during the last decade in photographic lenses. Yet, if we follow the chain of events preceding the establishment of the Jena glass industry, we shall find that the first link was the report of Professor Abbe, of Jena, upon the scientific apparatus then exhibited in London. Professor Abbe drew attention to the fact, that the microscope could not be perfected until new kinds of glass were manufactured, as the elimination of the secondary spectrum required more perfect adaptation of crowns and flints in relation to their properties of refraction and dispersion, and until this was accomplished opticians could not construct lenses of a higher order. Meanwhile the photographer, like the microscopist, had to content himself with the limitations imposed upon opticians by the properties of the older kinds of glass. In a recent account of the Carl Zeiss Stiftung we referred to these obstacles, and mentioned that their removal was due to the experiments made by Dr. Schott and Professor Abbe.

Dr. Friedrich Otto Schott, the son of a glass-manufacturer, had been specially educated as a chemist, and was therefore eminently fitted for the work Professor Abbe induced him to undertake. Professor Abbe proposed that an exhaustive series of experiments should be made to ascertain the interdependence of the chemical and optical properties of the various kinds of glass. The technical work was to be done by Dr. Schott, and the optical by Professor Abbe. The experiments were begun in 1881 by Dr. Schott, at Witten, in Westphalia, where he was at that time residing. They were made upon a small scale, as it was necessary, in the first place, to study the influence of each component with regard to refraction and dispersion. The results were so promising, that the work was transferred to Jena in the following year, and continued under more favourable conditions in a laboratory specially arranged for the purpose. In 1883 the problem of the production of improved kinds of optical glass had been so far solved, that it was thought desirable to attempt to manufacture upon a commercial scale the new varieties which had been made, and to put the work to the test of practical experience. Since the death of Fraunhofer, in 1826, Germany had become dependent upon France and England for its supplies of optical glass, and the firm of Carl Zeiss, in associating itself with Dr. Schott in this enterprise, hoped not only to effect important improvements in the microscope, but also to re-establish the optical glass industry in Germany. The firm of Schott & Genossen was founded by Dr. Schott, and the firm of Carl Zeiss and the Jena works were started in 1884. The Prussian Government had recognised the importance of Dr. Schott's work, and vainly attempted to induce him to establish the industry upon Prussian territory; but, although the invitation was declined, a grant of 1500*l.* per annum was made to the firm to foster the commercial experiments at Jena. This Government subsidy was voluntarily relinquished after the second year.

The large number of new varieties of glass introduced by Messrs. Schott & Genossen is not generally known, and, to emphasise the importance and extent of Dr. Schott's work, we may mention that, of the forty-four kinds offered for sale in 1886, nineteen were essentially new. In 1888 the list was increased by twenty-four, and of these seventeen were new varieties. Four years later eight other kinds were added to the firm's catalogue, and of these only two had been in use prior to Dr. Schott's experiments. It will thus be seen that the Jena factory has placed forty-two new kinds of glass upon the market, and within certain limits Dr. Schott can make glass of any desired refraction and dispersion. From a national point of view, the Jena factory has effected a commercial revolution in this branch of business. The new varieties of glass are essential to the manufacture of the best optical instruments, and the world goes to Germany for its supplies. But the work of Dr. Schott and Professor Abbe must command admiration for more important qualities. We refer to the definiteness of purpose with which it was conceived and planned, and the strictly scientific method in which the experiments were carried out.

We recently had the pleasure to visit the works, and were shown over the various departments by Herr Klett, the business manager. The men employed number not far short of 200, and, although the industry has not been established long, and from its nature requires different organization, the men enjoy some of the privileges granted to the hands at the optical works. The men at the furnaces work in gangs under a foreman, who contracts with the firm. The workmen receive fixed wages, and the surplus goes to the foreman, who is thus remunerated according to his skill. The manufacture of silicate glass may be taken as a typical example of the furnace work. The pots, or crucibles, in which the material is smelted are kept at red heat in a furnace from four to five days. They are then transferred to a second furnace, in which the temperature is raised to the melting point of the glass. After the inside of the crucible has been glazed with some scrap, the material is gradually introduced and melted. To clear the glass the heat must be further increased, and it requires from six to eight hours to complete the process. When the glass is clear and free from bubbles, the crucible is taken from the furnace, and, after standing for a short time to cool, it is transferred to the annealing furnace, where the crucible for the next batch has meanwhile been heated. The cooling of the glass lasts about three days. The crucible is then broken and the pieces of glass examined. The most transparent and perfect are again heated and moulded into suitable shapes. The second cooling requires from ten to twelve days, and the blocks, or slabs, are finally ground and polished on opposite sides and tested optically. If a batch yields twenty per cent. of good optical glass, the result is considered satisfactory. The discs of glass for telescope objectives have to be prepared with still greater care, and they pass through a special process to render them quite free from tension. Some telescope discs have been made of 50 inches diameter; and an 80-centimetre disc was bought last year by the Potsdam Observatory.

The whole process of optical glass manufacture requires constant vigilance and care. Even the crucibles are an important factor, and those used by Messrs. Schott are made at the works. A slight variation in the material used was once the cause of much loss, and seriously hindered the business for three months.

Although optical glass is the most important article manufactured by the firm, some other varieties possessing special qualities are also made. The Normal Thermometer Glass deserves special mention, and has given most satisfactory results, by reducing the errors to which thermometers are liable. Improved combustion tubes, tubes for explosion furnaces, and compound water-gauge tubing, are also special Jena manufactures. The firm has also recently introduced a special chimney for miners' lamps.

The Jena glass chimneys for incandescent gas burners are now well known in this country for their superior quality, and they are sent out from the works at the rate of 15,000 daily.

Photographers owe a great debt of gratitude to Messrs. Schott & Genossen for the valuable new varieties of optical glass they have invented, and we trust the firm will have a long and prosperous career.

GLASGOW AND THE PHOTOGRAPHIC CONVENTION.

IT has always been a boast of Glasgow worthies that St. Mungo possessed probably the finest streets in Europe, and, although to many this statement may appear rather tall, there is no doubt, from a commercial point of view at least, there are good grounds for such a boastful assertion.

A visitor to Glasgow at the first glance cannot fail being impressed with the commercial activity of the city as well as the beautiful regularity with which all its chief thoroughfares are planned, while there is no doubt several of its more important public buildings are unsurpassed by those of any other city. Its public parks, of which there are now no less than six in number, are a model of orderliness, and possess great attractions to the hard-worked artisan and shopkeeper, who are doing so much on the banks of the Clyde to maintain Glasgow in the proud position of being the second city of the empire.

There is no doubt that within the last quarter of a century the Corporation has done much to improve the health of the citizens, as well as to beautify the town. Old and dilapidated structures have been taken down, narrow wynds (lanes) have been opened out, and, in many instances, vast blocks of insanitary houses have been razed to the ground, and in their place have been erected modern buildings of the most sanitary description, and in others vast recreation grounds have been formed where previously nothing but dens of iniquity existed. The City Improvement Scheme is one that any corporation may feel proud of.

Of the many public buildings of note the first in importance are the municipal buildings, situated on the east side of George-square in close proximity to the Central Post Office, and this palatial building is well worthy of inspection both inside and out. George-square, being situated in almost the very heart of the city, and being surrounded with severa

of Glasgow's finest structures, is always a source of attraction to tourists, and the flower beds and numerous monuments which are studded at many points of the square are very ornamental, the square proving a delightful lounge at all times by day or night, and of an evening, when brilliantly lighted by electricity, is one of the most striking parts of the city.

Of the many magnificent structures mention need only be made of a few. It has been said that Glasgow is essentially a commercial city, and this is particularly noticeable in the traffic that never ceases by night or day to pass along its streets. Argyle-street has probably no equal in or out of London, and any snap-shot worker should not fail to have a look at it from the railway bridge which crosses at one of its busiest parts, viz., the Central Railway Station.

Buchanan-street is of a different stamp, and contains many of the finest shops in the kingdom. Here during the Convention many visitors will, no doubt, linger, admiring the display made by the leading warehousemen in the city, not to speak of the two leading firms in photographic apparatus and materials, whose places of business are situated in Buchanan-street—viz., Messrs. George Mason & Co., on the right, and Messrs. Lizars on the left-hand side of the street; while almost in close proximity to Buchanan-street, in St. Vincent-square and the other thoroughfares, are no less than seven or eight other photographic firms of leading importance, including the new premises of the Albion Albumenising Company, Messrs. Rae Bros., John Trotter, the Messrs. Bolton, Messrs. Gardner & Co., and several others, all within a stone's throw of each other.

The head quarters of the Convention will be in the Royal Art Institute, Sauchiehall-street, another magnificent thoroughfare, where within the last few years quite a number of enormous drapery establishments have been erected, and this part of the city, leading as it does from the centre to the west end, on a fine afternoon in the season (for Glasgow has a season when her merchants and their wives are at home and not at the coast), presents a fashionable and stirring promenade. As to the Royal Art Institute, where the meetings are to be held, it may be simply stated no finer or more suitable *locale* could have been provided in Glasgow or any other city for the purpose of a Photographic Convention, and these rooms are quite unique, and have been used several times for Glasgow's photographic exhibitions, all of which have proved so successful.

Of places of interest to visit by day or night there is no lack in Glasgow. It has been the proud boast of the citizens of Glasgow that they have made their river; and, in a sense, this is literally true, for the history of the Clyde, from its first improvement by Golborne down to the present day under the management of the Clyde Trust, is one long record of engineering skill and triumph. On the Clyde there will be much to interest visitors to the Convention, and a sail down the river will well repay the trouble, for, as to cost, a copper or two will go a long way by means of the Cluthas, and such a trip will give a stranger some idea of the enormous ramifications connected with the shipbuilding interests on the Clyde, and which, all going well and strikes excepted, ought to be in full swing about Convention time.

The old cathedral with its stained-glass windows has always been a source of attraction to tourists, and, doubtless, the Council will have provided permission from the Commissioners of Woods and Forests to photograph any part of it during the Convention meeting, at any rate visitors armed with permission will find in the warders who have charge of the grand old pile, the utmost courtesy and attention, even to the guiding of a suitable spot close by, where plates may be changed. The warders are a civil, intelligent set of old soldiers.

In many other ways Glasgow offers numerous attractions, and some of these may probably interest visitors very much, for instance our subway—a recent startling experiment in the matter of locomotion, but which has proved quite successful, conferring an amount of comfort in underground travelling hitherto unknown in any city. There being no locomotives or engines underground, the atmosphere is never polluted with smoke or soot like similar underground railways. An enormous wire cable runs the entire circuit of the subway, and at one point goes underneath the river Clyde. This wire cable is revolved round the circuit, being carried upon wheels or pulleys situated on the ground between the rails. An attachment to the cars, called a gripper, is made to take hold of the cable, or to let go the same whenever such is desired. This scheme has been well thought out, and the subway is a novel and, without doubt, successful engineering project, and one sure to be followed by other large cities.

Glasgow now possesses seven theatres, and all the London successes are to be found here.

To enumerate a tithe of the important works and industries that are to be seen in and around Glasgow would be impossible, and any visitor desirous of seeing specially over any particular work or factory should give notice to the worthy president, Mr. John Stuart, who, no doubt, would arrange for special permission to visit such places.

Glasgow at present is deep in an enormous sewage scheme, and the Corporation has recently inaugurated a novel method of treating the sewage, whereby the same is prevented from contaminating a part of the river, as well as making a handsome profit from the waste products treated as the sewage works, and which takes the form of valuable manure, supplied in the form of dry powder to the surrounding farmers.

The tramways of Glasgow belong to the people, and are a pattern of cleanliness and comfort, and since they have been acquired by the Corporation an enormous saving has been effected.

All considered, there is much to interest visitors to Glasgow, apart from the excursion which the local committee have arranged to form part of the programme.

These excursions, if the weather should prove favourable, will certainly long be remembered by those taking part in them. The Firth of Clyde has no rival in the attractions it affords for a photographic excursion, and, seeing that the party will have at their disposal a magnificently appointed saloon steamer, several of our grand lochs and kyles will be seen all in the one day, as well as the broader expanse of waters literally swarming with yachts at Hunter's Quay Regatta.

The Loch Lomond day will, doubtless, by many be deemed in no way inferior to the Firth of Clyde excursion. The beauty of this loch with its floating islands must be seen for anything like an adequate idea of its appearance being formed. It was a wise proceeding on the part of the local committee to arrange a special steamer likewise for this trip.

The Convention of 1898 certainly offers attractions that don't come every year, and no one desirous of seeing a bit of bonnie Scotland should miss the opportunity of taking part in the meeting.

PHOTOGRAPHIC CAMEOS.

[*Trade News.*]

The process is easily worked, and a little practice will enable one to become an expert. I use a 4×5 plate, which is sufficiently large. To make a medallion to attach to a watch chain, bracelet, or brooch, proceed as follows: Pose the sitter in a strong light. Powder the hair, eyebrows, and beard, if a gentleman. Have the neck bare to the shoulder, and make a profile view, using a black background, about the size of the head of the goddess on a silver half dollar. Under-expose slightly, and develop tolerably hard. When the negative is dry, paste thereon a round cut-out of thin black paper, with the opening just large enough to show the head and neck. Then take a clean glass plate of the same size as the negative, and cover it with a very thick solution of gelatine, applying it in the same manner as varnishing a negative. When dry, repeat the operation. See that the plate is coated evenly, and remember that the thicker the gelatine the better the result will be. When the plate is dried, immerse in a sensitised solution of—

Bichromate of potash	½ ounce.
Strongest water ammonia	20 minims.
Water	8 ounces.

This solution must be kept in a dark place, as its keeping qualities are not good; it is advisable to mix fresh each time. The gelatine-coated plate is immersed in the above solution, in a dark room by yellow light only, for three minutes, and allowed to dry in the dark. When dry, place in contact with a negative in a printing frame in the same manner as you would use printing-out paper, being sure that the contact is perfect. Expose to direct sunlight for about ten minutes. The time of exposure depends, of course, altogether upon the density of the negative; an ordinary negative will require about the same timed exposure as for carbon print. After printing, place the gelatine plate in the dark in running water until the bichromate is thoroughly eliminated, then place it in a shallow tray of water to which a few drops of glycerine have been added; allow it to remain there for fifteen minutes, when it should be removed and placed in a drying rack to allow the superfluous water to drain off. The image can now be seen standing out in relief. Now place it in an empty dry-plate box of the same size as the plate, then mix some plaster of Paris, not too thick, and pour in the box over the plate. When the plaster has hardened, which will be in about twenty minutes, break away the sides of the box, and remove the plate very carefully from the plaster cast. From this cast the cameo is made. Almost any metal can be used. For the first experiments lead is the best metal to use, as it is very easily melted. One can make a few samples of this metal, but my regular orders, calling for silver or gold cameos, I usually give to my jeweller, as he, having a furnace and crucible, can secure better and cleaner results. If a seal is wanted, take the plaster cast, warm it somewhat, and brush the same with olive oil, being careful not to use too much oil, and make another plaster impression from it. Use this last the same as the former one. This process is much easier than it appears at first glance. C. G. Mann.

MEYER'S CAMERA FOR PRODUCING NEGATIVES FOR USE IN THREE-COLOUR PRINTING.

In printing in natural colours three or more plates are used, each of which is sensitised for a special kind of rays. As these plates must be absolutely similar, there must be three perfectly corresponding negatives of the same object taken at the same distance and from the same point of view.

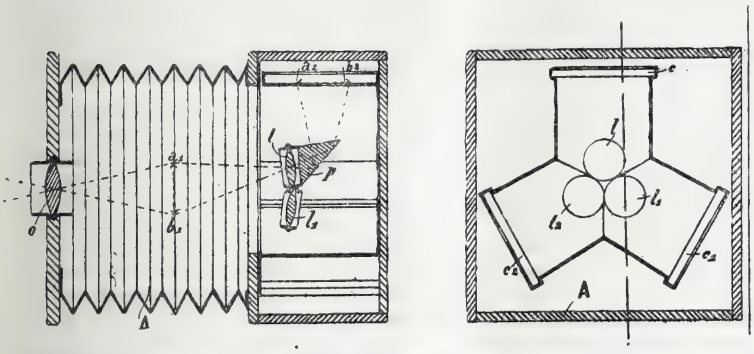
As all these operations involve more or less expenditure of time, it is self-evident that, with the means hitherto at command, it was only lifeless objects of which several exactly similar negatives could be taken in rapid succession, while portraits or landscapes with moving objects could either not be produced at all, or only with the greatest difficulty.

These drawbacks are now claimed to be obviated by the new apparatus represented in the drawing (in fig. 1 in longitudinal, in fig. 2 in transverse section) which permits of the simultaneous production of three or more perfectly similar negatives by means of an objective, thus rendering possible the production of portraits and landscapes in natural colours.

The apparatus consists of a photographic camera, A, with the objective, *o*, which throws a reversed picture of the object to be taken, *a*—*b*, upon a screen at a^1—b^1, or, as with the terrestrial telescope, in the air.

Three congruent lenses *l*, l^1, l^2, are now placed in the back part of the camera, as close as possible to each other, and in such a manner that the optical axis of each lens passes through the optical centre of the objective, *o*.

The distance of these lenses, *l*, l^1, l^2, from the picture, a^1—b^1, is equal to double the focal distance of the former. Immediately behind each lens is placed a right-angled isosceles prism, *p*, p^1, p^2, the surface of the hypo-



thenuse being coated with silver (in the illustration only *p* is represented), which deflects the rays falling through one lens at a right angle, and projects at a^2—b^2 a new image of *a*—*b*.

Three backs, *c*, c^1, c^2 (fig. 2), each with a sensitised plate, are now placed at a^2—b^2.

If the prisms were not used, the images cast by the lenses would partially overlop each other.

It would indeed, without the use of prisms, be possible, by drawing the lenses suitably apart, so to place the backs that the images should not overlop. But for practical reasons the use of prisms is always to be preferred.

The necessary colour filters are now placed in front of the lenses themselves, or even against the surfaces of the backs of the prisms.

As sensitised plates for different colours require a different length of exposure, each lens has to be provided with a special cover, which can be closed as required.

In cases where more than three colour plates are to be prepared, several lenses can be arranged in the same manner.

The lenses, *l*, l^1, l^2, can also be made to change places with the prisms *p*, p^1, p^2, without altering the effect.

THE STUDIO OF THE FUTURE.

The professional photographer is so closely associated with a studio of special construction, and of a uniform internal arrangement, that it requires a vigorous mental effort to imagine him apart from this accessory to his occupation. The studio is also strongly rooted in his traditions, past masters having expended much labour in perfecting it, the final outcome being the result of many years' experience, much study, and numerous modifications of earlier forms. So intimate is the relation between the photographer and his glass house that any suggestion that a costly room of this nature is not an essential in portraiture will, doubtless be met with an incredulous smile by the bulk of photographers. Tradition and custom in all that pertains to technical matters are difficult to break down, and, although I am not of a sufficiently Quixotic disposition to attempt such a task, I yet venture to put forward the heretical opinion that the photographic studio is now in use solely by reason of them, and not because it is indispensable to successful portraiture.

In judging the practical merits of the studio, it must not be forgotten that photography is progressive both on its scientific and artistic sides, the present form of glass house being planned to meet the requirements of collodion plates, with exposures of 20, 30, or 60 seconds, whilst the manner of furnishing is in accord with the artistic ideas which at first directed the portraitist. Both of these stages have long been passed, the modern gelatine plate, with its extreme rapidity, has entirely changed the question of illumination, and the more advanced views on photography and art, now current, cannot be realised with facility in a studio of the old construction. The common style of glass house being designed to render the production of good portraits as easy as the limitations of the wet-plate process would allow, and its furnishing not rising above the artistic notions then in vogue, it can hardly be expected to meet the needs of modern photography.

Going back to the beginning of photography, it is quite easy to trace the steps by which the studio reached its ultimate shape, as the evolutionist marks the growth of architecture from the mud hut to the palace. The original studio was primitive, consisting of a back garden, a chair, and the open sky, Draper, as early as 1839, producing portraits by the Daguerreotype, with exposures of five to seven minutes, under these conditions. In the first experiments the sitter was placed in the direct sunlight, but this giving strongly marked shadows, diffused daylight was employed. To shorten the exposure and equalise the illumination, Draper directed a horizontal beam of sunlight through a blue-coloured medium upon the face of the sitter. This was an inexpensive outfit, but quite unsuited to commercial purposes. The next advance was the erection of a glass cover or skylight, under which the sitter was posed, being thus protected from the elements during the operation. This was fashionable in Daguerreotype days, and, as appears from old prints, the sitter was raised on a platform some six or seven feet from the floor, being high up, almost touching the skylight, and illuminated entirely by top light. In such a position the lines of the face must have been deepened and the shadows exaggerated; hence, to soften the features as well as to cut off direct sunlight, the white curtain became a useful accessory.

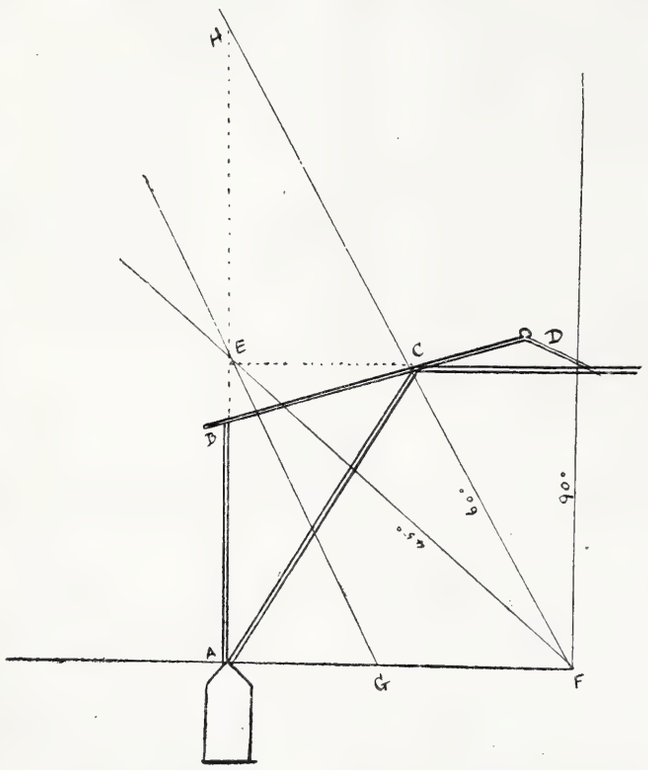
The collodion process soon followed, and, though quicker than the Daguerreotype, it still demanded the maximum illumination to bring the exposure within practical limits. The subject was now brought down to within a foot of the floor, and of necessity the lighting in this position, under a skylight, being solely from the top, and deficient in intensity, a considerable amount of side light was required; glass sides were therefore introduced, with the useful dark and light curtains. Lighted from the top and all sides in this manner, it would soon become evident that the subject was flat and wanting in vigour; consequently, we have the custom of blocking out one half of the glass to make a shadow side, and working with the direct light from half the top and side lights, relieving the shadows by reflection. By these steps we arrive at the usual form of glass house, and see that it owes its origin to the desire of securing maximum illumination combined with the most distinct view of the features. Practically only this single style of lighting could be utilised effectively with wet plates. The collodion process is now a thing of the past in portraiture, for with the gelatine plate the problem of illumination is altered; whilst the collodion-worker was compelled to use every ray of light consistent with the production of well-lighted features, the dry-plate worker is not so bound, he being at liberty to employ any size aperture, from a foot square upwards, with an exposure of no more than the 10 to 30 seconds of the earlier process. It results from this that the illumination in sitting-rooms, halls, passages, &c., becomes available photographically, and the portraitist is not confined to the top side light and reflector of the conventional studio. Under modern conditions, the choice of a studio is therefore as wide as the variety of rooms in domestic or civic architecture. In view of these circumstances, it may not be unprofitable to consider what kind of room would best meet the requirements of the photographer.

From a lengthy experience of the average photographic studio it seems to me the most unsuitable place for securing works of art; the powerful light, the dismal curtains and backgrounds, the head rests, reminding one of instruments of torture and the Inquisition, strange appliances and uncanny furniture, seen only in photographic studios, these all help to create an unfavourable impression on the sitter. It is not easy to make an apartment with glass sides and top attractive, since it contains none of the properties requisite for decorative effects and the sense of comfort; these can only be contrived in a well-furnished room, and in my opinion the future studio will be of this nature that is the photographer will reject the glass house, and in its place use a modified reception-room.

The apartment intended for photographic purposes should be as large as the usual studio, having a part of the side facing north of glass, either perpendicular or, by preference, inclined at an angle 62° 30′ towards the open sky. The glass may reach from ceiling to floor, except with rooms on the ground level, when it is useless to glaze lower than four or five feet. The more lofty the room the better, because, having to contend against a deficiency of top light, it is best supplied by this means. As regards the amount of illumination under the above circumstances, though less than in a glass house, it would not be so defective as to seriously lengthen the time of exposure. A reference to fig. 1 will show that in studio practice the angular extension of the light utilised is but little larger than may be obtained through an upright window. Supposing A B C D to represent the section of a studio, A E the aperture of a vertical window, A C the glass side of a room inclined at 62° 30′, then the intensity of illumination on the point F will be proportional to the angles, D F A, C F A, E F A, B F A. In general, the photographer does not work with light above C, the subject being near the point F; this gives an angle of 60°. Under the same conditions an upright window gives 45°, whilst, by inclining the side, A E, to A C, 60° is again reached. The utility of sloping the glass is thus manifest, whilst it is also evident that

the vertical window must be raised to the point H, to include an equal angle. To find the effects upon exposure, a useful table, by R. H. Bow, will be found in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1897, p. 674, and the whole article is worth studying in this connexion. From the table it is found that the efficiency of illumination at F, with an angle of 90°, being represented by 2, at 60° it will be 1; and, at 45°, 0·586; the relative times of exposure being 0·50, 1·0, and 1·706. The exposure in a room would thus be double that needed with the glass at A C, and four times as long, assuming the whole 90° of the studio illuminated the point, F. The average studio exposure is from one to four seconds; hence, with an upright window, the exposure would not exceed ten to twelve seconds, and, on bright days, might be reduced to three or four, a time well within practical limits. Exposures of ten and twelve seconds may seem unduly long to those using rapid plates, but here I would point out that the main advantage of rapidity is not the power conferred of shortening exposure, but the increased control over illumination it allows, a fact few photographers have yet realised.

The trouble of securing top light, and the rapid falling off of the illumination as the sitter is removed from the window, are more serious objections to upright windows than the matter of prolonged exposures. An object at F (fig. 1) receiving a sufficiency of top light through A, C, must be brought to the point G before equal top light falls upon it



through A, E; G, being close to the window, and for various other reasons, is an unfavourable position for portraiture. Moving from G to F, it is evident how rapidly the cone of illumination through A, E, decreases, being but 45° at F, whilst, through A, C, the point A can be moved along A, F, and still be illuminated through an angle of 60° at F. Under such circumstances a group of a dozen persons could not be taken, assuming every figure is to be equally lighted; this, however, rarely occurs in rooms, and it would be no violation of natural conditions if some figures were more in shadow than others.

Against these technical defects we must balance the gain from the pictorial side of using an elegantly furnished room, differing but little from the home of the sitter, who would certainly be more at ease in a place having but few things to remind one of what is to many a painful operation, than in the usual studio with its suggestion of the wings of a theatre and a furnished greenhouse. Should the employment of rooms become general, there can be but little doubt that business would increase by attracting many who have hitherto refrained from patronising the photographer owing to their repugnance of the usual ordeal.

I hardly expect that those possessing studios will, on reading this article, immediately turn them into printing rooms, and retreat to the reception-room; yet, to photographers about to build, it is worth reflection as a question of economy, if under modern conditions a glass structure is a necessity, since, if it is not, the initial expenses of commencing business may be much less, and the permanent charge for rent somewhat reduced.

Mr. H. P. Robinson has already pronounced in favour of a room 30 feet square, 14 feet high, with the north side glazed from the ceiling to within 4 feet 6 inches of the floor, and his judgment should carry weight with photographers.

JOHN A. RANDALL.

THE LESSON OF THE PHOTOGRAPH.

[Scribner's Magazine.]

THE time in which we are living might well be known as the age of photography. It is at least possible to believe that, of all the wonderful discoveries or inventions of the nineteenth century, that of photography is the most important, and that it will prove more far-reaching in its effects than any other since the invention of printing. The invention of printing was the discovery of a method for the preservation and multiplication of the record of human thought; the invention of photography was the discovery of a method for the obtaining, the preservation, and the multiplication of records of fact. Printing can only record what man knows or thinks; photography can record many things which man does not know and has not even seen, much less understood. In photography there is no personal equation. What a man has photographed is different from what he has seen or thinks he has seen, from what he declares he saw, from what he draws. Within its limits it is an accurate statement of what was. Hence, photography is one of the most valuable of the tools of science, at once a means of research and an invaluable, because impersonal, record. Its applications are infinite, and we are probably only at the beginning of them. It has become the indispensable tool, not only of the natural sciences, but of everything that touches upon science, of every study in which fact is of more importance than opinion or feeling. It will make history something different in the future from what it has been in the past, and, by the multiplication of reproductions of works of art, it has already revolutionised art-criticism.

But what has been and what is likely to be the influence of this great invention upon art itself? It has certainly added in some ways to the education of the artist; as an implement of investigation, it has taught us much about the science of natural aspects. Yet, up to the present, its influence would seem to have been evil, rather than good. We have had painters trying to rival the photograph in its accuracy of statement, and so nearly succeeding that their work has been hardly distinguishable from that of the camera, and now we have the camera attempting in its turn to produce art. Many of the cheaper magazines are illustrated almost wholly by photography, and nowadays they are filled with what are known as "photographic art-studies," and we have whole exhibitions of the same sort of thing, like a recent one at the Academy of Design. One might almost be forgiven for thinking that art and photography have grown so to resemble each other that the mere cheapness and facility of the latter is destined to win the day for it, without regard to its superiority in verisimilitude, and that photography is likely, in the near future, entirely to supplant art.

There are, however, other signs of the times which point to an entirely opposite conclusion. Are not these the days, or, rather, was not yesterday the day, of the poster fad? The poster is as far as possible from photographic; has as little as possible to do with fact or nature; is, in its extremest form, pure decoration run mad. Yet the day of the poster is coincident with the day of the photograph. The crisis of that fever is passed, but look at the current numbers of the "up-to-date" art periodicals, and observe the dominance of personality in the work they publish and comment upon, its decorativeness, its subjectivity, the variety of "tendencies" and "movements," of *alitys* and *isms*, that are represented. Never have there been so many schools and groups and secessions. Impressionists and symbolists and the Rose+croix, tonalists and colourists and luminists, are rampant. In art this is pre-eminently a period of anarchy and revolt, and the revolt is precisely against the photograph and the photographic, though it has seemed at times that the revolutionaries would batter down many good things also, including sound drawing and common sense.

No, the real danger at present is hardly that art will submit to the sway of photography, but that it will go too far in its rebellion and forget truth as well as mere fact. For photography is hopelessly ugly. The dreariness of the "photographic art-study" which has so impressed the artist, will end by impressing the public, and even the multitude will, in the long run, resent being fobbed off with mere nature when they ask for art.

If photography teaches the world nothing else, it will teach it that the end of art is not imitation. It will never again be possible for a great artist to believe, as Leonardo believed, that his aim is the production of a picture resembling as nearly as possible the reflection of nature in a mirror. We have the reflection made permanent all about us, and it does not suffice. The photograph has killed the doctrine of "realism." But neither will the old doctrine of "idealism" answer any longer. The realist taught that you should paint nature as it is, the idealist that you should paint nature as it ought to be. But the photograph shows us that nature is no more like Rembrandt than like Raphael, and that the something which is art exists in the work of Terburgh as unmistakably as in that of Titian, while it does not exist in nature itself or in the impersonal record of nature. What is this something? The shortest word for it is arrangement. It is some form of order, harmony, proportion. It is arrangement of line, arrangement of colour, arrangement of light and shade, for the sake of forming an harmoniously ordered whole which shall express some phase of human emotion and satisfy some vague desire of the human heart. There is even an arrangement of graven lines or of the stroke of a brush, so that "mere technique" may

also be artistic and have its reason in the creation of harmonies, though they be not harmonies of the highest order of importance. Sometimes nature fortuitously arranges itself into a semblance of pictorial harmonies, and sometimes a photograph may seize and perpetuate one of these accidental arrangements, and then we have the best that photography can give us. The "snap-shot" at a landscape under a fine effect, or at the momentary grouping of figures in movement, is often deeply interesting to artists, although it is not art; but, the more consciously the photographer attempts to be an artist the worse, in general, are his results, because the complicated harmonies which the painter arranges on his canvas are impossible of achievement anywhere else. You cannot pose figures as painters pose them, nor arrange drapery as they arrange it. You cannot get real light to fall as it falls in pictures, or natural colour to harmonise as pictorial colour harmonises. The artist's arrangement is complete, each smallest detail fitted to its place in the whole, each line and each touch of colour studied and modified until its relation with every other line and every other touch is perfect, and these relations, although infinitely subtle and complex, are subject to unascertained mathematical law as certainly as the relations of notes in a musical score are subject to a law better known and partially understood. Try to pose figures before the camera and to make a picture like some work of art you have seen, and you will discover that it cannot be done. If one detail is right, another will be wrong. The painter has studied the parts separately, trying again and again for this line or that shade, until everything fills its allotted place in a comprehensive scheme; but the photographer must get them all right at once or not at all. The result is that deadest of pictures, the *tableaux vivants*.

We all see photographs to-day, and most of us take them, and from this fact must surely come, if not a knowledge of what art is, at least a more general knowledge than has ever before existed in the world of what it is *not*. But, while art is arrangement and not imitation, in the art of painting the things to be arranged are the forms and colours of nature. The art may be good while the representation is poor, but there is no reason why the art should not be finer while the representation is truer. If the artist's knowledge is not so great that he can mould nature to his harmony, then he must leave the nature out, for the harmony is the essential; but, if the harmony is attained, then the more nature is included in it the more delightful is the art. The figure-designer should know the human figure so well that he can fit it to any scheme of line without ever a bit of false anatomy, and there is surely no reason why the landscape painter should not be able to produce great harmonies of colour and tone without one misstatement of nature's laws of light. For the competent artist there is no more necessity of falsification than there is need that the poet should write nonsense because he writes in verse. Meanwhile, there are no fully competent artists, and we need demand of those we have only that they shall be composers first, and that afterward they shall give us as much nature as they have learned to control.

Such is the lesson of the photograph. If we learn it, the influence of photography upon art will have been for good and not for evil. K. C.

As "K. C." says, and as his words still more strongly imply, the photograph has been sent us especially to teach the public what art is, that is to say, the art of the painter and the sculptor. The prodigious difference between the artist's representation of any natural object and the photograph of that same object is something which does not strike us so forcibly as we look at a drawing made by some monochrome process, but is very evident when it is the photograph which is before us. And yet there is a distinction to be drawn and a question to be asked with regard to it.

The photograph of a landscape subject is often of such refinement, "composing" so well, and affording so grateful and attractive a picture, that the public may be excused for asking if that is not landscape art, and even the student may be allowed to ask the same pertinent question. A picture of a distant mountain peak, made as some out-of-door photographers know how to make it, has a delicacy of tint, a subtlety of line, reproducing something of that strange passing of the mountain into the sky which the student of nature knows, but which beats the painter's efforts to render. And if, as will constantly happen, the mountain is much more gradual in its slopes and much less "alpine" in character in the photograph than we, in our excitement, looking at it, had supposed it to be; and if it is to be supposed that the painter would have falsified these slopes and that highest acclivity in order to tell more strongly the story of the mountain, as by a sort of exaggeration which is of the same nature as caricature, then it is a question at once whether such exaggeration be not a barbarous and primitive resort of the painter's art, whether the great mountain-painter ought not to find mountain character without so childish a device as that piece of falsification. Even the recollection of Turner's practice and the weight of his great authority leaves one in a questioning mood about this important matter; or, to take the more familiar instance of the hedgerow, the stile, and the turning of the lane in English landscape, or the familiar group of cows under a tree, or of poplars by the side of still water, or of children in a blackberry patch, the landscape being the essence of the picture in each case, there is many an instance of this sort of photographic picture which is very attractive even to the artist familiar to weariness with the drawings of a thousand masters who have gone before. And yet even Mr. Ruskin, best known to us all as worshipper of nature and preacher against conventions of art, tells his readers that the photographers ought to spend their strength on the perishing ancient buildings of Europe, remembering always that a photograph of a landscape is but a toy, while a photograph of a fine ruin is a document of precious significance.

In Florence, twenty years ago, a student of architecture was buying photographs on a rather large scale, when a painter of his acquaintance, and a devout follower of Ruskin's teachings, asked him how he could bear to spend money on such inartistic things as photographs. The answer was easy, relating as it did exclusively to photographs of architecture, sculpture, and objects of decorative art, it was that a photograph was a mere glass, through which one saw the veritable object which he wished to study. The artistical character was not in the photographic picture, but in the object which it reproduced. Through the ugly brown of a silver print more of the truth concerning the church front, "set full for the sun to shave," was visible than could be seen through any drawing over which he, the artist, might have spent long summer afternoons. This is the essence of the photograph, that it preserves every record, with some drawbacks and shortcomings, of what is put before it. If that thing is artistic, the photograph, in an indirect and secondary way, becomes itself artistic, as the reflection of a man's face in a glass is the man himself; so far, and no farther. There are some scraps of landscape which the artist can hardly improve upon in grace or in severity of composition. What is it that a critic says of the picture by Corot which he actually saw in process of being painted? Something to this effect, that at first he could not see what Corot, with his canvas out of doors in the forest of Fontainebleau, was trying to do, even the half-finished picture on the easel not fixing the subject sufficiently for the inquirer's information, until suddenly he saw, eighty yards away, in the dim middle distance, Corot's picture rising out of the ground. Corot, the least realistic of out-of-door painters, the most determined of all men to give one, and usually the same familiar impression, the deliberate painter at noon-day of dawn effects and of twilight skies, Corot could yet plant himself in front of a composition ready-made for him and modify it only in part as he worked. What, then, does the skilled and artistically intelligent photographer do? He selects the Corot subject, and, as he cannot alter it, he selects it with even more patient care. And what is his result? It is a transcript of a piece of nature which the photograph-artist has thought the most lovely within his immediate reach. It is not a work of landscape art, but of skill and taste in choosing landscape. The photographer, tied to the veritable facts before him, must select with more patient and longanimous care than the landscape painter, or he has achieved nothing whatever.

So much for landscape; but, then, it is notorious that real landscape comes nearer to our ideal landscape than some other manifestations of nature do to our ideal of them. To go at once to the other extreme, to the very opposite pole of the artistic world, how about figure-drawing, and especially the nude? Has any one ever seen a photograph of the nude or semi-nude model, no matter how admirably chosen or how artistically posed, which was not really ugly when considered from the point of view of the trained observer of drawings of the figure? Rembrandt was not much of a chooser of models, at least in the direction of their loveliness, and there are not many uglier individuals in the great gallery of nude figures than the Adam and the Eve in his magnificent etching, and yet these two figures are lovely when compared with the photograph of the nude model. And the reason for this is clearly that the conventions of art—the accepted conventions of art—the conventions upon which all our ideas of figure-painting and figure-drawing are based—are all an ideal very remote indeed from the actual fact. Consider a Greek statue of a perfectly central type, neither early nor late, neither primitive nor of the decline—consider the Hermes found fifteen years ago at Olympia, and made popular by the numerous casts of its bust, and the numerous photographs of the whole figure. Neither in actual modelling of the smaller parts nor in the texture of surface is this much like the nude body, even of the most athletic, the most healthy, the most admirably "trained" male model. The splendid young men whom one sees at the swimming bath, they, too, the fine-drawn and highly bred youths of our best races, and in admirable physical condition, are so unlike the Greek statue that one looks once and again with amazement, asking whether this indeed is the origin of the Greek convention.

It is notorious that many of our living masters of the human form in painting use the model only occasionally. It would not be hard to make a considerable list of men who, by their own confession, or by the statements of their friends, are known to compose and even to draw in detail without consulting the model at all, using the model afterwards to correct their work, or, perhaps, in case of a long-lasting toil, referring to it more than once in the course of their work. Some of these artists have, indeed, posed the separate models for their separate figures in advance, first nude and then afterwards draped. But there are those who will tell you that this plan is dangerous, because it leads to immobility, and to a look given to the figures in the final work as if they could not move, but were statues draped and coloured. This is not the place to discuss these delicate subjects at length, but they should be in the mind of every one who looks at photographs of human subject and asks in what consists their extraordinary lack of artistic value. The

draped figure follows at some distance the nude figure in all these conditions and conventions of art. The instantaneous photograph alone can give it movement and the charm of seeming alive; but at what a cost of grace!—at what a cost of artistic interest! Mr. Muybridge's photographs of man, beast, and bird in rapid motion are invaluable as documents, but we have yet to hear of the enthusiast who shall admire them as possessions in the sense that a work of art is a possession.

R. S.

ENLARGED NEGATIVES.

Before the meeting of the Gospel Oak Photographic Society, on Tuesday, May 3, Mr. W. J. Ramsey lectured on, and gave a demonstration of, the process of making an enlarged negative.

At the outset he mentioned the reasons for making an enlarged negative. Its need was felt the most when it was desired to make a large number of copies of the same picture, as it would be an enormous waste of time to make each enlargement separately. Several enlarged negatives would be made, and the prints from these, which might be on any paper desired, could be finished in large batches.

The time was when neither bromide paper nor dry plates had been introduced, and in those days enlarged negatives were the only means available, and the method adopted for their production was as follows: From a suitable negative was made by contact a carbon transparency. This was fitted in an aperture in a shutter, which, with the exception of that coming through the transparency, prevented the entrance of actinic light into the room. The camera (of the old box form) was placed close against this, and the image passing through the lens was focussed on a piece of glass covered with white paper, which was supported on an easel in front of the lens, and at right angles to it. The glass which was destined to become the support of the enlarged negative was carefully cleaned, coated with collodion, and sensitised in the nitrate bath, in the usual way. It was then placed in the position previously occupied by the paper-covered glass, the lens was uncovered, and the exposure made. The plate was then developed in the customary manner, and from the negative thus obtained the prints were made on albumen paper or carbon tissue, and by this means very fine results indeed were secured.

But the introduction of dry plates had simplified the above process very much. The method which he proposed to demonstrate was comparatively simple, and, if care were taken and attention given to each detail, excellent results might be secured.

The most important was the production of the transparency. This was best done on an ordinary or slow plate in a printing frame in contact with the negative. Exposure was best made with a wax match, giving, say, an exposure of ten seconds with an average negative, the match being held some two or three inches from the negative. The plates should be developed so as to give plenty of detail, not too dense, and preferably with one of the newer developers, such as metol, to prevent the film being stained, as it was most important that the high lights should be kept as clear as possible.

After fixing and washing, the transparency thus obtained was placed in the enlarging camera or lantern and focussed on the screen. The plate on which the enlarged negative was to be made was then placed in position, either on the easel in front of the lantern, or in the slide, if using an enlarging camera, and the exposure made. After exposure, it was to be developed in the usual way (pyro soda he used himself), fixed, washed, and when dry was ready for printing by contact, in any manner desired. Ordinary bromide paper could be utilised as described for plates and for large-sized negatives; the grain of the papers was a matter of indifference—in fact, was thought an improvement by some. Of course, if bromide paper were used for the enlarged negative, it would be developed in the same manner as though it were a positive, except that it should be left longer in the developer to attain the requisite density.

The lecturer then proceeded to demonstrate the process, and, by means of an enlarging camera which has just been acquired by the Society, excellent whole-plate negatives were made from a quarter-plate transparency, both on plates and on bromide paper. The illuminant used was magnesium ribbon.

SOLAR PHOTOGRAPHY.

Colonel St. George Gore, R.E., contributes to the *Journal of the Photographic Society of India* for April, an article on "Solar Photography," from which we make one or two extracts:—

"We may consider the sun as having two aspects—his apparent or physical aspect which is disclosed, more or less, by an ordinary photograph, and his internal or chemical aspect which ordinary photography does not give a clue to, but which has to be attacked by means of that trusty friend of the astronomer—the spectroscope. It is very much as if one photographed the view of a house: the picture will show all the external features of the house and give an excellent idea of its general appearance, but will give no clue to the material under the plaster of which the house is built, or the sort of wood used in the doors, still less any idea of what is inside the house.

"Our solar photography at Dehra Dun deals with the first of these aspects. The photo-heliograph used, similar in construction to that employed at Greenwich, consists of an equatorially mounted telescope, having an object-glass of three inches in diameter and five feet focal length. At the focus of the telescope are placed two very fine wires at right angles to each other, the image of which is impressed on each photograph, and the diaphragm holding them being so adjusted that the apparent motion of the sun across the field of view is parallel to one of them; these serve to locate the position of any detail on the photograph.

"Close to the focus is the shutter, consisting of a metal slide capable of being drawn very rapidly across the field of view by a strong spring. The slide has a slit in it, the width of which is adjustable from one hundredth of an inch upwards by suitable means.

"As the image of the sun formed by a lens of five feet focus would only be about half an inch in diameter, an enlarging lens of the rapid rectilinear type is fixed at a suitable distance behind the focal point. The lower end of the telescope is enlarged into a conical-shaped wooden box forming the camera proper, the outer end of which carries the usual focussing glass and dark slide. The slide takes a plate ten inches square, and the enlarging lens is so placed as to throw an image of the sun eight inches in diameter on the plate.

"The telescope is mounted equatorially: this consists, as, no doubt, most of my readers know, of arranging the mounting so that the telescope has motion in two directions, at right angles to each other, one axis of motion being directed towards the pole of the heavens. The result of this is that, if the telescope is pointed to any heavenly body, it need only be revolved on one axis in order to follow that body in its course through the sky. A clockwork arrangement is added, which revolves the telescope on this axis at the rate requisite to keep the object always in the field of view. The exposures are so very short that this following motion is hardly necessary for the sake of sharpness of the picture, but without it it would be impossible to ensure the image of the sun being in the centre of the plate.

"As to photographic processes, we in Dehra have always used wet plates, though at Greenwich dry plates are employed. As far as I could see, on comparing our negatives with those taken at Greenwich, the advantage in delicacy of detail lies very largely with the wet plates. Dry plates are undoubtedly very convenient, especially in cloudy weather, when the sun is only glimpsed at intervals; but, though I have experimented with them, I have not yet been able to get really satisfactory results. The detail on the sun, especially the mottling which covers the whole face, is so delicate and wanting in contrast, that it seems impossible to do it justice with dry plates, the result being flat and the mottling barely perceptible. Wet plates seem to have much greater power in discriminating between slightly different shades of illumination.

"On examining a good photograph of the sun, the first point which strikes one is that the surface, instead of being of even brightness, is mottled all over in a curious irregular way: here and there towards the limb of the sun will probably be seen certain bright patches of irregular shape, manifestly much brighter than the surface of the sun in their neighbourhood. These are known as faculæ; very possibly one or more groups of sun spots of the well-known form may be visible; and, finally, will be noticed a distinct falling off in general brightness near the edge of the sun which gives it a rounded appearance in the photograph.

"Of the points above mentioned which one notices on examining a photograph of the sun, the mottling seems probably due to the varying condition of the photosphere itself: the faculæ appear to be caused by great masses of incandescent matter probably solid, though in a fine state of division, extending above the reversing layers. They are only visible to the eye when near the edge of the sun, a result which is caused by their relative brightness not being greater than that of the photosphere, so that when they are centrally situated they do not show, and it is only when they approach the limb where the brightness of the photosphere as apparent to the eye falls off rapidly that they become visible. This diminution of light towards the edge of the sun, which is very noticeable in photographs, is caused by a layer of relatively dark dust above the photosphere which, when thickened by the effect of foreshortening near the edge, cuts off a good deal of the photospheric light.

"On our photographs we occasionally get spots of terrestrial origin. On one occasion a kite happened to fly across the face of the sun during the moment of exposure, and was clearly photographed. On one morning we found it impossible to secure a picture of the sun free from locusts, of which the air was full to a great height. Again, on developing a plate, it was found that we had secured on the face of the sun a flight of ducks evidently migrating north. Assuming them to be mallard, I calculated from their size that they were at least five miles distant."

THE HAND CAMERA.

Before the Edinburgh Photographic Society, on May 4, Mr. A. Eddington presiding, Mr. P. M. Macintyre, Advocate, read a paper on "The Hand Camera." Mr. Macintyre held that the hand camera, to be thoroughly efficient, should be self-contained, all the parts should be in the box; it should be compact, portable, and ready for work at a moment's notice. The focus of the camera should be capable of adjustment, and the focus of the lens should not be too short. The finders

of most hand cameras were too small, they should be at least one-quarter the size of the plates in use. The pneumatic release for the shutter should not be employed. A spring or button was better because they allowed the operator to use both hands to steady the camera. Mr. Macintyre approved of the employment of sheaths for holding the plates; slides were too heavy and their manipulation took too much time. The system of plate-changing advocated was that of the lever and bag.

The artistic possibilities of the hand camera were spoken of and illustrated by a number of studies from hand-camera negatives. The camera which had most limitations in the direction of artistic work was the stand camera, not the hand camera. It was pointed out that the changing phases of nature were most readily caught by means of the hand camera, and that such effects provided the best material for artistic work.

The use of the hand or stand type of camera was deprecated. It took too much time to manipulate such a camera, and to be most efficient the hand camera must be ready for use at a moment's notice.

CAMERA CLUB DINNER.

On Thursday evening, May 5, the Annual Dinner of the Camera Club was held at the Club House, Charing Cross-road. This was the second time that the experiment of holding the dinner on the Club's own premises was tried, and the result was a remarkable success. One could not have had a more admirable or better-served dinner at a restaurant of the highest class.

The President (Captain W. de W. Abney) was in the chair, and the company numbered about eighty, among those present being Sir H. Trueman Wood, Mr. George Davison, Mr. Lyonel Clark, Mr. Joseph Addison, Mr. R. Freer Austin, Mr. J. Cadett, Mr. R. W. Craigie, Major Lysaght, Dr. Patterson, Mr. H. M. Elder, Mr. Payne Jennings, Mr. Horace Wilmer, Mr. H. E. Davis, Mr. Thomas Bedding, Mr. E. Calland, Mr. A. Horsley Hinton, Mr. J. W. Godfrey (Hon. Secretary), Mr. F. Machell Smith, Mr. Seyton Scott, &c.

The toast list comprised "The Camera Club," given by Sir H. Trueman Wood, and responded to by Mr. F. Machell Smith; the "Visitors;" the "President;" the "Press;" and the "Honorary Secretary." The speeches were interspersed by some excellent music and recitations.

We gathered from the remarks of Mr. Machell Smith and the Honorary Secretary that the position of the Club has recently shown a distinct improvement, and that there is every probability of that tendency being maintained. The membership is increasing, and the high standard of the lectures attracts large and appreciative attendances. There is a manifest determination on the part of the Club executive to omit no effort to make the Camera Club a permanent success.

The company broke up at a late hour, and on all hands it was admitted that a very pleasant evening had been passed.

ROYAL PHOTOGRAPHIC SOCIETY'S *CONVERSAZIONE*.

The *Conversazione* of the Royal Photographic Society, which took place at the Crystal Palace on Tuesday evening last, in connexion with the Society's International Exhibition, was a brilliant and most successful function, and brought together a large assemblage, which included nearly all the best-known personages in the photographic world. The proceedings opened with a reception by the President (the Right Honourable the Earl of Crawford, K.T., F.R.S.) and the Council, at which about 600 members of the Royal Photographic Society and of affiliated societies, with their ladies and friends, were present. At eight o'clock Mr. W. H. M. Christie, C.B., the Astronomer Royal, addressed a crowded audience in the Theatre upon the subject of "The Photography of the Recent Total Solar Eclipse," his lecture being illustrated by numerous lantern slides depicting the arrangements which were made in India for observing the phenomenon, and by reproductions of the photographs taken before, during, and after the period of totality. The duration of the total obscuration of the sun, at the station occupied by the Astronomer Royal and Professor Turner at Sahdol, was only one and three-quarters minutes, and it was necessary to make special optical and mechanical arrangements to utilise every moment of this time. The special feature in connexion with the observations was the number and variety of the instruments utilised to obtain large scale photographs of the corona. Professor Campbell, Dr. Copeland, and Mr. Michie Smith, had each a telescope forty feet in length, the method of mounting this long tube being different in each case. Mr. Michie Smith pointed his tube to the Pole, and reflected the sun's rays into it by a plane mirror turning about a polar axis Professor Campbell mounted his tube on a timber framework so as to point to the position of the sun at mid totality, and applied clockwork to move his plate. Dr. Copeland used a fixed mirror to reflect the rays into his telescope, which was mounted horizontally, and moved the plate by clockwork. The instrument used by Mr. Christie was on a different principle, the large scale being obtained by applying a concave lens, by Dallmeyer, to magnify the image formed by an object-glass of comparatively short focal length, and thus the total length of the telescope was reduced to eleven feet, the combination being an application of the Barlow lens, known to photographers as the tele-photographic form. It was necessary to employ a number of assistants, as he wished to obtain seven photographs within the space of one and three-quarter minutes, the exposures ranging from two-thirds of a second to twenty seconds, leaving only some five or six seconds for changing plates. Considerable anxiety arose from the circumstance that the natives did not regard the eclipse from exactly the same point of view as the astronomers, and looked upon it as a very solemn religious function, in which it was of the greatest importance to their future welfare that they should recite as many prayers as possible; but they managed to count seconds, hand up fresh plates, and perform their various duties, and to comfort their conscience by praying in the few seconds that remained. Mr. Christie mentioned that the cœlostat which he employed was invented by M. Lippmann, in 1895, and was first used successfully in this eclipse. The slides shown included, besides Mr. Christie's photographs, some taken by Mrs. Maunder, showing the sun's corona after the period of totality, and some views by Mr. Thwaites, Captain Hills, and other observers, and representations of the various instruments employed and the methods of mounting them, and it was pointed out that the difficulty arising from halation had been overcome by the use of the Sandell triple-coated plate. At the conclusion of the lecture Lord Crawford expressed the cordial thanks of the Society to the Astronomer Royal for his interesting address.

Shortly afterwards the theatre was again filled for an exhibition of colour photographs by the Lippmann, Ives, and Joly processes, the examples of Mr. Ives's method of three-colour projection being received with special marks of appreciation. In addition to these items of photographic interest, an excellent concert was given by the Crystal Palace Orchestral Band, under the direction of Mr. August Manns, Madame Marion McKenzie giving very fine renderings of "The Worker" and "The Children's Home," and the Palace Military Band performed in the centre transept from half-past nine till eleven o'clock. Refreshments were served in the French Court.

During the past few days a rumour has been current to the effect that the Exhibition will remain open until May 21, but we are officially informed that this is incorrect, and that, as originally arranged, it will finally close on Saturday, the 14th inst. (to-morrow). There is, therefore, only one day remaining, and we must strongly urge all who have not yet visited the Exhibition, which is, without doubt, the most important and comprehensive photographic show ever inaugurated, to devote to-morrow to its inspection. The attendance continues to justify the highest expectations, the number last week being over 32,000, making a total for the first fortnight of about 75,000 visitors.

An Ordinary Meeting of the Society, for the election of members and for the usual business, will take place at 12, Hanover-square, on Tuesday next, at 8 p.m.

THE CRYSTAL PALACE EXHIBITION.

An Exhibitors' Dinner to the Executive.

In view of the great success which has attended the International Photographic Exhibition at the Crystal Palace, many of the exhibitors have expressed a desire to have the opportunity of testifying their appreciation of the efforts made on behalf of the Exhibition by the principal members of the executive. It has therefore been resolved to invite the Earl of Crawford (President), Colonel Waterhouse (Honorary Secretary), Mr. George Scamell (Honorary Treasurer), and Mr. R. Child Bayley (Assistant Secretary) to a complimentary dinner at the Holborn Restaurant on Thursday, May 19, at 7.30 p.m. These gentlemen have signified their acceptance of the invitation. Many exhibitors have already stated their intention of being present, and it is anticipated that the gathering will be fully representative. Communications on the subject should be made either to Mr. Bedding, 24, Wellington-street, Strand, W.C., or Mr. Wall, 9, Cecil-court, Charing Cross-road, W.C., who have undertaken the organization of the dinner, at which Mr. Frank Bishop will preside.

THE SEPAC COMPANY.

This is the distinctive name of the North Wales Central Photographic depôt of which Mr. G. Watmough Webster, F.C.S., F.R.P.S., is the managing director. The Company's retail department is at 33, Bridge-street-row, Chester, the wholesale at 4, 5, & 6, Fletcher's-buildings in the same town. The Company has been established for the manufacture and sale, under Mr. Webster's personal supervision, of every kind of apparatus, material, and chemical, used in the practice of photography. Dark rooms for the use of amateurs will be available. "Sepac" is a newly coined word: SE is for SElected, P is for Photographic, A is for Apparatus, C is for Chemicals. The principal features of the Company's business are to be developing, printing, and enlarging. Photographic chemicals, dry plates and printing papers, varnishes, mountanta, Sepac retouching medium, cameras and lenses, including the Sepac hand cameras. The Sepac Company are also agents for Ross's, Dallmeyer's, Wray's, Taylor's, and Optimus lenses; Frena, Optimus, Leviathan, Lancaster's, &c., cameras.

DEATH OF MR. S. W. ROUCH.

We are sorry to learn of the death, on Saturday, May 7, of Mr. S. W. Rouch, of the well-known firm of W. W. Rouch & Co., photographic chemists, apparatus-manufacturers, &c., 161, Strand, W.C. The deceased gentleman was in his sixty-fourth year, and leaves a widow, but no children. Messrs. Rouch's photographic business is one of the oldest engaged in the trade, having, we believe, been established over forty years ago, when wet collodion was the premier photographic process. The premises of the firm, when the business also included a pharmaceutical department, for many years occupied the corner of Norfolk-street, Strand. They have recently been pulled down to make way for a bank. Messrs. Rouch were the introducers of Hardwich's collodion many years ago, and they were very early in the field of gelatine dry-plate manufacture. They have always been distinguished for the great excellence of their photographic apparatus. The late Mr. Rouch, who was at one time a very skilful practical photographer, succumbed to an attack of pneumonia.

The control of the business passes into the hands of Mr. W. A. Rouch, a nephew of the late Mr. S. W. Rouch, and son of the original founder, who in recent years has built up a very high reputation for hand-camera photography, as his work, so often seen in the illustrated press, amply testifies.

Our Editorial Table.

The Barnet Book of Photography.

286 pp., with illustrations. Barnet: Elliott & Son.

Messrs. Elliott's object in preparing this book is "to place in the hands of every photographer instructive articles on essential processes and manipulations." The contributions of some very able writers have been secured by Messrs. Elliott, and the book stands out as a compilation of a highly informative nature. Captain Abney takes as his subject "Alpine Photography," and gives many hints likely to be of service to those contemplating photographic work in the Alps. "Negative-making: development, intensification, reducing," has the name of C. H. Bothamley appended to it, and we find that the author delivers himself of much sound and useful advice. "Lenses," by Mr. Chapman Jones, and "Portraiture," by Mr. Harold Baker, are competently handled themes by men who are masters of their subjects, and among the remaining writers are Mr. J. H. Avery on "Architectural Photography," Mr. Pringle on "Lantern Slides," Mr. Packham on "The Gum-bichromate Process," &c. There are many half-tone reproductions of photographs given as illustrations, and the book is well printed and bound. Inasmuch as, besides the subjects mentioned, "Platinotype," "P.O.P.," Bromide, and Carbon printing are also dealt with, it will be seen that the "Barnet Book of Photography" covers a wide field, and is likely therefore to be found of very great service by photographers.

Paget Prize P.O.P. and How to Use it.

By W. J. Wilson, F.C.S. 24 pp. Watford: The Paget Prize Plate Company.

No. 3 of the Paget hand books is a tersely written guide to the use of Paget gelatino-chloride paper by the two processes of printing-out and partial development. The little book has the advantage that the information it supplies is the result of accumulated and ripe experience in the treatment of gelatino-chloride paper, and it may therefore be relied upon in respect of the authoritative nature of its advice. Notes on the preservation of the paper, printing, toning, fixing, washing, the alum bath, mounting and spotting, and enamelling are given with sufficient fulness to enable the photographer to grasp the whole system of gelatine printing in detail, while the partial development process is also described in the amplest terms. The practised hand of Mr. Wilson shows itself in every line of the little book, which we can recommend as a thoroughly good guide to the proper manipulation of the Paget gelatine papers.

The Gum-bichromate Process.

By W. J. Warren. 75 pp., with illustrations, price 1s. London: Iliffe & Sons, 3, St. Bride-street, E.C.

Mr. Warren set himself the task of writing a practical handbook and guide to the working of the gum-bichromate process, eschewing the while "antiquarian research," and concealing from us his "private inclinations." Why he is fearful of offending in either or both these regards we do not know; correct history is always interesting, and sometimes instructive, while the avowed suppression of an author's "private inclinations" in the matter of a photographic printing process, of which he is a voluntary exponent, tends possibly to discount the value of his information and advice. Two passages on pp. 16 and 17, referring to the freedom of gum-bichromate printing from "mathematical (*sic*) or chemical complications," and of such prints being "not merely the result of a chemical or mechanical process," set us wondering whether Mr. Warren is aware that not even gum-bichromate printing escapes being dependent upon certain definitely understood chemical and physical phenomena; and that without there was a decomposition of $K_2Cr_2O_7$ by light in the presence of a colloid, and the consequent insolubilisation of a portion of the latter, there would not be a gum-bichromate process, and thus Mr. Warren's book about it would have remained unwritten. Again, the practical working of the process is just as "mechanical" as any other—you cannot have your finished print unless the "mechanics" of coating the paper, placing it in contact with the negative in that unquestionably mechanical contrivance known as a printing frame, and other "mechanical" things have been attended to. We fear that Mr. Warren—an able photographer of catholic tastes—has unconsciously absorbed some of the nonsense that has been written about photography of the new school existing in independence of optics and chemistry, and a knowledge of the latter being superfluous. Still, with the trifling exception we have referred to, Mr. Warren's book earns our sincere praise. It is an admirable little guide to place in the hands of anybody taking up gum-bichromate printing. The details and instructions given are clear and to the point, and it is evident that, in describing the various stages of the process, the author speaks from personal experience of its working. He quotes the opinions and experiments of Packham, Demachy, and others whose names are associated with gum-bichromate printing, and his illustrations assist the reader in realising what can be accomplished in the matter of personal control.

The Avery Stripping Solution.

Wholesale Agents: G. Houghton & Son, 89, High Holborn.

At the Crystal Palace last week Mr. Avery was good enough to demonstrate for us his method of stripping and reversing a negative by the aid of two solutions specially sold for the purpose. He successfully accomplished his task in four or five minutes, at the end of which time the reversed negative, in perfect condition, was placed in our hands. The process, with reasonable care and attention to detail, is practically certain; and thus, for the many purposes for which a reversed negative is desired, the Avery Stripping Solution should be in very great request. Two solutions are employed, and the method by which the stripping and transference is accomplished cannot be better detailed than in the words of the working instructions issued by Mr. Avery, who carried out the process under our observation just in the manner that it is here described:

Take negative to be stripped, and, if varnished, remove by rubbing well with pledget of cotton-wool in bath of methylated spirits. Using a ruler or other straight-edge, cut the film round the inside edge of the rebate mark, place on the levelling slab, and level truly. For a whole plate (for smaller or larger plates use proportionate quantities) pour into the minim measure 30 minims of solution No. 2, and make up 3 drachms with solution No. 1. Pour this on to film, and guide over with a small strip of paper, taking care to avoid waste by preventing solution from running over edge of plate. Allow to remain about two minutes, care being taken that no portion of the film remains uncovered. The film of rebate may now be removed with point of the knife. Next insert point of knife under one corner of film, and, using a small piece of white paper to protect the thumb, gently raise the corner of the film from the glass until one quarter of the film is clear from the glass, lay back, and repeat with the other three corners. If any difficulty is experienced in this, allow to remain a little longer.

The film having now been freed from the glass entirely, pour about 2 drachms of solution No. 1 in a pool on the centre of the film. Now take a piece of white paper, somewhat larger than the negative, and, holding one end in each hand, bend the paper downwards so that the middle of the paper strikes the film first, then gradually lower the ends so as to exclude air bubbles. Squeegee in same manner as for carbon printing, using slight pressure only. Raise one corner and insert knife point under film so that the film adheres to the paper, and pull *both* gently away from the glass. If any part of the film sticks to the glass (due to the presence of grit), gently aid with the point of the knife.

To Reverse.—Pour 2 drachms of solution No. 1 on the film, and in the same manner transfer to another piece of paper, squeegeeing as before. Lastly, pouring same quantity of solution No. 1 on centre of glass plate, lay the paper support, film downwards, on it, and squeegee well to prevent bubbles, insert point of knife between film and paper, and gently draw paper away from film, which will now adhere to the glass. The film dries in about five minutes, and may now be varnished and printed from in the usual manner. The film may, if desired, be retransferred to the original glass support and in its original position by the same method.

Illustrated Catalogue of the Royal Photographic Society's International Exhibition, Crystal Palace, 1898.

Edited by R. Child Bayley. 228 pp., price 1s.

Published by the Royal Photographic Society, 12, Hanover-square, W.

Universal praise has been bestowed upon the Catalogue of the Royal Photographic Society's Exhibition, which has been edited by Mr. R. Child Bayley. Inasmuch as it is obvious from a mere glance through its pages

that it is destined to have a permanent value as a work of reference, an indication in detail of the nature of its contents is distinctly called for.

The frontispiece is a Rembrandt photogravure of a portrait of the Prince of Wales, from a negative by Van der Weyde, and the indices and lists of exhibitors are given in full. In the Historical Section brief but useful biographies of the dead and gone fathers of photography appear. "Early Photographs and Apparatus," "Daguerreotype," "Talbotype or Calotype," "Wet Collodion," "Collodion Emulsion," "Gelatine Bromide," are sub-headings in the section. A note on "Various Methods of Carbon Printing," by Mr. Bolas, introduces the sub-section relating to carbon work in its various forms, and the same writer performs a like office for "The Photographic Camera." Colonel Waterhouse, on "Photographic Engraving in Intaglio," prefaces the photogravure sub-section, and Mr. W. Gamble briefly describes relief engraving in connexion with the tone-engraving sub-section. Fifteen pages are devoted to "Lenses," and the forms of the principal ancient and modern objectives are figured and their leading characteristics concisely set forth. A brief explanatory article, dealing with the history of photographic optics, would possibly have added to the interest and value of this section. Pictorial Photography takes up sixty-four pages, and the fifty illustrations that are given are in the main representative of past and present pictorial work in photography. Passing over the Apparatus Section (which occupies twenty-six pages), we come to the Scientific and Industrial Applications of Photography, which runs into over forty pages. The remainder of the catalogue details the miscellaneous exhibits which are of immediate rather than permanent value. Throughout the book, which is well printed on beautiful paper, are interspersed phototypic illustrations in half-tone, three-colour, bromide, collotype, &c., which convey to the reader an excellent idea of the perfection to which modern photographic printing processes have been brought.

The catalogue is a mine of sound and carefully compiled information relating to photography in its historical, scientific, industrial and pictorial aspects; and we can give it no higher praise than that it should have a place in the library of every photographer. It is a bit of work of which the editor, Mr. Child Bayley, may well be proud.

CATALOGUE RECEIVED.

FREDERIC LEWIS, 16 & 18, Gladstone-road, Sparkbrook, Birmingham. Price-list of enlargements, printing, &c., in bromide and carbon.

News and Notes.

MESSRS. S. B. BOLAS & CO. inform us that, having taken larger and more convenient premises at 77, Oxford-street, W., this address will in future be their headquarters, and all letters, messages, &c., should be sent to 77, Oxford-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, May 19, at eight o'clock, Mr. W. D. WELFORD will give an Animated Photographic display, showing a number of new films that he has recently taken. The Hon. Secretary will be pleased to see any one interested in this work.

PHOTOGRAPHIC CLUB.—Wednesday evening, May 18, at eight o'clock, Mr. W. Thomas will give a chat on Birch and Bracken subjects. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

Patent News.

THE following applications for Patents were made between April 25 and April 30, 1898:—

PACKING FILMS.—No. 9643. "Improvements in the Mounting, Packing, Storing, and Using of Photographic Films or Plates, and in Cases and Envelopes for same." J. E. THORNTON.

CAMERAS, &C.—No. 9738. "Improvements in and relating to Cameras and Projecting Apparatus for Kinematograph Pictures." J. ADAMS.

SHUTTER.—No. 9832. "An Improved Photographic Camera Shutter." Complete specification. F. LIDDELL and G. R. CANDELET.

PROJECTION APPARATUS.—No. 9857. "Improvements in Apparatus for Projecting an Image upon a Floor or other Picture Surface for Advertising and other like purposes." J. FRENKEL.

CAMERA-CARRIER.—No. 9872. "An Improved Carrier for Cameras and other Articles for the Use of Cyclists." T. N. MURRAY.

APPARATUS.—No. 9931. "Improved Photographing Apparatus." Complete specification. W. VON SCHEVE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

May.	Name of Society.	Subject.
16	Bradford Photo. Society	Members' Sale and Exchange Night.
16	North Middlesex	*Printing and Toning P.O.P.* A. H. Lisett.
16	Richmond	Annual General Meeting.
16	South London	*The Working of Improved Cameras and Shutters.* Mr. Hesketh.
17	Ashton-under-Lyne	Excursion: Queen's Park, Manchester. Leader, Stephen Sharp.
17	Gospel Oak	*Portraiture for Amateurs.* W. E. Debenham.
17	Hackney	*A Tour through North Wales with Cycle and Camera.* E. T. Coombes.
17	Leeds Photo. Society	Demonstration: *Photographic Ceramics.* James Taylor.
18	Borough Polytechnic	Intensification and Reduction.
18	Croydon Camera Club	*Electric Prints with Photographic Reagents.* W. Friese-Greene.
18	Photographic Club	Chat on Birch and Bracken subjects. W. Thomas.
18	Woodford	A Chat upon the Crystal Palace Exhibition.
19	London and Provincial	Animated Photographic Disp'ay. W. D. Welford, R.P.S.
20	West London	*Printing Processes.* L. Selby.
21	Croydon Camera Club	Excursion: Rowfant. Leader, J. Smith.
21	Gospel Oak	Excursion: Waltham Abbey.
21	Hackney	Excursion: Charterhouse. Leader, W. Rawlings.
21	South London	Excursion: Esher, for Oxshott. Leader, J. T. French.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 5.—In accordance with the suggestion made a few weeks ago, that this meeting should be adjourned and a visit made to the Royal Photographic Society's Exhibition at the Crystal Palace, on Thursday night some five-and-twenty members journeyed to the Palace, and met at the offices of the Royal Photographic Society, the rendezvous appointed. Soon after eight o'clock a start was made, the members present breaking up into smaller groups and making the round in their own way. To those making their first visit little more than merely a general examination of the photographs and stalls in the time was possible; but there were several who, having been there before, devoted the couple of hours at their disposal to a more minute examination into the details contained in the extensive sections devoted to the historical aspect of photography and photographic applications contained in the Egyptian and Roman courts. These, with their examples and the apparatus used, the invitation loan collections by the well-known workers of past and present times in the Pictorial Section, the commercial and professional exhibits in the north nave, and the handsome stalls and veritable picture galleries arranged by some of the large firms of camera and apparatus-makers, and plate and paper-manufacturers, received the full attention of those present until the close of the Palace at ten o'clock.

PHOTOGRAPHIC CLUB.

MAY 4,—Mr. F. Haes in the chair.

Messrs. Negretti & Zambra showed an instrument named the Verascope, made by Jules Richard, of Paris. It is an instantaneous stereoscopic camera and magazine, and takes according to wish either twelve stereoscopic or twenty-four single pictures. The instrument is in two parts—the camera and the changing box. The box contains twelve sheaths for twelve plates or films, which answer equally well, and the changing is effected in a very ingenious way, the exposed plate finding its way to the back by a simple pull-out and push-in motion of the changing device, which bears with it the other eleven sheaths, leaving the twelfth in the camera, where it is carried to the rear, the return motion of the changing box bringing the other sheaths to the front of the exposed plate. Metal is used throughout in the construction of the instrument, which possesses the following contrivances:—view-finder, time and instantaneous shutter, numerical register, and an improved form of sighter. Another form was shown in which the changing device is different altogether and the sheaths number twenty-four, one to each plate. With this, therefore, any stereoscopic picture taken is registered on two distinct plates, one of the pair on one plate and the second on the other, which consequently have to be combined for the stereoscopic effect. This camera also takes single pictures at will.

Mr. C. L. CAMASCHELLA, of Forest Hill, exhibited and described his stereoscopic camera. It took the form of an ordinary half-plate camera, with a specially wide front to accommodate the two lenses, and is made on the folding-front system. Its greatest extension is fifteen inches, and at its price is well built and a serviceable sort of camera. There is another pattern in which the front is fixed to the base, and the back may be racked. The camera may be used for ordinary work when required, the division for stereoscopic work being removed from the camera interior and a single lens substituted for the stereoscopic pair.

Brixton and Clapham Camera Club.—Mr. J. W. Coade (President) in the chair.—Mr. BYNOE, of Messrs. R. & J. Beck, Limited, gave a lecture, accompanied by lantern illustrations, on

INSTANTANEOUS PHOTOGRAPHY.

He first treated on the theory of the lens, explaining by the aid of excellent

diagrams on the screen the action of the pinhole and single and R.R. lenses, distortion of single lenses, and the principles of the fixed-focus system as applied to hand cameras, and showing how the various distances between which any object is in focus is found; for, although only one plane is in absolute focus, the circle of confusion caused by the crossing of the rays from other planes within the range is so small, viz, less than one-hundredth of an inch in diameter, that it is invisible to the eye, and consequently all the planes of the picture appear to be in focus. Mr. Bynoe strongly advocates the fixed-focus system as being the only one applicable for instantaneous work at all times, being ever ready for the subject, many of which occur on the instant, and unless immediately taken the opportunity is lost. One soon gets to be able to judge the distance beyond which all is in focus, and there is no risk of forgetting to put the index back to infinity after using it for a near object, and consequently having the result fuzzy as there is in the focussing type. Mr. Bynoe also explained the system of magnifiers adopted in the Frena, illustrating their action by a very ingeniously contrived mechanical slide. These magnifiers are supplementary single lenses, inserted in front of the ordinary fixed lens, and by means of which, by selecting from an assortment, any object situate between the nearest point at which objects are sharp at fixed focus to within a few inches from the lens is made to be in focus. The distances between which each magnifier will bring the planes in focus are engraved on the mount. This system of magnifiers seems to work in a perfectly satisfactory manner, such widely different subjects as architectural, portrait, animal, and flower studies, and copies of book illustrations taken by their use standing the magnification by projection on to the lantern screen equally as well as they would if carefully focussed in the usual manner. The lecturer also showed a slide with a copy of one of the Frena advertisement blocks, reproduced by the aid of the magnifiers in various sizes up to four-fifths of the original, and he stated that they expected to be able to produce a magnifier enabling one to copy full size. Mr. Bynoe also described the action of the swing back and its advantages as compared with the rising front, the superiority of the swing back being that it allowed the camera to be tilted, and the retention of the image around the axis of the lens without necessitating the convergence of the perpendicular lines of the object, whereas the rising front pushed to the extreme required the employment of a lens of a greater covering power. He also gave a very interesting account of the various devices for effecting the changing of films, and the difficulties to be overcome in producing a successful arrangement for that purpose. The defects of the various systems were pointed out, such as the arm or roller with steel points, which, owing to the hard nature of the celluloid, were blunted after short use, and only scored the film instead of lifting it; the pneumatic system, which sometimes lifted the whole pack instead of a single film, and other systems; and explaining that the only satisfactory method they had found was the "gravity" system with sliding-pin release, such as is adopted in the Frena, and with which, if the films are properly placed, it is impossible for more than one film to be discharged at a time. The action of this system was shown by a working model, and also on the screen, by a very clever mechanical slide, fearfully and wonderfully made. This system is also applicable as a changing box to the ordinary stand camera, and a box and slide in the half plate size were shown. Mr. Bynoe also laid stress on the necessity of the safety of the dark-room light during development, recommending paper instead of glass, as little ruby glass is absolutely safe, and stating that the films, especially the Double Instantaneous, were very fast, and that, if an unsafe light is used in development, they fog, and the fine deposit of silver prevents density being obtained. He also mentioned that it is necessary to develop films till they are apparently denser than plates, owing to the fact that the slight opacity of the celluloid makes the density of the image appear greater than it really is. Mr. Bynoe also gave very useful information as to the proper method of holding the camera, emphasising the point that exposure should be made at the moment of expiration of the breath to have the least liability to vibration. He also explained the shutter, and a model was placed in front of the lantern lens, and various exposures from one-fifth to one-eightieth of a second made on the screen.

Croydon Camera Club.—"You press the button—*we* do the rest," is a very familiar reminder to a certain class of hand-camera amateurs. How to "do the rest"—*i.e.*, develop the exposed plate—was the subject of the meeting on Wednesday, May 4. The PRESIDENT (Mr. Hector Maclean), at the request of the Council, opened the subject with some general remarks upon development and dry plates, in the course of which he stated that the prevailing fault he had noticed in amateurs' negatives was the lack of brilliancy and completeness of gradation, the causes of which were in many cases either over-exposure, very rapid plates with thin emulsions freely translucent to chemical actinic rays, stale or deteriorated plates, under development, and chemical fog. Occasionally negatives characterised by excessive contrasts were met with, slow plates, under-exposure, with improper development, being the main causes. In order to obtain a best possible negative, there are three leading points to bear in mind. The plate used must be chosen to suit the subject; one make is not the most suitable for all possible subjects. The developer must be varied, not merely in accordance with exposure given but with the plate used. Plate, exposure, and development should also be varied to suit the printing method in view. How to tell when development was complete was also referred to. At the close of an address which was received with applause, Messrs. Carley, Noaks, Watson, Taylor, and Isaac gave a series of demonstrations of the application of various kinds of reducing agents to the development of different makes of plates and films. Isochromatic, triple-coated, and speed plates, and celluloid films were amongst those used, the developers consisting of pyro, metol, amidol, and pyro-metol. A large muster of members followed the proceedings with sustained attention, and an interesting discussion was initiated by Mr. PACKHAM, who was followed by Messrs. CARLEY, WATSON (who found metol gave density with difficulty) and TAYLOR (who spoke highly in favour of amidol for under-exposures). Mr. SMITH advised time development; Mr. KOUGH differed. Mr. BRICE objected to pyro metol on account of its staining action. Mr. WRATTEN did not think one need consider special printing character of negative, providing P.O.P. be used. Councillor NOAKS stated that if any beginners required further instruction he should be glad to give it at the Club. In the course of the evening the PRESIDENT announced that the Hon. Secretary (Mr. W. H. Rogers) had prevailed upon the Brighton Railway Company to grant the Club special privileges respecting cheap tickets for parties of members attending Club outings.

Hackney Photographic Society.—May 3, Mr. R. Beckett presiding.—The EXCURSION SECRETARY gave the report of the special instruction outing to Woodham Ferris on April 23, under the leadership of Mr. J. H. Gear. The subject for the evening was a show of lantern slides by Messrs. W. Fenton-Jones and W. Hensler, illustrating a holiday trip to Killarney. Many of the slides were very fine, and the whole set showed what a fine district was the one in question for photographers. In moving a vote of thanks, the CHAIRMAN spoke of the value of these special evenings for members' holiday work, and hoped that many members would take the matter up. Mr. HUDSON gave his experience of developing a plate after fixing. He had succeeded in getting an image, which, however, had faded after drying.

North Middlesex Photographic Society.—The monthly lantern-slide competitions, instituted by the Council at the beginning of last season, continue to draw large meetings. The slides on these evenings are passed through the lantern, and the awards are made by vote of the whole of the members present. An excellent educational exercise, this system has also proved a great incentive to produce slides of high quality. In the competition on Monday, May 2, Mr. A. T. Crane secured first place, Mr. A. H. Lisett being second. Mr. Crane also secured first place in the Outings (prints) Competition.

Bath Photographic Society.—May 6, last Lantern Evening of the session, the Rev. E. A. Purvis in the chair.—The subject,

THE ROCKY MOUNTAINS,

said the CHAIRMAN, was of great interest to those present, and he could promise that the President (Mr. George Norman) had brought back many valuable pictures to show them. Mr. NORMAN then delivered his lecture. Commencing with a map of Canada, he traced out the position of various ranges, and explained how they were formed by geological changes in the carboniferous ocean. Passing on to the glacial period, he described how Lawrentian icebergs deposited rocks on the Rocky Mountains and so built up the enormous mass. Leaving Montreal at 9.50 a.m., and travelling 2330 miles, the Gate of the Rockies was reached at daylight on the morning of the fourth day. The view presented at Calgary, said the lecturer, was worth the journey from England to see. The engineering difficulties were considerable, and a constant increase in altitude is made until the pass is surmounted. At Calgary the train is 3388 feet above sea level. Banff is 4500 feet above sea level, and here is the Canadian National Park, surrounded with impressive mountains averaging 10,000 feet in height. Here are found alkaline sulphurous waters of a temperature of 114° Fahr. At a bend of the Bow River an hotel is located, and several views in the vicinity were given, one showing the engine and tender of the train taken from a rear coach as they were proceeding round the sharp bend of the river. Leaving Banff, and passing Mount Lefroy, which rises to 11,370 feet, the Great Divide was reached and the Selkirk range, and the lecturer spoke in high terms of the discoverer of Hector or Kicking Horse Pass, which enabled the railway to be built. Numerous scenes of an interesting description were given during the lecture, including the Fraser River, Old Cariboo Road and other noted gold-mining districts, Fort Yale, and Victoria, B.C.

Bradford Photographic Society.—May 1.—A large audience assembled to hear Mr. P. E. NEWSTEAD deliver his lecture,

THE GENTLE ART OF MAKING FAILURES.

Mr. ALEXANDER KEIGHLEY, before he introduced the lecturer, read a number of letters from the local members and other prominent Bradfordians, amongst whom were the Rev. Dr. Robertson (vicar of Bradford), Mr. James Leslie Wanklin, M.P., Mr. Ernest Flower, M.P., Captain Greville, M.P., Mr. Forlesque Flannery, M.P., Councillor Toothill, Councillor Jacob Moser, and Alderman Poplewell, all of whom signified their willingness to become patrons of the Society, which they felt certain was a most useful institution. A pathetic interest was attached to the reading of a letter from the late Sir Henry Mitchell dated a few days before his death, signifying that that gentleman would be pleased to lend his name if its use would be of any good, and in consequence of this a vote of sympathy with the relatives of the deceased gentleman was proposed by the CHAIRMAN (Mr. Keighley), and seconded by the Rev. Mr. MCKEE, and carried by all members standing. After this, Mr. NEWSTEAD gave his lecture, which was listened to with interest and amusement throughout.

Portsmouth and Southsea Amateur Photographic Society.—May 4, the President (Mr. G. Whitefield) in the chair.—The HON. SECRETARY stated that he had completed the purchase of the new lens for the enlarging apparatus from Messrs. Sands, Hunter, & Co., and that it gave complete satisfaction, showing four fine enlargements from quarter-plate to 15 × 12, produced with the lens working at *f*·6, and with, approximately, one-quarter of a minute exposure. Colonel E. J. DE SALIS asked a question regarding intensification, having intensified some negatives with home-made uranium intensifier, the result being a complete reversal, the negative becoming a positive, the prints from the plates becoming perfect negatives. No explanation could be offered. Mr. Sterry's paper, read before the Royal Photographic Society, on "Two Latent Images," was discussed, and at the request of those present the HON. SECRETARY (Mr. F. J. Mortimer) promised to read a paper and give a demonstration on the "Gum-bichromate Process" at the next ordinary meeting, June 1.

Sheffield Photographic Society.—May 3.—Mr. F. C. ROBINSON gave a paper and demonstration on

THE CHEMICAL CHANGES INVOLVED IN SOME OF THE MODERN PHOTOGRAPHIC PROCESSES.

Having explained that photography being based on the chemical decomposition

that light effects in many compounds, the lecturer, by means of exposures before the limelight, was able to show how the action of light on iron, copper, uranium, chromium, mercury, and silver compounds was utilised in photography, and also in many other cases how the same changes could be brought about by purely chemical means, thus proving that photography owes its discovery and progress to chemical science. The preparation of emulsion was shown, and the subsequent treatment of the negative briefly explained in principle. Next the lecturer dealt with intensifiers, reducers, and hypo eliminators, and, lastly, with the fundamental principles underlying the production of a print.

FORTHCOMING EXHIBITION.

1898.
May 13, 14 ..... International Photographic Exhibition (Crystal Palace), R. Child Bayley, 12, Hanover-square, W.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

CONCENTRATING RÖNTGEN RADIATIONS.

To the EDITORS.

GENTLEMEN,—My attention has been drawn to a paragraph in your last issue setting forth a method of concentrating the effects of the Röntgen radiations by means of a cylinder of glass or metal. I have made repeated experiments in this direction, using various metals (polished and unpolished), but have failed to secure any better results than can be obtained without the cylinders. So far I have not found a single substance which is capable of reflecting the X rays, even in small degree. The rays appear to pass in straight lines through every substance, and can neither be reflected nor refracted. I therefore surmise that M. Garrigon's experiments have been improperly described.

In reference to your note upon an apparatus for locating foreign bodies, I would like to state that at the first meeting of the Röntgen Society (November 5, 1897) both Dr. Mackenzie Davidson, and myself exhibited apparatuses for this purpose. After continued experiment, however, I have arrived at the conclusion that for practical purposes no method of localisation can compete with the simple one of taking a stereoscopic picture.—I am, yours, &c.,

J. HALL-EDWARDS, L.R.C.P., F.R.P.S., &c.

161, *Newhall-street, Birmingham.*

EARLY DRY-PLATE PROCESSES.

To the EDITORS.

GENTLEMEN,—I read Mr. W. B. Bolton's article in THE BRITISH JOURNAL OF PHOTOGRAPHY of this day with much pleasure. It is invaluable in an historic point of view.

I don't recollect having seen any notice of Mr. Pollitt, of Manchester; he manufactured Taupenot plates of a high quality. The definition was as fine as any Daguerreotype I ever saw, and for some years I bought all for my personal use. Manchester became the patron of this process, and the members of their Society produced some very fine work.—I am, yours, &c.,

JAS. ALEX. FORREST.

53, *Shrewsbury-road, Oxton, Birkenhead, May* 6, 1898.

PHOTO-TELEGRAPHY.

To the EDITORS.

GENTLEMEN,—I send you for publication an extract from a letter just received from my friend Amstutz, the inventor of the method of photo-telegraphy which you have already mentioned in such a kindly manner in your paper. The time is not far distant when the scientific world will be put in full possession of the method in which Mr. Amstutz has perfectly solved this entrancing problem. So for a time I trust that the many friends who have communicated with me direct on the matter will possess their souls with patience. In the mean time here is the extract from the letter I mentioned above :—

"THE BRITISH JOURNAL OF PHOTOGRAPHY of March 20, 1898, came to hand all right, in which is a detailed description of the Szczepanik-Kleinberg and Lee telectroscopic apparatus. I especially thank you for this paper, because, though it is a field somewhat removed from the *engraving* photo-telegraph, it is nevertheless closely associated with other work of my own in a similar line. On February 28 and March 14, 1894, I published in *Electricity*, New York, upon this field of investigation and did at that time give my deductions that it was absolutely necessary to divide the picture or image into picture points in both directions *arbitrarily* before any success could be obtained in 'instantaneous' pictorial telegraphy. The article attracted attention all over Europe and no doubt the collated data, referring to previous efforts in this direction, all illustrated with original diagrams by myself, led the parties referred to in the BRITISH JOURNAL to develop their ideas."

I think it only fair to Mr. Amstutz to place these facts on record in your pages, and I thank you in advance for the opportunity of doing so. —I am, yours, &c.,

HAROLD FURNISS.

5, *Ellesmere-villas, Wimbledon.*

THE EXHIBITION.

To the EDITORS.

GENTLEMEN,—You say that "not a discordant note nor a sound of dissatisfaction, either from visitor or exhibitor, has reached your ears" in regard to the Crystal Palace Exhibition. As an exhibitor I venture to add a drop of gall to your honey. What about the catalogues? When are they to be sent to those who were not able to go Monday before last with the ticket which accompanied the invitation to the opening, which was to be exchanged for a catalogue? It *said* on this ticket, those who could not go might send their tickets by post, and that a catalogue would be sent them. After a week elapsed I ventured to write to the Secretary, reminding him that I had not had a catalogue in return for my ticket, but no catalogue is to hand yet. As I cannot see the Exhibition, I wished to see the next best thing, the catalogue. I have been wondering whether Professor Scaife's Pistolograph for taking flashlight pictures, which he worked in 1869, is shown. Some people whom I have told that Mr. Scaife took flashlight portraits on wet plates in 1869 have said they did not believe it.—I am, yours, &c.,

AN EXHIBITOR.

May 6, 1898.

"AURIO" ENLARGEMENTS.

To the EDITORS.

GENTLEMEN,—The Autotype Company, New Oxford-street, have called my attention to the editorial notice and supplementary advertisement appearing in THE BRITISH JOURNAL OF PHOTOGRAPHY of May 6, pointing out that the word *Auro*type given to my process is calculated to mislead the public by its similarity to autotype, under which name they have traded for a number of years.

In view of this, I have altered the word given my process, and should be obliged if you will allow me, through your columns, to inform photographers generally that the word *Auro*type will be discontinued, and that, for the future, my productions will be known as "Aurio" enlargements.—I am, yours, &c.,

HENRY M. WARD.

37, *Belgrave-avenue, Leicester, May*, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

F. W. G. Blyth, 92, Wells-road, Bristol.—*Photograph of Colonel Sir Edward Stock-Hill, C.B., M.P.*

A. J. Ashbolt, 29, High-street, Southampton.—*Photograph of group of the Southampton football team, with Southern League challenge shield.*

A. M. Riddle, 4, Strathaven-terrace, Oban.—*Photograph of group of house party at Achnacarry. Photograph of Locheil tenantry at Achnacarry. Photograph of Locheil, Lady Margaret Cameron, and Donald Walter Cameron, younger, of Locheil.*

H. W.; H. E. WATKINS.—We can only suggest immediate legal proceedings.

BARKER PRICE.—The prints may possibly be reduced with nitro-hydrochloric acid but, in practice, you will find it better and more profitable to make fresh prints.

ADDRESSES.—VIEW FINDER. Frith, Reigate; Valentine, Dundee; Norman & Co., Tunbridge Wells; Wilson & Sons, Aberdeen.

J. C. DAWSON.—Apply to the Secretary of the Photographers Benevolent Association, 6, Farringdon-avenue, E.C.

ORTHOCHROMATISING PLATES.—B. Eosine or erythrosine is only used for sensitising plates for the yellow rays, and not for all colours. Various other materials are used for the other rays.

"ONE WHO WAS THERE."—Thanks; but we prefer to withhold the letter—amusing and harmless as it is—as it might create an unpleasant impression on the mind of the gentleman principally concerned.

LENSES.—OPERATOR. It is quite against our rule, as we are continually stating, to express an opinion on the comparative merits of different makers' lenses. We may, however, tell you that all those you mention are good instruments.

LENS.—J. R. MARCHANT. If you require the lens only for landscape work, you cannot do better than purchase the one offered to you. For pure landscape work the old single landscape lens is yet unsurpassed by any of the newer forms of lenses.

DEVELOPER.—C. GARDNER. Whether you use sulphite of soda or the metabisulphite of potash, the salt must be completely dissolved before the pyrogallic acid is added. As you have proceeded in the reverse way, you have got a coloured solution.

CINEMATOGRAPH.—W. W. W. From the drawings it would appear that yours is a very ingenious apparatus, and looks as if it would answer its purpose. But we cannot say whether a valid patent could be secured for it, or whether some parts of it would infringe patents already in existence. The only suggestion we can offer is to search through the specifications at the Patent Office, or employ a patent agent to do so for you.

OBSTRUCTING STUDIO LIGHT.—S. J. If the studio has enjoyed an unobstructed light for twenty or thirty years, your neighbour must not put up any building on his own ground that will be an obstruction to your "ancient lights." He can be restrained from doing so by the Court of Chancery. If the light is not seriously obstructed, cannot you arrange terms with him, say, by paying you a certain sum by way of damages?

OWNERSHIP OF NEGATIVE.—MICROG asks: "If I pay to a photographer about ten guineas for my portrait, does the negative belong to him or me?"—The negative is the property of the photographer, unless at the time of sitting you made a special agreement that it was to become your property. Although the negative belongs to the photographer, he has no right to use it for any purposes of his own, and can be restrained from doing so.

WET-PLATE PHOTOGRAPHY.—W. CONWAY. The ferrous-oxalate developer, as used for bromide enlargements, will not do at all for developing wet-collodion plates with. Though an iron developer, it is quite a different thing from the iron developer used for wet plates. The latter is composed of protosulphate of iron, acetic acid, and water. It would be quite as useless for dry plates or bromide paper, as the ferrous oxalate would be for collodion plates.

COPYRIGHT.—INNOCENT. Though you sign yourselves "innocent," it is perfectly clear that you have broken the law by pirating the photograph, and the best thing you can do now is to make terms with the owner of the copyright, and thus avoid heavy law costs in addition to penalties or damages. The terms, though high, are really very moderate under the circumstances. You "did not think the picture was copyright" will be of no avail in a court of law.

INDIARUBBER SOLUTION.—DOUBLE TRANSFER writes: "I have quite failed to dissolve indiarubber, though I have used the best benzole I can obtain. I have tried with pieces of the tires of a bicycle, and, also, some indiarubber tubing, but it will not dissolve at all?"—We are not at all surprised at that. If you desire to make a solution of rubber, you should get what is known as masticated rubber, that will dissolve freely. You will perhaps find it more convenient to purchase a tin of rubber solution and dilute that with benzole.

COLLOTYPE.—S. THORN says: "I wish to experiment with gelatino-bromide for collotype. 1. Can you tell me what gelatine, and, if possible, what formula, Dr. Liesegang recommends? 2. What substratum would be most efficient? I have tried without a substratum, but find the films pull off after trying one or two proofs."—1. Dr. Liesegang has not published what gelatine he uses nor the formulæ for the emulsion. 2. The best formula will probably be a solution of silicate of soda and albumen as used in the ordinary collotype process, when the water-glass substratum is employed.

GLAZED CARBON PRINTS.—W. BRIDGEWATER writes: "Can carbon prints be enamelled like silver prints—I mean, have the same surface as enamelled silver pictures? If so, are they done in the same way?"—Carbon prints with an enamel surface can be produced like silver ones, and by an easier method. Treat a clean glass plate with French chalk, and then coat it with enamel collodion; when set, wash out the ether and alcohol. Squeegee the exposed tissue on that and develop; after the picture is dry, apply the transfer paper, and, when again dry, strip off. It will then have an enamel surface. If the print be made by the single-transfer process, simply squeegee it while still wet on to the washed collodion plate.

STUDIO.—NORTHUMBRIA asks: "Would you kindly look over enclosed plan of studio, which I intend erecting in a country town for professional purposes. The lens that will be used is a 7×5 Optimus Euryscope, working at *f*·6, and the equivalent focus is given as 8¾ inches. Any suggestions from you to alter dimensions (which I am trying to keep down as much as possible) or arrangements will be gladly accepted, and also—1. What would be suitable colour to paint inside? 2. What would be best material for blinds? 3. How could ventilation be affected? Thanking you in anticipation."—The length shown in the plan (20 feet) is very short for a studio for professional work, and it is also somewhat narrow. We should prefer the glass to be carried a foot or two higher and with more slope. 1. A light blue or French grey 2. Rather light grey holland or dark blue. 3. By having doors to open in the solid roof and sliding doors near the floor, so as to obtain a current of air through the building.

SPOTS ON PRINTS.—W. O. T. says: "1. Having recently had an iron pump fixed in my dark room for pumping water from a well for washing purposes, I find that the rust from the iron produces black spots on my prints, so that I shall be obliged to replace it with either brass, copper, or lead; but, before doing so, I should like your advice. Will you kindly say if either of these metals would have any injurious effect on my prints, or which metal would be the best to use, also the address of a firm who supply hand pumps? 2. Also I enclose a small piece of a cabinet print with very small white specks on it, which I cannot understand the cause of what would cause them? 3. Can you give me the address of a firm where I can get slip mounts for 10×8 prints?"—In reply: 1. We should recommend you to get a local plumber to fix you up with an an ordinary lead pump. 2. They seem very like particles of dust between the paper and the negative while printing. 3. Marion & Co., Fallowfield, and similar houses.

WASHING PRINTS AND PLATES.—H. E. R. says: "I have taken a place in the country where the water is not laid on, and the same has to be drawn from a well some little distance. Could you advise me as to the best way to arrange for the washing of prints and plates? Can chemicals be used so that a less quantity of water will be wanted, or could the arrangements be made so that the water could be used twice? What should be used, or what would you advise me to do? I prefer running water to changing with hand."—A very little water will really suffice in washing prints and plates if it be rightly used. For example, if the prints be blotted off when they are taken from the fixing bath and then put into fresh water and kept moving for a time, and again blotted, and so on till the whole of the hypo is removed, a very little water need be used. With plates, a thorough draining between each change fulfils much the same end as blotting off in the case of paper prints. We do not recommend any of the hypo eliminators.

PHOTOGRAPHING MACHINERY.—H. A. M. writes: "I get a good deal of machinery to take at different times. 1. My first difficulty is to get the evenness in the photograph that is necessary; there is too much light and shade in mine. 2. Next, I can't get (it must be on albumen paper) that blue lead-colour tone on my prints I should like. 3. And, then, I do not quite know how to dry my prints so that they do not crack when rolled up and unrolled, as they are very frequently done. I supply them unmounted, and they are continually being unrolled and rolled up, and mine crack, whereas others do not. I should be greatly obliged, and feel under a great obligation to you if you could give me answers to these questions."—To obtain the best effects in photographing machinery, it should be "flatted" over with a mixture of turpentine, white lead, and lamp-black mixed to a slate colour, and that is what is usually done. After the photograph has been taken, the flatting is quickly cleaned off with a pledget of cotton-waste charged with benzoline or paraffin oil. If there are any dark portions that the light does not reach, they should be lightened up by reflection from sheets of white paper. 2. Strong negatives and strongly sensitised paper will allow of toning to the cold stage. 3. Dry between blotting-paper, and roll up, albumen outward, when dry. In this class of work the plates should be backed, which will help matters much.

PANORAMIC PICTURES. AMATEUR writes:—"Would you kindly give me your advice about the following, and oblige? How do you proceed in taking panoramic views (I don't know if that is its correct name), I mean a series of negatives of the same subject, to be printed and mounted ends together, so as to form one picture—such as, say, a range of mountain scenery. Now, what I want to know is, how you manage in focussing to get the exact angle of view included, so that each negative fits in exactly with the preceding one. I should think it would be difficult to make them match, so that when the prints are put together you have a continuous picture. Is there any special device employed in doing that sort of work? If you could kindly give a few hints, they will be highly esteemed."—The matter is very simple. Plant the camera perfectly level. Then, after the first section of the view is taken, loosen the tripod screw and rotate the camera for the next section, and so on till the whole series of pictures are obtained. The lens used should be one that will evenly illuminate the plates upon which the negatives are made, otherwise they will have dark margins, which will render the joins very conspicuous. In taking the different sections, it will be well to include a good portion of each in the next negative. That facilitates the matching. In mounting the pictures a better effect is obtained by allowing a small space—a sixteenth of an inch or so—between each section; inequalities are then not so noticeable.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1985. Vol. XLV.—MAY 20, 1898.

Contents.

	PAGE
Ex Cathedrâ	321
Development under New Lights	322
The Alleged Influence of the Developed Image on an Unexposed Film.—II.	323
Leaderettes:— The Hands in Portraiture—Photogravure *versus* Line Engraving—Some Properties of Röntgen Rays—The Varying Brightness of the Screen—Submarine Photography—A New Light Standard—Proposed Optical Exhibition—Miniatures—Royal Society *Soirée*—The Royal Academy—Liquid Hydrogen—The Next Loan Exhibition in the City	324
Experiments with Colour Sensitisers for Gelatino-bromide Plates	326
The Gum-bichromate Process. By J. K. Tulloch, M.B.	327
Some Facts about Focus	328
Mirage. By Major P. A. MacMahon, R.A., F.R.S.	328
The Glasgow Corporation and the Photographic Convention	330
At the Camera Club	331
Mr. Alfred Ellis's Catalogue of Photographic Publications	332
The Britannia Works Company	332
Our Editorial Table:— *Kromskop Colour Photography* — *Praktikum der Wissenschaftlichen Photographie* — *Taschenbuch der Praktischen Photographie* — *The Photographic Tourist's Guide* — Catalogues Received	332
News and Notes	332
Patent News	333
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society	333
Correspondence:— The Convention — Stereoscopic Radiography — Philanthropic Photography — An Assistant's Grievances — A Photo-cycling Society	335
Answers to Correspondents	336

EX CATHEDRÂ.

The International Photographic Exhibition at the Crystal Palace closed on Saturday evening last. What had been looked forward to by many as a good wind-up to a successful display was entirely marred by the presence of some 30,000 children in the Palace and grounds. These young people, who attended to demonstrate their love for animals—a feeling that is carefully fostered by the excellent Society for the Prevention of Cruelty to Animals, under whose auspices the festival was held—literally swarmed over the naves of the Palace and made an inspection of the exhibits by adult visitors a task altogether lacking in comfort and convenience. We ourselves, who had business in the building in the afternoon, made no attempt to execute it. This juvenile invasion not only drove visitors to the Exhibition away from it almost as soon as they got there, but, as we subsequently ascertained, prevented many others from attending. These wise persons knew what a children's festival at the Palace meant in the way of noise, dust, and impediments to locomotion.

* * *

It is to be regretted that, from the exhibitors' and visitors' point of view, the last week was spoilt by two extra attractions which the Palace Company had provided; for in addition to the children's invasion on Saturday, the Salvation Army on the previous Monday had stormed the Crystal Palace with its customary enthusiasm, and had thereby relegated the Photographic Exhibition to the position of a mere side show, which nobody patronised. However, notwithstanding these final drawbacks, the Exhibition has, on the whole, been found a great success by those who were its largest supporters, the Trade Exhibitors. There are one or two voices absent from the chorus of satisfaction, it is true; but we have every belief that in time even those who are at present disposed to regard the Exhibition as of little commercial advantage will have reason to change their views. One prominent exhibitor at the Palace told us that his experience of exhibitions was that the return on the outlay and trouble often did not begin to make its appearance until long after an exhibition was closed, and that even now he could trace some of his present business to one of the former Crystal Palace exhibitions.

* * *

There was a deficit on the working of the Exhibition amounting to little more than a hundred pounds. The loss would, of course, have fallen on the Royal Photographic Society, whose funds, however, are in none too plethoric a condition. We are pleased to learn that immediately it was known that expenditure had exceeded receipts, several of the exhibitors voluntarily came forward and made up the deficit among themselves. It is to the enormous cost of the catalogue—which outran its originally assigned size, and entailed an expenditure of over seven hundred pounds—that an estimated profit resulted in a loss. The prompt action of the exhibitors in making up the loss shows, however, that the policy of the Society in organizing the Exhibition has been appreciated; and we are sure that, as time passes on, and the photographic world sees this great and memorable exposition of photography in retrospect, there will be nothing but feelings of gratification at the work which the Society boldly undertook and successfully accomplished in organizing and holding the Exhibition.

* * *

Mr. John Stuart, of Glasgow, the President Elect of the Convention, was in town last week, and advantage was taken of his presence to convene one or two informal gatherings of members of Council, for the purpose of discussing the

arrangements for the meeting that takes place July 4–9 next. The programme of excursions, &c., has been completed by the local committee, and this with the list of papers will be submitted to a meeting of the Convention Council in London, on Thursday, May 26, for approval. The Convention handbook will thus, doubtless, be ready early in June. We may say that the programme of excursions looks very tempting, and it is certain that a pleasant outing awaits us all. The papers, we think, will be found of varied interest, and fully representative of those subjects which at present are engrossing the attention of photographers. There is to be a large exhibition of apparatus by Glasgow dealers and manufacturers; a pictorial exhibition organized by Mr. Craig Annan and others, and the lantern slides by Glasgow workers, selected by a local committee of the highest competence, will, it is anticipated, satisfy southern visitors that, in respect of transparency making for the lantern, Glasgow photographers are in the very forefront. Altogether, the prospects for a successful meeting look very bright, and we are sure that, in return for their strong efforts to make the Glasgow Convention a great and memorable one, no reward will be so highly appreciated by Mr. Stuart (President), Mr. Goodwin (local Hon. Secretary), Mr. W. J. B. Halley, and the other hard-working members of the local executive, as a large and, if possible, a record attendance.

* * *

With regard to next year's meeting of the Convention nothing has yet been settled. Hastings does not appear anxious to renew the invitation it tendered last July. Tunbridge Wells has been mentioned, and Paris and Antwerp have each been discussed. We have been at some pains to ascertain the views of prominent Conventioners in respect of the meeting being held abroad, and we find that there is an objection to taking the Convention outside the United Kingdom. We ourselves, after considering the matter, are disposed to think that the characteristic features of a Convention could not be maintained in a foreign city, and that, if even they were, they would fail to excite the sympathy of the Convention's hosts. Possibly, on the whole, it will be wiser, for the present at all events, not to push the idea of taking the Convention abroad.

* * *

As to the Presidency of the Convention for the year 1898–99, we have authority for stating that Mr. Joseph Wilson Swan, M.A., F.R.S., would accept the position were it offered him. The Convention would, undoubtedly, gain in lustre and esteem with Mr. Swan at its head. The scientific *éclat* thus imparted to it would tend immensely to lift the status of the Convention in the eyes of the outside world. Nobody is more fitted to occupy the Presidential chair of the Convention than Mr. Swan—himself one of the few living fathers of photography and a great scientist of the Victorian epoch, whose work in connexion with electrical illumination has conferred lasting benefits on the community. With Mr. Swan as President of the Convention for 1898–99, Newcastle-on-Tyne is clearly marked out as next year's meeting place, and in the interests of photography generally, and of the Convention in particular, we trust that the forecast we are here indicating will be fully realised next July twelve months.

* * *

We have received from the editor of our contemporary, *The Pharmaceutical Journal*, a reprint of a compilation of metrical equivalents of Imperial Weights and Measures and Thermometric Equivalents that recently appeared in its pages. In a prefatory note it is pointed out that the metric system of weights and measures is now legalised in the United Kingdom for purposes of trade, and it appears desirable that the extended use of the system should be encouraged as much as possible. The tables in question have been compiled to facilitate the conversion of quantities stated in terms of the Imperial system into terms of the metric system. There are five sections in the reprint, consisting of (1) The Metric Equivalents of Imperial Weights and Measures; (2) Equivalents of Measures of Length, and Conversion tables; (3) Equivalents of Measures of Mass; (4) Equivalents of Measures of Volume; and (5) a Table of Thermometric Equivalents of the four scales commonly employed. The information given is seen at a glance, and the reprint is one that should be constantly at hand for reference, inasmuch as it is useful as well as educational, now that the metric system appears to have some little chance of creeping into general recognition.

DEVELOPMENT UNDER NEW LIGHTS.

Within the last few years the number of chemical compounds newly added to the list of developing agents has multiplied to an alarming extent—we may say that in round numbers we have now a dozen new developers to choose from. We are far from deploring this plethora of choice if there can be a distinct gain shown, and, indeed, in any case, on the grounds that the true function of research is to experiment—on definite lines of course—such a wealth of material may be a subject of congratulation. So far, however, the mine has virtually not been quarried. There are here and there to be found a few disconnected essays upon one or the other of the new agents, but nothing whatever has been written in the shape of a treatise giving the relative values of even the earlier of the recent developers. In saying this we do not refer to the laborious and multitudinous experiments in the most valuable series of papers by Messrs. Hurter & Driffield, the loss sustained by photography by the lamented death of the former being difficult to estimate. A few only of the developing agents have been examined by them, but from their experiments with a portion only it is a very natural conclusion to draw, that so far as actual results are concerned it is almost a matter of indifference what developer is employed, using the word in the sense either of the particular agent, or the proportion of ingredients, contained in any particular solution under investigation.

This difficulty meets us on the threshold of any attempt to estimate the usefulness of new developers. Messrs. Hurter & Driffield have made an immense number of experiments with scientific exactitude, and the irresistible conclusion to be drawn from them is that, no matter what developer is employed, you can get the same gradation with the same exposure with any developer. The whole practice of the development of gelatine plates as carried on for, now, so many years is thus in effect revolutionised; but, so far, this is not admitted by the many: a few, however, appear to govern their practice upon this theory. "A straw shows which way the wind blows," and on this point a remark made by Mr. Howard Farmer at the "Royal" the other day is well worthy of being remembered. He said he regarded the examination of a negative during development as being "a fad of no practical value."

Granting, however, the correctness of this appreciation of Messrs. Hurter & Driffield's work, and of its degree of acceptance, there yet remain many practical points in which one developer might be preferable to another. For example, one developer might at a given strength produce a finished negative in half the time needed for another at the same strength. This would be an obvious advantage. Linked with this aspect is that of developers used at average strengths which never contain enough of the particular developing agent to injure the film or image, so that the question of cost is an important element of comparison. If a two-grain to the ounce of one material will do the same work as a four-grain to the ounce of another, and both are the same price, it needs no argument to show that the former is the one to be preferred. But even on so simple a point as this we are without sufficient data to form a judgment. We might expect to get some knowledge from the manufacturers of the materials. Let us examine the formulæ they give us; there are two little handbooks published in the respective interests of Herren Andresen and Hauff. Let us see what they say about glycin, for instance, an agent of latest introduction, described in the pamphlets in question. Herr Andresen for a normal developer—two solutions—gives it at seven grains to the ounce but with a one-solution we are only to use six grains. Again with a two-solution developer we are to use $2\frac{1}{2}$ grains sulphite to 1 of glycin, but double that proportion for a one-solution, and with the latter we are given seventeen or eighteen per cent. more potassium carbonate than with the two-solution. If we turn now to the Hauff book, $6\frac{1}{4}$ grains is the strength to use, with the same sulphite and potassium proportion as the Andresen two-solution developer, but with double the amount of the potassium salt to be found in that formula! Turning next to the treatment of metol in the two books, we find the Andresen formula to be $1\frac{1}{4}$ grains to the ounce for a one-solution, but 3-grains for a two-solution! The Hauff formula give $3\frac{3}{4}$ grains to the ounce, and half the proportion of potassium carbonate to metol that the Andresen book recommends.

Amidol Andresen is to be $2\frac{1}{2}$ grains to the ounce; amidol Hauff $3\frac{1}{2}$ grains, and so on. (It is to be noted that, when we give proportions for a two-solution, they refer to the amount present in the solution mixed ready for use.) The labour, or rather time, involved in making the calculations for these comparisons is a discredit to any publisher of a formula, but all are sinners alike. When will the time come when makers will give us the proportions of the constituents per ounce or other unit in the ready-for-use developer? Much more could be written in the same strain, but we think we have said sufficient to show the urgent need, if our knowledge of the newer agents is to be put on a proper footing, for a scientific research upon the true place and value of the more modern developing agents and formulæ.

THE ALLEGED INFLUENCE OF THE DEVELOPED IMAGE ON AN UNEXPOSED FILM.

II.

In our previous article three weeks ago we dealt with the action during development of a rapid gelatine film, coated both before and after exposure with a comparatively slow film of collodion emulsion, and showed that, although the more rapid gelatino-bromide does undoubtedly so far transfer the light force expended upon itself to the collodion film that has received a short but altogether inadequate exposure, the latter is capable of yielding a fully exposed image, yet it exercises an apparently inappreciable action upon a film that has received no exposure at all.

But the circumstances surrounding this experiment are, as we pointed out, widely different from those in the case of a collodion film coated upon a developed, fixed, and finished negative. In the one instance we have the simultaneous development of the gelatine film proceeding in close proximity to, if not in absolute chemical contact with, the unexposed film, and it would not be difficult to imagine that the molecular excitement set up in the one by the process of development would in some measure communicate itself to the other, more especially as the developing solution must pass through the latter before it can exercise any action at all. In the circumstances quoted by Herr Liesegang, however, the possible inducement of molecular excitement is altogether absent, and whatever action arises must be a purely chemical one, which, indeed, is the explanation that gentleman himself offers.

In repeating Herr Liesegang's experiment the same washed collodion emulsion was employed as in the cases already cited. The first negative selected was one which had been taken three or four years, ago and which could therefore scarcely be expected, if such is even the case, to retain any latent traces of the disturbances set up by the action of light and development. After coating the negative it was allowed to stand, sheltered even from the light of the dark-room window, until the solvents had nearly evaporated, and the edges of the collodion film were beginning to dry when it was immersed in a dish of water until the fluid ran evenly over its surface.

Development was then commenced with the same strength of pyro ammonia as in our previous experiments, that is to say, with a solution rather below the normal strength as regards ammonia if a gelatine film were in question, but of about safe strength for use with a collodion emulsion; in fact, we were desirous of avoiding the slightest risk of introducing complications by setting up abnormal reduction or fog, arguing that, if chemical action were to take place at all, it would do so, more slowly perhaps, with a comparatively weak solution as well as with a strong one. However, at this strength absolutely no action took place at all, the collodion film retaining its original cleanness for several minutes.

A fresh solution was then made strictly according to our normal formula for use with gelatine plates and containing three minims of ammonia to each ounce. Even this produced no action beyond a very slight general veil, scarcely amounting to "fog" after five minutes' application, so it was further strengthened, with the production of an increase in the veil, and still further addition of ammonia and prolonged action eventually brought about a dense reduction over the whole plate. The fog was apparently perfectly uniform, but, after washing off the strongly discoloured developer, a very faint negative image could be seen when the plate was examined by reflection in a strong light; but, such as it was, it was only traceable on the most prominent high lights of the original negative, and not at all by transmitted light.

The trial was repeated several times with negatives of different ages, from one just dried upwards, but with no better result in any shape or form. The most that could be got out of any of them was a vague sort of darkening of the colour of the surface image on those parts corresponding to the highest lights of the original image, and this was so slight as to be completely masked by the discolouration of the pyro solution.

In no single instance, it may be noted, was any result obtained until general fog had commenced; and, in order to test whether the formation of the supposed secondary image commenced simultaneously with the fog, several plates were washed at different stages in order that they might be examined without the disturbing influence of the discoloured developer. But it was only when the fogging was well advanced that any trace of an image was discoverable, and we may add that not in every case was it discoverable at all.

Our trials were all made so far, it will be noted, with pyro, but it occurred to us that, as Herr Liesegang mentioned in his original note that a normal alkaline hydroquinone developer had been used, possibly some virtue might attach to that particular reducing agent, or at least that it might exercise the selective action without as much tendency to fog as pyro; but, on repeating the experiments with hydroquinone, the results were practically identical, the only difference being in the colour of the reduction, and in the fact that the faint image was sometimes visible during development.

From the numerous experiments we have made with practically identical results we can only come to the conclusion suggested in our previous article, that whatever result is produced is quite independent of the negative image as such, and would occur just as readily upon any silvered or partially silvered surface with an unexposed film spread upon it if the latter were pushed to the verge of, or rather well into, a state of fog. It is easily conceivable, and this we believe to be practically Herr Liesegang's own explanation of the phenomenon, that, as the gradually fogging film gives off its bromine, a portion of this is absorbed by the silver image underneath, and accordingly those portions of the film which correspond with the underlying image, being thus less restrained than those others which have none of their evolved bromine abstracted, undergo stronger reduction. This view seems to be further strengthened by the fact that it is only in the last stages of the process that any selective action is noticeable, or when the reduction has reached sufficiently near to the silver image to give it, rather than the alkali of the developer, the stronger attraction for the nascent bromine.

Since the above was written we have varied the experiment by substituting a "physical" for the "chemical" developer hitherto employed, and under the altered circumstances we should have been not unprepared to find a well-marked negative image, at any rate, with a recently developed negative. We were correspondingly surprised, therefore, to find a *positive* image produced, not a practically useful one, even if it could have been separated from the underlying negative, but more strongly marked than any previously obtained. Thinking it might possibly be due to the action of light through the negative in examining the plate, the experiment was repeated without removing the plate from the dish, but with a quite similar result. We are at present unable to offer any suggestion as to the cause of this, we must confess, anomalous behaviour.

The Hands in Portraiture.—In view of the prominent and oftentimes unsightly positions in photographic portraits which are assumed by the hands of the sitter, the following suggestions, given by Mr. Xanthus Smith in *Anthony's Bulletin*, are well worth attention. Mr. Smith says in part: "When the fingers are extended straight out and held close together, the effect is stiff, and, if they are kept straight and spread equally, the result is a sprawled, awkward look. When the hand is open, three fingers pose together better than two, and some of the fingers should be drawn up, but not all equally. A completely doubled-up hand is not good—it is like a fist; but a pose in the position of holding a pen or pencil, or when writing or drawing, is one which looks well from many points of view. A very bad arrangement of the hand is when it is held flat and the fingers doubled up to the second joint. The squareness of the form and the impression of the ends of the fingers being cut off are very unpleasant." Naturalness and unconsciously suspended action seems to be the all-important point, and this will be the most likely to result if employment of some kind is found for them, either in the holding of some object or the actual doing of some action, which, of course, must have a direct and logical connexion with the general pose and surroundings, and which must not be of sufficient prominence to lead from the motive of the picture itself, but rather should harmonise with and be subservient to it.

Photogravure *versus* Line Engraving.—The great extent to which photographic processes of engraving have displaced the work of the engraver is well known, and too often is as much to be deplored. An example is to be seen in the supplementary portrait, presented with a recent issue of *Nature*, of Professor Albert von Kölliker, a photogravure forming No. XXXI. of a series of scientific worthies published by that periodical from time to time. They comprise in the main a set of fine line engravings, the one we now refer to, however, being a photogravure and evidently from a highly retouched photograph. We do not think that in this case there has been any gain to art by the use of the modern method.

Some Properties of Röntgen Rays.—Professor Röntgen has presented a paper to the Berlin Academy of Sciences in which he enters into some interesting and instructive particulars relative to the X rays. Regarding the opacity of bodies to the rays, he points out that, though an opaque screen be used, if a fluorescent surface be placed beyond it a slight fluorescence may be observed when the tube is illuminated, and he explains the effect to be due to the fact that the air round the Crookes tube gives off X rays.

The Varying Brightness of the Screen he explains as being due to many causes, which he enumerates in the paper. When a focus tube is used the rays that leave the platinum reflector are most active when they come off at the greatest angle, so long as it does not much exceed 80°. The thicker a transparent plate is, the more rays in proportion does it allow to pass. Then, again, the actual transparency is not an unchangeable factor, different kinds of tubes giving different values in this direction; thus, tubes of soft glass require a small, and hard glass a high potential. Further, the quality of the rays is governed by many factors—the way in which the interrupter works, the insertion of a Tesla transformer, the vacuum, and other causes not yet investigated. The quality of the rays is not influenced by the strength of the current, but their intensity is directly proportional to it. Among the conclusions he presents, it may be noticed that the photographic action varies considerably according to the hardness of the tube, though different fluorescent screens, for example, may have identically equal luminosity. The ordinary photographic plate is very transparent to the rays, and when films were used a pencil of Röntgen rays was able to pass through and penetrate to the very last one of ninety-six films.

Submarine Photography.—Hitherto most experiments in the field of photography under water have met with but a small measure of success. In river water the want of transparency has been a difficulty that could not be overcome, while in truly submarine work the absence of light was the difficulty. Professor Louis Boutan has set to work with such determination that he has had a measurable success. The first part of his work is to don a

diver's dress and go down into the water; then his camera, specially constructed, of course, and in a watertight case, is sent down to him from an anchored boat. He sets his camera up and goes to work as though on dry ground, but to get suitable contrasts he finds a blue-glass screen to his lens to be desirable. The darkness, which varies according to the depth, necessitates long exposures, some having amounted to as much as twenty-five minutes. It is reckoned that not more than a hundred square metres can be included in one picture; but even that suffices for the production of valuable results. After all, it is felt that the problem to be solved is to use artificial light with an apparatus that can be used, in a sense, automatically, without needing a diving operator to work it.

A New Light Standard.—Some little time ago we described Sir Wm. Crookes' light standard, devised many years ago, and apparently possessing the highest merits. For some reason or other, it does not appear to have been adopted, and "a new light standard" has become a subject of perennial interest. At present the rather impracticable white-hot platinum system holds the field for scientific exactitude, though in this country the standard candle still holds its own. The latest suggestion in this direction is that of M. C. Fery, who, in a paper recently presented to the Paris Academy of Sciences, proposes an acetylene flame. Seeing that the production of a virtually pure acetylene gas presents little or no difficulty, no trouble in regard to variation of the illuminant need be anticipated. There only remain the conditions of combustion. These M. Fery proposes to meet by using a burner with an aperture of half a millimetre in diameter.

Proposed Optical Exhibition.—The Spectacle-makers' Company, as we have before mentioned, is, like some other of the ancient City Companies, now furthering the craft they are supposed to represent in a practical way. It has already decided to institute a system of granting diplomas to proficients in ophthalmics. Now it is proposed, under the auspices of the Lord Mayor, who is Master of the Spectacle-makers' Company, to hold an Optical Exhibition. Sir Reginald Hanson, M.P., who is seconding the Lord Mayor's wishes, in view of the movement has promised a substantial sum of money, on condition that the most noteworthy exhibits are afterwards sent to the Paris Exhibition of 1900. It is to be hoped that the proposition will bear good fruit if carried out, as too long has much of the optical trade in this country been in the hands of foreigners.

Miniatures.—The Exhibition of the Fine Art Society, which opened on Monday last at New Bond-street, should be of great interest to photographers. It includes a very large number of miniatures as well as something like fifty full-length drawings by Cosway, one of the finest miniature-painters we have had; also some forty of Downman's profiles of eighteenth-century beauties, as well as examples of the best miniatures of that period. In the earlier days of photography miniatures were very much in vogue, but photography quite killed those of the "Le Creevy" type. At that period a considerable business was done in coloured Daguerreotypes and coloured paper pictures, as well as glass pictures for lockets and brooches, for then portraits set in jewellery were in fashion, though we understand they, for lockets, are again becoming fashionable.

At one period high prices were paid for coloured photographic miniatures—five guineas and upward—but they were of great excellence, and were painted by artists who were miniature painters on ivory before the advent of photography. Unfortunately the work was done on an unstable base when on paper, as there were then only silver prints to work upon. Now the case is different; we have the carbon process and the platinotype process, both of which are permanent, and the latter especially lends itself to the colourist. But where, it may be asked, are the miniature-painters, as of old, to do the work? Alas! the echo is, Where? Photographic colouring (miniatures) of the standard of forty years ago seems to have become quite a lost art. Modern photographic colouring, so far as miniatures are concerned, is quite a different thing from that produced by Lock, Williams, and others in the late fifties and early sixties. However, photographic colouring of the larger-size pictures is still as good as ever.

Royal Society Soirée.—The Annual *Soirée* of the Royal Society was held last week, and, as usual, the *élite* of the scientific were present. Of course, photography was to the fore. Some of the most interesting exhibits were the photographs of the late solar eclipse in its various aspects, as taken by the different expeditions in January last. These were explained by Sir Norman Lockyer, and, by his lucid description, were much appreciated by the visitors. The Röntgen rays were well in evidence, and Mr. A. A. Campbell Swinton, who was, perhaps, the first to investigate the X-ray subject in this country, had some very interesting things on view as well as promising things for the future. Photographs of electrical discharges were shown by Mr. Tarrant, and the Naturographs of Dr. Selle, taken by colour screens, were also shown, as was the complete set of apparatus for the micrography of metals, designed by Professor Austen for use at the Elswick Works. It is doubtful if photography has ever figured so prominently at any previous *soirée* of the Royal Society as on this occasion.

The Royal Academy.—The Annual Exhibition of the Royal Academy is now open, and, although some of the most prominent R.A.'s have unfortunately, during the last two or three years, joined the great majority, the Exhibition, excepting their works, is a good average one, if not in some respects above the average. In going through the rooms one cannot but recognise that photography has been of immense service to many of the artists; but the majority would, doubtless, deny it, though some few would not, and would freely admit that they had even used the camera to aid them in their work. Although photography has been largely utilised in landscape and figure subjects, it is chiefly in portraiture that it has played the most important part. In most, if not all, the artists have worked from photographs for the likeness, or, as they would probably say, "to save the time of their sitters." It is somewhat surprising the comparatively few photographers who visit the Royal Academy Exhibition, though they would always learn much therefrom, and more particularly from a real art point of view. We say real art point of view in contradistinction to the so-called art of the Photographic Salon type.

Liquid Hydrogen.—At last hydrogen has succumbed and been liquefied. For many years past it has been thought impossible to liquefy this element, though no end of attempts have been made by different experimentalists which have all ended in failure. But at last Professor Dewar has succeeded, and now all known gases have been reduced to a liquid state. This condition was obtained by Professor Dewar under a pressure of 180 atmospheres, at a temperature of 240° below the zero of the Centigrade scale. Some of our non-scientific readers will perhaps the better realise this intense coldness when we mention that it is equal to 432° below the freezing point of the Fahrenheit thermometer. It will readily be recognised that, working under these conditions of pressure and coldness, the experiments are conducted under considerable personal risk.

In an article on the subject, in the *Standard* of Friday last, some doubt is cast upon Professor Dewar being the first who really produced liquid hydrogen, and, while giving the credit to the Professor of being the first to produce it in quantity, the writer infers that Professor K. Olszewski had done the same on a smaller scale two years ago, and published it at Cracow in June 1896, and that it was translated in *Nature* for August 20 of the same year. In a letter in the same paper the next day Professor Dewar gives a distinct

denial to that, and quotes from Professor Olszewski's writings in 1895 in proof of his contention.

The Next Loan Exhibition in the City.—In our issue of the 6th inst. we mentioned that the Lord Mayor, in responding to the toast to himself and the Corporation, announced that a valuable collection of work of the French school would be opened this year at the Guildhall. The date of the opening has since been fixed for Saturday, June 4. The postponement to that date has been necessitated by the ill health of Mr. Temple, the Director of the Gallery. The Exhibition will be open free, as the Corporation do not accept "gate money." It may be added that the Exhibition will be open on Sunday afternoons as hitherto.

EXPERIMENTS WITH COLOUR SENSITISERS FOR GELATINO-BROMIDE PLATES.

[*Photographische Correspondenz.*]

At the suggestion of Dr. Eder the author has investigated various colour sensitisers with special regard to the relative sensitiveness of the sensitising bands in the less refrangible parts of the spectrum. A very large number of experiments were made in order to obtain the most favourable and even acting formulæ.

The sensitising of gelatino-bromide plates with erythrosine was taken as a starting point, the erythrosine being obtained from Schuchardt, and it was tried sometimes with and sometimes without a preliminary bath of ammonia.

Erythrosine (Tetra-iodo-fluorescine of soda).

This acts in pure aqueous solution weaker than when ammonia is added; the most favourable method proved to be with a preliminary ammonia bath of the following concentration:—

Preliminary Bath.

Ammonia	2 c. c.
Water	100 ,,

In this the plates were bathed for two minutes and then immersed in the following dye bath for two minutes:—

Erythrosine solution 1:500	6 c. c.
Ammonia	2 ,,
Water	100 ,,

Then dried in the dark. The preliminary bath acts very favourably and increases the sensitiveness considerably. The addition of two c. c. of ammonia to 100 c. c. of water must be taken as the maximum; above this quantity, fog.

The plates prepared according to the above formula show a high sensitiveness and a broad and intense sensitising band from D into the green ($D\frac{3}{4}E$), which is broader and better closed towards blue than with any other kind of sensitising. These erythrosine plates were used as normal plates for spectrum photographs for comparing with those obtained with the following dyes.

An increased quantity of erythrosine cannot be recommended, as, although the sensitiveness to yellow remains the same to a certain limit, the band of sensitiveness in the yellow-green becomes smaller, since the great quantity of the dye in the film prevents the access of the light corresponding to the absorption, and causes the so-called "screening." With an excess of dye solution the total sensitiveness is considerably lowered. The addition of silver nitrate is not advantageous as by this method of working the clearness is decreased.

A plate prepared according to the above formula with eosine solution (tetra-bromo-fluorescine of potassium) proved to be four times less sensitive than the erythrosine plate. The sensitising band also was narrower and rose more abruptly.

Ethyl eosine (the potassium salt of tetra-bromo-fluorescine-ethyl-ether), and methyl eosine (the potassium salt of tetra-bromo-fluorescine-methyl-ether), obtained from Monnet & Co., act better than ordinary eosine and showed a broader band and a less abrupt maximum. The sensitiveness also with the two last-named dyes was higher than with the ordinary eosine. As the sensitising maximum of these dyes lies approximately in the same place as with ordinary eosine (or only a very little further towards the yellow). it would be advantageous to replace the ordinary eosine by the ethyl or methyl eosine.

Rose Bengal (tetra-iodo-tetra-chloro fluorescine of potassium, obtain from the Badische Anilin und Soda fabrik).

The best concentration with this dye is as follows: 2 c. c. of a 1:500 to every 100 c. c. of water. A preliminary bath of two per cent. of ammonia as well as the addition of two per cent of ammonia to the dye bath acts favourably and broadens the sensitising band, which extends even with the shortest exposure from the yellow-green to beyond D in the orange. The general sensitiveness of these plates is lowered by too large a quantity of dye, but even in the most favourable cases it does not reach that of erythrosine.

Octo-iodo-fluorescine.

This dye shows just such a narrow band as eosine, but is more sensitive than the latter. The best action is obtained by adding 2 c. c. of a 1:500 solution of the dye to every 100 c. c. of water with 2 per cent. ammonia, and no preliminary bath should be used. Only when 12 c. c. of the 1:500 dye solution are used does the preliminary bath broaden the sensitising band, but even then it is not so broad as with the first quantity of dye.

Phloxine (alkali salt of tetra-bromo-dichloro-fluorescine, obtained from the Badische Anilin und Sodafabrik).

Phloxine gives gelatino-bromide plates twice as sensitive as Rose Bengal, and four times less sensitive than erythrosine. The position of the sensitising band is almost the same as with eosine, only slightly displaced towards yellow. It acts best with the addition of 6 c. c. of 1:500 solution of phloxine and 2 c. c. of ammonia. A preliminary bath of 2 per cent. ammonia acts favourably. The sensitising band of the phloxine plates is narrow, and the sensitiveness is considerably lowered, even with the addition of 12 c. c. of 1:500 dye solution.

Bromo-naphthol-fluorescine (obtained from Bayer & Co., Elberfeld).

The band of sensitiveness with this dye is still narrower than with phloxine. An increasing proportion of the dye in the sensitising bath makes the band broader and more intense; still with the most favourable proportion of dye, which is 12 c. c. of 1:500 solution to 100 c. c. of water and two per cent. ammonia, it is not satisfactory.

Naphthol-fluorescine (Bayer & Co., Elberfeld).

This is a good sensitiser, and shows three maxima in the band of sensitiveness, the strongest lying at D, whilst the two weaker lie in the orange and towards red. The band increases in breadth and intensity, with increasing proportion of dye, and the best formula is as follows:—

Preliminary Bath.

Ammonia	2 c. c.
Water	100 ,,

Bathe the plates for two minutes, allow to drain, and then immerse in the

Dye Bath.

Naphthol-fluorescine solution 1:500	12 c. c.
Ammonia	2 ,,
Water	100 ,,

Bathe the plate for two minutes and then dry.

With excess of dye, for instance, 24 c. c. to 100 of water, the band suffers in breadth. The action of the blue is not so strongly lowered as with rose Bengal or erythrosine, so that when photographing coloured objects with much blue a darker yellow screen should be used.

Cyanosine (alkali salt of tetra-bromo-dichloro-fluorescine methyl ether, obtained from Monnet & Co., of Lyons).

The band of sensitiveness of this dye is fairly good, but it is not so broad as the previous one. The best formula is:—

Preliminary Bath.

Ammonia	2 per cent.

Dye Bath.

Cyanosine solution 1:500	12 c. c.
Ammonia	2 ,,
Water	100 ,,

Dibromo-nitro-fluorescine and Tetranitro-fluorescine are less valuable as sensitisers, and not worth using, as, independently of the great insensitiveness, they give only a narrow band.

Mono-chloro-fluorescine, fluorescine, benzyl-fluorescine.

Mono-chloro-fluorescine imparts to gelatino-bromide of silver plate a prolongation of the sensitiveness from the blue into the green; the plates are, however, very insensitive. With longer exposure (thirty seconds) a small maximum showed at D.

Fluorescine acts equally unsatisfactorily, benzyl-fluorescine is somewhat more sensitive, but, as they only show very narrow bands, they can hardly be considered as practical sensitisers.

Acridine Yellow (hydrochlorate of di-amido-dimethyl-acridine, obtained from Leonhardt, of Mühlheim).

The action of acridine yellow shows as a continuation of the blue band towards D. In order to obtain a satisfactory result it is essential to add 30 to 50 c. c. of a saturated solution of the dye in hot alcohol to 100 c. c. of water. The disadvantage is that the plate is rather deeply stained, and, after fixing, the gelatine must be decolourised with alcohol. A preliminary ammonia bath, or the addition of ammonia to the dye bath, must be avoided, as the dye is decomposed thereby. The best formula is :—

Acridine yellow (hot sal. sol. alc.)	30 c. c.
Water	100 ,,

Bathe the plate for two minutes.

Chrysaniline (nitrate of di-amido-phenyl-acridine, obtained from Schuchardt of Görlitz).

The action of chrysaniline is similar to that of acridine yellow, it consists in a continuous prolongation of the sensitive maximum and the blue towards the yellow. It gives less sensitive plates than acridine yellow, but does not stain the gelatine so strongly. For sensitising 2 c. c. of a warm saturated alcoholic solution should be added to 100 c. c. of water. A stronger proportion of dye produces an insignificant extension of the sensitising band, but the general sensitiveness is considerably lowered. The addition of ammonia is disadvantageous.

Chinoline Red.

The position of the band of sensitiveness is similar to that of rose Bengal, but the latter shows a more intense sensitiveness in the orange yellow. The best receipt is as follows, but a preliminary bath must not be used:—

Sol. chinoline red (1:500)	1–2 c. c.
Water	100 c. c.

A higher proportion of dye lowers the general sensitiveness, and has no action on the extension of the sensitising band. The sensitiveness of the sensitised part in the yellow green is four times less than with erythrosine.

Nigrosin B. (Bayer & Co.).

The best variation of Dr. Eckhardt's recipe, is that in which the supplementary alcohol bath is omitted, and the alcohol is added to the preliminary as well as the dye bath. The sensitiveness at D is considerably increased, so that not only the maximum in the red at a, but also the maxima on both sides of D, attained their full value. The formula runs :—

Preliminary Bath.

Ammonia	2 c. c.
Ethyl alcohol	20 c. c.
Water	80 c. c.

The plate should be bathed for two minutes and then immersed in the dye bath and left there for four minutes.

Dye Bath.

Nigrosine solution (1 : 500)	10 c. c.
Ammonia	1 ,,
Ethyl alcohol	20 ,,
Water	70 ,,

If the plate is left for too short a time in this bath, it tends to produce fogs and drying marks. By increasing the proportion of alcohol, the maximum at a becomes more intense, whilst the maximum before D is lowered; with the above formula the two maxima appear equally strong. The replacement of ethyl alcohol by methyl alcohol is not to be recommended, as the sensitiveness is unfavourably influenced.

The following table gives an accurate summary of the behaviour of the plate at the position of maximum. It should also be mentioned that with all these dyes the film of the plate must not be touched with the fingers either before or during sensitising or spots will be caused.

The testing of the colour sensitiveness of the various plates was effected with a Steinheil small spectrograph with direct vision scope and a constant gas flame with an Argand burner in front of which was placed a Bunsen burner in which was placed asbestos soaked in salt, in order to obtain the yellow sodium line, D. The various times of exposure which were required to obtain the same effect on the different plates give an accurate measure of the relative sensitiveness of the same.

Dye.	Position of the Sensitising Band. from	to	Time required to obtain a mean Opacity in Seconds.	Relative Sensitiveness in the Position of Sensitising Erythrosine = 1
Erythrosine	D	D$\frac{2}{3}$E	1	1
Eosine	D$\frac{1}{3}$E	E	4	$\frac{1}{4}$
Rose Bengal	C$\frac{2}{3}$D	D$\frac{1}{3}$E	2	$\frac{1}{2}$
Octoiodo-fluorescine	D	D$\frac{1}{3}$E	4	$\frac{1}{4}$
Phloxine	D$\frac{1}{3}$E	D$\frac{2}{3}$E	4	$\frac{1}{4}$
Bromo-naphthol-fluorescine	D	D$\frac{1}{3}$E	6–7	$\frac{1}{6}$–$\frac{1}{7}$
Naphthol fluorescine	B C$\frac{1}{3}$D D$\frac{1}{3}$E	D D$\frac{2}{3}$E	2	$\frac{1}{2}$
Dibromo-nitro-fluorescine	D$\frac{2}{3}$E	D$\frac{1}{3}$E	7	$\frac{1}{7}$
Cyanosine	D	D$\frac{1}{3}$E	4	$\frac{1}{4}$
Methyl eosine	D$\frac{1}{3}$E	D$\frac{2}{3}$E	2	$\frac{1}{2}$
Ethyl eosine	D$\frac{1}{3}$E	D$\frac{2}{3}$E	2	$\frac{1}{2}$
Monochloro-fluorescine	from blue D$\frac{1}{3}$E	D$\frac{1}{3}$E D$\frac{2}{3}$E	15	$\frac{1}{15}$
Acridine yellow	b	G	7	$\frac{1}{7}$
Chrysaniline	from blue	F	7–8	$\frac{1}{8}$–$\frac{1}{9}$
Chinoline red	C$\frac{2}{3}$D	D$\frac{1}{3}$E	4	$\frac{1}{4}$
Nigrosin B.	a C$\frac{2}{3}$D D	B D D$\frac{1}{3}$E	60	$\frac{1}{60}$
Benzyl-fluorescine	D$\frac{2}{3}$E	E$\frac{2}{3}$F	more than 15	less than $\frac{1}{15}$
Fluorescine	D$\frac{1}{3}$E	D$\frac{2}{3}$E	,, ,, 15	,, ,, $\frac{1}{15}$
Tetra-nitro-fluorescine	D	D$\frac{2}{3}$E	,, ,, 15	,, ,, $\frac{1}{15}$

THE GUM-BICHROMATE PROCESS.

[Paper read before the Dundee and East of Scotland Photographic Association.]

From the earliest days of photography the hard mechanical perfection of the results have been at once the glory and shame of this method of representing nature. Indeed, it is not a little amusing to watch the wordy warfare which has been and is still waged round this question. On the one hand we are told that the camera represents for us nature with a precision and accuracy which the artist of pencil or brush can never hope to attain. We are told of how much service photography has already been to artists in correcting their drawing, and, generally speaking, opening their eyes, and it is more than hinted that much of the best modern art owes more to photography than the artist would care to admit. This is the "glory" side of the question. On the other hand, it has been argued that the shame of photography is this very mechanical perfection. Whatever side has been taken, it has pretty generally been felt that the power to modify the photographic picture in such a way as to bring it nearer one's ideal would be a great advance. So long as there is no such method, then, on the principle of the sour grapes, I suppose, no one wants any such thing, and photography is already perfection without it; but let there be mooted a method which claims to allow of more individuality in the results, and all are eager to put it to the test. The dictum that "the camera cannot lie" is modified (pro tem. at least) and all are ready to admit that a power of this kind is much needed. Should the hope turn out to be false, then it is understood, of course, that all rights are reserved, and that we go back pell-mell to our former principle of the all-sufficiency of pure photography, untampered with by man's erring hand. Now, the gum-bichromate process is one of the many processes devised with the intention of giving the operator some latitude in the way of modifying the hard mechanical results of pure photography. It is claimed for it, that it puts into the hands of those who work it a power in some measure analogous to the power which a painter or an etcher has over his work. The hybrid, indeed, is supposed to have the good qualities of hand art and photography in one, and only requiring to be taken up by the genuine artist to turn out works to astonish the world. I do not say that any one individual holds the whole of these inflated notions, but I do say that these are the ideas which one gathers from a general reading up of authorities in this process. In order to determine how far such claims are justifiable, we must give a moment's consideration to this question. Is a picture by the artist as near a copy of nature as he can make it? and, if not, in what way or ways does it differ from

it? Now, in a word, man is superior to nature, just exactly in the measure of his intellect, using the expression intellect in a special sense, that is, in the sense of artistic genius. No doubt there are those who find it quite difficult enough to reproduce nature as they find her, but these individuals are mere copying machines, like cameras, and are not artists. There must be few scenes in nature indeed so perfect that the crowning factor in creation as we know it, the intellect and genius of man—cannot improve upon.

This, I am afraid, will sound as rank heresy to some, but I believe it true. I do not claim for man that he originates those improvements; he simply combines the perfections which he sees around him in one whole. For this reason, the picture of the artist, although, in a sense, original, is a mere combination of perfections which he has, at one time or another, picked up from nature in her more pictorial moods. Not the minutest part of the canvas but has received individual attention and treatment. Lights are graduated into half-tones and half-tones into shadows by the skilful artist with such delightful harmony and effect as one rarely sees in nature. It is not impossible in nature; it is only infinitely rare. It is this power of combining innumerable perfections into one grand original total which constitutes art, and one's delight or astonishment is called forth in proportion to the cunning which has produced such stupendous results by *apparently* inadequate means. Now let me again point out that art is superior to nature as we generally find her. Art is not a mere alteration, but an improvement, and no method of picture-making which does not leave every atom of effect completely under the control of the artist can be rightly included under the title of graphic art.

Now, you will perceive that in the process of gum-bichromate picture-making, which I dare say is well enough known to require no description, there is no analogous process of selecting and combining. There is to be no improving upon nature. An ordinary photographic image, at its very best a transcript of an average scene of nature, lies hid under a film of amorphous colour. This is the condition of things before development, and it is now proposed to term this a work of art because, forsooth, you have the power to develop much or little of your photograph by removing much or little of the amorphous colour now obscuring it.

In what way is this anything like an improvement on nature? On the assumption that, somewhere within the thickness of the film of pigment, a perfect picture lay hid which required only the skill of an artist to uncover it, there might be something in the claim; but, when we remember that what of pigment (over and above the photographic image) is left unwashed away is a mere formless veil, we can scarcely allow the claim of control over the artistic result which is put forward. I dare say something in the way of massing the whites and blacks can be brought about by this method, but even here it must be remembered that lights and shades are not the formless things got in this somewhat elephantine way. A high light has its own form, and, if extensive, its own gradation, and it seems to me unreasonable to expect such precision in working with a tool in the shape of a downpour of water from the mouth of a jug. Shadows, too, are not formless and of like intensity throughout. Shadows have their own proper forms and gradations, and I am bound to say that I cannot see how the clumsy tool before described can possibly work with the required nicety. These theoretical objections were amply justified to me in an examination of the prints we had exhibited in our late exhibition. However struck with their unlikeness to the usual photograph, this much could be said about them, they bore no evidence of increased control over results, but rather the contrary.

The touch of an artist not only confers an individuality upon his work, it supplies the mind of the observer with continual evidence that what so entrances him is the work of man's hand and legitimately enhances the wonder and delight in observing it. This great source of pleasure is altogether wanting in photographs. However beautiful or perfect the photographic picture, the absence of all evidence of human handling seems to dissociate it from man's genius and ranks it with nature's own work rather than man's art. Pictures by the gum bichromate process have the same fault. Whatever power one has over his results in this process there is no more evidence in them of human intention than in an ordinary photograph. That you can extend the gradations in what would otherwise be a flat picture need not be denied, but, as I have already said, neither the high lights nor the shadows so obtained are the genuine article, but mere imitations which will not bear a moment's examination. I see no future before this process but think it rather a retrograde movement than an advance, and in any case must simply take its place along with other "fakes," to use a slang expression for getting passable prints from faulty negatives.

Photography at its best is almost a perfect method of reproduction, and the art of the photographer must lie entirely in presenting to the camera such subjects as are as nearly pictorially perfect as he can find. After all, by far and away the best dodge to improve a faulty negative is to do another without the faults. There is no skill needed here but that without which you can never succeed in making pictures by any method, the artistic genius.

We cannot, like the artist, combine many perfections in a perfect whole, and photography must therefore take a back seat as a graphic art; but, given a subject pictorially perfect, photography can reproduce it with a fidelity beyond the power of the human hand. This is the reason that only now and again do we see a photograph which might reasonably be called perfect. It does not lie in the difficulty of reproduction, but simply that nature seldom presents us with pictures perfect in themselves and ready for the camera. That the gum-bichromate process is capable of producing queer-looking things, which the unthinking may style artistic, I believe, but that it is for the betterment of photography, or that it places an added and valuable power in the hands of the photographer, I deny.

J. K. Tulloch, M.B.

SOME FACTS ABOUT FOCUS.

[Before the North Middlesex Photographic Society.]

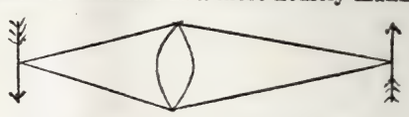
On Monday, May 9, Mr. W. E. Debenham delivered a lecture on "Some Facts about Focus." He prefaced his remarks by saying that what he had to put before the meeting were facts admitting of no difference of opinion, except, perhaps, so far as that portion of his lecture relating to depth of focus was concerned.

He then proceeded to explain and illustrate on the blackboard the laws of conjugate foci, and to point out the usefulness of such knowledge, enabling the photographer, as it did, to settle definitely the following points:—

1. The focus, called the principal focus, of the lens.
2. The necessary extension of the camera for an image having a definite ratio to the size of the object.
3. The distance an object should be from the lens in order to give an image of a given proportion to the original.
4. The length of focus of lens required to give an image of an object at a certain distance, the image having a known proportion to the original.

In describing conjugate foci, Mr. Debenham said, "There is on either side of the lens a distance equal to the principal focus plus that measure multiplied by the ratio which the object or image bears to the object or image on the other side of the lens."

This he proceeded to illustrate in a more homely manner as follows:—



Focus × ratio + one focus more. Focus × ratio + one focus more.

Thus, assuming the lens to be of 6-inch focus and we wish to produce an image one-third the size of the original, what will be the distance from the lens to the object, and from the lens to the image?

Distance lens to object:

Focus = 6 × ratio (3) = 18 + one focus more (6) = 24 inches.

Distance lens to image:

Focus = 6 × ratio (3) = 2 + one focus more (6) = 8 inches.

Proceeding, Mr. Debenham explained the method of determining the most suitable lens for use with any given camera, when desiring that the image shall have a definite ratio to the object. He also gave the following formula for determining (approximately) the focus of any given lens: Multiply the distance from the object to the image, by the proportion the image bears to the object, and divide the product by the proportion the image bears to the object plus one squared.

Thus, assuming the distance from the object to the image to be 60 inches, and the proportion the image bears to the object to be one-fourth, we have:—

$$60 \times 4 \div (4 \times 1)^2 = 9{\cdot}6 \text{ inches.}$$

Mr. Debenham next dwelt upon spherical aberration and how it was affected by the stops. Depths of focus then engaged his attention, and he said that it was in all lenses governed not by the relative, but by the actual size of the aperture, focal length had nothing to do with it. A diaphragm with a one inch opening would give the same depth of focus whether used in a 5-inch or a 15-inch lens. No more and no less in one case than in the other.

MIRAGE.

[Paper read before the Camera Club.]

When a ray of light passes from point to point of a medium which is everywhere similarly constituted, its path is a straight line; when it passes from one medium to another medium of different density, then the ray of light is refracted or bent at the surface which separates the two media. When the ray passes from one medium to another which is denser, the refraction of bending is always towards the normal to the surface separating the two media at the point of incidence; when, on the other hand, the ray passes from a medium of a certain density to one of less density, then the bending is always from the normal to the common surface at the point of incidence. The earth is surrounded with a spherical envelope of air, and, if that air were always of the same density everywhere, its refractive index would be the same, and there would be no terrestrial refraction. But the spherical envelope which surrounds the earth is not all of the same density, and the refractive index of the air varies with the density. There are two cases, in the main, which militate against the uniform density of the atmosphere;

one is barometric pressure, and the other is temperature. Taking no account of temperature for the moment, taking merely as the cause barometric pressure, the density of the air diminishes gradually upwards from the surface of the earth, so that the refractive index of the air diminishes upwards. The diminishing of the refractive index is not absolutely proportional to the decrease of density, but it is found by experiment to be sensibly proportional to the excess of the density over unity. The circumstances of normal refraction in the British Isles as regards temperature is that there is a gradual diminution of temperature upwards at the rate of about $\frac{1}{300}$° Fahr. for every foot of ascent. As the air gets cooler the density increases, so the tendency is to some extent to counteract the effect of barometric pressure, but it does not altogether do so. The result in the normal refraction of the British Isles is that there is a gradual diminution of density upwards.

We may consider the air to be stratified in horizontal layers; as a matter of fact, it is stratified in spherical layers, but it will simplify matters to consider it stratified in horizontal layers, the more so as the sphericity of the earth, though it is a slight cause of terrestrial refraction, is not by any means the chief cause; terrestrial refraction would still exist if the earth had no sphericity, and if its surface were perfectly plane. I show you here a diagram representing the normal state of the atmosphere, and showing the curvilinear path taken by a ray of light when it passes from one point of such an atmosphere to another point horizontally distant from it. The reason a curved path is taken is this: Supposing the ray to have a general direction upwards, and supposing it to have been inclined at incidence at a certain angle with the normal, as it is going from a medium—air—to air which is less dense, it bends away from the normal, and therefore there would be a successive bending away from the normal at each layer until finally the ray would arrive at the highest point in the diagram. Then, if it were to pass downwards, it would be passing from a medium of a certain density to one of a greater density, and it would approach the normal at each surface of separation of the media, and therefore its path would be a curved path presenting concavity downwards. A ray of light will actually take some such path because, by curving upwards, it takes the path which it can pass over in the least time. Generally a ray of light takes the minimum path as regards time, and it is found to curve up into the layers of air which are of less density because it can traverse them with greater velocity. It is important to notice that a ray of light always presents the concavity towards the denser layers; and there is another principle, that the amount of curvature of the ray, *i.e.*, the total bending that there is in the ray over a given length of ray, is directly proportional to the rate at which the density changes along the normal to the direction of the ray. For instance, if we take a vertical line, the normal to the direction of the ray is horizontal, and there is no change of density in that horizontal direction, and accordingly there is no bending of the ray; if, on the other hand, the general direction of the ray is horizontal, the normal of the ray is vertical, and that is the direction along which there is maximum change of density, and therefore in that case you will get maximum bending. We get, then, the two cases: When the ray is vertical, there is no bending, no curvature; when the ray is horizontal, you get maximum curvature; and for intermediate directions you get intermediate amounts of curvature.

I was first led to look into this subject by considerations which arise in discussing certain questions respecting artillery firing, and I propose to give you some results which I have obtained in order to show the effect of refraction upon artillery fire. A mile on the earth's surface subtends at the centre of the earth an angle of about 52″; the refraction will have a mean value of about 4″, a minimum value of about $2\frac{1}{2}$″, and a maximum value of about 8″; and, taking a range of three miles, these values of the refraction would become 12″, about 8″, and about 24″ respectively; and very exceptionally the refraction would amount to about 1′ 18″. The meaning of this, in regard to artillery fire, is that (taking this exceptional amount of refraction), if the tangent sights of the gun were laid upon an object at that distance, they would be really laid at an elevation of 1′ 18″ too much, and correction for terrestrial refraction would consist in depressing the gun through an angle of 1′ 18″. That is not a very important matter from an artillerist's point of view, because guns can only be laid properly to within about 5″.

There is also the question of determining the range. That can be done from an elevation by an instrument called the depression range-finder. If we take the range of an object by means of this instrument, the terrestrial refraction would give a longer range than we ought to have, and the necessary correction would diminish the found range.

I now come to other cases that may present themselves in the density of the air. The case that we have considered already is that of the temperature diminishing gradually upwards at the rate of $\frac{1}{300}$° Fahr. for every foot of ascent; in Great Britain the diminuti n is seldom more than about $\frac{1}{180}$° or less than $\frac{1}{400}$° Fahr., but in other climates it is different. If the temperature were to fall at a more rapid rate, the air would be very much more nearly of uniform density, and that would result in a smaller curvature of the ray. If the fall were at the rate of about $\frac{1}{300}$° Fahr. for every foot of ascent, it would result in the density of the air being uniform, and there would be no terrestrial refraction at all. A more rapid fall of temperature still would cause a rise of air density upwards, and that would cause a curved ray with the concavity presented upwards. In such a case the refraction is said to be negative, whereas, in the case that we had formerly, the refraction is said to be positive. On the other hand, a rise of temperature upwards causes a rapid diminution in air density in ascending, and the ray with the concavity presented downwards is then more curved; and in the extreme case in which the rise of temperature upwards is at the rate of $\frac{1}{18}$° Fahr. for every foot, the curvature of the ray would be the same as that of the earth, and in that case — which, of course, would never actually present itself—we should be able to see completely round the globe, simply because the ray would encircle it. Again, climatic conditions may lead to another distribution of the density. There might be a gradual rise in density upwards to a certain stratum of maximum density, and then a diminution of density upwards, in which case the ray of light would pass in a curious sinuous path with the concavities presented towards the denser layers.

[Major MacMahon enumerated conclusions, relating to terrestrial refraction in the plains of India, drawn from the experiments and observations of the late General J. T. Walker, R.E., formerly Superintendent of the Great Trigonometrical Survey of India, from which it appeared that the circumstances mainly affecting terrestrial refraction were in order of importance as follows:—(1) The time of the day, (2) the temperature, (3) the aspect of the sky—whether cloudy or sunshine, and (4) the humidity of the air.]

Before proceeding to the next part of my subject, I will mention the well-known case of astronomical refraction—the circumstance that, during a total eclipse of the moon, the whole disc of the moon is not obscured, the fact being that the rays of the sun in passing through the atmosphere of the earth are refracted towards the normal, and in that way some light does get upon the surface of the moon.

I come now to that effect of extraordinary refraction which is more especially termed mirage, and which was first noticed, so far as we know, by the French army under Napoleon. The conditions favourable to mirage are generally a very hot sun and a sandy soil, which becomes very hot under the influence of the sun, and an almost total absence of wind. Under these circumstances there is an extraordinary amount of negative refraction, the rays are very much curved, and the concavity is presented upwards. An illustration which is familiar to everybody, because it occurs in many books on physics, is that in which the observer sees the top of a tree by means of a negatively curved ray, and it accordingly appears to him to be in the direction of the tangent to the ray where it enters the eye; the other points in the tree he sees in other directions, and altogether the tree appears with an inverted image below it. Not only so, but where there is a very clear sky that also is refracted down, so that the tree appears in the midst of an inverted image of the sky, which has very much the appearance of water. This phenomenon is very common in Egypt. In Egypt there is very often a great quantity of sand with villages dotted about, these being somewhat raised in order to escape the periodical inundations of the Nile, and the effect to our observer is that of a number of raised villages in the midst of what appears to be an enormous lake. The illusion is increased by two circumstances: First, that by reason of the great heat of the sand there is a considerable convection of heated air upwards, which gives the air that peculiar rippling appearance, causing the refracted sky to look like ruffled water; and, second, that the general direction of the ray is very similar to that of a ray reflected by a horizontal mirror placed upon the ground. This phenomenon is also common in Australia and in the plains of India, in the low-lying fen districts of England, and on the shingle ranges at Lydd.

One very curious thing about mirage is that it depends very much upon the position of the eye; a few inches in the height of the eye may make all the difference. I remember myself, on the plains of India, observing a mirage which was only evident when I was at a particular height; there was only a vertical space of two or three inches in which the effect could be seen, so that these phenomena may easily escape notice. A singular effect may sometimes be observed at a particulur spot on the south coast, and very likely at other places; when the waves come in on to a very hot beach, if you place the eye within about a foot from the ground and look parallel to the wave fronts, you can see an image of the wave two or three feet above the real wave. This may conceivably arise in this way. The wave may bring in some cold air, and if the wind were blowing a little off the heated beach there might be some heated air brought in as a layer above that cold air; that would give that rapidly diminishing density upwards which gives a ray with considerable curvature and with concavity presented downwards, and would certainly result in an image of the wave above the real wave.

I should like to mention a case of refraction observed on the artillery range at Lydd, which has given rise to some controversy. An officer was firing on a hot sultry day from an ordinary Maxim machine gun, at a target about 600 yards distant, and as the firing went on he saw a great wedge-shaped gap in the top of the target, and he thought that the hail of bullets had beaten down a part of the target. To his astonishment, however, when the firing ceased the gap disappeared, and the target appeared intact and undamaged. I imagine this to be an effect of mirage. I conclude that he was looking over the gun through the heated gases rising from the muzzle, which formed a medium of

gradually increasing density upwards; he was observing the upper portion of the target through this medium, and I have no doubt that that caused negative refraction, bending the rays so that the sky above the target was seen in the shape of a wedge, something like the shape of the vertical section of the rising gases. I have discussed the matter with physicists, and some agree with me, but other physicists of note do not accept the explanation which I have given.

I now pass on to another part of the subject, which is called "looming." Distant objects are said to "loom" when they appear in positions much higher than their actual positions, that is to say, when images of them appear considerably raised above their true positions. The effects of looming are very extraordinary, and I have some slides to show you which I have prepared from examples recorded by Commander William Scoresby, who went on his third voyage in his ship the *Baffin* to the Greenland whale fishery in the spring of 1822. The first of these views includes several large irregularly shaped icebergs, which must cause very unusual distributions of air density, and give rise to quite remarkable vertical and lateral refractions. In the second there are images of ice which was quite out of sight, or quite beyond the horizon. There was extraordinary vertical magnification: small hummocks of ice were drawn out into spires, sometimes of a castellated shape and sometimes having the appearance of naked trees; at other times there appeared to be a city of ice, with public edifices, spires, &c., and Commander Scoresby states in his book that these effects were constantly changing, and were never the same for two minutes together. The first of these drawings, which you saw on the screen, showed a curious inverted image of a ship in the sky, raised considerably above the horizon; that ship was so distant that it could not be seen with a powerful telescope.

During the Crimean War, observers on one occasion saw the whole of the British fleet inverted at a considerable height, an illustration of which appeared in the *Illustrated London News* at the time. Some very interesting cases were recorded by Dr. Vince in the Bakerian lecture of 1798, read before the Royal Society, some of which are delineated in the succeeding slides. He remarks upon these curious phenomena that he thinks that, in cases of national emergency, certain people should be told off with telescopes to look out for the enemy's ships, and to search the horizon to see if they could detect any ships looming. Dr. Vince mentions another remarkable instance in which he saw Dover Castle from Ramsgate, at a point from which the whole of the keep of the castle cannot be seen, the four turrets only being visible. The most curious case of lateral refraction that I have been able to discover was observed at Geneva in 1818 by M. Jurine: A barque was seen approaching on the left bank of the lake, and at the same time an image of the sails was observed above the water, which, instead of following the direction of the barque, separated from it, and appeared to approach Geneva by the right bank of the lake, the image moving from east to west while the barque moved from north to south. This case was brought to the notice of Biot, the physicist, and he, in one of the scientific journals, gave a very long explanation. He came to the conclusion—from the geographical features, and climatology, and the direction in which the sun's rays were passing at the time of the observation—that there would be considerable lateral difference in the temperature, quite sufficient to produce this phenomenon of lateral refraction.

Another case of curious refraction has been noticed by most people—I have seen it myself, particularly on the coast of Norway. Low lands, and the extremity of headlands, or points forming an acute angle with the horizon of the sea, and viewed from a distance beyond it, appear elevated above it, with an open space between the land and sea, the effect being proportional to the amount of evaporation taking place at the surface.

Fata Morgana is a name given to an optical phenomenon sometimes seen in the Straits of Messina, between Sicily and the Italian coast. Minasi says: "When the rising sun shines from that point whence its incident ray forms an angle of about 45° on the sea of Reggio, and the bright surface of the water is not disturbed either by wind or current, the spectator being placed on an eminence of the city with his back to the sun and his face to the sea, on a sudden there appear in the water various multiplied objects, namely, numberless series of pilasters, arches, castles, columns, towers, palaces with balconies and windows, valleys of trees, plains with herds and flocks, &c., in their natural colours and proper action, passing rapidly in succession along the surface so long as the above-mentioned causes exist. If, in addition, the atmosphere be highly impregnated with vapour and dense exhalations not previously dispersed by the action of the wind and waves, or rarefied by the sun—in this vapour, as in a curtain, to a height of 24 or 25 feet, and nearly down to the sea, the observer sees the same objects not only reflected from the sea, but likewise in the air, though less distinct. Lastly, if the air be hazy, and slightly opaque and dewy, the objects appear only at the sea surface, but with prismatic colours." He endeavours to prove that they are representations of objects on the two coasts. He considers the sea an inclined speculum, on account of the rapid current which runs through the straits, and divided into different planes by contrary eddies, and he ascribes the aerial morgana to the refractive and reflective power of matter suspended in the air.

Lastly, I would mention the experiments of Wollaston upon the subject of refraction and mirage. First, he says, into a square phial containing a little clear syrup put an equal quantity of water, in such a way that it floats without mixing, and after a little time, by mutual penetration, you see effects; if you view through the syrup a card with a written word upon it, you see it and also above it an inverted and erect image of the same. That is a case in which the density diminishes upwards and the ray has its concavity presented downwards. Then above the water he placed rectified spirits of wine, when the inverted and erect images were seen below, these appearances continuing many hours and even days; and he carried out similar experiments with water at different temperatures. Everybody knows the experiment with a red-hot poker; the effects of mirage can be seen by looking along the surface of a red-hot poker, held at a distance of about a foot from a sheet of paper, when there is perceptible refraction. Again, Wollaston looked along a horizontal plate of glass upon which he poured ether, and a line appeared instantaneously upon the opposite wall at an elevation of half a degree, this effect being due to the cold caused by the evaporation of the volatile liquid. Finally, Brewster showed that all the phenomena of unusual refraction might be observed by holding a heated iron over a mass of water bounded by parallel plates of glass, and then substituting a cold body for the hot iron.

MAJOR P. A. MACMAHON, R.A., F.R.S.

THE GLASGOW CORPORATION AND THE PHOTOGRAPHIC CONVENTION.

THERE is always a right way and a wrong way of doing a thing (a correspondent of the *Glasgow Evening News* writes to that journal), and it not unfrequently happens that the Corporation chooses the wrong way. Thursday's decision with regard to the public recognition of the forthcoming meeting of the Photographic Convention of the United Kingdom is a case in point. The initial mistake, no doubt, lay with the magistrates in deciding not to grant the formal compliment which the officials of the Convention believed that the municipality would be pleased to pay to the members of the Convention—a compliment which has never hitherto been withheld in any of the large towns and cities in which it has met. Ten years ago the Glasgow Corporation extended a formal welcome to the Convention, and no valid reason seems to have been advanced on this occasion for refusing to repeat the courtesy. The magistrates, to their credit, after learning that they had come to an adverse decision in the first instance through ignorance of the scope and aims of the Convention, were willing to repair their error, but their request for an opportunity to reconsider the matter was unfortunately mixed up with an entirely different issue. There is no necessity to institute a comparison between the merits and standing of the Photographic Convention and the position of the Booksellers and Newsagents' Conference; but this, at least, should be said, that, while the latter is held entirely in the interests of a laudable industry—is a species of trades-union—the Photographic Convention is a society of representative photographers who are seeking to advance no personal interests, but solely to further one of the most popular applications of modern science to a pursuit which has admittedly done more than any other to raise and purify the taste of the great masses of the people and to inculcate a love for the beautiful. Photography may have no claim to rank as an art—there are those who say "no" as well as those who say "yes" to the question—but its followers are within their right in claiming that it is one of the most promising handmaids of art in its scientific aspect. It is almost daily conquering new fields, revealing the wonders of the heavens, and the hidden secrets of the human frame. The exhibitions and gatherings of the Convention are to be held in the galleries of the Royal Fine Art Institute in July, and several hundreds of ladies and gentlemen will be present from all parts of the Empire. Surely they had reasonable grounds to believe that the Lord Provost and a few of his colleagues would be pleased to attend the opening meeting and making them free of the city and its interesting sights. Nothing more was sought. A luncheon, a *conversazione*, a banquet; none of these was sought or expected—although they have been given in the past to less representative institutions—indeed, judging from what the Convention has done in bygone years in the places it has visited, the city's representatives would, instead, have been requested to partake of the Convention's hospitality on the opening day. There is no need to say anything on the widespread interest taken in photography. Her Majesty has granted the coveted title of "Royal" to the Society, and no later gone than last week the Prince of Wales put himself to considerable inconvenience in order to open one of the leading shows in London. Dublin Corporation has an unenviable reputation in some respects; but, when the Convention met there a year or two ago, the Mayor and his colleagues handsomely maintained the credit of their country for courtesy and hospitality. Everything considered, it is surely matter for regret that, within a week or two of the public meeting at which the Corporation joined heartily in sanctioning costly arrangements for the entertainment of the British Association, it should have been fortuitously, but all the more unfortunately, led to cast a slight upon an influential scientific and artistic society, and a slur upon its own good name. No city can afford to adopt such a boorish policy, and it is to be hoped the Lord Provost, when he returns, will yet be able to repair the mischief which has been done. The situation is one of great delicacy, but, by the

exercise of a little tact, susceptibilities already wounded could, no doubt, be healed, and the fair name of our city cleared of the imputation of being ostentatiously discourteous to a large and influential gathering of strangers. Such is the impression which will certainly go forth to the country unless immediate steps are taken to efface it.

It would be manifestly improper on our part to comment on the action of the Glasgow Corporation in declining to grant the Photographic Convention of the United Kingdom an official reception next July. The refusal, doubtless, owes its origin, as hinted in the article we have reprinted, to a temporary misconception on the part of a few members of the Corporation as to the aims, scope, and position of the Convention, and we are sure that no member of the Convention will assign any other interpretation than that reason for the Corporation's decision.

Failing an official reception by the Glasgow municipality, however, we are pleased to be in a position to announce that the Lord Provost of Glasgow will attend and welcome the members of the Convention at the opening meeting on Monday evening, July 4, at the Galleries of the Royal Fine Arts Institute.

AT THE CAMERA CLUB.

An unusually large number of members assembled last week to hear Dr. W. J. Russell's lecture upon the action exerted by certain metals and other substances upon the photographic plate. This subject, it will be remembered, he dealt with in his recent Bakerian lecture at the Royal Society, a full report of which appeared in our columns. It will, therefore, not be necessary to go over the same ground again. But, as the lecturer has since made additional observations, and as, moreover, in speaking to an audience of photographers, he went more fully into certain phases of the phenomena described, there is much to record that did not appear in the former paper. That this was the case may be judged from the circumstance that the lecturer began to speak at 8.30, and the discussion upon his lecture did not conclude until past eleven o'clock. It seemed at one time, indeed, so great was the interest taken in this discussion, that Dr. Armstrong, who occupied the chair, would have had to adjourn the meeting to another evening.

On the lecture table were a number of prints taken by the new method of investigation, as well as several substances which had taken part in the experiments; but the actual negatives, if we may call them so, were exhibited on the screen by means of the electric lantern.

It will be remembered that Dr. Russell has devoted much time to his curious investigations; he acknowledges, indeed, that he has in their prosecution used up some thousands of gelatine plates. He has also produced similar effects upon Eastman bromide and Solio papers, but these were by comparison so slow in action that he has stuck to the plates.

His general method of working was to place in contact with the plate, for some hours or days, in complete darkness, certain organic or metallic bodies, and he found that these bodies, under such conditions, seemed to have upon those plates much the same effect as light—that is to say, upon development a distinct darkening action was apparent.

Taking the organic bodies which produced this strange effect, he had found that one of the most active was boiled linseed oil (drying oil), as used by painters. Turpentine and its derivatives were also quite as active, as were also the essential oils, such as bergamot, oil of lemons, bitter almonds, &c. A property common to all these bodies, it should be noted, is their reducing quality—*i.e.*, their power of combining with oxygen.

Among the bodies not active were alcohol, ether, benzine, petroleum, &c.; but some of these bodies, if impure, would be active agents. We have here, therefore, a method of detecting such impurities.

The oil in printing ink was active enough, and prints some years old would yield an image to the plate by simple contact in darkness. An architectural view and a portrait thrown on the screen bore witness to this truth, and we may remark, in passing, that we have sometimes seen worse results from lantern slides produced in the more orthodox manner.

Cinnamon, charred wood, charcoal, and some other substances were capable of giving off this active vapour, or whatever it was that affected the dry plate, while cork and bits of wood, some a century old, also retained the same power. An interesting point was that an under-exposed plate—*i.e.*, a plate exposed to light in the ordinary way—can be intensified by after-exposure in darkness to one of these active bodies, but the darkening action is spread over lights and shadows alike.

The strange action will pass through various media, such as gelatine, celluloid, collodion, gold-beater's skin, ordinary and vegetable parchment, &c., but is stopped by gum arabic, glass, and some other bodies. From careful experiments, the lecturer believes the action to be due to vapour given off by the active substances.

Metals are active in the following order, taking the most active first:—Magnesium, cadmium, zinc, nickel, aluminium, tin, cobalt, antimony. Other metals are slightly active, and alloys show curious results. Brass, for example, is inactive if the zinc in it only amounts to forty-five per cent.—as in ordinary samples—but, if the percentage be raised to forty-seven, it becomes active. The metals must in every case be clean, *i.e.*, free from oxide, or they are inactive.

In opening the discussion upon this very interesting lecture, Dr. Armstrong pointed out that its chief interest lay in the many conundrums which it offered for solution, and he called upon the members to contribute any experiences which they had met with that might throw light upon the phenomena which had been so patiently investigated by the lecturer.

Mr. Warnerke had made a number of experiments in the same direction, but not so extensive in their range as those of the lecturer. He was bound to say that some of his results differed entirely from those which they had heard detailed. For example, with regard to gelatine as being a substance through which these emanations would easily pass, he had come to a totally opposite conclusion. He had used bromide paper and chloride paper—not plates—and had found that each description of paper gave different results. By interposing rings of gelatine between the active substance—he used copal varnish brushed upon paper and dried—and the sensitive surface, he found that on the sensitive paper he obtained rings of white, while the rest of the surface was blackened, showing that the gelatine, instead of allowing the vapour, or whatever it was, to pass through, stopped the action entirely.

Sir H. Trueman Wood thought that Dr. Russell's experiments showed, in a remarkable manner, what an instrument of research we had in the photographic dry plate. Possibly these researches would throw some light on the phenomena connected with the organs of smell. We know that several things—musk for example—would emit a powerful odour, and that this emission would go on for an indefinite time without any change of volume of the substance which afforded it.

Mr. Stroh called to mind some experiments in which he was engaged about fifteen years ago, with magnetism, and it occurred to him to see whether, as had been asserted by Reichenbach and others, the magnetic force would picture itself on a photographic plate in darkness. He placed a compound magnet upon a dry plate for twenty-four hours, in the dark, and then developed that plate, with the result that he obtained a most perfect image of the metal, with the screws and bolts which held the parts of the magnet together; but there was no trace of any force emanating from the poles of the magnet or anywhere else. He attributed the action to the metal. Subsequently he varied the experiment by using zinc, bits of paper, wood, &c., and obtained more or less perfect images of them in the same way; but, as his experiments were on magnetism, he threw these observations aside as being no part of the subject under investigation. He might suggest, as a comment upon the lecturer's observation with regard to the opacity of writing ink, that the best mode of keeping gelatine plates in good condition would be to wrap them up in inked paper.

The Chairman here interposed with the suggestion that, as iron was one of the inactive metals, Mr. Stroh's magnet might have had upon it a film of oil, which would account for the effects produced.

Mr. A. L. Henderson had met with some curious experiences. At one time, on developing a number of negatives taken abroad, he was grieved to find that they were spoilt by markings which he subsequently traced to be due to emanations from the dark slides. He found that the markings were removable by treating the rest of the plates with an alkaline solution (carbonate of lithium) before development. It was here stated by a member present that several negatives of the recent solar eclipse had been spoilt by a grain impressed upon them by the wood of the dark slides in which they had been carried.

The Rev. F. C. Lambert was anxious to know whether Dr. Russell had tried plates of varying speeds, and whether vulcanite acted as a transparent or an opaque body.

In rising to reply, Dr. Russell said that, in addressing an audience of photographers, he had looked forward to learning something, but they had given him so many questions to answer, and nuts to crack, that his anticipations had been more than realised. He was most interested in Mr. Warnerke's results. He worked with sensitive papers, while the lecturer worked with plates; they were therefore experimenting under different conditions. He felt sure that something would be discoverable out of their differences; and if Mr. Warnerke would come to him, or he would go to Mr. Warnerke, he should be most happy to compare notes, and work together towards the elucidation of the questions at variance.

Attention had been called to a remark of his that, while red printed matter behaved like black printing ink in being active, blue was transparent. He attributed this to the red holding more oil than the blue; for the colours (dry) themselves were quite inactive. But he acknowledged that nothing definite could be stated upon these details; many more experiments would be necessary. At present they were groping in the dark.

Another question had arisen with regard to moisture. There was no doubt that the presence of aqueous moisture did, generally speaking, increase the effects produced. He had already stated that, when Bristol board was dry, it was quite inactive; when, however, it was kept in damp air some time, it altered its character.

A most hearty vote of thinks was given to the lecturer, and the Chairman trusted that on another occasion he would see fit to give them the results of the further experiments which he had told them were in progress.

MR. ALFRED ELLIS'S CATALOGUE OF PHOTOGRAPHIC PUBLICATIONS.

We so seldom receive for notice a publication of this kind that we have no hesitation in according Mr. Alfred Ellis's catalogue particular mention in these columns. Mr. Ellis, as all the world knows, is one of the foremost of our "celebrity" photographers, and his name is associated in the minds of most people with theatrical photography, of which for some years he has been probably our principal exponent. Indeed, the photograph of an actor or an actress by Mr. Ellis is commonly understood to be a synonym for whatever is best in this class of work.

The catalogue before us extends to 116 pages, and the photographs mentioned are those of persons prominent among the aristocracy, artists, authors, the clergy, composers, dramatists, the medical profession, music and the drama, theatrical managers, &c. Art studies, country views, plays, &c., are also subjects towards which Mr. Ellis has directed his camera. The catalogue, which embraces many hundreds of separate photographs, is to be obtained of Mr. Ellis at his address, 20, Upper Baker-street, N.W.

THE BRITANNIA WORKS COMPANY.

The prospectus is in circulation of the Britannia Works Company (1898), Limited, proprietors and manufacturers of Ilford dry plates and photographic materials. The capital is 380,000*l.*, divided into 190,000 six per cent. cumulative preference shares of 1*l.* each, and 190,000 ordinary shares of 1*l.* each.

The preference shares are entitled to a fixed cumulative preferential dividend of six per cent. per annum out of the profits of the Company, and also rank in respect of capital in priority to the ordinary shares.

No debentures will be issued without the special consent of the preference shareholders.

The certified profits are: 1894, 47,994*l.*; 1895, 43,746*l.*; 1896, 46,939*l.*; 1897, 47,362*l.*; or an average of 46,510*l.*, showing six per cent. on the preference, ten per cent. on the ordinary, and a surplus of over 16,000*l.* for direction expenses and reserves.

The following are the Directors: The Right Hon. the Earl of Crawford, K.T., F.R.S., Chairman of the Wigan Coal and Iron Company, Limited (Chairman). Major-General G. F. Blake, Chairman of the Hovis-Bread Flour Company, Limited (Deputy-Chairman). Mr. Charles J. Cox, Chairman of the Civil Service Co-operative Society, Limited. Mr. Edward B. Knobel, F.R.A.S., Managing Director; Mr. Thomas Hughes, Factory Manager; Mr. John Howson, Commercial Manager (Directors of the old Company).

Our Editorial Table.

Kromskop Colour Photography.

By Frederic Ives. 80 pp. London: The Photo-chromoscope Syndicate, Limited, 121, Shaftesbury-avenue, W.C.

The first part of this little book takes the reader through a plainly written description of what the Kromskop is, its construction and operation, instructions for its use, and its care and adjustment. The lantern Kromskop, the Kromskop cameras, and Kromskop photography are the themes of succeeding chapters, which give instructions of very considerable value to the student of this beautiful and fascinating branch of work. A paper by Mr. Ives, on "The Perfected Photo-chromoscope and its Colour Photographs," read by the author before the Society of Arts, on April 22, 1896, is also included. The second part consists of a series of extracts from the writings of Von Bezold, Pickering, and Rood, on light and colour. These extracts enable the reader to usefully augment a knowledge of the underlying theories of three-colour photography that he has gained in perusing the first portion of the book. We can cordially recommend *Kromskop Colour Photography* to our readers. It is the record of a thoroughly scientific attempt to subordinate the theory of colour vision to the requirements of practical photography. The admiration which the flawless beauty of a properly executed Kromgram always excites is, perhaps, the best tribute to Mr. Ives's success and skill in perfecting a process to which he has devoted so much time and labour. The little book is issued gratis, and has many illustrations.

Praktikum der Wissenschaftlichen Photographie.

Gustav Schmidt, Berlin.

This work, by Dr. Carl Kaiserling, assistant at the Royal Pathological Institute, Berlin, is probably the first guide-book to photography as applied to science. The author has been engaged for some years in giving courses of lectures on photography to physicians and naturalists, and the volume has been written exclusively as a guide for those who wish to use photography for the record of scientific facts. It is divided into nine chapters, with the following headings: Light and its Action; Photographic Apparatus; Taking the Photograph; The Negative Process; Positive Processes; Micro-photography and Enlargements; Stereoscopic Work; The Application of the Röntgen Rays; Photography in Natural Colours and Photographic Engraving. The book is written throughout on scientific lines, and unites in one volume information that could only be obtained by reference to numerous works on photography. The illustrations are very numerous and good.

Taschenbuch der Praktischen Photographie.

Gustav Schmidt, Berlin.

Dr. E. Vogel's handy guide to practical photography has reached its fifth edition, and this fact testifies to its well-merited popularity. The author has not spared any pains in bringing the text well up to date, and the illustrations throughout the volumes are excellent. The process prints, illustrating the differences between over, under, and correctly exposed negatives, and their proofs will, doubtless, be of much service to beginners. The text is clear and concise, and the large number of well-selected formulæ for most branches of photographic work make it a valuable little volume.

The Photographic Tourist's Guide.

68 pp., price 3*d.* Published at the Offices of the *Pharmaceutical Journal*, 5, Serle-street, Lincoln's-inn, W.C.

This little guide is "a concise gazetteer, including a list of dark rooms and dealers in photographic materials in the United Kingdom and abroad." It also gives "brief particulars concerning places of interest, a calendar, hints to photographic tourists, exposure tables," &c. These details serve to show the little book's scope, which has been extremely well covered. The details given are concise and clear, and yet they are, nevertheless, ample, for we even notice that the unromantic neighbourhood of Shoreditch figures among the places described, the local dealers' names being mentioned, particulars of Shoreditch Church and Columbia Market also finding inclusion. Next to "Shoreditch" in the list comes beautiful "Shrewsbury." These two references show the thoroughness of the compilation, which we can strongly recommend to travelling photographers as something useful for the camera case.

Catalogues Received.

J. H. Dallmeyer, Limited, 25, Newman-street, W. 78 pp.

Messrs. Dallmeyer's catalogue, which is beautifully printed and turned out, has its first thirty pages devoted to references in detail to the firm's optical productions, among which prominence is properly given to the Stigmatic and Tele-photographic series. To guide the photographer in the successful use of the latter, numerous explanatory notes and data are supplied, and, indeed, to each of the many lenses mentioned, brief and informative practical hints are appended, so that this part of the catalogue is distinctly superior in real utility to the majority of such compilations. The remaining forty odd pages of the book set forth a variety of well-chosen apparatus, cameras, shutters, and the like, among which some of the firm's own specialities also figure. The Dallmeyer catalogue is as tasteful as it is useful, and deserves a place in the photographer's reference library.

Wyatt & Co., 31, New-street, Lancaster.

Abridged catalogue of photographic apparatus, chemicals, and solutions. Messrs. Wyatt & Co. are pharmaceutical chemists, and their catalogue seems one designed to appeal to the wants of amateur photographers.

Hinton & Co., 38, Bedford-street, Strand, W.C.

Messrs. Hinton's catalogue extends to seventy-six pages, and gives a full list of chemicals, bottles, solutions, varnishes, developers, toning solutions, dry plates, films, lenses, cameras, shutters, dishes, lanterns, and most other photographic requirements. It is freely illustrated, and the amateur photographer will find it of considerable service as a reference catalogue.

News and Notes.

Royal Photographic Society.—Tuesday, May 24, at eight p.m., at 12, Hanover-square, London. "The Chinese Far West," by Mrs. Isabella Bishop (Miss Bird).

The annual visitation of the Board of Visitors of the Royal Observatory, Greenwich, will take place on Saturday, June 4. The Observatory will be open for inspection by invited guests at three o'clock.

The Austin-Edwards Monthly Film-negative Competition.—The prize-camera for the current month has been awarded to Mr. R. Stewart Park, 91, Brook-street, Broughton-terrace, N.B., for his negative *Lessons*.

Mr. W. J. Belton, having completed a successful three weeks' demonstration of Velox paper for Messrs. Griffin at the Crystal Palace Exhibition, will next week visit Birmingham for the purpose of introducing the paper to dealers and photographic societies.

The names of the prize-winners in the Warwick Monthly Competition for May are:—First prize (20*l.*), Mr. W. Henderson, Grey Horse Hotel, Tenby; second prize (10*l.*), Mr. F. E. Corney Wilson, 16, Swiss-road, Fairfield, Liverpool; third prize (5*l.*), Mr. F. Whaley, Photographer, Doncaster.

Photographic Club.—Wednesday evening, May 25, at eight o'clock, "Some American Notes," illustrated by lantern slides, Mr. H. Snowden Ward. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E.) will be pleased to forward on application.

THE editors of the *Photogram* are now making preliminary arrangements for their fourth Annual, *Photograms of* 1898, and ask us to draw the attention of our readers to this, and also ask them to submit their latest works to the editors of the *Photogram*, with a view to their being reproduced in its pages. The work will be carried out in practically the same style, and on the same lines as the three previous Annuals, but this year considerable space will be devoted to the Royal Photographic Society's Exhibition, recently held at the Crystal Palace, and considerably more space will be given to the American Section. The criticism, as heretofore, will be in the hands of Mr. Gleeson White, while the French Section will be dealt with by Monsieur Robert Demachy, and the American Section by Mr. Alfred Stieglitz and the editors of the *Photogram*. All pictures for use in the Annual should be in the editors' hands not later than September 1.

A MISSING PICTURE.—In the Queen's Bench Division, on Monday, Mr. Justice Grantham and a common jury heard an action brought by Mr. Felix Moscheles, portrait-painter, residing at 80, Elm-park-road, W., against the Crystal Palace Company, to recover 157*l.* 10*s.*, the value of a portrait of Sir George Grove, which the plaintiff lent to the defendants in April of last year for exhibition. Defendants denied liability. Mr. Crump, Q.C., and Mr. J. E. Bankes appeared for the plaintiff, while Mr. Mears represented the defendants. In April of last year the defendants proposed holding an exhibition at the Crystal Palace, to be called the Imperial Victorian Exhibition, and they invited the plaintiff, the Duke of Norfolk, and others, to lend certain pictures for exhibition. The plaintiff agreed to lend the defendants the portrait which he had painted of Sir George Grove. Later on, the defendants' carman called at the plaintiff's residence for the picture, and the plaintiff suggested that, before he took it to the Crystal Palace, he should leave it with Mr. Holder, in Soho, in order that it might be cleaned. The carman carried out the plaintiff's instructions, and afterwards took the picture to the Crystal Palace and deposited it, as he stated, with the defendants' agent. When the plaintiff asked that the picture should be returned, it could not be found. Defendants now denied that they received the portrait. The jury, after hearing the evidence, found a verdict for the plaintiff for the amount claimed. Judgment accordingly, with costs.

Patent News.

THE following applications for Patents were made between May 2 and May 7, 1898:—

MUTOSCOPES.—No. 10,050. "Improvements in and connected with Mutoscopes." A. WRENCH.

VIEW-FINDER COVERS.—No. 10,279. "Improvements in View-finder Covers or Shades for Photographic Cameras." Complete specification. W. G. HARRIS.

TRIPOD TOP.—No. 10,304. "The Folding (Photographic) Tripod Top." E. M. WINDUS.

STAND-CARRIER.—No. 10,498. "A New or Improved Combined Portable Photographic Camera Stand Carrier, Air Pump, and Photographic Dark Room or Tent, Particularly adapted to be Carried on Velocipedes and the like." H. BATE.

PLATES.—No. 10,512. "Improvements in Holders for Photographic Plates or Films." Communicated by F. A. Brownell. THE EASTMAN PHOTOGRAPHIC MATERIALS COMPANY, LIMITED.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

May.	Name of Society.	Subject.
23...	Bradford Photo. Society	Prize Slides.
23	North Middlesex	*Printing Processes.* Leslie Selby.
24	Hackney	*X Rays to Date and Wireless Telegraphy.* C. T. Fleetwood.
24	Isle of Thanet	Annual Exhibition of Members' Work.
24	Royal Photographic Society	*The Chinese Far West.* Mrs. Isabella Bishop (Miss Bird).
25	Croydon Camera Club	Conversational Meeting.
25	Photographic Club	*Some American Notes.* H. Snowden Ward.
25	Southport	Prize Prints.
26	Liverpool Amateur	Open Meeting.
26	London and Provincial	Open Night.
26	Oldham	*Platinotype Printing.* J. Shaw.
28	Ashton-under-Lyne	Excursion: Chetham College, Manchester. Leader, W. J. Hannan.
28	Borough Polytechnic	Excursion: Wanstead.
28-30	South London	Excursion: Dorchester-on-Thames. Leader, F. Goddard.

ROYAL PHOTOGRAPHIC SOCIETY.

MAY 17,—Ordinary Meeting.—The Right Hon. the Earl of Crawford, K.T. (President), in the chair.

MEMBERSHIP.

Five new members were elected, and twelve other candidates were nominated. It was announced that six members had been admitted as Fellows of the Society.

AFFILIATION.

The name of the Heckmondwike and District Camera Club was added to the list of affiliated societies.

REVERSAL OF THE IMAGE.

Colonel J. WATERHOUSE, I.S.C. (Hon. Secretary), read "A Note on some Curious Cases of Reversal of the Photographic Image in Solar Photographs," in which he recounted the details of some instances of reversal which he had experienced in photographing the sun, in India, on blue-stained collodio-bromide plates. The experiments to which he referred were made with plates prepared with bromised collodion, sensitised in an eighty-grain bath of nitrate of silver, and, after washing first with distilled water and then with two changes of common water, treated with a solution of an aniline blue dye, which he had found to produce reversal very readily in photographing the spectrum. Most of the plates were developed with alkaline pyro, and for others a formula of Dr. Vogel's was used. One plate was exposed through a red glass, and, having first been subjected to a short preliminary exposure to diffused daylight, received several images of the sun, with exposures varying from one to twenty seconds, and the plate, upon development, was weak, and the reversed action was not very strong. A second plate, exposed under a blue glass without the preliminary exposure to light, but otherwise under similar conditions, before development showed strongly marked images of the sun, dark on a light ground; on applying the alkaline developer, the dark circles grew lighter in colour, and became quite transparent, the rest of the plate, which had been illuminated by the blue haze, coming up to full strength, and, after fixing and intensifying, a good positive resulted with the solar images clear on a dark ground. On a blue-stained plate, exposed without a blue glass, the images given by a very short exposure were not quite reversed, those with five or ten seconds' exposure were completely reversed, and then, as the exposures had been increased to from 60 to 200 seconds, the reversal was only observed round the sun's limb. The reversed images were remarkable for their clearness and sharpness, there being no trace of irradiation or anything of the kind. Having detailed the observations made in the course of a long series of similar experiments, Colonel Waterhouse proceeded to refer to the publication by Dr. Janssen, in 1880, of the results of his investigations in this direction, in THE BRITISH JOURNAL OF PHOTOGRAPHY, 1880 (p. 402), which were (1) First negative; (2) First neutral (uniformly obscure); (3) First positive (reversal); (4) Second neutral (uniformly clear); (5) Second negative (re-reversal); (6) Third neutral (uniformly obscure). Dr. Janssen appeared to have obtained recurrent normals, with neutral and reversed intervals, rather than recurrent or double reversal. He estimated that the intensity of the light required to produce the second negative image was 100,000 times as great as that giving the ordinary image, an estimate which practically agreed with that given by Mr. Hugh Brebner in an article in THE BRITISH JOURNAL OF PHOTOGRAPHY, vol. xxxv. p. 23. In that article there was a calculation of the periods of exposure required to produce the various phases, and it appeared that, if the normal were obtained with an exposure of the second, the time for the second reversal would be 393 days; or, putting the normal exposure at one-thousandth of a second, nine hours would be required for the second reversal.

Mr. J. SPILLER asked whether Colonel Waterhouse could more definitely describe the aniline blue dye to which reference had been made, as that name was given to many dyes of different kinds?

Colonel WATERHOUSE said he bought it in a bazaar at Calcutta, and he did not know its proper name, but he still had a little of it left.

Mr. SPILLER thought, judging from the description which had been given, that it must be what was known as "pure soluble blue," but he undertook to say exactly what it was if Colonel Waterhouse furnished him with a few grains of the substance.

Mr. W. E. DEBENHAM asked whether the statement was to be taken in the strict sense that an image visible before development had developed up quite clear, or whether it only appeared clear in comparison with the dark background? If it developed quite clear, he would like to hear some explanation to account for the removal of the visible image formed directly by light.

Colonel WATERHOUSE said he had been quoting from his notes made in 1876, and the negatives had since been destroyed by fire, but they must have struck him at the time as being unusually clear.

Mr. T. BOLAS recalled some experiments which he made some years ago, in which bichromated plates were exposed for a long time in a printing frame, and developed with ferrous oxalate, when the printed-out image certainly disappeared and nearly clear glass resulted; he had also found that the same thing occurred without the bichromate.

Mr. J. STERRY referred to his own investigations upon the subject of reversal, and said he could quite understand Colonel Waterhouse stating that the printed-out image developed clear. One's first impression was that the apparent clearness was due to the contrast, as Mr. Debenham had suggested, but, upon measurement, he had never found that the image was clearer than the amount of reduction by light alone; there had always been some very slight addition by development, although in some cases very slight, but there had invariably been no reduction of the amount produced by light alone. He asked what was the extent of the preliminary exposure to light.

Colonel WATERHOUSE said he placed the plate near the window of his dark room, and opened and closed the shutter as quickly as possible.

Mr. CHAPMAN JONES asked Colonel Waterhouse whether he knew of any instance of reversal with printing-out paper?

Colonel WATERHOUSE said he did not.

Mr. SANGER SHEPHERD said that, on one occasion, he accidentally exposed a piece of printing-out paper under a negative for two or three days, and upon opening the printing frame he found a perfect negative.

Further discussion took place of a conversational nature, in which Mr. Chapman Jones, the Rev. F. C. Lambert, Mr. W. Thomas, Mr. Bolas, and the Assistant Secretary took part, and a vote of thanks was passed to Colonel Waterhouse for his communication.

SOIRÉE AT THE GRAFTON GALLERY.

The PRESIDENT announced that he proposed to invite the Fellows and members of the Society to a *soirée*, to be held at the Grafton Gallery, on Tuesday, June 14 next, when he would exhibit a large collection of manuscripts dating from the seventh century.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 12, Mr. Philip Everitt in the chair.

The Chairman reminded the meeting of the batch of Fry & Co.'s films, negatives on some of which had been held by Mr. Hodd to show the good keeping qualities of this film during some eight years which had elapsed between making and exposing the emulsion. The remainder of the packet had come into the Chairman's hands, and he had made a couple of trials in an interior. The day was dull, the hour about four p.m., the stop *f*-22, and the exposure twenty-five minutes. The negative was very much under-exposed, although the ordinary exposure for a moderately rapid film would be about ten minutes; but, not only was the film under-exposed, it was covered with a series of markings, which were also on the parts cut off to fit the film into the dark slide. These were due probably to contact with the packing paper. The Chairman used the pyro-ammonia developer.

Mr. J. E. Hodd compared his results with the Chairman's, the difference between them being very marked. Mr. Hodd's experience with the pyro-potash-metol developer, which he used, showed that the films did not want such an extreme exposure as the Chairman's results would suggest.

Mr. R. Beckett did not think that pyro ammonia was the best choice to make for the development of a stale plate. If there was anything in it which was bad, pyro ammonia would find it out.

The Chairman contended that, if the films were still good, they should stand the test. He purposely chose the developer named.

Mr. W. D. Welford considered that, if the negatives had received a full exposure, the markings to be seen would be absorbed, as it were, in the general details of the negative. At any rate, they would not show by any means so strongly.

Mr. S. Herbert Fry believed these apparently insensitive marks were traceable to an unfortunate method of packing. He gathered that these films had a greasy paper packing between each, and the marks were a certain amount of the grease which had parted from the paper. They could be rubbed away before development, and so allow the developer to act evenly upon the whole surface of the coating.

Comparisons of Developers.

The Hon. Secretary read a series of notes forwarded by Mr. A. Haddon, who had undertaken to introduce a discussion on Mr. Teape's paper of recent date, but was unavoidably absent himself. After pointing out the extreme difficulty which more often than not occurs in raising a discussion upon a paper immediately after its delivery, and favouring the setting aside for such discussion of an evening, by which time all can have carefully weighed the facts of the paper, Mr. Haddon proceeds to discuss the paper in hand. He supported Mr. Teape's method of taking the manufacturer's formulæ in comparing new with old developers. It was only after their peculiarities were learned that variations could safely be made. Of diogen, for example, practically nothing was known regarding its powers in abnormal exposures. Mr. Teape found that it was good for over-exposures, while for under it was inferior to many others. But, after further study, it might rank with the best for all kinds of exposures. Now, notwithstanding the fact that new developers are generally compared with pyro, which the majority look upon as the perfection of developing agents, it has been shown by Mr. Teape that a mixture of rodinal and hydroquinone gives in under-exposures better gradation and less fog than pyro under even the best conditions. From an examination of Mr. Teape's development notes, Mr. Haddon was surprised to find how large was the quantity of bromide used with the fifteen-times normal exposure in the case of pyro development. The action of bromide in preventing development was still surrounded by darkness, but one would almost have expected a suspension of action altogether with such a quantity. Mr. Haddon concludes from the tests of ortol in under-exposures that mere dilution of the normal developer does not conduce to the best results unless, after the appearance of all detail, a strong solution is applied. Mr. Haddon notes the peculiar behaviour of soluble bromide in the development of over-exposures. In the case of three-times normal, the developer contained only one-fortieth of a grain of strainer, yet with sufficient effect to correct the over-exposure, but with this there was an increase in the quantity of ortol and metabisulphite. With a ten-times normal the bromide was increased 320 times. Thus bromide in small quantities appears to act almost as well as when greatly increased. From the figures bearing on the appearance and completion of the image he notes that with extremely over-exposed plates, and an increase of ortol and bromide, the time of development is not greatly increased, as in the case of pyro. Ortol promises to be a good all-round developer, both for under and over-exposures. Diogen is good in some respects, *i.e.*, over-exposures, while falling short of its rivals in under-exposures. He observes the smallness of the quantity of bromide advocated for slight over-exposures by the makers, but Mr. Teape does not adhere to this, using in the fifteen-times normal nearly four times the maximum. Study of the times of development reveals the fact that bromide was not that powerful restrainer with diogen that the makers thought. Mr. Haddon puts the question whether it would be found possible, having started to develop with a much-restrained developer, the plate proving to be not much over-exposed, to produce a satisfactory image by a reconstituted developer, or whether the abnormal quantity of bromide at the start would completely alter the range of tone. For under-exposure dilution was recommended up to five or seven-times bulk; and, although Mr. Teape diluted to three volumes for half normal and to five for a quarter normal, the gelatine was deeply stained yellow and orange, while the time of development of the shorter exposure was sixty-one minutes. Mere dilution will not then serve for under-exposure. Perhaps further study will suggest a means. The solution appears to be a powerful absorber of oxygen in the presence of alkali, suggesting a possible energetic developing action if only it could be applied. Mr. Haddon congratulates Mr. Teape upon his mixture of rodinal and hydroquinone. When first introduced, rodinal negatives were far from good, the images being grey and weak. Rodinal of to-day was a different article, very powerful, and if by itself it cannot produce any great density; combined with hydroquinone, the defect is removed.

The Chairman regretted the results of Mr. Teape's paper were not measured photometrically. One could not well judge by the eye the value of the resulting negatives. What was sought in the negative was the truth of the scale of gradation.

Mr. S. H. Fry held it important that the results should be discussed in their practical bearing. A negative, he said, was no more than a compromise of values which were seen in nature, which may not agree with the actual values decided phtotometrically. Therefore, while photometrical measurements gave valuable information to the emulsion-maker as to his advance in density, speed, &c., the users of plates must decide upon the compromise value of the negative, putting aside special colour-reproduction work, in which there was room for differences of opinion.

Mr. Teape thought, in practical work, scientific measurements were not required. He could trust to his own eye to say whether a certain negative would give a good print.

Mr. Beckett agreed that the scientific test was not wanted.

Mr. Mackie understood the aim of the experiments was to discover in what way one could produce the least bad negatives under conditions which, in ordinary routine, would produce a bad negative.

Mr. Teape described some further results, shown at a previous meeting, and said it seemed to be the idea that there was no necessity to use such large quantities of bromide as he had. His reason for so doing was based upon conclusions drawn from work of some time ago and his general work since. He then described minutely the experiments he made, using bromide solution in which to immerse over-exposures before development for varying times. Before these trials he had never believed that such long exposures could be made to yield reasonably good negatives.

Mr. Beckett said the method of immersing in bromide before development was a plan he had long adopted.

A long and animated discussion ensued bearing on the correctness or otherwise of Mr. Teape's mode of drawing his conclusions compared with photometrical measurements.

PHOTOGRAPHIC CLUB.

May 11,—Mr. H. Müller in the chair.

Mr. James Brown showed a half-plate Woodbury relief ready to be pressed into the lead block to form the printing mould. Mr. W. D. Welford gave a display of cycling and general animated photographs. The subjects included several films, showing how this branch of photography has been utilised for the purposes of trade advertisement, and, while most of the films were old friends and of general interest, consisting chiefly of the class of thing commercially obtainable, Mr. Welford had a few of specially got-up events running in length to as much as 250 feet, as against about fifty feet with the usual commercial films. The machine used was that of the Prestwich Manufacturing Company, and Mr. Prestwich was present to assist in the show. In all, some thirty films were projected upon the screen, and at the close of the display a vote of thanks was passed to Mr. Welford.

The Glasgow Convention.

Mr. John Stuart, of Glasgow, the President of the 1898 Convention, in response to Mr. Bedding's request, offered a few remarks about the arrangements which had been made in Glasgow in anticipation of this year's meeting in July. He and his fellow photographers in Glasgow were all heartily looking forward to the time when they should see, and be able to welcome, their friends from London and elsewhere, and to the opportunity they should have of conducting their visitors through their city and through the neighbouring country side.

Mr. Stuart entertained little doubt that their Scottish scenery would fascinate and interest all comers, and he hoped that what was provided in the way of excursions on the Clyde by special steamer, and to such spots as Stirling and the field of Bannockburn, would please the members who participated, amongst whom he hoped to see everybody present at this meeting.

Mr. F. A. Bridge, the Secretary of the Convention, heartily supported Mr. Stuart's invitation, and promised all a good time in Scotland.

MANCHESTER PHOTOGRAPHIC SOCIETY.

May 12,—The chair being taken by Mr. A. E. Casson.

Mr. W. Thomson, F.C.S, exhibited a new form of blind shutter which he has recently patented. By the simple pressure of the ball either time or instantaneous exposures may be given.

Mr. J. T. Sandell, of London, gave a demonstration on

Multiple Films, their Theory and Practice.

These plates are manufactured for the purpose of giving to photographers a plate specially adapted for preventing halation. In making the Double plate (II.), the glass is first of all coated with a slow landscape emulsion; then, when this is dry, another coating is put on, but this time the emulsion is the most rapid, therefore providing a plate which is equally good for snap-shot work in interiors, as shown by the various lantern slides Mr. Sandell had with him. The effect on a III. Triple plate, which is made somewhat similar to the Double, of an exposure of five minutes on the sun is as follows: The top film has a weak image, the second or middle film a stronger one, whilst the third film is completely solarised. "How long shall I develop a Sandell plate?" is the usual question asked, and Mr. Sandell said that, after the bulk of the image had been developed up, the plate should be allowed to remain in the developer another fifteen or twenty minutes. Six plates, having had exposures varying from five seconds to five minutes, were developed in one dish for the same length of time, and, although quite different in gradation, each was a good negative.

Some large prints from negatives taken by Mr. Sandell were on view, and, no doubt, the members present gained knowledge on the use of multiple films.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE CONVENTION.

To the EDITORS.

GENTLEMEN,—I shall be glad if you will allow me, through your columns, to ask intending members of Convention, who have not already done so, kindly to communicate with me as early as possible.

The Glasgow Convention promises to be an unusually large gathering, and it will materially lessen the labours of the executive, and increase the comfort of those attending the meeting, if the approximate number is known well in advance.—I am, yours, &c.,

F. A. BRIDGE, *Hon. Secretary.*

East Lodge, Dalston-lane, London, N.E., May 16, 1898.

STEREOSCOPIC RADIOGRAPHY.

To the EDITORS.

GENTLEMEN,—I have just read Dr. Hall-Edwards's letter, p. 319, but the previous communications to which he refers I have not at hand, but that is of little or no consequence at the moment. Dr. Hall-Edwards says that "he has arrived at the conclusion that, for practical purposes, no method of localisation can compete with the simple one of taking a stereoscopic picture."

Most of your readers will admit that there have been few stronger advocates for the stereoscope than myself. Indeed, when looking at the very first radiograph I ever saw, it occurred to me the stereoscopic radiographs would be a decided advantage, and at once, then and there, I started to manufacture one from the picture then before me; it was the hand of a man (Röntgen's hand, I believe). First, a reduced copy was made to get it on to an ordinary stereoscopic slide; then I traced the tissues (the flesh part) on tracing paper, and cut this out in duplicate, cutting two paper patterns together, so that any irregularity in the one would be also in the other. These were gummed on to a glass plate at about $2\frac{7}{8}$ inches centres. Next, the bones were traced, and two sets cut together as before; these were blackened by Indian ink, and gummed on the top of the first pair representing the tissues, but at a little wider centre, about 3 inches. From this a negative was printed, and a positive was made from the negative. In the first trials the edges of the cut paper showed too clear, and, printing through the glass, gave a blurred edge and made it more like the original.

The result by the stereoscope was very effective. The bones had the appearance of being deep down in the flesh. This slide was shown to many medical and scientific men (as a genuine article, of course), and it was amusing to hear their diagnosis. The "diseased bone" was really nothing more than the irregularity of the cutting of my paper tracings, only that it was alike in each side. Of course, I did not allow the joke to go too far, or I might have contracted a disease of some sort. Well, now, this manufactured or counterfeit stereoscopic radiograph was produced many days before I had even got the apparatus ready for making genuine radiographs. But I was soon at work, and attention was again given to the stereoscopic aspect, and it did not take long for me to arrive at a different conclusion to Dr. Hall-Edwards, viz., that, for practical surgical purposes, stereoscopic radiographs were of little value.

A single radiograph shows two dimensions, *length* and *breadth;* but we want the third dimension, *depth.* Which is the most practical way to get it?

I attended the meeting of the Röntgen Society, to which reference has been made, and saw what Drs. Mackenzie, Davidson, and Hall-Edwards were doing.

It is quite easy, either by the method these gentlemen were then advocating, or by stereoscopy, to locate the needle in a bar of Sunlight soap, or to find a calculus hidden in a loaf of bread, and it is not difficult to show the exact position of a bullet in the head of a cadiver by the stereoscopic method, but it is quite another thing when we have the living subject to deal with, and, after the experience of about 1000 cases which I have radiographed for the medical profession, I am confirmed in my early opinion that stereoscopy is impractical, and that the best or most practical method for showing the third dimension is by taking a second radiograph at right angles to the first, though even this is, in some cases, beset with considerable difficulties.

To ensure a stereo-radiograph two exposures must be given on two different plates, the relative position of tube and patient must be adjusted between the first and second exposure, but the position of the patient to the second plate must be identical with the first; in other words, the patient must not move from the beginning of the first exposure to the conclusion of the second exposure.

If the patient be quite still, say, for the first exposure, and then moves, say, a little sideways for the next exposure, there will be a fearful confusion, but that is not the worst of it. The stereoscopic relief in the finished result may be anything the radiographer likes to name it; the greater the adjustment of tube to patient between the first and second exposure, the greater will be the stereoscopic relief, and the stereoscopic relief at its very best is simply a matter of judgment, and everybody knows that judgment is liable to error.

By taking a second radiograph at right angles to the first, the patient has a chance to rest between the two exposures, and this is not an unimportant consideration sometimes; but the results, when properly done, permit of definite measurements being taken, and not left to guesswork.

And now, in conclusion, I am fully prepared for somebody or anybody to tell me that the right-angle method is not always possible, and I admit it.—I am, yours, &c.,

W. I. CHADWICK.

PHILANTHROPIC PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—In your issue of to-day you refer to a circular issued by a firm of photographers requesting the favour of a free sitting, or, perhaps, I should say, offering the honour of a free sittting. Though not an "eminent man of science," I have also received a number of such circulars, and as the latest one is worded in precisely the same terms as the one you quote, presumably it is from the same firm, a London one, the name of which is fairly well known. Previous circulars stated that the firm in question were anxious to make a collection of portraits of a certain London Society to which I have the honour to belong. The question naturally arises, How is such an undertaking to bring in any profit to the photographers? In the first place, the members of this particular Society are numbered by thousands, and the initial cost of making the collection would be considerable; therefore, if duplicate copies of the complete set are to be put on sale, the price would be prohibitive to the majority of the members of the Society, outside which there would be no likely purchasers.

In the second place, the copyright of the portrait of one of the most eminent members might be of value, but the copyright of mine would not be worth a "grain of mustard seed" to anybody, and, though I do not want to disparage the worth of my fellow-members, the same might be said of the vast majority of us.

In the third place, I have to face the unpleasantly snggestive idea that this well-known firm of photographers proposes to make the necessary profit out of myself, even though in their circulars they carefully (too carefully?) abstain from any reference to such a thing, and I am unnerved with the thought that after the sitting I shall be expected either to order half-a-dozen copies for myself, *and to pay for them,* or to face some unknown and very unpleasant consequences, an ultimatum of some sort possibly. Under these circumstances, I put these invitations into the waste-paper basket, as I have not pluck enough to accept them, and face what appear to be the probable results of refusing to purchase prints that I do not want.

If these conclusions are wrong, will the firm in question please put me right? They can easily identify themselves from the quotation in your last issue.

If they can explain that they have undertaken this rather big project for their own personal amusement and satisfaction, and that they really want to make a collection of the portraits of the members of this Society purely at their "own risk and cost" (*i.e.* the firm's risk and cost, not the members'), some of my "insuperable objections" will be overcome, not all, because on receipt of their last letter I went off and got photographed somewhere else, and still have some copies left.—I am, yours &c.,

May 13, 1898. NEMO.

To the EDITORS.

GENTLEMEN,—You invite opinions from your readers on the question of touting. As on old photographer and an old reader, I should like to have my say. To begin, I can quite remember the time when not only the "best" men, but the second best men, in the profession, considered it derogatory to tout much as an architect or a doctor considers it now. The little men in side streets of crowded garrison towns and "beach" men were pretty well the chief representatives of the system. Lately, however, the methods have been so glorified and refined that some men of mark in the profession have been able to hypnotise their self-respect so far as to enable them without scruple to circularise broadcast. The fisher for sitters tries now all waters. November never arrives but the new Mayor gets the neatly lithographed letter asking him to call when in town to honour Messrs. Smoothy & Son with a sitting to complete their series of these dignitaries. Has a man written a noteworthy book, he is to be added to Windbag & Company's collection of eminent authors, "all free of cost and proofs submitted."

Only a few weeks ago a client of mine, living more than a hundred miles from the metropolis, reported that he had received a call from a photographer, giving the name of a famous London firm as his principals, asking permission to obtain a sitting there and then for inclusion in these people's set of Justices of the Peace. A proof would be forwarded, and an enlargement on approval free of cost. I may say, in parenthesis, that a partner of the same firm is, to my knowledge, a member of the Photographers' Copyright Association, a body that is surprised that more pro-

vincial men do not join that august society. Of course, one sees the advantage of possessing copyright negatives obtained by this system of touting, and one can also see at what disadvantage the man is placed who has too much delicacy to go round the country on tramp for business in this way, or refuses to join in circularising enterprise. As regards doctors, and actresses, and the clergy, the "begging-letter writers" have it nearly all their own way. The sprat is thrown desperately in every expanse of water, the mackerel is too often hooked, landed, and done for. No efforts of photographic societies, Royal or other, no addition of three or four letters to ornament a name, will ever give any professional status as long as these tricks of trade continue. It is easy to imagine how such a thing would work if indulged in by members of the learned professions. I have heard of a local doctor venturing as near as possible the verge of decency by calling at the houses of possible patients for a glass of water by way of introduction, and who earned thereby the scorn of his brother practitioners. But this is primeval innocency in comparison with the touting methods of some latter-day photographers, of whom it is not too much to say that they bring shame on what ought to be, and might be, an honourable and gentlemanly profession.—I am, yours, &c.,

SENEX.

AN ASSISTANT'S GRIEVANCES.

To the EDITORS.

GENTLEMEN,—Would you allow me to point out a grievance that exists among photographic assistants, relative to the requirements exacted by those who advertise (or, rather, the majority of them) for assistants.

In advertising for applicants to fill the respective posts that are vacant, they (the advertisers) require the portrait of the applicant as a guidance. That's all well and good and as it should be, but they forget (should the application be not entertained) that the applicant requires the return of such portraits in time for answers to further advertisers in the next week's issue.

One cannot overlook the fact that, when an assistant is out of employment, and he replies to half a dozen advertisers and each reeuires a portrait of self, that it means a very serious matter to him not to be able to comply with their wish.

In my own case I could instance such where I have forwarded portrait of self and also specimens of work, with stamp to cover for return of same, only to find that they have been returned too late to be of any use for the following week's issue of your paper.

I appeal to those for whom this letter is intended, if they would kindly be a little more considerate, and remedy this grievance, for which many assistants would be grateful.—I am, yours, &c.,

May 10, 1898. AN ASSISTANT.

A PHOTO-CYCLING SOCIETY.

To the EDITORS.

GENTLEMEN,—Will you be good enough to inform your readers that, owing to the past success of our Club, we propose to spread out by startling a photo-cyclist section, and shall be glad to enrol any one interested in cycling or photography. The subscription will be 5*s*.

Runs will be arranged during the summer months to suit the convenience of members, and they will be conducted by some member who knows the district visited.

Mr. E. R. Shipton (Secretary of the C.T.C.) has consented to beceme Vice-President.

Application for membership to be made to one of our Secretaries. Ladies are eligible for membership, and many applications are already in.—I am, yours, &c., PAUL A. C. ARMFELT,

Kingston-on-Thames Photographic Society.

Melbourne Lodge, East Molesey, May 14, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

C. C. Bogg, 7, St. Michael-street, Malton.—*Photograph of four lambs sucking a cow.*

Adolph Lipschitz, 41, Cheetham Hill-road, Manchester.—*Photograph of group of Rabbis*

E. A. D.—We think you would be quite safe. We doubt the validity of most of the patents.

A. H. DE'ATH (Ashford).—Yours is one of many complaints that we have received. We should recommend you to take extreme measures. It is against our rules to answer questions through the post.

BARNET ON COMPOSITION.—STUDENT writes: "You will greatly oblige me if you will say where the present edition of Barnet on *Composition and Chiaroscuro* is published, and the price?"—For the moment we do not remember; perhaps some reader will kindly supply the information.

G. HOLLAND.—The photograph is a very good specimen of the class of work, and we think it shows the possession of sufficient ability to justify you in commencing business. But do not interpret this opinion as a recommendation. The face of the photograph would be decidédly improved by a little retouching. The latter branch of work is not difficult to master. Messrs. Percy Lund & Co., Bradford, and Marion & Co., Soho-square, publish books on retouching, which we recommend you to procure and study.

STUDIO.—H. G. MOULDEN writes: "Could you give me assistance in your query column for the best arrangement of blinds in the colour for a studio that faces west? is it possible to do good work in such a studio? Any suggestion would be very gratefully received. Of course, excellent results can be obtained in a studio with a western aspect. As no information is given as to the form of the studio or its dimensions, it is impossible to say the best arrangement of blinds. But, for such an aspect, light green or dark blue will be the best colour for the blinds or curtains.

WAGES.—CASH says: "Kindly give me an answer to the following question; I have an assistant, age twenty-two, whom I have brought up from childhood. I find him in clothes, food, lodging, &c., in short, entirely support him, and give him 7*s*. 6*d*. per week pocket money, with twenty per cent. on all outdoor work, which he is very good at and pushing. Will you kindly tell me what is a fair estimate in hard cash of such a post? I want an unbiassed opinion, and know that you will give it?"—We should say, with your long instruction and the young fellow's admitted proficiency, he would be worth from thirty shillings to two pounds a week in salary, without board and lodging.

RESTORING PRINTS.—WILLIAM ELLIS writes: "I believe there is known a compound in solution in which faded photographic prints may be immersed and they will come up bright as though newly toned and fixed, so that they may be copied with all the details showing. Can you tell me what the compound is? I know the prints will afterwards totally fade, but, after they are copied, that would be of no consequence to me. An answer in the usual place in the JOURNAL will be esteemed."—We know of no such compound. If the prints were toned with gold, and they are immersed in a solution of bichloride of mercury, the yellow tint will be removed and better copies can be obtained. No lost detail will be restored, nor will such prints, if well washed, totally fade afterwards. We have prints treated in this way twenty years ago that are as good now as when first treated.

OVER-PRINTED PICTURES.—REDUCER writes: "Please oblige by stating by what method I can reduce P.O.P. prints that have been printed too dark, if possible so as not to alter the tone, *i.e.*, after they have been fixed? The paper I use is of foreign make, and the makers do not recommend any washing before toning, but the prints to be put straight in the toning bath. Do you think this method detrimental to the permanency?"—We do not know anything of the composition of the foreign P.O.P., so can say nothing definitely as to the treatment as regards permanency. For ourselves we should not work that way. As to reducing the prints, we know of no method by which that can be done without altering the original tones of the pictures. We may say, however, that you, as a professional photographer, would find it more economical to make fresh prints than attempt to reduce faulty ones.

BROKEN DISH.—INVESTIGATOR writes: "With reference to your number of 6th inst., p. 296, about 'Broken Dishes,' will you kindly let me know: 1. What is water glass? 2. The difference in price between pure or rather real and artificial fish glue being in the proportion of about six to one, is real or artificial glue meant? 3. As for the composition of the cement, the water glass and the fish glue are indicated in c. c., which, of course, means that they are to be in a liquid state, in what quantity of water are the substances, in their solid state, to be diluted?"—In reply: 1. "Water glass" is either the silicate of soda or the silicate of potash, both are known as water glass. 2. We imagine that what is known as commercial fish glue is meant, and not pure isinglass. The formula is given as it appeared in the foreign journal from which it was quoted. 3. The silicates of soda and potash are only met with commercially in solution, so we imagine that the commercial solutions of the silicate and fish glue are meant. As we have said, the formula is quoted as it appeared in the *Photographische Chronik*. We have not tried it ourselves.

FAULTY DARK SLIDES.—COLONEL GUBBINS says: "I use Thomas's A 1 isochromatic films. I have recently had five double slides made for films. When I first got them I was troubled with hinge marks, *i.e.*, an insensitive band across that part of the films which had lain under the flexible material of the dark-slide shutter. I hung the slides up in a warm room, with one shutter open, for weeks at a time; but now, on my return from a two months' trip to Italy, I find the negatives still marked in the same way. Can you tell me of any way of treating the shutters that will prevent this occurring in future? Ought not the maker to be able to rectify it? Are isochromatic films and extra-rapid ones more likely to be marked than ordinary and slower ones? If you can help me, you will greatly oblige."—The only way the trouble can be overcome is by taking off the old material of the hinges and substituting a fresh and inert material. This the maker of the slides should do without demur. The more sensitive the plates are, the more susceptible they are of trifling disturbances. We were under the impression that all the best makers of cameras now used only inert material for the hinges of their dark slides.

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No. 1986. Vol. XLV.—MAY 27, 1898.

Contents.

	PAGE
Ex Cathedrâ	337
Photogravure with the Ruled Screen	338
Leaderettes:— Photography at War Time—Practical Joking by Photography—Kew Bridge—Historical Engravings of London—The Spectaclemakers' Company	339
By the Way. By Dogberry	340
Foreign News and Notes:— Spectrum Analysis—Improvements in Radiography—Toning—Photographic Paper—A New Lens—Absorption and Reflection—Optical Glass	341
The Working of the Röntgen Ray in Warfare	342
The Decorative Capabilities of Photography.—III. By T. N. Armstrong	343
X-ray Tubes. By J. Pike	343
For the Lady in the Reception-room. By A Mere Man	344
Stereoscopic and Cloud Photography	344
Survey Photographs by Means of a Kite	344
Birch and Bracken Subjects	345
Stereoscopic Transparencies	345
Notes on Printing Papers	346
The Coming Convention	346
Crystal Palace Exhibition—Dinner to the Executive	346
Our Editorial Table:— Hauff's Chemicals for Development—*Mémoires Originaux de Créateurs de la Photographie*—The No. 2 "Special" Bull's-eye Kodak—A Print-trimming Gauge—Catalogues Received	347
News and Notes	348
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Croydon Camera Club—Hackney Photographic Society—North Middlesex Photographic Society—Leeds Photographic Society—Liverpool Amateur Photographic Association	348
Patent News	350
Correspondence:— Depth of Focus—"Some Facts about Focus"—Anastigmatic Lenses—Early Dry Plates—The Stores and Carbon Printing—Kromskop Colour Photography—Miniature-painted Photographs on Ivory—Invitation Sittings	350
Answers to Correspondents	352

EX CATHEDRA.

An agreeable termination to the many pleasant little functions, formal and informal, which the Royal Photographic Society's International Exhibition at the Crystal Palace called into existence, was the dinner to the principal members of the executive, given by the leading exhibitors at the Holborn Restaurant on Thursday, May 19. A short report of the proceedings appears in another column. The dinner was the occasion of bringing together a number of gentlemen prominent in the photographic world, who rarely, if ever, otherwise meet, and on that account we do not doubt that it will long be looked back to as both a pleasant and a unique festivity. Hosts and guests appeared to be greatly delighted with the evening's proceedings, and there was only one cause for regret that we could discover, viz., that so many exhibitors were prevented by illness, distance, prior engagements, and other causes, from being present.

* * *

It has been represented to us that in restricting the number of guests to four the line was drawn too soon. The names of three or four other gentlemen who did great service in the preliminary arrangements of the Exhibition and the hanging of the exhibits have been mentioned to us as deserving of inclusion among those whom the exhibitors might have honoured at the dinner. We are aware of the devoted labours which the gentlemen in question contributed to the Exhibition; but, as it was ascertained that their services are to be recognised by the Society in another and perhaps not unsatisfactory manner later on, it was felt that the necessity for inviting them to the dinner was obviated. We trust this explanation will remove all cause for further misapprehension.

* * *

It will be observed that Mr. Child Bayley makes the statement that 75,000 people went specially to inspect the Photographic Exhibition—an unprecedently large attendance at an exhibition connected with photography. Could there be any better or more convincing justification of the action of the Society in determining to hold the Exhibition? We think not. Already the eyes of those who have the interest of all branches of photography at heart are turned towards the future, and when the next great International Photographic Exhibition is held it will be found that the experiences gained at the Crystal Palace during the past two months will have been profited by to the fullest extent, so that those who support the Exhibition will have the assurance that their needs will be studied to the fullest extent.

* * *

In taking leave of the subject in this part of the Journal we may draw our readers' attention to the fact that a large number of copies of the Exhibition catalogue remain on hand for disposal. That catalogue, as we have already pointed out on more than one occasion, is really a unique production. It epitomises the history of photography, and completely illustrates its present position. As a work of reference it is bound to increase in value as time goes on, and in future years it will undoubtedly rank high as a text-book. Nobody at all more than superficially interested in photography should be without it. The catalogue is on sale at the Society's offices, 12, Hanover-square, W.

* * *

According to the *Lancet*, the use of Röntgen rays as a means of certifying the existence of death was demonstrated at a recent meeting of the Biological Society of Paris. M. Bougarde showed three "photographs" of the thorax, two of them from living persons, and the third from a corpse, all taken by the

X rays. In the two first the different thoracic organs and the walls of the thorax itself exhibited a hazy outline, so that their limits could not be exactly made out. This, of course, was owing to the natural movements of the parts, the pulsations of the heart and the great vessels, and the movements of the diaphragm. Even when the subjects held their breath so as to minimise movements as much as possible the outlines were still hazy, and the outline of the diaphragm was seen as a shadow varying in depth and extending over the ninth and tenth intercostal spaces. The heart and great vessels were seen to occcupy the centre of the chest as a dark oval mass, the shadow of which was dense in the centre, and gradually faded away towards the periphery until the almost transparent lungs were reached. In the radiograph of the corpse, however, the appearance was quite different, for all the organs had sharp and well-defined edges.

* * *

"The White Door" is conspicuous among the entrances of that handsome thoroughfare of handsome houses, Regent-street, London. As its distinctive name implies, it is painted quite white, and it gives ingress to the Romney Studio, No. 122, Regent-street, W., which has just been opened for photographic purposes by Mr. Percy Wood. Among sculptors Mr. Wood has long had a prominent place, and his name is identified with the production of a great many notable statues. He is a man of fine artistic sympathies, and he has furnished his studio—which occupies the four upper floors—in a delightfully *dégagé* manner, dominated, if we may so express ourselves, by cultured Bohemianism. In the production of portraits by photography Mr. Wood brings to bear the proved ability of the instinctive artist; and we are confident that, ere long, the White Door and the Romney Studio will be understood as terms significant of the unusual thing in photographic portraiture, appealing alike to the artist and the person of culture.

* * *

Messrs. W. Watson & Sons, of 313, High Holborn, W.C., inform us that they have just opened, at 16, Forrest-road, Edinburgh, a branch business for the sale of their photographic apparatus, as well as microscopes, Röntgen apparatus, and all optical goods. The business is in charge of an assistant who has been with them for nearly twenty years, and is thoroughly competent in the various departments. Messrs. Watson intend to keep a fully representative stock at their new branch.

* * *

Adverting to our last week's references to the forthcoming Convention at Glasgow, the arrangements for which are briefly summarised in another part of the Journal, we find that we were in error in stating that Mr. J. Craig Annan was "organizing" an exhibition of pictorial photographs. It seems that Mr. Annan has simply consented to arrange such pictures as the Committee may be able to collect. We are sorry to have misrepresented Mr. Annan in the matter; but we are, nevertheless, glad to find that we are not wholly wrong on the main point, namely, that his invaluable services will be placed at the disposal of the local committee in the arrangement of the photographs.

* * *

Mr. Thomas Protheroe, of 21, Upper Bedford-place, W.C., has shown us a partly finished portrait in oils of the late Right Hon. W. E. Gladstone, painted from sketches which Mr. Protheroe made of the dead statesman in 1892. The picture when finished will undoubtedly prove a very good likeness of Mr. Gladstone in a familiar and characteristic attitude at his writing-table. In the year above mentioned Mr. Protheroe also executed a portrait of Mr. Gladstone in what may be termed a House of Commons attitude, which earned the approbation of the right honourable gentleman himself and many competent art critics.

* * *

At a recent visit to Mr. Protheroe's studio he was good enough to show us many direct portraits in oils, notably one of Sir W. H. Wills, and one of Mr. Lionel Brough, as well as some charming pastels. Mr. Protheroe, who was originally an artist, and a frequent exhibitor, has after a long photographic career resumed the brush, and for the future intends devoting himself to painting portraits from photographs in oils and pastels. His work is of the highest class, as may be evidenced from the fact that he is the possessor of several medals obtained for his paintings, and where photographers desire the best results we are confident that Mr. Protheroe is fully competent to rise to the occasion. As a rule, oil paintings from photographs are not characterised by much artistic merit, but Mr. Protheroe's work is of a totally different character to such productions, as might be expected from a student of Benjamin Constant at Julien's studio in Paris.

PHOTOGRAVURE WITH THE RULED SCREEN.

In a short paragraph in our last issue reference was made to a portrait which recently appeared in *Nature*, and which, being a photogravure, was compared rather unfavourably with the line engravings which have formed the chief portion of the series to which it belongs.

It requires little argument to show that, when circumstances permit, that is to say, when expense is no object, the very finest results possible on portraiture are obtainable by various methods of photogravure; but it need also scarcely be pointed out that the process generally is necessarily a somewhat expensive one as well as requiring most especial care in working, which, as a matter of course, still further adds to the cost of production. It is probable then that the particular portrait to which reference is made has been hurried through in printing to meet the necessities of the publication of the journal in which it appeared, and equally probable that in these days of cheap process-work pecuniary considerations have had something to do with the matter.

Whether pure photogravure of the best class is capable of competing upon level terms with steel engraving of equally high quality is a question that may be open to some discussion; may, in fact, be really more a matter of individual opinion than anything else in which the enemies of "process" in any form would undoubtedly take the side of hand work, while photographers with at least as much justice on their side would back the photo-mechanical method. However that may be, we see no reason why for the class of work in question really good work should not be produced by photogravure at a much less cost than is at present the case, and, we venture to think, of a character that no journal even of the highest class need be ashamed to publish.

We remember nearly, if not quite, twenty years ago, a series of portraits that were published periodically in the same journal we have referred to—*Nature*—and amongst them we

remember some at least that appeared to be what are now known as "half-tone etchings," but of a very high class. In other words, the gradation consisted of a series of dots, of varying size; how produced we are not able to say, but we believe at the time they were said to be the result of an intaglio or photo-engraving method. At any rate, it appears to us that at the present day, when ruled screens have been brought to such a degree of perfection, and the methods of using them so thoroughly studied, much more might be got out of the combination of photogravure and the cross-line screen than seems to be attempted. In fact, by substituting the half-tone dot for the "natural" or "dust grain," or, to put it in another way, by replacing the relief block by an engraved intaglio plate, we believe photogravures of a very high character would eventually be obtained, with far less expenditure of trouble, and consequently of expense, than by the present methods.

Of course we shall be met with the charge usually made against half-tones, that they are coarse and deficient in gradation, but we shall reply, That is not the fault of the process so much as the printer; or, perhaps, it should be said that the method is not adaptable in its entirety to relief printing. Even with the most careful machinery, and using special surfaced papers, it is scarcely possible to use a screen of finer ruling than about 175 lines to the inch; but, if the intaglio method of printing were adopted, there is scarcely any limit to the fineness that might be found possible; and, with the adoption of finer rulings, the charge of coarseness and want of gradation would disappear entirely.

The etching process for photogravure on copper plates, too, would, we think, prove much easier than in the case with relief blocks on zinc, and there would be far less need for the laborious methods of clearing, intensification, reduction, and "cutting," that constitute the chief art of making or marring a "half-tone" negative at the present time. Any one who has compared an albumen print from an unintensified "half-tone" negative with an etching of the same subject from the best negative producible will have some idea of the possibilities of the combination we suggest, namely, photogravure with a cross-line screen of fine ruling.

Photography at War Time.—A British subject has, it is said, been killed at San Juan. He had previously been sentenced to nine years' imprisonment for photographing some fortification. The Spaniards say that he was wounded by a shot from the American ships, which struck the Town Hall, but some refugees say that it is more probable that he was shot by the Spaniards. However, nine years' imprisonment for taking a photograph of a fortification, for, possibly, quite an innocent purpose, is a pretty severe sentence, even in a time of war. As the excursion season is at hand, we would again caution photographic tourists on the Continent against being seen using their cameras in the vicinity of fortifications, as they may render themselves liable to great inconvenience, though not perhaps to nine years' imprisonment. A delay of only a day or so on a pleasure tour is unpleasant enough to most photographic tourists. Apart from using the camera in the neighbourhood of fortifications, there is practically no restriction on photography on the Continent.

Practical Joking by Photography.—The annoyance one may be subjected to through their photographs was well exemplified in the Queen's Bench Court one day last week. It appears that a few months back a flaming advertisement appeared in several of the London and other papers of a purported unsolicited testimonial from two medical students as to the merits of a certain loudly advertised cocoa. To prove the genuineness of the testimonial the cocoa people had, in the advertisement, given the portraits of the two students. It turned out, however, that the two gentlemen had given no such testimonial, and knew nothing of the matter till it was unpleasantly brought to their notice by the "chaff" of their fellow-students. They then entered an action against the cocoa-maker, when it transpired that the thing had been a practical joke on the part of some fellow-students. In the end the defendants consented to a verdict for the plaintiffs for 200*l.*, and costs as between solicitor and clients. This case shows to what annoyance and ridicule people may be subjected through their portraits, also the value to be attached to the testimonials one sees in connexion with largely advertised things, however plausible they may be made to appear, even when aided by photography.

Kew Bridge.—For years past Kew Bridge has been in a very unsafe condition, and it would have been demolished and a new one erected long ago if the Surrey and the Middlesex County Councils could have been brought into agreement as to terms, &c. Now, however, the work will definitely be taken in hand. The present bridge of seven arches is, perhaps, not the most picturesque one on the Thames, yet it makes a good background for pictures, looking up the river, of Strand-on-the-Green. By the way, Strand-on-the Green does not seem to be so well known to photographers as it deserves to be, though it is well known to artists. On a summer day one scarcely passes without seeing several painters at work. In the space of a quarter of a mile nearly a dozen plates may be exposed with advantage. Those who intend visiting the spot should do so before the demolition of the old bridge is commenced, as massive scaffolding does not add to the beauty of any scene.

Adjacent to Strand-on-the-Green is the old town of Brentford. Now, Brentford, though it is the main road to Staines and Windsor, is by no means a handsome place. It mainly consists of one long, irregular, narrow street, over a mile in length, but it contains some picturesque and quaint buildings of the past century, which make good subjects for the camera. Many very excellent pictures may also be found by following the River Brent from Brentford upward. The late Mr. Norman Macbeth, the well-known artist, frequently visited Brentford with his camera in search of subjects for his works. At Isleworth, between Brentford and the Thames, there are on the banks of the river several good subjects for the camera, though they do not appear to be so very well known to Londoners as they might be. Within a radius of a mile or so from Kew Bridge there are probably more excellent subjects for the camera than are to be found in any corresponding area within an equal distance from London—seven or eight miles only.

Historical Engravings of London.—In their auction rooms, close to our office, Messrs. Sotherby & Co. last week disposed of a large number of old engravings and drawings, principally relating to London and its history, that were got together by the late Mr. Holbert Wilson. Old relics of this kind are getting scarcer and scarcer every year, and consequently, as they are now in demand, their price is also increasing. It is stated that many of the prints sold made more than as many pounds as they cost their late collector shillings. Old London is fast disappearing, and a large portion has disappeared since Mr. Wilson ceased filling his portfolios, some thirty years ago. We must now look to photography to perpetuate what still remains, for it is doubtful if engraving will be used so much for the purpose in the future as it was in the past. One thing is certain, namely, that photography will give a better idea of the subject than do many of the ancient engravings or drawings that realised such satisfactory prices at the sale. Some idea may be formed as to the extent of the collection when we mention that the sale lasted the whole of the week, and that was only of the first portion of it.

The Spectacle-makers' Company.—On several occasions during the past few months we have commented upon this ancient

City guild, and the efforts, under the auspices of the Lord Mayor, who is Master of the Guild, being made to render it truly representative of the craft it should represent. In recognition of this the craft members of the Company decided to present his Lordship with a telescope which was to be "made in London." On Tuesday last week the presentation was made of a yachting telescope of fine workmanship, and, at the same time, the Lady Mayoress was presented with an aneroid barometer. It is stated that the Company are about to organize an Exhibition of their crafts, and that, in all probability, through the liberality of Sir Reginald Hanson, M.P., it is intended to have a highly meritorious exhibit at the Paris Exhibition in 1900.

Anent London, or even English, workmanship, the Lord Chancellor, speaking as Chairman of the Council at the annual meeting of the City and Guilds of London Institute one day last week, said he had been very much struck by the fact that a very great deal of the machinery which was necessary for the equipment of a London technical school—the Northampton Institute, Clerkenwell—had been made either in Germany or the United States. He added that he had felt a certain amount of regret that such should be the case, and he had thought that, as an example of the excellence of English work, English machinery should have been provided in that Institute. We are not at all surprised at these expressions of Lord Halsbury, seeing that he lived for many years during his early life within a few hundred yards of the Northampton Institute, and at that time Clerkenwell was pre-eminently the neighbourhood for the manufacture of instruments of precision.

BY THE WAY.

The great event of the half-year has come and gone; the spring Exhibition of the Royal Photographic Society is now a matter of history, and, whatever its shortcomings may have been, it seems to be generally agreed that it has proved a success. That the selection of the Palace as the *locale* of the Exhibition would not, as was prognosticated by many, suffice to bring failure, was amply evident before the opening day, and the contrast that the show just closed presented to its rather ghastly predecessors of ten years or so ago was strongly marked. But those were little more than trade shows, in which business jealousy formed perhaps the most prominent exhibit.

Speaking of trade jealousy reminds me of a very comic incident that occurred during the first of that series of exhibitions in, I think, 1888, when "ructions" of one sort and another were going on the whole time. I happened to meet a well-known dealer with whom I had had business transactions, and, as we strolled round the place, we happened to stop at the stall of a rival with whom I was also acquainted, and who happened to be present. My companion, who had, I believe, a real "grievance" if such a thing be possible, ignoring the presence of his rival or feigning ignorance of his identity, began to point out to me the weak features of the chief exhibits, and delivered himself of several distinctly unkind criticisms in a by no means inaudible tone.

Later on I happened to meet the rival, with whom, as I have already said, I was acquainted, and we together took a turn round, stopping, no doubt by intention on my companion's part, before the stall of his critical rival, who was also present, though he kept in the background, while an assistant, who evidently knew neither of us, was showing some of their principal "specialities." A hand camera came on the *tapis*, which my companion proceeded to criticise with at least as much freedom as its proprietor had exhibited shortly before, and concluded with a sarcastic reference to its "avoirdupois." But the innocent assistant brought the proceedings to an abrupt close by remarking: "But, excuse me, gentlemen, this camera is made for use, not ornament. Did you hear that the 'prize' camera they are talking so much about came to pieces in the exhibitor's hands this morning? and I am told he is very careful with it." As my companion walked away without a word of reply, I could see by his manner he had received what is vulgarly known as a "nasty smack," and I learnt afterwards that the statement was an actual fact, though the assistant was quite unaware to whom he was conveying the unnecessary information.

Whether the Palace is the proper place to hold such an Exhibition as the one just closed, which was not only intended, but proved, to be a thoroughly representative one, is a question that can be argued from the separate standpoints of photography and photographers. So far as regards the former, whether we consider technical or pictorial photography, the subject is brought under the notice of a far larger number of visitors than would possibly be the case if the *venue* were elsewhere and the Exhibition a purely photographic one. But, whether or not it can be considered an advantage to bring it, so to say, forcibly under the notice of a large section of the public who are not in the least interested in photography, or any other subject scientific or pictorial, is a matter that is reasonably open to debate. But there can be little room for doubt that at least some of the casual visitors may undergo conversion, and, though it may not be an altogether unmixed blessing that adds a few more to the already vast army of snap-shotters, at least it is good for trade.

So far as photographers themselves are concerned (that is, the non-exhibiting section of them), it seems to me an altogether unsuitable place for such an exhibition, even when the vast space at disposal, the undoubted facilities the place offers for large numbers of visitors, and its accessibility are taken into account; and surely the closing day, if no earlier ones, must have taught the executive the lesson that future shows will be better held under more reserved conditions. A troop of thousands of half-wild children, or of perhaps equally excited Salvationists, certainly does not add to the attractions of the Palace *quâ* Palace, and such adjuncts most decidedly detract from the pleasure of *bonâ-fide* and intelligent visitors. I am thankful to say that I was spared the trial of forming one of a party partly made up of 30,000 children, however well behaved.

As to the Exhibition itself there cannot be two opinions. It was undoubtedly the "biggest thing" ever attempted or carried out in connexion with photography, whether considered from the purely historical, the strictly technical, or the merely pictorial standpoint. In its two first characteristics I doubt whether it is possible to decide whether it was more interesting to photographers or to the intelligent lay public; but, from what I myself heard, I am very strongly of opinion that the outside public enjoyed the show fully as much as the most enthusiastic photographer could; and that, let it be understood, without (except in a small minority of cases) there being any thought or intention of "going in for" photography as a result of the interest aroused. It does not follow that, because one may take an interest in watching the process of, say, carpet-weaving, or in studying the working parts of the latest torpedo or other engine of destruction, he must perforce embark on the manufacture of carpets and engines of warfare. It is the privilege of an intelligent being to increase his store of general knowledge by taking an interest in a vast number of things that are really no business of his; in fact, it is just this interest in things in general that distinguishes the well-informed individual from the ignorant or the mere faddist. And it was impossible to mix amongst the general crowd that surrounded the technical exhibits at the Palace without being struck by the fact that there is perhaps a far greater amount of intelligence abroad than the general public is credited with, and that the working details of photographic processes have as keen an attraction for non-photographers as butter-making, or brewing, or printing, or the thousand-and-one different pursuits that draw large audiences at the Agricultural Hall and elsewhere.

The pictorial side of the show, of course, appealed more especially to the purely photographic visitor, for it is too much to expect a non-technical public to take a violent interest in the different methods adopted at different times by photographers in their attempts to attain pictorial results; but to the careful photographic student the recent Exhibition afforded ample opportunity of comparing past with present methods, and of gauging the

comparative amount of success attained. Personally, without wishing to pose as *laudator temporis acti*, I could not help feeling that, in comparison with their means and facilities, the workers of twenty-five and thirty years, or even more, ago, made a better show than we modern ones do; and, moreover, that in spite of our vaunted advances the much-talked-of "limitations" operate as powerfully against the photographer of to-day as against his forerunner. But the present-day limitations are those inseparable from photography, while in years gone by these were supplemented by others connected with processes and formulæ. Yet, I repeat, the photographer of earlier days does not suffer much in comparison with his present-day brother. DOGBERRY.

FOREIGN NEWS AND NOTES.

Spectrum Analysis.—The *Photographische Correspondenz* gives some account of Eder and Valenta's experiments, during the last twelve months, with a new large Rowland concave grating. The radius of curvature of the same is five metres, and the secondary spectrum obtained with it is several metres long. A revision of the spectrum of silicon was brought before the Vienna Academy of Science by Eder and Valenta on January 13 last, and the groups of lines in the ultra-violet were specially considered. A very comprehensive treatise concerning the spectra of sulphur was also laid before the same society on March 3 this year by the same authors. The spectrum analysis of this metal is very difficult, but by means of very exact spectrum photographs it was possible to obtain very accurate results, within a few hundredths of an Angström unit. It is noteworthy that the displacement of wave-lengths in vacuum tubes, first discovered by Eder and Valenta in the spectrum of argon, has also been found by them in the spectrum of sulphur, and it is dependent upon the pressure of vapour in the tubes. These phenomena of displacement were shown in the heliographic tables and more particularly described, and the wave-lengths of several thousand sulphur lines determined. It was also shown that the peculiar "compound spectrum" discovered by C. Runge and F. Paschen had nothing in common with the spectrum of elementary sulphur, but probably belongs to a combination of oxygen and sulphur.

Improvements in Radiography.—Professor Valenta also gives some account, in the same periodical, of the progress made in radiography. It was to be expected that the activity of several hundred persons who have devoted their attention to this subject should lead to progress. The researches of S. J. Precht, published in 1897, demonstrate that the X rays show phenomena of interference (refraction by a slit, &c.), and that they are composed, at least partially, of undulations. It may also be taken as proved that the Röntgen rays are not simple. The rays produced under various degrees of vacuum possess different capacity for traversing flesh, bone, &c., according to their mode of production. The X_1 rays are those that easily traverse flesh, but with difficulty bone, and they are obtained with a tube of low vacuum. If the vacuum is increased, the bones are traversed more easily, and the rays of this kind are called X_3 rays. Between both extremes there is a third kind, called X_2 rays. In coils for high-tension currents it has been sought to make an improvement by substituting for the ordinary oscillating hammer a rotary interrupter working *in vacuo*, or a fluid of bad conductivity, but this has not been attended with much success. But the mercury interrupter has been found very suitable for currents of low tension (twelve to twenty-five volts). In the old arrangement the spring vibrates slowly, and the number of breaks is small, but with Gebbert & Schall's interrupter the defect is considerably diminished. This is very suitable for small coils with sparks up to 20 cm., but, for larger, the rotating mercury interrupter is mostly used. In tubes there has also been considerable improvement. The best are now made with a metal concave mirror, which concentrates the cathode rays on the tube within the smallest possible area. But this has the disadvantage of heating the tube (sometimes to redness) and shortening its life. The introduction of the platinum or iridium anticathode is a great improvement. This is placed near the focus of the rays, and the cathode rays are partially converted into Röntgen rays. Aluminium tubes would be very efficient, but they are very difficult to make. Bluish, fluorescent tubes, made from borate glass, have also been introduced commercially; but, although they transmit the X rays in a high degree, they do not last long.

Toning.—The *Photographisches Wochenblatt* states that E. Sonstadt has found that a ·1 per cent. solution of platinic chloride may be boiled without decomposition, but that such is not the case if the solution is diluted to ·01 per cent., when platinous chloride will be deposited. Moreover, if one part of chloride of gold is dissolved in 15,000 parts of distilled water free from organic matter, and then boiled, gold will be precipitated, and the solution will give indications of the presence of hydrogen dioxide. This may be of importance in the theory of toning.

Photographic Paper.—An article in the *Photographisches Wochenblatt* states that the recent combination in the photographic paper trade will be met by a powerful competitor. The amalgamation of the Rives and Malmedy firms was followed by an intimation that the price of paper would be raised from frs. 2·50 to frs. 5 per kilo. But it appears that a large firm in the German photographic trade has induced some well-known manufacturers of paper, with ample means, to undertake the manufacture of photographic paper. It is expected that operations will soon be commenced, and it is possible that the new paper will be sold for less than the old price of the Rives and Malmedy papers.

A New Lens.—From the *Deutsche Photographen-Zeitung* we learn that Messrs. Zeiss have applied for a patent for another lens, which is to give an anamorphosic representation of an object. Jan Szczepanik has frequently pointed out that a means is wanted, in textile industries, of altering the dimensions of a pattern in a given direction according to scale. This new lens solves the problem, and a number of photographs were shown at a meeting of the Deutscher Photographen-Verein, in which the proportions had been changed in one direction in the ratio of five to eight. The lens should also be of use in making grotesque photographs by distortion.

Absorption and Reflection.—In the same paper R. Schüttauf, of Jena, also makes some interesting observations on the light absorbed by lenses, and the loss by reflection from their surfaces. It is difficult to determine the amount of absorption by simple experiments, but it was ascertained some years ago at Jena, by a series of experiments with plates of glass 105 mm. thick, that the absorption of actinic light was quite minimal, although some of the samples were greenish. Modern lenses are made only of such transparent glass that any difference of rapidity, apart from relative aperture, is ascribable to more or less reflection from their surfaces. A series of comparative tests were made under identical conditions with the following lenses:—

1. A Zeiss single Anastigmat VII., focus 183 mm.
2. A Zeiss convertible Anastigmat VIIa.
   Doublet No. 9, focus 412 mm. } = 192 mm.
   285 „ }
3. A Zeiss Anastigmat IIIa., focus 196 mm.
4. A triplet composed of thin lenses, focus 187·8 mm.

No difference worth mentioning was observable, but there was a perhaps unmistakable advantage in favour of the single anastigmat as compared with the triplet. The differences between the doublets and the triplet were minimal. Noticeable differences were only to be seen in comparative exposures in slightly misty, dull weather. The photographs taken with the single and double anastigmats were distinctly more brilliant, and the detail in the shadows was better than in those taken with the triplet. A further test was made to determine what difference of effect could be discovered between different relative apertures. The triplet was stopped down to *f*·12·5, and the doublet to *f*·11·9. Their relative rapidity according to aperture was, therefore, as 10 to 11. The photograph with the doublet had decidedly more detail, which proves that a difference of ten per cent. in illumination is distinctly observable.

Optical Glass.—The Commission appointed by the Société Française de Photographie to award this year's medal of the triennial prize of the Exhibition of 1889, has decided to confer it upon M. Mantois for the improvements he has made during the past ten years in the manufacture of optical glass. M. Mantois is now making several new sorts of crowns and flints with zinc or baryta bases. He is also engaged upon the production of a disc of glass 1 m. 25 cm. in diameter for the Paris Exhibition of 1900. This lens will permit of the moon being seen and photographed as though it were only 40 kilometres distant from the earth.

THE WORKING OF THE RÖNTGEN RAY IN WARFARE.

[Abstract of paper read by Surgeon-Major W. C. Beevor, M.B., Army Medical Staff, at the Royal Institution, Friday, May 20, 1898.]

THE object of this lecture is to give my experience in the working of this curious element, the X ray, in military surgery, and through the universal kindness of many official friends I shall be able to give you the results of its employment on the recent Frontier Expedition in India, and then to lay before you some modifications in the construction of the appliances for generating the X ray, which have suggested themselves to me after working amongst the wounded on the field of battle and its adjacent hospitals, and I humbly beg your criticism of them, in the hope that some useful advance in the science may be originated, and additions made to our efforts towards alleviating human suffering, thus showing our craft to be still striding onwards and making laudable efforts at deserving the kindly praise bestowed upon it by the Secretary of State for War, Lord Lansdowne, in a recent speech in the Senate, and proving that we surgeons of the present day are aiming, as our illustrious forefathers ever aimed, at placing at least one more niche in the Temple of Æsculapius.

It is not within the province of this lecture to attempt a description of our knowledge of the nature of this wonderful element; I merely beg to lay before you some of the most interesting results of its powers as applied to military surgery, and, as I see both non-professional and professional friends have kindly come to give the subject their attention, I will make my best endeavours to describe the cases with as few technicalities as are conducive to clearness of demonstration.

As many may not care to go into the details of construction of apparatus, I will first exhibit some of the pictures taken during the recent Frontier Campaign, and give a short description of each, in the hope of entertaining those who would rather not wait for the consideration of what one may call the engineering or mechanical section of the subject.

When organizing any apparatus or materials for use in warfare, one has to consider many details peculiar to the special work the apparatus may be engaged in; so, for convenience of description, I propose to divide this portion of the lecture into the following headings:—

1. The best form of apparatus for military work.
2. The safest means of transport.
3. The difficulties met with on and near the field of battle, and the means of overcoming them.

Now, I think you will agree that one great *desideratum* in the construction of all apparatus for military work is that they should be what one may call "get-at-able," thus enabling us to renovate the inevitable defects of wear and tear; every portion of our apparatus should undoubtedly be easy of access, the coil, the condenser, connexions, &c., should all be packed in cases that can be opened and inspected at a moment's notice, without the necessity of special instruments; there should be no looking about or sending for particular screwdrivers, wrenches, &c., no hurrying or flurrying of attendants; the operator should be independent of help, and, with a view to obtaining this desirable condition, the Medical Department of our Army has spared no expense or trouble, having, after due consideration, ordered the apparatus which I now place before you.

Secondly, we now come to consider the most desirable means of transport for our apparatus, and, whilst introducing this subject, I beg to point out that it is not only possible but quite easy to have an X-ray apparatus working at the front; further, also, that the cases already exhibited contain indisputable proof that, even in savage warfare, where the Geneva Convention is unknown, the X ray can be brought under control, and an immensity of human suffering obviated; it is not necessary that every Field Hospital or Bearer Company should be supplied with an apparatus, as it can be readily transported from one part to another of the field of operations. I feel sure you will see what an advantage it is to be able to localise bullets and other foreign bodies without the painful process of searching with probes, and that a threefold advantage is gained in the treatment of our patients by this means: first, the absence of any pain or physical injury, from which arises the second advantage, in cases where there has been much loss of blood or injury to bone we are enabled to ascertain the exact condition of affairs without the risk of increasing the depression of our patient by operation, and we thus give him the best chance of reaction, upon which depends his recovery. Who, indeed, has not seen on active service many a case where the vital powers have held out to their last flicker, and are probably being supported by a cheerful and magnificent heroism on the part of a brave man, where, with proper means at hand, the surgeon has been enabled to fan that last flicker into a wavering flame, which he would have been powerless to accomplish without scientific aid; and who, with much experience of active service, has not gone through the indescribable chagrin and sorrow of witnessing the converse? Therefore, ladies and gentlemen, I maintain it is now the duty of every civilised nation to supply its wounded in war with an X-ray apparatus, amongst other surgical aids, not only at base hospitals, but close at hand, wherever they may be fighting and exposing themselves to injury in the performance of their hazardous duty. After trying every kind of transport in India—mules, camels, wheeled vehicles, &c.—I come to the conclusion that by far the safest and most satisfactory in every respect is human transport; coolie labour can be obtained in most places, and, where not, any European could be employed. As the portable apparatus should not weigh more than from eighty to one hundred pounds, two men are all that is required for the moment, and a reserve of two more, with reserve equipment, complete the transport I beg to exhibit for your consideration; a bamboo pole or hollow steel bar of about six feet in length are what I found the best construction from which to suspend the boxes; each end of the pole is carried on the heads or shoulders of the bearers, and the boxes are slung from the pole as you see here. In Tirah I employed a disused Dhoolie pole and Dhoolie bearers to convey my apparatus; they willingly volunteered for the service, and carried the whole apparatus from Bagh Camp in Tirah, down the defile to Dwatoi, and down the Bara Valley to Peshawar, without injury; parts of this march were beset with difficulties seldom experienced in any kind of warfare, and yet these faithful followers landed their charge in good working order at a time when it was sorely needed. It may interest you to see a few photographs I took during this march, as they will serve to show the difficulties of transport in such a country; yet photography cannot adequately exhibit the conditions, for rocks, icy-cold water, rapid torrents, frost, and snow do not come entirely within the grip of our photographic lenses. Mules, camels, and wheeled transport are too uncertain conveyances for delicate materials, except, of course, where we have good roads and plenty of room; but our military apparatus should be independent of these luxuries, and it seems to me that this transport fulfils the necessary conditions.

In the third part of this section I will give you what appeared to be the difficulties specially involved in working the apparatus at the front; the generation of our primary current of electricity is at present a very serious consideration. The only means I had in Tirah was a heavy and cumbersome primary battery, worked by a mixture of bichromate of potash and sulphuric acid; the latter is too dangerous an article for military transport unless accompanied by some one who will look specially after it. I ran out of the supply in Tirah, the railway company refused to forward more, and I had to gather together the few ounces carried in the equipment of the various field hospitals. I therefore condemn this form of battery for field work, and beg to recommend the employment of a hand dynamo and portable accumulator. This combination has many advantages; in the first place, it will stand rough transport, and, should one get out of order, the other can be substituted. Thus, if the accumulator is run out or injured, the dynamo can be used to give sufficient current for most cases; with an army in the field there is always plenty of hand labour for this purpose; and again, if the dynamo is out of order, the accumulator can be charged at the field telegraph station.

We shall often experience a good deal of difficulty in examining cases in the open air or in tents from conditions of climate: hot sun, rain, frost, snow, and wind all militate against a good result; the baneful effects of hot sun are chiefly seen in the condition of the wax which insulates the wire of the secondary coil; should this melt, the coil becomes useless. We have experimented and found that the mixture of paraffin wax and resin in which this coil is imbedded will not melt until the temperature is raised above about 150 Fahr., which should be enough for all practical purposes; this covering of felt also protects it from sun, rain, snow, and frost.

I experienced much annoyance from high winds when working in the open or in tents; the delicate platinum terminals of our ordinary Crookes tubes were constantly breaking from the strain of the shaking wires, and I had to strengthen them by imbedding them in this cap of sealing-wax; but Mr. Dean has devised this vulcanite case for each tube, which seems to get over the difficulty.

Another matter requiring special study for military operations is the quality of our "connecting" and "lead" wires. I tried several patterns, and found they all leaked at times, especially in damp, hot weather, and the one which gave the best results is the common thick telegraph wire—its insulating material of rubber, wax, and hemp is far more serviceable than any of the fancy silk varieties.

Regarding the use of the fluorescent screen at the front, I must say it seems to me to be the most important part of the apparatus for urgent cases; by its means we can explore, without delay, the whole body, and its condition is therefore a matter of much importance. I am indebted to M. LeCouteur, of the London Photographic Association, for the suggestion of protecting its surface with a layer of celanite, and having the whole enclosed in an aluminium case. This protecting layer of celanite is most important, for, no matter how careful one is, the surface is liable to be scratched, and you will find that in military surgery your operations have frequently to be conducted under conditions of temperature, where perspiration, like the babbling brook, flows on for ever, and soaks through everything porous; besides the danger of the enthusiastic onlooker, who, in his laudable delight at discovering the shadow of a bullet on the screen, seems quite unable to resist the temptation of driving his finger at the inoffensive shadow of the offending bullet, and from climatic as well as preventable causes the military finger is not always chemically inert.

Regarding the employment of glass photographic plates for taking radiographs, there is, of course, the danger of breakage in transport. I broke many, but, after trying films, bromide papers, and X-ray papers, I came to the conclusion that we have not yet

arrived at a satisfactory substitute for glass; the gelatine on films is very apt to deteriorate in hot, damp weather, and I was not successful in obtaining good pictures with X-ray papers, though it was probably due to my want of practice in their development. It would undoubtedly be a great advantage to discover an unbreakable basis for our sensitive photographic film, but I must confess I have not seen one yet, though we are working diligently to discover the much-needed element, and hope soon to succeed. I cannot let this matter pass without paying a tribute of high appreciation to Messrs. Paget's XXXXX plates; I had three dozen at the commencement of my venture in Tirah, and through all the adverse conditions they worked admirably, giving at the end of four months' rough travel as good results as at the beginning. Mr. LeCouteur, of the Photographic Association, then described some new apparatus and improvements, especially referring to a new system of developing a dry plate or film in the open air.]

THE DECORATIVE CAPABILITIES OF PHOTOGRAPHY.

III.

Among the numerous articles in daily use that are suitable for decoration by means of photography may be mentioned lamp and candle shades, and such articles in which the pictures are best rendered by means of transmitted light.

Glass transparencies are frequently so arranged and mounted as to form elegant window screens, and where a series of views of any district are so arranged increased interest in such beautiful furnishings is rendered, even in public rooms, cafés, libraries, &c.

If it be desired to produce suitable pictures to adorn lamp shades, a selection of some semi-transparent printing medium ought to be made. As a rule, glass pictures of even half-plate dimensions are too heavy to be utilised, but, when light paper materials are selected, no exception in this respect can be taken. From among several suitable materials may be mentioned that of parchment ferro-prussiate. This material is manufactured in long bands, and its printing and manipulation is simplicity itself. The colour of the image yielded, when suitable negatives are selected, is a very pleasing blue; care must be observed, however, when working these parchments, that the printing is carried to a much greater depth than many might imagine to be necessary.

The material may be obtained, ready-sensitised, from any wholesale stationer in the habit of supplying drawing materials and engineering requirements. If these parchments are kept tightly rolled and in tin cylinders, it will keep in good printing condition for several months. A very suitable form of lamp shade may be made by obtaining from any American store, or very probably wholesale ironmonger, a wire frame in hexagonal form. These are regularly kept in stock, and generally have fitted to them the opaque cardboard shades so frequently in use. To utilise one of such for photographic decoration; six cardboard panels should be cut to precisely the same size and shape by means of a template, which may be made easily of glass by one possessing a glazier's diamond, which is one of the most useful articles a photographer can possess. Having cut a large sheet of glass to the exact shape and size of the various panels in the hexagonal wire frame, suitably sized sheets of good cardboard must be procured and cut true to form by means of a sharp knife, and the glass template. When the six panels are cut true to shape, they are bound firmly together by means of satin ribbon, of any suitable colour, to match the blue picture. Previously to gluing these sections together, by means of the satin ribbon, a suitable aperture must be cut out of the centre or selected parts of the cardboards. If round shapes be desired, several homely templates are generally found in any household; the writer has frequently utilised a 3-inch diaphragm stop belonging to his portrait lens. There is, however, another very suitable method of cutting out round apertures, referred to by the writer some time ago, and described in The British Journal of Photography. This method consists of using a sharply prepared set of compasses, *i.e.*, one of the legs being fitted so as to act like the blade of a sharp penknife. By placing the other leg of the compasses firmly into the cardboard, resting on a soft wooden support, the cutting blade of the compasses is marked evenly but firmly at any diameter it is desired, and the least practice will enable any one to cut round with these prepared compasses, that are quite true at the edges.

Of course, there are other shapes that offer no trouble, such as diamond shapes, as well as those in the form of a heart, &c.

With the aperture cut out, the panels are then carefully glued together by means of hot glue and the ribbon. The glue must be thick, and likewise a good rich ribbon. If these precautions are observed, the glue will not find its way so easily through the texture as it otherwise would were the glue thin and watery and the ribbon thin in texture.

There is little difficulty in executing this gluing operation provided a systematic way of doing it be gone about. By gluing the cardboard sections together in pairs, and allowing each pair to become thoroughly dry before adding any more, there is less liability of the junction of the cards being pulled asunder. When the first three pairs are dry, they are all glued into one piece, in form like a collar, and again allowed to dry. There will now only be one join remaining to be executed, and the writer has found the easiest method to adopt in making the last join is by placing the cardboard collar on the wire frame, and making the last join when so set up. All the previous joins are made on a large table, with the cardboards lying flat.

Six good vigorous negatives, similar in every way to those used in cloth printing, should be selected and printed by means of ferro-prussiate parchment. Most readers of The British Journal of Photography will, doubtless, know that all that is required for the development of ferro-prussiate papers is a good supply of clean cold water. In making prints by this process they should be produced in slightly reduced form by means of masks, whereby a pleasing white margin is produced all round their sides, or, if desired, they may be vignetted with good effect. When the prints are developed by washing, they are first dried and trimmed slightly larger in size than the aperture they are intended to cover, and, in cases where the apertures are not large, there is no need to redamp the pictures prior to mounting them. A thin rim of gum run round the inside of the cardboard will permit of the little pictures being securely fixed in any desired position.

Several very striking effects in photography are capable of being produced by this means. Of course, these are intended for view when the lamp is lighted.

Should any one have difficulty in obtaining ferro-prussiate samples, they may sensitise a suitable paper or other support themselves by the following method of working.

Having procured a sample of semi-transparent paper of fine, hard substance and close texture, free from any deleterous dressing, let a thin mucilage be made by means of Bermuda arrowroot, which, when quite cold, has the consistency of thin starch. With the aid of a clean flannel pad swab the entire surface of the paper thinly but evenly with the arrowroot paste. When dry, the paper is ready for sensitising.

To make the sensitising solution, the following must be prepared in separate vessels, and the mixture only made just at the time of sensitising:—

A.

Citrate of iron and ammonia	450 grains.
Water	4 ounces.

B.

Ferricyanide of potassium	300 grains.
Water	4 ounces.

Equal parts of the above are mixed to form the sensitising solution.

To apply the above solution, let a glass strip, about three inches wide, have bound around one end, securely tied with thread, a double fold of clean swan's-down or flannel, and, with the aid of the swab, the sensitising solution is applied in a perfectly even manner over the entire surface of the sized paper. Dry in a dark room and expose under negative, printing very deeply.

The best prints will be made from freshly sensitised samples of paper, and the operation of doing this entails no trouble to perform.

Blue prints made in the manner above described are sometimes used by attaching them to the outside of opal globes, but they are never so satisfactory as when placed in cut-out apertures as above described. Some striking effects are capable of being displayed, especially with such subjects as moonlight and snow scenes, as well as some examples of marine studies.

Another very useful form of ferro-prussiate printing is that on serviettes, and, when such are prepared with a sizing solution suitable for keeping the image from sinking into the fabric, very good results are produced.

T. N. Armstrong.

X-RAY TUBES.

The small ring terminals of tubes are frequently so soft and yielding that the only way to avoid early fracture, from the strain caused by frequent attachment and removal of the conducting wires, is to mount the tube before taking into use within a small and light frame, making permanent attachments by means of thin wire to small screw terminals fixed to the ends of frame. Such a frame is very easily made, the end pieces may be of cork or wood, the middle parts being cut (circular holes) to take the ends of tube and support the latter, the cork or wood ends being connected at the sides by pieces of thin glass tubing, of the requisite length. Small terminals are inserted in the cork and the connexions made thereto; such a frame weighs under an ounce, is permanently fixed to the tube, and does not interfere in any way with its use or appearance.

In the event of a terminal of tube being broken off close to the glass, such a frame as above outlined should be made, but in this case a thin copper strip (perforated copper as used for commutators of motors, &c.) must be fixed, and attached to the brass screw terminal above referred to, so as to press lightly upon the fractured end of table; sufficient contact will thus be made, as a rule, and the tube will have another and a long lease of life; a better way, however, is, I think, to prepare a little powdered tinfoil (by rubbing foil with a globule or two of mercury) or dental amalgam, or even gold bronze, mix the tinfoil or bronze powder with a little gum to make a stiff paste, and, having twisted up a small piece of thin copper wire to shape, fix it over the fracture in a small heap of the metallic paste, leaving a small ring protruding; when

throughly dry and hard, the strength and tenacity of the new terminal appears to be remarkable, while the contact is perfect.

I am inclined to think, from observations made of tubes, that they are bettered by having comparatively heavy terminal connexions, but any one can readily test this for himself, and there is no easier way than by using powdered tinfoil mixed as described. J. PIKE.

FOR THE LADY IN THE RECEPTION-ROOM.

IT may be considered presumptuous for a mere man to address fair ladies on such a subject as that of dress, and I fancy I hear the sniff of indignation that will rise when these lines meet their eyes. Advise *us* indeed! What does *he* know about it? But lend me, ladies, your pretty ears for a few moments while I try to show you that men, even the merest, have clearly defined ideas on that important subject, and appreciate grace and beauty wherever found.

And what, as the poet observes, is grace, is charm? And where would they be more appreciated than in the reception-room of the photographer? To the average mind a visit to that functionary is an ordeal to be dreaded; a visit to the dentist is perhaps more unpleasant, but the evil effects are not so permanent. However, it must be endured; Algernon is leaving for India next week—his sisters and his cousins whom he reckons up by dozens must have a photograph to gaze upon in his absence. He therefore gets himself up regardless of expense—for he hopes that this counterfeit of himself will occupy a prominent place in the boudoir of his favourite cousin—and goes to the photographer's looking and feeling much about as cheerful as if he were proceeding to instant execution.

Now, the photographer's reception-room is usually arranged more or less artistically, specimens of his work adorn the walls or are distributed around the room on easels. The heavy doors subdue the roar of the street traffic to a pleasant murmur; the light falls softly, shaded by thick curtains, soft carpets give back no echoing footfall. One instinctively speaks in lowered tones, the place seems sacred to art. Should not, then, the high priestess of this temple dress and act in accordance with the scenes in which she moves and so complete the artistic whole? Let me say at once that it will be almost impossible for her to do this if she is a slave of the fashion of to-day. Art knows no fashion, it is a law unto itself, and, in determining her style of dress, the lady will naturally be guided by her particular style of beauty. We will suppose her "a daughter of the gods, divinely tall and most divinely fair," and in that case would suggest that she should clothe herself in long trailing robes of velvet (or more probably velveteen) dark in colour and fashioned in some quaint style, such as one sees in old pictures.

But I hear some one say, Consider the expense! The pay of a reception-room lady is anything but princely, how does he think we are going to buy velvet gowns continually? Just like a man! Wait a minute, dear madam, let me explain. Men are not quite so ignorant as you think. They are aware that there is a paper called the *Queen*, likewise another, the *Gentlewoman*, and yet another, *Home Notes*. They *have* been known to improve their minds by reading these, or, at any rate, glancing down their columns. And the most casual observer cannot fail to notice that, nowadays, wonderful velveteen can be had in the most artistic shades and at very reasonable price. True, the first cost may be more than you would pay for an ordinary gown, but then it wears so well, and if made in a style of, say, the sixteenth century, would not need renewing very often, being quite independent of the passing fashion. Then, the hair should be artistically arranged to suit the dress, not tortured into unnatural directions, but falling softly round the face as nature intended it should. Think over this, dear ladies, and ask yourselves if such a figure as I have described would not be likely to give more pleasure to the unhappy Algernon than a damsel in a skirt and blouse whose waist belt hardly fulfils its duty of keeping the two together, fuzzy head, wrists covered with jingling bangles and, very probably, hands neither soft nor white? I think if he has any taste whatever he would prefer the former, and that his reception by such a lady would go a long way towards calming his troubled breast and reconciling him to the coming ordeal. To merely look at a beautiful object insensibly softens the features and brings out what is best in our natures, and Algernon cannot fail to be happily impressed by a vision such as I first described, especially when she addresses him in the sweet low voice which is, as Shakspeare tells us, an excellent thing in woman. She will not gaze haughtily at him, demanding his name and his fee as if she wondered by what right he intruded on her domain, but a few sympathetic words will send him upstairs in a happy frame of mind, and, consequently, looking his very best, and the remembrance will be such that, when the operator places him in an uncomfortable attitude before the camera with his head screwed into a vice and then requests him to look pleasant, he will have no difficulty in doing so.

I referred just now to soft white hands, one of the greatest feminine charms. There are many preparations on the market for producing white hands, but the simplest and best is to rub half a teaspoonful of new milk into the hands every morning until it is completely absorbed.

Perhaps there is no vocation in which there is greater need for tact than that of a reception-room lady. She it is who must interview the ladies who have formed too high an estimate of their own charms and are dissatisfied with the faithful—too faithful—rendering of the camera. She must endeavour to calm their wrath and at the same time conscientiously discharge her duty to her employer. How this is to be done passes a man's comprehension, but her quick wit may safely be trusted to carry her through; a sympathetic manner, joined to a gentle firmness will go far towards appeasing the wrathful fair one, especially if she can manage to infuse a little spirit of gentle flattery to act as oil on the troubled waters. A MERE MAN.

STEREOSCOPIC AND CLOUD PHOTOGRAPHY.

BEFORE the Gospel Oak Photographic Society, on Tuesday, May 16, in the unavoidable absence of Mr. W. E. Debenham, who was to have given a lecture on "Portraiture for Amateurs," Mr. W. Beyer consented to fill the breach, and delivered the lecture on Stereoscopic and Cloud Photography, which he had promised to give on June 7, Mr. Debenham's address being postponed until that date. Dealing with stereoscopic photography first, Mr. Beyer said that the stereoscope owed its introduction to Sir David Brewster, and at the outset enjoyed considerable popularity, until unscrupulous dealers spoilt the market by the vile stereograms which they sold, some of these being nothing more than two prints from the same negative pasted on a card, and which, of course, did not give any stereoscopic effect. The first slides which were obtainable were drawn by hand, and consisted of pictures of cubes, &c.

The various methods of taking the two pictures necessary for the slide were then explained, and the advantages of using a single lens with some method of moving the camera from one point to another, and of using a pair of lenses with a movable division inside the camera, were commented upon. Mr. Beyer stated that for ordinary subjects the single lens, with a satisfactory shifting arrangement, was on the whole the best method, as the distance from the centres would then be adjusted to suit the distance of the camera from the subject to be photographed. When, however, one came to take objects in motion, in which case a shutter had to be used, then a pair of lenses must be used. The separation of the lenses from centre to centre should not be less than two and three-quarter inches, nor more than three and a quarter inches for the class of subjects usually dealt with. It must be carefully noted that the print from a stereoscopic negative must be cut in half, and the left-hand picture mounted on the right-hand side of the mount, care being taken to see that a prominent point in the foreground of the picture is exactly the same distance from the bottom of the mount in both halves of the slide, otherwise the two pictures would not properly combine, and the effect of looking at a solid object would in a great measure be lost. If the lenses were too widely separated, the various planes would be rendered, but they would appear as though cut out in sheets, instead of appearing solid. Coming to the subject of the photography of clouds, Mr. Beyer's remarks were not directed so much to the subject of the making of cloud negatives as to their use—and abuse. By means of some drawings in monochrome, which he had specially prepared for the purpose, the evil effects of using clouds which were of the wrong form, too heavy or lighted from the wrong side, were shown.

The best method of obtaining clouds on the same plate as the landscape was by means of a sky shade. This was an arrangement by means of which the exposure on the landscape itself could be allowed to proceed without the image of the clouds being recorded on the plate. The shade was then raised, and the exposure made for the clouds, thus securing such clouds as were present at the time, and doing away with the possibility of false lighting.

Mr. Beyer also showed how artificial cloud negatives might be made by means of water colours applied to plate glass. Burnt sienna was the most satisfactory colour to use, and, when the rough outline had been painted in, the picture should be softened by means of a camel or badger's-hair mop, so that all harsh edges should be broken up.

SURVEY PHOTOGRAPHS BY MEANS OF A KITE.

PHOTOGRAPHS of a town or district taken from a great height by means of a kite are by no means a novelty, such having been produced some years ago by Monsieur A. Batut. A recent number of the *Aeronaut* describes the apparatus employed for the same purpose by Monsieur E. Wentz, whose photographs of these subjects merit admiration. M. Wentz says: "A kite measuring two and a half metres in height, and one and three-quarter metres in breadth, can hardly be considered a very portable piece of apparatus, and is liable to sustain damage during its transit to the scene of action, besides exciting the curiosity of the passers-by. My first object was, therefore, to construct a kite which could be readily taken to pieces, and after a number of experimental attempts the following arrangement was fixed upon as combining simplicity of construction with efficiency in working: Two thin steel tubes (such as used in bicycle building), measuring from ·08 to ·10 metres in length are brazed together in the form of a cross. Into the ends of each of these tubes a good bamboo cane is fixed, two of the canes being ·85 metres long, one two metres, and the fourth half a metre. At this stage the apparatus is in the form of a large cross, the ends of the canes being prevented from splitting

by means of thin copper tubes, pushed tight over the end of each. At two centimetres from the end of each cane a hole is made (perpendicular to the plan of the cross) which is to receive the string by means of which the sail of the kite is held in position. In order to facilitate the entrance of the string into the holes, the latter are connected with the end of the cane by a fine saw cut. The whole now forms a frame strong enough to carry the sail of the kite, which can be made of taffeta, canvas, cotton, &c., with or without two or three coats of varnish; the best material consists of three thicknesses of gold-beater's skin, glued together. The kite, which is now quadrilateral in form, the bamboos being the diagonals, has its four angles strengthened by small triangular plates of copper. Some short strings stitched at intervals to the back of the sail permit of its being attached to the canes, and keep the whole arrangement together. Thus constructed, the kite can be set up in a few seconds, and suffers nothing in efficiency from its great portability. The sail of the kite is best made from the same material as the sail; it will wear better, is more easily manipulated, and will not get into a tangle. To make it, one has simply to sew a strip of material, about fifteen centimetres in width, to a strong cord, taking care to pass the thread frequently through the cord in order to prevent the sail sliding on its string. A small bag is sewn to the end of the sail to receive any ballast which may be necessary.

The cameras, of which I use a selection of six, are made of wood and cardboard, they are of fixed focus and provided with lenses as follows: No. 1, for 11 × 15 cm. (*i.e.* about half-plate), has a single lens; Nos. 2 & 3 (for 18 × 24 cm. *i.e.* 7 × 9½ inches) have a wide-angle lens mounted in aluminium: No. 4 (for plates 18 × 13, *i.e.* 7 × 5 inches) has an aplanatic objective by Hermagis, focus 21 millimetres; No. 5 (for 13 × 18) has two aplanatic lenses, by Hermagis, for stereoscopic work; camera No. 6, is provided with a Hermagis telephoto objective, magnifying five times; No. 7 (for 13 × 18) has removable double dark slides, whilst Nos. 4, 5, & 6 are so fitted that the plates can be removed in daylight.

For suspending the camera my first efforts were based on the method of M. Batut, the camera forming part of the kite. I soon found, however, that this plan is highly inconvenient, owing to the difficulty of constructing a support both light and rigid; also the camera is obliged to follow the movements which the kite is constantly making around its axis, whereby the cords are liable to cross the field of the lens. After a number of trials I devised a most simple method of suspension, which yet possesses the following advantages: the field of the objective is not intercepted; the camera possesses great stability, independently of the movement of the kite; it offers slightly less resistance to the wind; the camera can be adjusted without difficulty or special apparatus to embrace a perspective view, either in front or behind the kite; the camera can be easily and rapidly removed. This is achieved merely by hanging the camera by a loop (the two ends of which are attached to the kite); when so suspended, it is independent of the movement of the kite around its axis. The shutter is a "drop" pattern of the simplest form, and works in the diaphragm aperture; it is released either by a fuse or by a second cord communicating with the earth, the latter plan having the obvious advantage that exposure can be made at any desired moment. An electrical release can be employed, but is more expensive and complicated, besides adding to the weight of the outfit. As I had intended to allow the kite to pull out from 2000 to 4000 metres of line, some practical method of paying out and winding in this length was very necessary. Moreover, not having at the commencement of my experiments the most convenient dark slides, it was necessary to be able to change the plates on terra firma. I therefore constructed a piece of apparatus which could be used for three separate purposes:—

(1) For holding the entire outfit (camera, plates, reel, sail, &c.), except the bamboos, which can be easily carried in the hand.

(2) For winding the cord in and out.

(3) For changing (and if needs be, developing) the plates.

A reel for carrying the cord is arranged so as to be quickly mounted on a windlass and removed therefrom. In designing it there is no need to specify any great strength, but rather to obtain rapidity in action. Each bobbin, which carries 2000 metres of twine, marked off every twenty-five metres, has fitted to one end a thick caoutchouc washer of ·05 metre in diameter. When the bobbin is placed in its bearings, this washer rests against a metal wheel attached to the inside of the case. The metal wheel is put in action by a handle outside the case, and so constructed that one turn of the handle produces about six turns of the bobbin. The twine can thus be wound and unwound very rapidly.

BIRCH AND BRACKEN SUBJECTS.

At the meeting of the Photographic Club on May 18, Mr. A. Mackie in the chair, Mr. F. A. Bridge announced that, in consequence of lack of sufficient time to attend to the duties of his post, he had thought it better in the interests of the Club to ask the Committee to appoint a successor to him in the secretaryship. Mr. Stretton had acceded to the wish of the Committee and would take over the office next week, and Mr. Bridge hoped that the same support which had been given to him would be extended to Mr. Stretton in what was a rather onerous position.

Mr. W. Thomas gave a few hints likely to help those attempting the photography of birch and bracken subjects, from experience gained during the last few years in his endeavours to translate these subjects into photographs. At the outset he could not help expressing his regret at two crying evils of to-day; first, in the amateur world at any rate, the absolute lack of technical skill which the subject seemed to exhibit, and secondly the way in which they roamed about, tackling every conceivable subject, apparently with impunity. Compared with this, if the works of our best painters were examined, it would be seen that each devoted himself to one class of subject and stuck to it. Yet, in the photographic world, it was a truth that a man devoting his talent to one subject and showing such results consecutively, was howled down on the score of monotony. Personally, Mr. Thomas favoured the adoption of some particular branch that appealed to the worker, which he should study fully and master. There was one period of the year when birch and bracken was best approachable by both painter and photographer, which in his experience was from about the end of September to April or May. At other times the bracken was just growing and useless. One should notice that these subjects exhibit abundant contrasts:—the bare bark with its light and dark patches, the black background of thick wood, and the still stronger contrasts of colour in the bracken, with its light and shade, and orange, purple and russet tints, combined with the rich green of the grass beneath. Cases where branches and tops of trees stand clear against the sky, recalling halation prospects, must be noted also. One must expose generally, there being no fear within limits of overdoing it. Better results will thus follow than by reliance on alkali in development. The plate should be rich in silver, and sensitive to the yellow and green rays. Isochromatic plates assist therefore in this respect, while the photographer may assist the plate by using a yellow screen, reducing to some extent the excessive colour contrast. Halation is a possible cause of trouble; hence every plate should be well backed, either with caramel and sienna, or with stained collodion.

It was a source of amusement to Mr. Thomas to hear of the so-called trouble of backing plates, really one of the simplest things in the world. Mr. Thomas backed a plate with a soft brush and covered it with a piece of paper, cut to size, so as to protect the slide from the wet caramel. Exposure depends on the usual factors, and experience alone can tell the right amount. Assistance may be derived from the use of an actinometer, an instrument which the lecturer always used, but the exposure must be so full that no forcing in development is necessary. When developing, the strong contrasts of the subject must be recollected, and the solution adjusted accordingly, weak in its density-giving properties. As regards lenses, the speaker had a strong preference for uncorrected spectacle lenses, and showed several negatives done by these means. There was no cause for quarrel in the definition of these pictures, in Mr. Thomas's opinion. Negatives possessing different degrees of definition were shown, one of them done with a pinhole, which, although deliberately produced, was perhaps open to ridicule by reason of its great diffusion of focus, notwithstanding which, however, it was very pleasing to Mr. Thomas. The negatives shown were all remarkably thin, but yielded the best of prints. At this point several slides were shown on the screen, illustrating the possibilities offered by this branch of work, many of which were criticised by Mr. Thomas regarding both composition and manipulation.

The Chairman, in the course of some remarks, spoke a word in favour of the use of lenses of longer focus than were ordinarily employed. If there was one fault which occasioned more failures than another, it was the neglect of this rule. Again, when using long-focus lenses, there was not that necessity for fine-quality lenses. He did not think Mr. Thomas was any too emphatic in his wish that photographers should take up a special branch of work. More success would follow the adoption of some definite line of work than was likely where the photographer tried at this and that, as was only too commonly the practice.

STEREOSCOPIC TRANSPARENCIES.

This was the subject dealt with at the meeting of the Leeds Camera Club on Wednesday, May 17. Mr. C. Grayson, in a practical manner, demonstrated the best methods of obtaining such transparencies, and he showed also the cause of so many persons failing to get satisfactory stereoscopic results. Lenses on camera fronts fixed to a given distance apart he considered unsatisfactory. A lateral motion was necessary, so that near and distant objects should be accurately rendered, and he showed a very simple appliance to do it. The centres of the lenses must be absolutely the same distance from and parallel to the bottom edge of the sensitive plate in its slide, for, in making the transparency, the pictures are transposed, the right hand on the negative becomes the left hand on the transparency, so that, unless the lines of the pictures are exactly to one height, they cannot superimpose when seen through the stereoscope. The working distances of the lenses were from two and five-eighths to three and a quarter inches apart from centre to centre; but, in making the transparency the best distance was about two and five-eighths inches from centre to centre of each view. The negative may be cut down the middle and a strip cut off each picture, but it is most important that it be cut truly parallel to the edge of the plate, and exactly the same cut from each. No attempt must be made to "straighten up." Any lines

out of perpendicular must remain so. Stereoscopic pictures may be taken with one lens; the camera is made to slide on a baseboard having two slotted holes parallel to each other, three and a quarter inches long, An exposure is given, the slide then reversed, camera moved to the other end of the slot, and another exposure given. The two negatives are now cut to proper size, put side by side, and contact transparency made, transposing them as before stated. Whilst this gives satisfactory results for statuary, &c., it is not so for general landscapes. Mr. Grayson exposed and developed a transparency, and also showed a very fine stereoscope, whereby five dozen or more views could be exhibited in rotation, giving a beautiful and realistic effect, the thanks of the members being unanimously accorded to him.

NOTES ON PRINTING PAPERS.

At the General Meeting of the Oxford Camera Club, in the University Museum, on Monday, May 23, the Hon. Secretary (Mr. G. W. Norton) gave some remarks on Printing Papers, and specimens were shown of a number of different kinds of papers, and the result of various methods of toning. The Ilford Matt P.O.P. paper, deeply printed and not toned, gave pleasing red and brown effects, and was very easy to work. The tones of the Alpha paper, which is now seldom heard of, were also approved, as well as Mariona paper, some good specimens of which were shown. Specimens of platinum, fully printed out and not developed, were also shown. These made good pictures, and Mr. Norton said it was useful to bear in mind, when working platinum, that if a print had gone too far for development, as was often the case if not carefully watched, it could still be treated in that way.

The new Velox paper, however, which can be worked in ordinary light, received the greatest share of attention, and pictures taken from the various brands—matt, glossy, rough, and special—were shown, and all gave very pleasing results. Mr. Norton exposed and developed some prints in the full gaslight, and the safety of the paper from fog and the comfort of working in a good light were fully demonstrated and seemed to be appreciated by the members, who were very favourably disposed towards the new paper, which gives good black tones. The exposures were forty and fifty seconds with an average negative a few inches from an Argand burner—the print was then laid on a piece of glass and developed by the metol-quinol developer issued with the papers, applied with a brush. The image appeared instantly, as in platinum, and a few seconds sufficed to complete the picture, which was then put straight into a hypo and alum combined bath.

It was important to see that the fixing was thorough and the bath of full strength, or stains might appear. Although the paper was able to bear a good deal of light, it was, of course, advisable to use reasonable care, for it was a good plan to develop on a piece of ruby glass instead of clear glass; by keeping the back of the glass towards the light the paper was fully protected, and development could be watched, and prolonged with greater safety. Experiments proved that an exposure of fifty-five seconds, five feet from an ordinary gas jet, has no visible effect on the paper. sixty seconds showed a very slight fog. Development, however, seldom occupied more than twelve or fourteen seconds.

Mr. Norton said the paper did not seem to have much latitude in exposure, but it was easy after a little experience to get the correct exposure, and then with a fairly good negative it was the easiest process he knew for getting good prints.

THE COMING CONVENTION.

Arrangements are being rapidly pushed forward, and the work is now well advanced. The local committee at Glasgow have secured a most notable list of patrons headed by the famous scientist, Lord Kelvin, and including the M.P.'s for the city, and the leading scientific and artistic men of the district. The local committee is large and representative, and includes representatives from all the photographic societies in the district, besides a worthy list of professionals and others. A special effort is to be made by the "Introduction" Committee—Messrs. John Stuart (Convener), Geo. Mason. J. Craig Annan, W. M. Warneuke and Wm. Crooke—to introduce the various members of the Convention, one to another, so that everybody will be "hail, fellow, well met." The excursions are varied, and ought to suit all tastes. The various times for starting are, as yet, only approximate, as the railway companies have not yet completed their summer arrangements, but the exact time will be definitely stated on each ticket. The tickets for the whole-day excursions will cost 20*s*. for the three. At the head-quarters—the Windsor Hotel—a large smoking room will be reserved for members of the Convention, whether staying in the hotel or not. The official programme, which will be issued shortly, will give a list of recommended hotels, tea and lunch rooms, and over and above this—for the Scot is nothing if not economical—a list of private lodgings will be furnished to those who grudge hotel rates, or prefer the privacy of lodgings.

The following is the programme as far as yet settled:—

Monday.—As the secretaries will be busy taking fees, issuing tickets, &c., no special arrangements have been made, but parties may be made up for Ayr and the Land of Burns, leaving St. Enoch Station at 12.30 p.m by ordinary train, Ayr will be reached at 1.30, where luncheon will be ready at the Station Hotel. Brakes will be in waiting to convey the party to "the Banks and Braes o' Bonnie Doon," passing the birthplace of Burns, the ruined Alloway Kirk, Burns' monument, and the Auld Brig o' Doon; returning by a different route, spending a short time in Ayr, and reaching Glasgow about 5 p.m. Railway fare and drive about 3*s*.

Guides and carriages will be provided for those who desire to spend the day in Glasgow, and every facility for visiting and photographing places of interest will be afforded. The full-dress opening *conversazione* will take place in the Fine Art Institute at 7.30 p.m., the Convention will be declared open, and the President will deliver his address. The programme will include a specially selected exhibition of lantern slides.

Tuesday: *Edinburgh and Forth Bridge.*—A special train will leave Queen-street Station about 8.50 a.m., and the usual direct route will be departed from, and the journey will include the beautiful scenery around Stirling, passing the battlefield of Bannockburn (what a hurrah will be there, my masters!), Stirling Castle, the Wallace monument on Abbay Craig, and the Links o' Forth; running along the base of the Ochil Hills to Alloa and Dunfermline, the train will cross the Firth of Forth by that triumph of modern engineering, the Forth Bridge; a stop will be made here, so that a better view of the Bridge may be obtained, and those desirous of photographing it can do so. On arriving at Edinburgh, luncheon will be served in the Mason Hall, George-street, after which the party will be taken in charge by guides from the Edinburgh Photographic Society. The local arrangements are in the capable hands of Mr. Wm. Crooke. For the convenience of those who wish to see as much as possible of the city, special carriages will be provided, but special tickets must be obtained (price 1*s*. 6*d*.) before leaving Glasgow. Fare about 7*s*., including luncheon; driving extra.

Wednesday: *Annual General Meeting.*—Election of new Council at the Fine Art Institute at 10 a.m. After the meeting a visit will be paid to Kelvin Park and the University. The Convention group will be taken by Messrs. Geo. Bell & Co. in the Park at 12 noon, and on dispersing the members will be animatographed by Mr. E. Prestwich. Carriages and guides will be in waiting at the Institute at 3.30 p.m. to convey parties to places of interest, such as the Cathedral, the City Chambers, the harbour and ship-building yards. The annual dinner and smoking concert will be held in the Windsor Hotel at 7.30; tickets, not including wines, 5*s*.

Thursday: *'Doun the Watter.'*—On this day the members will have the opportunity of seeing and photographing the racing yachts at the regatta of the Mudhook Yacht Club. Leaving the Queen-street Station at 9 a.m. the train follows the river Clyde to the steamer pier at Craigendoran, passing many places of interest, of which full details will be given in the official programme. A first-class steamer, specially reserved for the Convention party, will be in waiting, and will (after the party is aboard, of course) immediately proceed as far up the Gareloch as time will permit. The steamer will then run down the firth, past the pretty watering-places on the Argyllshire coast, and reach Hunter's Quay in time for the start of the yacht races. The yachts will be followed until they begin to scatter, and the steamer will then sail down the coast to Rothesay, then round the island of Bute, passing through the Kyles of Bute, where, if the Conventioners have long enough necks, they will have an opportunity of kissing the stoical 'maids of Bute,' then, crossing the firth to the Cumbrae islands and Largs, will return to Craigendoran, and so back to Glasgow. Fare, including luncheon on board, 7*s*. Facilities for supplying and changing plates on board.

Friday: *Loch Lomond.*—A special train will leave Queen-street Station at 8.50 a.m. The route is the same as the previous day, until Craigendoran is reached; then the train enters the new West Highland Railway. Passing behind Helensburgh, the line runs along the hillside above the Gareloch, affording a fine view of the Firth of Clyde, Loch Goil and Loch Long, from the crest of the hill at Whistlefield. The route then follows the shore of Loch Long to Arrochar. At the head of the loch, we run through the beautiful Glen Falloch to Ardlin, where the northern journey ends. Some time will be spent here for picture-making on the shores of Loch Lomond and in Glen Falloch. A special steamer will then convey the party down the loch, passing from point to point—'juist as we like'—until the village of Luss is reached. A stop will be made here, and the local clergyman has offered to act as guide-in-chief. The place is full of pictures, the islands adjoining being perfect little gems. A sail down the loch to Balloch brings us to the special train waiting to convey us to Glasgow, where we arrive about 6.15 p.m. Fare, including luncheon on board, 7*s*. Arrangements for plate-changing on board.

Saturday.—This day will be principally reserved for tours around the city, but, if a reasonable number want excursions to any part, they will be arranged.

CRYSTAL PALACE EXHIBITION—DINNER TO THE EXECUTIVE.

On Thursday evening, May 19, at the Holborn Restaurant, the principal members of the executive of the International Photographic Exhibition which closed at the Crystal Palace on Saturday, May 14, were entertained

to a complimentary dinner by the leading exhibitors. Mr. Frank Bishop presided and the guests were the Right Hon. Earl of Crawford, K.T., F.R.S. (President of the Royal Photographic Society), Colonel J. Waterhouse (Hon. Secretary), Mr. George Scamell (Hon. Treasurer), and Mr. R. Child Bayley (Assistant Secretary). The other gentlemen present were Mr. J. Stuart, Mr. W. Willis, Mr. Cameron Swan, Mr. Ignatz Herbst, Mr. A. W. Penrose, Mr. J. Le Couteur, Mr. H. Snowden Ward, Mr. F. O. Bynoe, Mr. A. Horsley Hinton, Mr. F. Ahrlé, Mr. C. Hyatt-Wolff, Dr. John Attlee, Mr. C. L. Burdick, Mr. B. E. Edwards, Mr. Greenwood, Mr. J. B. B. Wellington, Mr. E. J. Humphrey, Mr. Conrad Beck, Mr. Hall, Mr. A. L. Adams, Dr. Charters White, Mr. E. J. Wall, Mr. Thomas Bedding, Mr. W. M. Rous, &c.

The dinner was admirably served. The *menu* card, due to the well-known artist Mr. W. T. Whitehead who had gratuitously produced a graceful and appropriate design, had been kindly printed in platinum by the Platinotype Company at very short notice. In the course of the evening a 15 × 12 flashlight photograph of the company was taken by Mr. J. H. Avery (Messrs. J. Bulbeck & Company).

After the toast of "The Queen" had been duly submitted and honoured, Mr. Bishop (the Chairman) went on to propose the toast of "The Executive of the Crystal Palace International Photographic Exhibition." He said that the Exhibition had been well organized. It was not merely a shop affair, but it traced the growth, the history, and the progress of photography. He considered that the four gentlemen whose names he had associated with the toast deserved all praise for their thought and labour. Both exhibitors and the public appeared to have been highly pleased; the catalogue, too, was a very valuable book. After reading a letter from Mr. T. R. Dallmeyer regretting his inability to be present, and referring to the Exhibition as one which had not elicited a single grumble, the Chairman concluded by mentioning that a large number of exhibitors who were unable to be present had written approving of the object of the dinner.

Lord Crawford, in acknowledging the toast, returned thanks for the compliment, which he said he felt deeply. The success of the Exhibition was a great reward for their efforts, and the dinner came to them as the dessert after a banquet. After alluding to the labours of Colonel Waterhouse, Mr. Scamell, and Mr. Child Bayley in appreciative terms, his Lordship said that the catalogue was the nearest approach that could be made to the catalogue of the 1851 Exhibition, which contained many valuable reports. The 1851 Exhibition, however, had ruined British supremacy in manufactures, for it not only showed foreign competitors our goods, but also how they were made.

Colonel Waterhouse (Hon. Secretary) also acknowledged the toast, remarking that he was very pleased at the success of the Exhibition.

Mr. G. Scamell (Hon. Treasurer) compared himself to the skeleton at the feast, as he had to remind them that there was a slight deficit in the working of the Exhibition. However, he was pleased to say that the deficit had been made up by some of the prominent exhibitors.

Mr. R. Child Bayley, in his reply, acknowledged the help which the Society had received from the great learned societies in the organization of the Scientific Section. About 75,000 people had gone specially to see the Exhibition, the success of which, he thought, was due to the spirit of unity which had animated those who had the task of organizing the Exhibition in hand.

Lord Crawford briefly gave the toast of "The Chairman," whom he praised for his labours in the cause of photographic copyright. Mr. Bishop, in his reply, said that the need of vigilance in looking after the protection of photographic copyright was greater than ever, now that there was a Bill on the subject before Parliament.

A pleasant evening terminated at about eleven o'clock by the singing of "Auld Lang Syne."

Our Editorial Table.

Hauff's Chemicals for Development.

Agents: Fuerst Brothers, 17, Philpot-lane, E.C.

From Messrs. Fuerst Brothers we have received a selection of chemicals in cartridge form prepared by Mr. J. Hauff. In the ortol-bisulphite tube is contained two reagents, ortol and metabisulphite of potash. Soda cartridges to make the complete developer are also issued. In addition there are toning and fixing cartridges, and fixing cartridges, for making solutions of definite strength. We have very frequently found the cartridge system of employing developing and fixing salts a handy one, and, doubtless, many users of ortol will also appreciate the convenience here offered them.

Mémoires Originaux de Créateurs de la Photographie.

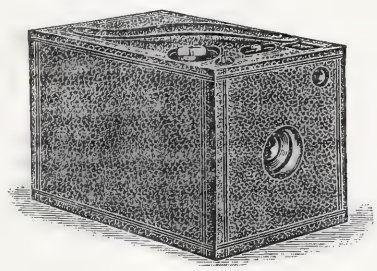
By R. Colson. Paris, Georges Carré & C. Naud, 3 Rue Racine. 184 pp.

The creators, or, as we should say, the fathers of photography, who have supplied Captain Colson with the material for his book, are Nicephore Niépce, Daguerre, Bayard, Talbot, Niépce de Saint Victor, Poitevin. The course followed has been to give a brief biography of each of the experimentalists named, and then an account of his work drawn as far as possible from his own writings. Captain Colson has thus brought together a considerable amount of matter of historical value that was not hitherto accessible to the general reader. Some of the English photographic and scientific publications appear to have been consulted with advantage. A book of this kind, compiled with conscientious care, has great possibilities of value in the hands of those interested in photo history.

The No. 2 "Special" Bull's-eye Kodak.

The Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

This little camera, like the ordinary bull's-eye, is for square pictures $3\frac{1}{2} \times 3\frac{1}{2}$ inches on cartridge film. The size of the camera is $4\frac{3}{4} \times 4\frac{3}{4} \times 6\frac{3}{4}$ inches, and the weight twenty-eight ounces. It takes a roll of film for twelve or eighteen exposures, which can be inserted in or removed from the Kodak in broad daylight. The No. 2 Special Bull's-eye Kodak is fitted

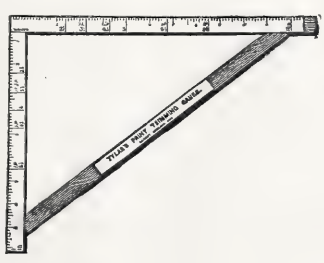


with a rapid rectilinear lens, having iris diaphragm stop and triple-action shutter. The shutter is simple in action, and may be adjusted for snap-shots or time exposures, and has a regulator giving three adjustments of speed for instantaneous exposures. A rectangular view-finder is provided, and a socket for tripod screw. The fittings are of polished nickel, and the camera is neatly covered with leather. The price, not loaded, is 3*l.* 3*s*. For the No. 4 cartridge Kodak a wide-angle lens, costing a guinea, is also supplied.

A Print trimming Gauge.

W. Tylar, High-street, Aston, Birmingham.

This gauge is of rectangular form with straight edges in metal; on one side English measurements, up to $6\frac{1}{2} \times 4\frac{3}{4}$, are printed; and on the other



centimetres up to 180 × 130. Its use is to ensure parallel edges in the print. Any size print up to the maximum may be cut. In use all that is necessary is to cut round two sides of the print, reverse the gauge, and cut again. It is a neat and handy addition to one's printing tools.

Catalogues Received.

Wilfred Emery, 3, Soho-street, Soho-square.

Mr. Emery sends us his price-list for developing, retouching, printing, enlarging, &c., together with some very good specimens of his work in platinum, carbon, and gelatine printing. He is wholesale agent for the Luxia & Sans Égal P.O.P.

Ross, Limited, 111, New Bond-street, W.

Messrs. Ross send us a collection of small catalogues relating to their different specialities. One of the catalogues deals with Ross-Goerz double anastigmats, the Goerz sector shutter, the Anschutz focal-plane shutter, &c. Another summarises a series of press and other testimonials. Catalogue No. 2 treats of microscopes, telescopes, and allied instruments, while yet a fourth compilation, which is printed in the Spanish language, extends to 100 pages.

News and Notes.

"METRIC EQUIVALENTS OF IMPERIAL WEIGHTS AND MEASURES AND THERMOMETRIC EQUIVALENTS."—The price of the above work, which we noted in Ex Cathedrâ last week, is 1*s.* 6*d.* net.

A PLEA for a kinematograph bureau is put forward by M. Boleslas Matuszewski, Paris. His view is that a national or international bureau, directed by a responsible Government official, should be established to receive kinematographs and preserve them for their historical value.

A NEW standard of light is suggested by M. C. Féry in a memoir to the Paris Academy of Sciences. He proposes a flame of acetylene, supplied through a jet of half a millimetre diameter, and points out that it supplies a method of determining the commercial value of samples of calcium carbide.

THE "POSTER."—The first number of the *Poster* will be ready early in June. It will be a profusely illustrated chronicle of the art-poster world, both British and foreign. In addition to original drawings it will contain reviews and reproductions, some in full colours, of the principal pictorial posters of all nations.

PHOTOGRAPHIC CLUB.—Wednesday evening, June 1, at eight o'clock, subject, "Modern Developers." Visitors are admitted to the meeting of the Club on the personal introduction of a member or by invitation cards, which the Hon. Secretary (Mr. W. R. Stretton, 23, Fanthorp-street, Putney, S.W.) will be pleased to forward on application.

MESSRS. THORN & HODDLE write: "It may be of interest to your readers to know that we have a complete installation of acetylene gas in operation at Earl's-court Exhibition (Stand No. 13, Picturesque England). In a dark room there we compare the new illuminant with electric light and coal gas, and are ready to give all information to visitors. We are lighting up a portion of Old London near the Great Wheel."

MR. H. O. DRAKE, of 35, Heath-street, Hampstead, N.W., informs us that he is just commencing business on his own account after serving five years with Messrs. R. W. Thomas & Co., and six years with Messrs. W. Butcher & Son. We gather that Mr. Drake, whose catalogue will shortly be ready, intends dealing in optical and scientific instruments, photographic materials, cameras, lenses, surveying and mathematical instruments, lanterns, &c. We wish Mr. Drake every success.

MESSRS. DAWBARN & WARD write: "We have been appointed by the Royal Photographic Society special agents for the sale of their catalogue of the Crystal Palace Exhibition. We are predaring a handsomely bound cloth edition, which will sell at the very moderate price of 2*s.* 6*d.* It will be ready in a few days, and we shall be glad if you can find space to give notice to your readers that copies may be had to order through any photographic dealer or bookseller," &c.

WILLIAM GASCOIGNE is credited with the first use of cross hairs in telescopes in 1640, or a little earlier, says the *Engineer*. Gascoigne fell at the battle of Marston Moor in 1644. He speaks of only hair and thread. In 1662 Malvasia employed, besides hair and vegetable fibre, silver wires. In the middle of last century glass and mica plates, with engraved lines, were employed in place of cross hairs, as described by Brander in 1772, and used by Breithaupt in 1780. Spider webs were not thought of until 1775, when their use was advocated by Fontana. In 1818 Struve employed fine glass threads, and platinum wire has been substituted in recent years.

ELECTRICAL IMPRESSIONS ON PHOTOGRAPHIC PLATES. — Mr. A. S. Bates writes to *Nature*: "Some simple variations of the inductoscript may be of general interest. A photographic glass negative is placed on a plate, and a ½-inch induction coil is sparked for one or two minutes on the outside; a perfect positive with fine detail can be developed. If printed paper is so treated, a clear image of the reading is made, white letters on a dark ground; a coin gives dark letters. If the exposure to the spark is prolonged, an indistinct image of the print, which is on the other side of the paper, will also appear. More or less perfect images can be made if ink or pencil writing or a photographic print be put on the plate. When thin paper is placed between a coin and a plate, a fair, but less perfect, reproduction of the coin will be produced. It makes very little difference whether fast or slow plates are employed."

"WHY are not amateurs permitted to photograph in Richmond Park without an order from the authorities in Whitehall?" asks *The Critic*. "I am informed that this regulation was originally framed with the object of suppressing the nuisance of the professional travelling photographer in the London parks, and to this extent the by-law was in a measure justified. But to regard the hand camera as a nuisance in a large demesne like the Richmond reserve, while the scorching cyclist and the vandal picnic party are winked at, is absurd. It is clouding the issue to object that the authorities make no difficulty about granting these permits; indeed, it but aggravates the ridicule of the situation, for, if, as I am assured, these are issued indiscriminately, what object can there be in exacting them? Nor do I care whether or not the by-laws are legible from the footpath opposite the 'Star and Garter.' If a by-law be idiotic, the less legible it is the better. It appears to me that the only effect of the maintenance of such a prohibition is to put a premium on the four keepers receiving gratuities to shut the near eye. If the authorities can allege any *bonâ-fide* reason for the law, the sooner we hear it the better. If not, they should be made to see the error of their ways; and, as the Ranger can always protect himself from infringement of copyright with a wave of his umbrella, he surely has nothing to fear from the too enterprising snap-shotter."

A PHOTOGRAPHIC IMPOSTOR.—Thomas Menzies Bell, a middle-aged man was charged at the Edinburgh Sheriff Court on Friday with having on twelve different dates, between the end of January and May 7, at various places in Edinburgh and the surrounding district, pretended that he was taking orders for copies of a photograph of two prominent officials of the North British Railway Company, and induced various persons, chiefly station agents, to hand him sums amounting in all to 9*l.* 9*s.* without supplying or intending to supply the photographs. The defendant pleaded not guilty. Twelve witnesses were called, and deposed to having been called upon by accused, who asked them to give an order for one or both of the photographs, promising in most cases to have them ready in four or five days. In some instances he had said the photographs were by a firm in Princes-street. The Sheriff said that in January the accused got two photographs from a photographer in order to sell them, but the connexion ended in the middle of March, and it was proved quite conclusively that after that date he hawked about photographs and took orders for them on forms which bore the name of a firm which, if it ever existed at all, expired four years ago. There was no doubt he got the money. There was no suggestion that he had ever accounted for it, and, to the Sheriff's mind, it was perfectly clear he never meant to. A previous conviction in regard to a somewhat similar offence was libelled, and the Sheriff passed sentence of forty days' imprisonment. As the accused was removed below, he shouted to the witnesses in the Court that when his "time" expired he would supply every one of the gentlemen who gave him an order with a plate.

TO PRODUCE PHOTOGRAPHIC PICTURES UPON COTTON FABRICS BY PRINTING. —E. Kopp publishes an interesting paper on indigo salt in the *Bull. de la Soc. Ind. de Mulhouse*. For a number of years a prize has been offered in the said *Bulletin* for a process to produce photographic pictures upon cotton fabrics by printing, a problem which has not yet been solved. Kopp has made a contribution toward the solution of the question founded on the following facts: Indigo salt was formerly sold in commerce as bisulphite compound. The same decomposed strongly, however, in diffused daylight; even if stored in dark rooms, decomposition set in after a few months. Therefore, Kalle now offers the free "keton" of the indigo salt to the print works, and the consumer has to add the bisulphite himself directly before use. Kopp had made the observation that cotton goods prepared with indigo salt, if they had been exposed to the light for some time before treatment with soda lye, did not show a nice blue effect. On this he based his photographic process. He prepared the cotton fabric with:—

Indigo salt	7·5	grammes.
Sodium bisulphite, 40° Bé	0·01	litre.
Soda	1·0	gramme.
Water	4·0	c. c.
Wax	$\frac{1}{10}$	litre.
Gum water	0·3	litre.

Dry with exclusion of light and the fabric is prepared for the photographic printing. Expose the texture, according to the description of the *cliché* and the concentration of the colour, one hour to one day to the sun. The design forms in yellow, passing more or less into dark brown. Develop with caustic soda lye of 15° Bé at 62° Cent. on the foulard, wash and dry.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

May.	Name of Society.	Subject.
30	Bradford Photo. Society	Picnic: Guildford and Godalming District.
30	Hackney	Excursion: Woodham Ferris. Leader, W. A. Hensler.
30	North Middlesex	Excursion: Welwyn and Tewin. Leader, J. Mummery.
30	Liverpool Amateur	Excursion: Moreton Old Hall. Leader, Dr. J. W. Ellis.
31	Hackney	Members' Lantern Night.
June.		
1	Borough Polytechnic	Open Night.
1	Edinburgh Photo. Society	Thirty-eighth Annual Meeting.
1	Photographic Club	Modern Developers.
1	Southsea	Excursion: Goodwood.
2	Leeds Photo. Society	*Elementary Optics*. R. Child Bayley.
2	London and Provincial	Demonstration of Photo-lithography. A. E. Smith, R.P.S.

ROYAL PHOTOGRAPHIC SOCIETY.

MAY 24,—Technical Meeting,—Mr. G. Scamell (Hon. Treasurer) in the chair.

THE CHINESE FAR WEST.

MRS. ISABELLA L. BISHOP read a long and deeply interesting paper, which had been announced by the above title, but which, she said, would have been better named "The Yangtze Valley and Beyond," for the journey which it described was up the Yangtze Valley and by the tributaries of the Yangtze for about 2700 miles from Shanghai, and she did not propose to say much about the Chinese Far West, as the aboriginal inhabitants of that country were scarcely the people to bring before such an audience. Mrs. Bishop

started from Shanghai with a half-plate camera and a Ross symmetrical lens, and unfortunately left her hand camera behind, an omission which she regretted from the day she reached Hankow. It is impossible to set up a stand camera in any Chinese city, and in the Far West, where the hostile feeling against foreigners is exceedingly strong, it is absolutely impossible to do so where there is a human being in sight. In the attempts which she made to set up her camera in Western China, she was mercilessly knocked about, beaten, and pelted with dangerous missiles, and the camera was overturned. The natives believed that lenses were made of the eyes of Chinese babies, and that the foreigners slaughtered the babies for that purpose. They also believed that Mrs. Bishop kept a black devil in the camera, which, with its one eye, could see the treasures hidden in the mountains, and that at night the devil was liberated in order that it might dig them up. So strong was this belief that at one place the people attacked her boat, under the impression that it was ballasted with golden cocks stolen from the mountains, and the traveller had to put out into what was almost a rapid in order to save the boat from destruction at their hands. Photography, as practised in Western China, was, therefore, anything but a recreation, and nothing but the most intense desire to obtain pictures of the country and its people would induce any one to go through all the torment and serious risk which it involved. Mrs. Bishop appears to have developed all her negatives on the spot, and this was, as might be expected, a matter of very great difficulty. For nearly eight weeks she was on the Yanztze, and the only water available for developing was the fluid mud of the river, which left a deposit on the negatives, which she had found it impossible to remove. After this photographic introduction the lecturer proceeded to give a graphic and eloquent description of her journey up the Yangtze Valley from Shanghai to Tchang, the Gorges and the Great Rapids, Wan Hsien, Fu, Hsien, Chan, and Ting, and inland travelling in Sze-chuan. Her boatmen and coolies were uniformly faithful, kind, and in their way polite, but the hostility to foreigners evinced by the officials and inhabitants was very great, and at some places—particularly at Liang Shan and Lao Kia Chang—she and her attendants were subjected to great violence by stone-throwing, beating with sticks, and abuse. These things were, she thought, connived at by the mandarins in authority, who only interfered when matters had reached such a stage that the lives of foreigners were imperilled. The accommodation at the halting plates was of the sorriest kind; at one place—the name of which is almost unpronounceable, and quite unspellable—the traveller had to pass the night in the "pigs' room," a mud-floored apartment, perfectly dark, with the porcine occupants enclosed in one corner by a bamboo fence. The industry and resourcefulness of the Chinese were referred to in the highest terms; the inhabitants of the remote districts described were living in prosperity and security, and had never heard of England or America, or even of the war with Japan. Coal, in one region, was in great abundance, and was sold at 2*s.* a ton at the pit's mouth; the colliers worked on the surface, fearing that, if they dug to any depth, they might scratch the back of the great dragon beneath the earth, and cause him in his anger to produce an earthquake.

Mrs. Bishop's paper was illustrated by a large number of lantern slides, many of them exquisitely tinted by Japanese artists, depicting the scenery of the country through which she passed, with its pagodas, porcelain temples, bridges, feudal castles, and other interesting and unique characteristics, and upon its conclusion a very hearty vote of thanks was given to her by an audience which had already repeatedly shown its appreciation both of her lecture and her photographs.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 19.—Mr. J. T. French in the chair.

Mr. E. H. BAYSTON showed the experimental results obtained on the Fry films supplied to him by Mr. Hodd, about which there has been some discussion and diversity of opinion regarding their keeping qualities, the films being understood to date back some eight or nine years. One of the films was exposed in sections for five, ten, fifteen, twenty, and twenty-five seconds at *f*-32 at eight o'clock in the morning of a bright day, but it was noticeable how very little difference existed between even the extremes of this range of exposure. Regarding the marks on the films, which it was suggested were due to grease from the packing paper, he had done as recommended, and rubbed with his finger as hard as he could without risk of destroying the film without moving the marks in the slightest degree.

Interest is still maintained in the capabilities of these films, and other members have undertaken trials of the remaining specimens in Mr. Hodd's possession.

Some discussion followed the reading of this question: "In photographing rather brightly lighted water, with almost black trunks of trees on the banks, would isochromatic plates with a yellow screen be an advantage or disadvantage?" The aim was to get detail on the trunks while not over-exposing the water.

Mr. A. MACKIE should certainly recommend an isochromatic plate for a difficult subject of any kind. They gave better and more harmonious negatives than did the ordinary plate. With an isochromatic plate and a yellow screen detail would be got which would be absent probably in an ordinary plate. The usual mistake in taking subjects like that named was in giving insufficient exposure. These things required an exposure far beyond anything one would first imagine necessary for the purpose.

The CHAIRMAN added his testimony to this opinion, and described some of his own experiences with backed ordinary plates on similar subjects. With a Marion ordinary plate and lens working at *f*-32 he gave exposures of from fifteen to twenty seconds.

Mr. A. L. HENDERSON, who has recently arrived home after a stay of several months in Corsica and the South of France, showed a few slides taken during the Queen's visit to Cimiez, and promised an evening show of his work in Corsica during the past winter.

Croydon Camera Club.—May 18, Mr. Hector Maclean in the chair.—Mr. FRIESE-GREENE on

ELECTRIC PRINTING.

Mr. W. Friese-Greene gave a highly interesting demonstration lecture before a large gathering of the members at the Club rooms on the 18th inst., on which occasion he, for the first time, published and described the results of his researches and experiments respecting the action of electric currents in producing prints. The demonstrations included the impressing of ordinary samples of white and coloured paper which had not received any preparation beyond being damped with plain water, with latent electrically formed images, which remain unaffected by time or light, and are developable by most reducers. An electric printing press was shown in action capable of producing impressions from uninked stereos and other metallic surfaces having a design in relief. These impressions require no development, but come straight from the press a jet black. Another curious effect was shown, in which a sheet of paper, sensitised in a solution of amidol, gave a blue impression with the electric current which passed in a few seconds through a long range of colours. If one agent is susceptible of giving images of almost any colour of the spectrum, are we not a step nearer to the obtention of a direct photograph of the colours of nature?

Hackney Photographic Society.—May 10, the President in the chair.—Information as to the classes for competition in the next Annual Exhibition was given by the HON. SECRETARY. Reports of the excursion to Greenwich and the cycling run to Enfield on the previous Saturday were given by the respective leaders. The subject for the evening was to have been a lecture on "Astronomical Photography," by Mr. A. Taylor, but, on account of that gentleman's unavoidable absence, the lecture was postponed, and in place of it Messrs. ROLAND SMITH and W. RAWLINGS gave a most interesting lantern lecture on

ENGLISH ARCHITECTURE.

Slides were shown illustrating the various architectural styles to be found in England from the prehistoric Stonehenge to those of later periods.

MAY 17, Major Williams presiding.—Reports of excursion outings were made by the Excursion Secretary, who announced that the Whit-Monday outing would be to Woodham Ferris instead of Godalming and Eshing as on the fixture card. Trains leave Liverpool-street at nine a.m. Mr. Rawlings showed a very compact twin-lens hand camera, made by Mr. Jackson, of Amhurst-road. It had all necessary movements, and was of the magazine pattern. A paper was read by Mr. E. T. COOMBES on the subject of

A CYCLING TRIP TO NORTH WALES,

and was illustrated by a larger number of lantern slides. In answer to questions, Mr. Coombes said he carried a 5×4 hand camera slung over the shoulders by means of a broad webbed strap. A few light articles were carried on the handle bar of the bicycle, but all heavy luggage was sent on from place to place in advance.

North Middlesex Photographic Society.—The third fortnightly outing of the season took place on Saturday, the 7th instant. Twenty-five members journeyed to London, and, favoured by fine weather, spent a most enjoyable time in and around Monk Wood. Supplied by the leader, Mr. Gosling, with sketch maps of the district, members had little difficulty in moving amongst scenery of the most charming and varied character, exposing in all about 100 plates. The afternoon's devotion to recreation and "picture-hunting" was brought to a termination with a substantial tea at the Bag of Nails, Loughton.

ON Monday, the 16th inst., forty-nine members, more than half the strength of the Society, attended the fifth Instruction Lecture of the season, delivered at the Society's rooms, Jubilee House, Hornsey-road. The lecturer, Mr. A. H. LISETT, had for his subject

PRINTING AND TONING P.O.P.

Briefly, his method was to reduce the various operations to as near mechanical action as possible, as it enabled him to produce particularly uniform results. He showed a number of prints varying in colour from yellowish-red to cold purple, all of which had been toned for the same length of time. The differences he obtained by altering the proportions of the constituents of the toning bath. He preferred himself to tone a small number of prints only at a time, to place them in a bath one after the other as quickly as possible, and to allow them to remain, constantly in motion, for eight minutes. He advocated the use of the common salt bath both before and after toning. Artificial light he thought best for conducting the various operations, and found no difficulty in judging colour providing he always used the same light. Mr. Lisett attribute fading mainly to insufficient fixation, and thought that prints should be allowed to remain in a ten per cent. hypo bath for twenty minutes. He further recommended that, in order to avoid the risk of blisters, the hypo solution should be made up at leart twenty-four hours before required for use. A freshly made solution was too cold. The lecturer confined himself almost entirely to the practical side of the subject, holding that the beginning should be as little as possible confused by the introduction of abstruse chemical theories.

Leeds Photographic Society.—An auction of members' surplus photographic apparatus (the second of its kind) was held at the ordinary May meeting in the Society's rooms. The number of lots submitted for sale did not reach the aggregate of the previous one, simply because many of the members had made a good clearance a year ago. Of the forty-seven lots sent in, forty-one changed hands, six being withdrawn at reserved prices. The sale was conducted, as hitherto, by Mr. G. H. Robinson (Messrs. Robinson & Son), and proved an agreeable change in the Society's syllabus. At its close Mr. P. GILSTON (President) proposed that the best thanks be given to the auctioneer for his honorary services, and hoped the Society would long be able to retain his services on these advantageous terms. Mr. B. A. BURRELL seconded, and

he vote was carried with acclamation. Several additions have lately been made to the membership of the Society. It has been arranged to substitute on June 2, instead of the paper on the syllabus, "The Great Sahara: its Inhabitants, Landscape Features, and Animals," illustrated with lantern slides, by H. Bendelack Hewetson, F.L.S., F.R.G.S.

Liverpool Amateur Photographic Association.—The second excursion of the season took place on Saturday, May 7, when a large party, under the leadership of Mr. Paul Lange, left Woodside Station at 10.35 a.m. for Erbistock, Overton, and Bangor-is-Coed. A special saloon carriage to Wrexham was reserved by the Great Western Railway, and this contributed to the comfort of the party. The remainder of the journey was performed in two large brakes. Erbistock was reached about 2 p.m., and, after exhausting the interesting subjects in the vicinity of the ferry, the party crossed the river and walked along the bank to Overton, where the conveyances awaited them. Another stoppage was made at Bangor, and Wrexham was finally reached at about 6 p.m., and a substantial tea discussed at the Wynnstay Arms Hotel. The return journey was quickly accomplished, the party arriving in Liverpool at 9.30 p.m. Over 170 plates were exposed.

Patent News.

THE following applications for Patents were made between May 9 and May 14, 1898:—

SENSITISING EMULSIONS.—No. 10,589. "An Improved Process for making Silver Halogen Emulsions Sensitive to Light." M. PETZOLD.

STANDS.—No. 10,793. "Improvements in Supports for Photographic Cameras." Complete specification. W. R. BIGSLY-CHAMBERLIN.

PRINTING FRAMES.—No. 10,819. "Improvements relating to Photo-printing Frames." A. FELL.

PHOTO-MECHANICAL PRINTING.—No. 10,862. "Improvements in or pertaining to Photo-mechanical Printing." A. HENLEY.

FABRICS.—No. 10,951. "Improvements in Photograph Print Fabrics." J. A. HARVEY.

FILM-PACKING.—No. 10,966. "Improvements in or relating to the Arrangement of Photographic Films as a Pack with Separating Devices therein between." A. L. ADAMS.

FLASHLIGHT APPARATUS.—No. 10,971. "Improvements in Flashlighting Apparatus for use in Photography." P. BOYER.

FLASHLIGHT PORTRAITURE.—No. 10,972. "Improved means for Facilitating the Taking of Portraits by Magnesium or other like Light." Complete specification. P. BOYER.

TRIPODS.—No. 10,993. "Improvements in or relating to Bases or Supports for Cameras or like Tripods or Stands." S. LEDERER.

CAMERAS.—"Improvements in and relating to Photographic Cameras." H. BRETON.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEPTH OF FOCUS.

To the EDITORS.

GENTLEMEN,—Whilst I do not in any way wish to raise so hot and wearisome a discussion as raged some years back on the "diffusion of focus" question, possibly I may be allowed to question the statement made by Mr. W. E. Debenham before the North Middlesex Photographic Society. It runs as follows: "It was in all lenses governed not by the relative, but by the actual, size of the aperture; focal length had nothing to do with it. A diaphragm with a one-inch opening would give the same depth of focus, whether used in a five-inch or a fifteen-inch lens; no more and no less in one case than in the other."

If this statement be true, we may carry the argument to the *reductio ad absurdum*, and state that a one-inch aperture would give as much depth of focus with a five-inch lens as with a lens of 500-inch focus, or even five-mile focus, or with a lens of one-inch focus; yet, if we draw a perpendicular of one inch in height, and let fall from the ends of it lines which shall cross one another at the several distances of 1, 5, 500 inches, and 5 miles, it will be obvious to all that the angles at which the lines will cross at the focal plane will be much more obtuse at the one and five-inch than at the 500-inch and five-mile, and one would naturally suppose that it would be possible to obtain with the longer-focus lens much greater depth of focus, because there would be a greater distance on either side of the focal plane through which the plate could be moved without the image of a point becoming a circle with a greater diameter than $\frac{1}{250}$ of an inch.

I am not an optician, but do use both hand and stand cameras with lenses of varying foci, and my experience has taught me that depth of focus can be increased by the insertion of smaller diaphragms, and that the shorter the focus the more depth I get; but it is quite possible that, though I get these results, and can show them both in prints and in lantern slides, they do not exist, but are merely created chimeras of my failing eyesight.—I am, yours, &c., T. D. F.

"SOME FACTS ABOUT FOCUS."

To the EDITORS.

GENTLEMEN,—Upon reading the above article in last week's issue of the JOURNAL, I really am slightly puzzled over one statement made therein. Now, bearing in mind who is the author of the article, I must presume that it is my own density which prevents me from understanding the point. The article says that "depths of focus are governed, not by the *relative*, but by the *actual*, size of aperture, and that a *one-inch* diaphragm gives the same depth of focus, whether in a five-inch or a fifteen-inch lens."

Now, a diaphragm of one inch used in the five-inch lens (assuming the size of glasses to be one inch or more) would give an intensity, roughly speaking, of *f*-5, and, in the other case, the one-inch diaphragm used in the fifteen-inch lens would have an intensity of *f*-15; and, assuming the two lenses to be of the same type, surely there would be a greater depth of definition in the lens working at *f*-15 than in the one working at *f*-5. I am not for a moment venturing to argue with Mr. Debenham, but merely ask whether he has made a mistake, or whether I have altogether missed the point of his statement.—I am, yours, &c.,

80, *Boundary-road, N.W., May* 23, 1898. FREDERICK W. MUNCEY.

ANASTIGMATIC LENSES.

To the EDITORS.

GENTLEMEN,—In January last you kindly printed Mr. W. K. Burton's paper on "Testing Lenses for Astigmatism," and the interest taken in the same subject was evident from several contributions to the ALMANAC. I hoped that Mr. Jourdain's excellent suggestions (page 769) would have led to some information in the direction he indicated.

I found it an easy matter to prove the superiority of anastigmats over the ordinary rapid rectilinears in equality of illumination, but I failed to ascertain in what respect the anastigmat of one maker excelled that of another. Probably many other amateurs with as little leisure and an equal lack of suitable appliances as myself are in the same position.

Under the circumstances I bought one of the cheapest anastigmats in the market, and my choice was partly decided by the advantage of being able to use the back combination as a single lens of long focus.

Strangely enough, the makers of anastigmats which can be used in this way omit to inform us of a risk which, it appears, is incidental to such a use of their lenses, and of which I only became aware last week in reading in an advertisement that "no lens which is frequently separated and rearranged can retain the requisite precision of adjustment which —— lenses always possess."

I do not wish to impair the efficiency of my lens in its complete form, and shall therefore desist from separating it, except for dusting, until I can glean some further information on the subject.

I exposed two plates last week and made enlargements to test the present condition of the lens, and hope I have not yet done much harm, if any.

As my limited time prevents my joining a society to compare notes with other workers, I should be glad to learn the experience of any readers of THE BRITISH JOURNAL OF PHOTOGRAPHY who have made any observations on the matter.—I am, yours, &c., ANASTIGMAT.

May 18, 1898.

EARLY DRY PLATES.

To the EDITORS.

GENTLEMEN,—With regard to the date of the earliest dry plates issued to the public, I have a small pamphlet entitled *The Dry-collodion Process*, by Charles A. Long, dated 1857. At the end there is a price-list of these plates, sold by Bland & Long, photographic-instrument makers, 153, Fleet-street, London.

I note the price of quarter-plates is 5*s.* a dozen; 15 × 12, 4*l.* a dozen.

The process is an iodised collodion plate, coated immediately after

taking out of silver bath with a solution of meta-gelatine, and dried. The exposure with a three-inch single landscape lens (sixteen-inch focus, half-inch stop) is stated to be about five minutes for a bright landscape. —I am, yours, &c., G. MANSFIELD.

Morristown, Lattin, Naas, May 17, 1898.

THE STORES AND CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—I am given to understand, from a client in London, that he can get carbon enlargements from the Civil Service Stores for 10*s.* 6*d.*; although he doesn't state size I am led to think it is 12 × 10 or 15 × 12, and, even were it whole-plate size, it isn't the price the enlargers charge with second-class finish. Can you throw any light on the matter in a future issue of your JOURNAL, thereby obliging,—Yours truly,

"GRATEFUL."

[Some reader who is a member of the Stores may be able to answer this question.—ED.]

KROMSKOP COLOUR PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I received from the Press-Cutting Association, this morning, copy of a notice you kindly put into your JOURNAL on Friday, reviewing the "Kromskop Colour Photography" book, by Mr. F. E. Ives, but you state, "The little book is issued gratis," and we are, as a matter of fact, charging 1*s.* net for each copy, which will barely pay the expense of printing, and this little sentence has resulted in a great number of applications for a copy of the book.

I should be obliged if, in your next issue, you would kindly state that the book is not issued gratis, but a charge of 1*s.* net is made per copy.—We are, yours, &c., THE PHOTO-CHROMOSCOPE SYNDICATE, LTD.

Holbein House, 121, *Shaftesbury-avenue, London, May* 23, 1898.

[We regret having stated Mr. Ives's useful little book was issued gratis. It is well worth 1*s.*—ED.]

MINIATURE-PAINTED PHOTOGRAPHS ON IVORY.

To the EDITORS.

GENTLEMEN,—In your issue of the 20th inst., you cry "Alas!" for the decadence of miniature-painted photographs on ivory, and incorrectly state that it has "become quite a lost art."

You then proceed to remark that, "so far as miniatures are concerned, it is quite a different thing from that produced by Lock, Williams, and others, in the late fifties and early sixties."

With all due deference to your informant, I beg to dispute his statements, and to maintain that miniature-painted photographs on ivory and porcelain are done equally as well, and, in fact, far better than any turned out by the miniaturists you mention; but to obtain such results is merely a question of price. It cannot be done at the miserable money generally paid; but that it can be attained at a good price is an indisputable fact. If any one will pay me five guineas for colouring a carbon photograph on ivory, I will guarantee to entirely conceal the existence of the photographic basis, and to finish the picture according to the highest traditions of the art. One celebrated present-day miniature-painter, who occasionally executes special orders for me, is equally at home in painting his splendid specimens from the life or upon the photographic basis; for, unfortunately, photography has driven many a first-class miniaturist to commercialism in his art, and to satisfy the rampant desire for cheapness.

The artist to whom I refer has been an exhibitor in the Royal Academy for many years, and has had the honour of painting most of the members of the Royal Family and the aristocracy, of course, in pure *drawings* on the ivory or porcelain.

The *Times* has compared his work to that of the great Cosway, and yet he is often compelled to paint on the photographic base, on account of the dearth of higher-class orders; for even the rich and cultured people are clamouring for cheapness in everything—from art to funerals. It is indeed the funeral of art when it becomes nothing but a factory, when well-known artists cannot sell their pictures that have been advantageously placed in the Royal Academy, and when popular penny weekly publications offer to provide their readers with highly finished (gold frame, and all complete) miniature (!) for 7*s.* 6*d.*

I am not writing this letter to seek a free advertisement, but to disabuse a very common error—and one that has become fashionable, and constantly reiterated *ad nauseam—i.e.*, that the art of miniature-painting is dead! Given the same encouragement and prices that obtained in the old days, and I feel assured that miniature-painting—the most delicate, beautiful, and difficult of arts—would again lift its head to its old and honoured place in public estimation. It is decried simply because photography has cast it under a cloud for the time being; but, when one considers that some of our best oil painters are not above seeking the aid of the camera, I think the time has arrived for the parrot-cry of "miniature-painting is dead" to cease.

It would be more worthy and useful if press writers would try and lift the art into its lost position, in preference to grinding it down still further into the mud of ignorance and contempt.

Photography has been a bad enemy to both miniature-painting and engraving in the past, and it is well within its power to become a sincere and effective friend to at least the first-named, for, alas! I fear that the beautiful art of steel engraving will, indeed, be a lost art in the immediate future.

As your writer states, we have now the carbon and the platinotype processes, both permanent, and it is to these processes that the miniature painter of the present and future must look, for Art with a big A, and at present prices, must go by the board. Drawings on ivory are doomed, but it seems to me that, if the public once awakens to the permanence of miniatures painted on either carbon or platinotype, there is still a chance for the *real* artist in miniature.

Trusting that you can insert this letter in THE BRITISH JOURNAL as a gentle refutation to your remarks upon this subject in your last issue,—I am, yours, &c.,

T. S. BRUCE, *Artist in High-class Miniature-painting.*

4, *Villas-on-Heath, the Vale, Hampstead, N.W.*,

May 21, 1898.

INVITATION SITTINGS.

To the EDITORS.

GENTLEMEN,—It is much to be hoped that your timely notice of this serious and growing evil will have some effect in restraining photographers from adding to the public want of esteem which now threatens professional photography, and as the result of undignified touting for patronage.

So long as well-credited firms throughout the country refused to countenance business methods which smacked of the kitchen area, no great mischief was done; but, when men of position in the West-end imbibed the spirit of the factory and threw overboard their reputation for professional dignity, the danger assumed a new and extremely grave phase; for the public naturally believe that, if *these* men have to "*beg* the honour of a sitting" and accept tamely the chances of having their work thrown back in their faces, the status of the photographic rank and file must be getting low indeed.

Herein lies the chief injury which such men do to their fellow-workers —the very eminence to which they have attained in the past makes their new business policy all the more fateful.

The man who preaches unselfishness in business matters may be looked upon as a well-meaning crank, and be reminded that, until the millennium arrives, "every man must scheme for himself and the old gentleman will grab the hindmost."

But there is such a thing as overlooking the fact, that when men strive to advance their own interests, *regardless of the general welfare* of the business or profession in which they are engaged, they array against themselves a force which is bound, sooner or later, to place a limit upon their inconsiderate ambitions. Thus, a well-known photographer in London, who is at this moment pushing an elaborate invitation and touting business, incurs a professional antagonism which will inevitably react upon the professional support he must have to keep his manufacturing schemes healthy and profitable.

No sane man should doubt that the final results of inviting people indiscriminately to sit for their portraits are unpleasant. If he does, let him pass a few weeks in a large provincial studio after the Mayor, Sheriff, J.P.'s, and medical men of the district have been circularised by some prominent London firm working the invitation system. He will hear that firm alluded to in unflattering terms, he will hear suggestions of "a played-out business," he will hear that "Mr. Corner-Stone has consented to sit at the Town Hall, merely *to oblige* those photographers from London." But, when Mr. Corner-Stone has "obliged," and the inevitable circular of prices for copies has come down with the proofs, he will probably hear that Mr. Corner-Stone has expressed himself in most uncomplimentary terms about the nature of the transaction.

Of course the provincial photographer is neither surprised, nor altogether displeased, at the views which are expressed by his sitters, and *explains*.

And, when provincial photographers all over Great Britain make up their minds to explain to their fellow-townsmen the invitation system stripped of its specious flattery and humbug, and contrast it with fair above-board methods of professionalism, they will be doing much to limit the extent of a danger which all thoughtful and earnest workers perceive.

Rightly or wrongly, the impression prevails in the country that several West-end photographers have done their best to ruin each other by invitation work and general touting and toadying; but, if they mean to extend the scope of their operations to the country, every effort should be made to anticipate and neutralise the effect of their plans when visiting the preserves of the PROVINCIAL.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

J. P. Blair, 1, Chapel-street, Petersfield.—*Photograph of old houses in The Square, Petersfield, Hants.*

H. E. Winter, 46, Craven-park-road, Harlesden, N.W.—*Three drawings, titled "Still is the Night," "Midsummer," "By Mead and Stream."*

AJAX.—See our issue of April 8.

G. LESZ.—Sorry we are unable to supply the information asked for.

G. E. BROWN.—Not so far as we are aware. We do not recollect coming across any patent for it.

TRICOLOUR.—Sorry to say we have mislaid the address. You can obtain it from the patent specification published at the Patent Office, Chancery-lane, W.C.

HYDRO.—1. You appear to have over-exposed your plates. We should not alter the composition of the developer. 2. A plain hypo solution of the usual strength.

XAVERIUS.—1. Half-plate size we should say. 2. Not essential to use a screen. Stop down your lens to *f*-45, and, using a fairly rapid plate, give an exposure of about a second.

LIPPMANN'S COLOUR PHOTOGRAPHY.—GRINGO asks: "Can any one give me information as regards how far development requires to be carried in this process? In return I may be able to give other details."

H. E. WATKIN.—1. We have frequently given it as our opinion that no risk would be incurred in making such pictures. We doubt the validity of such patents. 2. As to the article, we will bear the suggestion in mind.

WAITING.—We can only suggest an immersion in a bath of alum acidified with either acetic or hydrochloric acid. Wiping with an acid is a risky thing, and we should not expect alum and hypo to be of any use in such a case.

SHUTTER.—S. SOAMES. If you are not mechanic enough to take the apparatus to pieces yourself, and see what is the matter and remedy it, we should advise you to send it direct to the maker, instead of intrusting it to a "handy man."

A. M. TRAVERS.—We know of no such book or paper. Various articles on the subject have from time to time appeared in our columns and our annual ALMANAC, and to these we must refer you. Search the indices of back volumes.

BI-GUM.—It is only by practice, and the use of a proper stippling brush, that anything like an even coating can be obtained. Of course, unless that is secured, an even image must not be expected. Read Mr. Packham's paper as given at the Photographic Club and the work just issued by Mr. Warren.

STAINED NEGATIVES.—T. CONNOR. The cause of the stain or mark is that the negative was imperfectly fixed, *i.e.*, removed from the hypo bath before all the unaltered bromide was dissolved out of the film. As the negative has been printed from, it is doubtful if any further treatment with hypo will remove the stain.

CERAMIC PHOTOGRAPHY.—T. J. ROBERTS. Ceramic colours may be had from Lechertier Barbe & Co., the Quadrant, Regent-street. Muffle furnaces are supplied by all the dealers in chemical apparatus. Fletchers, of Warrington, have a very convenient gas furnace specially adapted for the work. Write to them for a price-list. The whole cost of the outfit will not be much.

H. H.—The quality of your work is certainly above the average. The cause of your failure is probably that the market for retouchers is overstocked. About the last thing in the world we should advise anybody to adopt as a profession is retouching *per se*. Conjoined to operating, it is useful, of course; but as the sole means of earning a living it is a very feeble crutch to lean on.

CORRESPONDENT WHO DATES FROM EDWINSTON (Newark), but gives no name.—Spots such as those on the piece of print sent may be due to many causes. They may be due to the paper, the manipulation, the mount, or the mountant. Certain stains and marks on certains portions, not the spots, indicate a want of care in the working. Perhaps that may also account for the minute spots.

INQUIRER.—Probably the best plan is to enamel the prints. Proceed as follows: Collodionise the glass in the usual way, then prepare a solution of gelatine, say, 1 ounce Nelson's No. 1 photographic gelatine; water, 12 ounces; methylated spirit, 1 ounce. Immerse the print in the warm gelatine solution, and place on the plate. Squeegee well, and in some hours the print will strip.

ARTICLE ON DEVELOPERS.—H. H. PERRINS writes: "Some time ago you printed an article on various developers, giving their chemical formulæ. Will you please give me the date when the article appeared?"—In reply: The article appeared in our issue of February 11.

WET-COLLODION PROCESS.—PROCESS. Collodion made with the methylated spirit of the oil shops is quite unsuited for making negatives with. As you seem to be quite a novice at the work, we should strongly advise you to purchase the collodion; you will then ensure having the proper thing for the work you are going to experiment with, and thus eliminate one source of uncertainty.

CAMERA BELLOWS.—T. MAY. If the gussets of the camera bellows stick together in the way described, rub them well over with French chalk, and dust off. Two or three treatments with that will, no doubt, remedy the trouble. The same treatment will, no doubt, also avail with regard to the sliding part of the woodwork. For this, however, black lead would perhaps be better. But in neither case should grease be used.

PLATINO-MATT PAPERS.—O'CONNOR. What are known as platino-matt papers, are not the platinotype paper. They are bromide papers that give a result very closely resembling that obtained by the platinotype process. To distinguish the difference between the two processes immerse the prints in a solution of bichloride of mercury. In that a platinotype will be unaffected, but the image of a bromide print will be bleached.

BROMIDE PAPER.—S. JAMES says: "I have a lot of bromide paper that has acquired a strong yellow tint. It develops all right, and yields good pictures but for the yellowness of the lights, which is much stronger in the prints than it was in the paper before it was printed. Is there any means of getting rid of that?"—Not that we know of. The paper has evidently deteriorated by keeping, and the best thing will be to discard it altogether.

ENLARGING DIFFICULTY.—S. N. W. The lack of sharpness in the enlargements made by the lantern is, doubtless, due to the optical and chemical foci of the objective not being coincident. The best objectives for lantern projection have not the foci coincident, as it is found better that they should not have. Either substitute a photographic objective, or make the necessary correction for the chemical focus after the image has been focussed.

STUDIO.—W. BILLING. A studio of twenty feet long is short for professional work, inasmuch as it entails the use of lenses of short focus, which is very undesirable. In such a studio, to take, say, full-length cabinet portraits, a lens of not more than eight and a half inches focus is necessary, and that is too short to give pleasing perspective, and inconvenient for taking groups with. Cannot you increase the length of the studio by five or six feet? The increased length will prove a great convenience in practice.

FOCUSSING GLASS.—FAILING LIGHT. The best form of focussing eyepiece is what is known as the "Ramsden eyepiece." It may be had from any of the dealers in photographic materials. It embraces a wide and quite flat field. It must, in the first instance, be adjusted to the sight of the user. This is done by loosening the clamping flange, and then unscrewing the tube until it is at such a distance that the grain of the ground glass is shown perfectly sharp, then the flange is screwed up perfectly tight, and the glass is adjusted once and for all.

LENS.—C. WARD. A lens may be a wide-angle one and a narrow-angle one at the same time, according to the size of the plate that is used with it. For example, the one you propose to purchase—a stigmatic of nine inches focus—if used on the largest plate it will cover (12×10) may be considered a wide-angle lens; but, if used on a 7½×5 plate, it is only a moderate-angle one. If on a smaller plate, it becomes a narrow-angle lens. Any lens that will cover, in proportion to its focal length, a large plate becomes a widea-ngle lens, whatever may be its construction if used on that size plate.

BURNET ON COMPOSITION.—MR. DRINKWATER BUTT writes: "In reply to the query of 'Student,' in THE BRITISH JOURNAL OF PHOTOGRAPHY for May 20, I may say that the work required is Burnet's (not Barnet's) *Essays on Art* (including those on composition and chiaroscuro), published by Messrs. Percy Lund, Humphreys, & Co., London and Bradford, crown 4to, cloth, 2*s.* 6*d.* net, or 2*s.* 10½*d.* post free. It is a very sound and practical work, and of much service to artistic and photographic students."—Several other correspondents, whom we thank, also write to the same effect. "Barnet" was a misprint for "Burnet."

CARBON TISSUE.—R. A. S. says: "I am told that the 'daylight tissue' is not made now, and I have very little convenience for drying the ordinary tissue in a darkened room. Can you give me any hints in the matter?"—Ordinary tissue is, practically, daylight tissue if used with a few precautions. It may be sensitised in full daylight, as it is quite insensitive while wet. Then, if it be squeegeed on to some opaque material such as a sheet of ebonite, a ferrotype plate, or a sheet of zinc, it may be dried in any ordinary room if the side of the plate upon which the tissue is, is turned away from the light. The yellowness of the paper, from the bichromate, practically protects the pigmented gelatine from the action of light while drying.

G. W. Y.—1. The room will answer for the purpose, although one with a north light would have been preferable. 2. Use the cabinet lens and camera, providing that the former covers the picture to be enlarged. 3. The back of the camera should fit close against the window, the whole of which should be pasted over with opaque material, or boarded over, so as to exclude all light except that which passes through the negative. If you are a carpenter, you will know how to provide some sort of support for the camera and an easel for holding the paper, presuming you are enlarging on bromide paper; you do not say. Write us again if you require further information. To answer you fully would require several columns of the JOURNAL.

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Contents.

	PAGE
Ex Cathedrâ	353
Further Object-lessons of the late Exhibition	355
Leaderettes:— The Portrait Lens in Astronomical Work—Government Kinematographs—Röntgen Rays and Suspended Animation—Kathode Rays Lamp—Cloud Produced by Ultra-violet Light	355
Depth of Focus. By W. B. Bolton	356
Photographic Workers at Work:— XXI. The New Palace of "King Kodak"	357
Foreign News and Notes:— The Lead Intensifier—The Price of Raw Paper—An Acid Fixing Bath—Toning Bromides—Liquid Glue—Cement for Glass	359
The Deterioration of Paper	359
Photographic Ceramics	361
The Triple Anastigmat	361
The Decorative Capabilities of Photography.—IV. By T. N. Armstrong	363
Wilson's Photograph Wrapper	364
Before the Convention	364
Our Editorial Table:— The *Year-book of Photography*, 1898—Exposure Tables for Paget Prize Plates—Catalogue Received	365
News and Notes	365
Patent News	366
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Hackney Photographic Society—North Middlesex Photographic Society	366
Correspondence:— Some Facts about Focus—The Action of Electric Currents in Printing Images—The Convention of 1899—A Gum-bichromate Postal Club—Store Prices for Carbon Enlargements	367
Answers to Correspondents	368

EX CATHEDRÂ.

The Sixth Annual Exhibition of the Photographic Salon will be held at the Dudley Gallery, Egyptian Hall, Piccadilly, from September 30 to November 5 next. The receiving day is Monday, September 19, from 10 a.m. to 6 p.m., on which day all pictures for exhibition must be delivered at the Gallery either personally or through an agent. The prospectus and entry form are now ready, and may be obtained by *written* application only to the Honorary Secretary, Mr. Reginald Craigie, Camera Club, Charing Cross-road, W.C.

* * *

The regulations, conditions of entry, &c., &c., appear to have been drawn up in the terms adopted in former years; but we note that great prominence is given to the statement that "the Committee particularly wish to assure intending exhibitors that every care will be taken of frames sent for exhibition, but they cannot accept responsibility for damage." For a comparatively small exhibition such as the Salon is the percentage of complaints of damage that have been made by exhibitors each year has been unusually large, and the assurance that every care of frames will in future be taken is therefore not ill-timed. Two other sentences in the prospectus deserve to be brought to the notice of intending exhibitors. These are: (1) "Pictures which have already been publicly exhibited in London will not be accepted," and (2) "Pictures sent for exhibition to any other exhibition open in London at the same period are liable to be disqualified."

* * *

The total solar eclipse of 1900 is already engaging attention. Mr. G. F. Chambers, F.R.A.S., made an interesting statement on the subject at a meeting of the British Astronomical Association, held last week. He said that eclipse would offer some very special opportunities to observers in this part of the world. The central line of totality crossed Portugal and Spain, almost through the centre of each of those countries. It touched first the coast of Portugal a few miles below Oporto, and came out at the other end near Barcelona. In addition to Oporto being easily accessible to Britishers, the Portuguese as a people were exceedingly friendly to us, and he thought that any expedition of a scientific character going to that country would be sure to meet with every possible acceptance and sympathy. After pointing out that those who did not care to take the long sea voyage could travel over almost the whole distance by land, Mr. Chambers said he could not say much at the moment with regard to the astronomical features which might be expected to arise in connexion with the eclipse, but he could say it would be somewhat coincident with a minimum period of sun-spots. The duration of totality would, he thought, be a little above the average. With regard to climate, he was of opinion that the month of May would offer advantages as regarded the probability of a good sky which were not offered by certain other seasons of the year.

* * *

It is announced that the Röntgen Society has appointed a committee to collect information and report on the alleged injurious effects of the Röntgen rays. Mr. E. Payne, Hatchlands, Cuckfield, Sussex, is the Secretary, and will give all necessary information. The Committee will be glad to hear from all medical men who work with the X rays of any case of injury that may have come under their notice after exposure of a patient to the rays, and, in order to obtain accurate reports, the Committee have prepared a set of questions, which

have been framed with a view to elicit opinion and collect information to show whether the injury was the result of any of the following causes: (1) the X rays themselves directly; (2) some electrolytic or electro-thermal action of a leakage discharge current from the leads or from the terminals of the tube; (3) some action due to the varying electrostatic charges on the surface of the tube; (4) some combination of these; (5) some other hitherto unrecognised kind of radiation emitted simultaneously with the X rays; or (6) some other cause hitherto unobserved. The Secretary of the Committee will be glad to send copies to any medical man or other worker in X rays who may know a case about the circumstances of which he is willing to give particulars.

* * *

We learn that, by permission of the Queen, Mr. Ernest Law has been able to compile an important work on the pictures in the State Rooms at Windsor Castle. Mr. Hanfstaengl, of Pall-mall East, will publish it in parts, each of these being illustrated with ten photogravure plates. Every picture photographed was removed from its place on the walls, detached from its frame, and brought down to a temporary studio in the court-yard of Windsor Castle. The photographing of the pictures occupied upwards of two months, but the results are expected to more than justify all this effort.

* * *

Mr. F. J. Jervis-Smith sends to *Nature* the following interesting note relating to an early example of the effect produced by printer's ink on gelatino-bromide of silver: "In a paper on the action exerted by certain metals and other substances on a photographic plate, by Dr. W. J. Russell (*Proc. R.S.*, vol. lxi. p. 424), the author mentions that the *Westminster Gazette* is printed with an ink which readily acts on a photographic plate. The printed paper in some experiments is placed in contact with the photographic plate, in the dark, and, after being left in contact for some time in the dark the plate is developed and the printed letters come out clearly. Dr. Russell mentions the names of several periodicals, the print of which acts on a sensitive plate. To these the following example of the same phenomenon may be added: A photographic plate wrapped up in an advertisement sheet of *Modern Society* on development showed the printed characters very clearly, the words reading from left to right, not being reversed, so that the action must have taken place through the thickness of the paper. This sample of the action of printer's ink on a photographic plate (the property of Mr. W. B. Croft) has been in the excellent physical laboratory museum at Winchester since 1892. The print is good and clear, and probably one of the earliest observed instances of the action of printer's ink on a photographic plate in the dark in which the physical conditions were known and recorded."

* * *

Messrs. Ernst Colby & Co., of Zwickhau, write us: "As you know, the firms Rives & Steinbach have formed a trust, and have caused a rising of the prices of plain paper by 100 per cent. We have not joined in this association, and still furnish plain paper, as well as baryta paper, at the same prices as before."

* * *

The following story, which we extract from a country newspaper, has at least the element of novelty in relation to the Princess of Wales's known *penchant* for photography: "The Princess and her daughter often amuse themselves when at their picturesque Norfolk seat at Sandringham by taking snap-shots at the scenery or any incident that interests them. They are in the habit of photographing the Prince's horses as they pass in review at the Wolferton sale. On one occasion the Princess of Wales took a snap-shot at a goods train crossing the railway bridge at Wolferton Station, which, as is well known, is on the line running between Hunstanton and Lynn. When the negative was developed, she noticed that the bridge had a curve, and thought she had held the camera wrongly. A few days later she photographed the bridge when an express train was passing over it. Again she saw the curve, and this time she carried her photograph to the Prince of Wales. He at once concluded that something was wrong with the bridge, and set inquiries on foot. It appeared that engine-drivers had complained of a movement when passing the spot, and investigation revealed a serious defect in time to avert disaster. A good many people may owe their lives and limbs to the Princess's camera. But what were the Company's officials about to disregard the complaints of the drivers?"

* * *

Mr. Alfred Dewey, of High-street, Sidcup, writes: "Having successfully photographed 85 babies and 353 adults and children on one day, namely, May 24 (the Queen's birthday), I am anxious to know if any one has taken a greater number of sitters in one day. The whole of the photographs will be on view on Friday previous to distribution on Saturday, June 4. Over 500 plates were exposed between ten a.m. and six p.m. I have sent you a local paper, which gives a few particulars, thinking that a small paragraph may be of interest to your readers." Our contemporary states that, commencing at ten in the morning, Mr. Dewey had an incessant stream of people claiming his attention till considerably past six o'clock in the evening. A police officer was requisitioned to regulate the ingress into the reception-room, where, in turn, they passed through the conservatory to the studio. The developing was begun the same evening.

* * *

According to the Vienna correspondent of the *Daily Chronicle*, Herr Jan Szczepanik, the inventor of the telectroscope, has now made some inventions likely to revolutionise the whole of the textile industry. By utilising photography for weaving purposes, he can now, in a single quarter of an hour, accomplish what it has taken the designer months or years to complete, according to the size of the design. Herr Szczepanik totally abolishes the designer, and more than supplies his place by photography. . . . . The focussing screen is one and a half metres square, and the bellows draw out to a length of twenty metres, while the immense lens had to be made expressly by Zeiss, of Jena. Next he employs ruled screens, containing the necessary intersections. These screens or grids are on glass plates prepared by photography, and are the largest photographic negatives ever made, measuring 1·10 metres square. Each such screen contains one million squares. Having chosen the pattern (say, a landscape) the web is to show, he attaches a picture of it to an upright board fastened to the camera stand. The next thing is to insert a suitable ruled screen immediately in front of the sensitive plate, *i.e.*, the silver bromide paper (*sic*, Eds. B.J.P.). After the negative has been taken, the second process is punching the jacquard stencils. Hitherto this has been a slow operation, carried on with the help of a machine, &c., &c. We wonder what Herr Szczepanik really *has* invented this time.

FURTHER OBJECT-LESSONS OF THE LATE EXHIBITION.

In a recent issue we pointed out some object-lessons of the late Exhibition at the Crystal Palace, and at the time intimated that we might recur to the subject. Many who visited the Exhibition were not a little astonished at what was accomplished with some of the obsolete, or nearly obsolete, processes of old, and the primitive appliances with which the results were obtained. Many have, no doubt, also asked themselves whether so great an advance has been made within, say, the last twenty years, so far as all-round results are concerned, as is commensurate with the improved facilities for obtaining them and the better knowledge of the principles involved in the different processes.

With regard to the apparatus of all kinds, there is no question that immense advances have been made, and it seems a little doubtful if much more can be done in that direction. Again, in the production of our negatives, gelatine plates have now been brought to such a state of perfection, both as regards sensitiveness and uniformity, that there really seems little to improve upon at present. Good as dry plates now are, both in sensitiveness and uniformity, there are still some conservative photographers of the old school who aver that gelatine negatives are not, even now, so good as those by the wet-collodion process. Certain it is that for some purposes —mechanical processes for example—wet-collodion negatives are still almost exclusively employed, notwithstanding the troublesomeness of the process and the skill necessary for its working.

One great advantage with gelatine plates is that the operator has the opportunity of devoting more attention to the art side of photography. In the old days, with the wet-collodion process, the plate had, perforce, to be exposed and developed within a few minutes of its preparation, otherwise it would be spoilt. Now, with gelatine, the worker is relieved of all anxiety as to the keeping of the plate. In the field he can wait patiently for the passing of a cloud, or for a gleam of sunshine; in the studio he can leisurely pose the sitter, and then wait for a suitable expression. Hence we see a greater proportion of artistic photographs now than formerly. Yet, notwithstanding the inconveniences of the wet-collodion process, works by the late Mr. O. G. Rejlander, Mrs. Julia Cameron, and Colonel Stuart Wortley, shown in the Exhibition, proved that the difficulties of obtaining artistic results with it were not insurmountable.

In technical matters how have we advanced? Going back to the original carbon process—now called the gum-bichromate process—of Pouncey, forty years ago, the pictures that were produced at that period are much superior to the majority of the modern works shown by that process. The carbon process, again (the examples lent by Mr. J. W. Swan, made in 1864–5), are quite as fine as any carbon prints that are made at the present time; and, although the method of working has been modified in this country, the original indiarubber method is still practised almost exclusively on the Continent. The process, as worked in England, though simpler, is certainly not better so far as technical qualities are concerned.

Take, again, silver printing; has any advancement been made in that beyond the convenience of ready-sensitised papers? One may safely assert that the silver prints of to-day are certainly no improvement, in any way, on those of twenty or thirty years ago, while they may not be nearly so stable. Some shown in the Exhibition, though thirty and forty years old, showed little, if any, change; and that brings us to the point, Are modern papers capable of yielding such permanent results as those of old, or is the fading due to the workers who employ them? Thirty years ago silver prints were looked upon as being more or less unstable, but no satisfactory theory as to the cause was forthcoming. Is there now? and, if so, why is the fading not remedied; or modern prints made as permanent, at least, as those of, say, thirty years ago? We still have no more satisfactory method of restoring faded silver prints than we had in the sixties, though the silver that once formed the image is still in the paper, but only in an altered condition, for there is no reason to surmise that it has become volatilised. Take again ceramic photography; the examples by Lafon Camarsac and Joubert, made in the very early sixties, and sent by the Photographic Club, are not surpassed by any that are done now. When such matters as these are duly considered, it may be asked if the advancement in technical photography, during the latter half of its life, has really been so great as one might have imagined.

Anent old process and applications thereof—examples of all, however, were not shown—some new ideas may be obtained, which may be useful now. Pouncey's process is a case in point; so is Taber's bas-relief portraiture. This latter form of portraiture was first introduced now more than thirty years ago, but nothing much was done with it at the time, excellent though the results were. Now they seem to be appreciated. Photo-sculpture, again, though very successful, was not much appreciated. The case might be different now. Eburneum pictures were very beautiful, though, except in the hands of the inventor, Mr. Burgess, and a few others, they were not a great success. Now they would be much more easily produced than then. In place of the gelatine and oxide of zinc being applied to a collodion positive, a similar result may be obtained by simply developing a carbon picture on ivory celluloid, or transferring one to it from a temporary support. Such pictures might meet with commercial success now.

There are several defunct processes that might now be experimented with or without modification. Here are a few ancient processes that were once used, though the names of them even will probably be quite new to modern photographers. For example, the Ambrotype, the Chrysotype, the Cyanotype, the Chromotype, the Ferrotype or Energiatype, Catalysotype, Fluorotype, and others that are fully described in the earlier works on photography. Some of these might be reinvented, and new names found for them, as in the case of several other old methods.

The Portrait Lens in Astronomical Work.—At a time when astronomy and photography have become more closely linked than ever, and when amateur photographers might, if they but knew it, add appreciably to the store of astronomical knowledge, with no great trouble and with infinite interest and pleasure, it is worth while giving some remarks on this subject, written a little while ago over the signature of R. A. Gregory, in *Nature*. "We must look," he writes, "to the portrait lens for the larger details and the fainter nebulosities which are absolutely beyond the reach of any photographic objective or mirror. There can be no rivalry between the two classes of instruments. Each is perfect in its way, each will mislead if solely relied upon. . . . . The 'best instrument to use' is not a matter of personal experience nor of individual opinion; the optical and photographic laws bearing on the subject are well known, and the practical limits of atmospheric definition and instrumental construction are within sight. The

ideal instrument for photographing nebulæ will probably combine large aperture, short focal length, and the large flat field* of the portrait lens will be, in fact, a glorified portrait lens. . . . . While waiting for this instrument, every possessor of an ordinary rectilinear lens, with an ordinary camera can, by strapping his camera on to an equatorially mounted telescope, and using infinite patience, materially advance our knowledge of nebulæ by means of photography."

Government Kinematographs. — As briefly mentioned last week, M. Boleslas Matuszewski, of Paris, has suggested the establishment of a kinematograph bureau, and marshalled his arguments in a pamphlet lately issued. Appreciating the historic importance that will attach to many kinematographic illustrations of popular events, he holds that as national, or even an international, bureau under the direction of a responsible Government official should be established for the purpose of receiving and storing such kinematograph pictures as should possess historical value.

Rontgen Rays and Suspended Animation.—Whether, as is denied by many scientific authorities, there exist any real grounds for the popular dread of being "buried alive," there can be no doubt of the widespread existence of such fear, and any method which can be devised for setting it at rest must be received with acclamation. According to the *Lancet* (see p. 338 *ante*) such method is to be found in the use of the Röntgen rays, as demonstrated at a recent meeting of the Biological Society of Paris. Three X-ray photographs of the thorax were exhibited by M. Bougarde, two being from living subjects and the third from a corpse. During life, though the exterior part of the body may, as in a case of catalepsy, be rigid and cold, the interior, while life exists, carries on its usual functions—feebly it may be—in all of which motion takes place—the pulsations of the heart and the great vessels and the motion of the diaphragm. Hence skiographs during life will give an unsharp image, while when death has supervened, motion being arrested, the skiograph is sharp, and the organs have well-defined edges as regards the internal organs. It may, however, be argued that we know nothing of the internal state of the body during those cases of supposed death which have turned out to be supposed only, the "corpse" having come to life, and that in consequence the X-ray method is, after all, only hypothetically a certainty.

Kathode Rays Lamp.—At the Royal Society's *Conversazione* one of the most interesting exhibits was Mr. Campbell Swinton's kathode ray lamp. The kathode rays from two concave kathodes placed opposite to one another, and supplied with an alternating current of about 20,000 volts, are brought to a focus upon a button of highly refractory material, whose temperature is thus greatly raised, with the consequent production of incandescence. It appears that, for the amount of electricity expended, the light produced is in excess of what would be obtained by putting the same current through an ordinary incandescent lamp, and sometimes in excess of the light production of an arc lamp. If such a lamp could be made efficient for practical work, there would be a vast field of usefulness for it with the microscope or lantern.

Cloud Produced by Ultra-violet Light.—Mr. C. J. R. Wilson exhibited an arrangement for showing the effect we described in these columns some little time age, of the production of cloud when a beam of ultra-violet light passes into a vessel containing moist dust-free air. The light is obtained from an arc lamp, focussed through a quartz lens into a vessel containing the special air. If a sheet of glass or mica be interposed, so as to cut off the ultra-violet rays, no cloud or rain results. The suggestion is made that possibly the small particles that give rise to the blue of the sky are produced by the ultra-violet rays of sunlight absorbed in the upper layers of the terrestrial atmosphere.

* This, of course, is a relative term. A Petzval portrait lens, used as a portrait photographer is accustomed to, gives a field neither large nor flat compared with other photographic lenses, but the centre of the field is flat enough over one that compared with a telescope would be considered large.—EDS.

DEPTH OF FOCUS.

IT is not surprising that Mr. W. E. Debenham's remarks on the above subject, in his recent lecture before the North Middlesex Photographic Society, should have elicited a good deal of correspondence, because, in effect, they are in direct contradiction to hitherto accepted beliefs; but that I have known Mr. Debenham for a good many years as one of our most trustworthy authorities on most subjects connected with photography, and one who never commits himself to a statement without having previously given the subject the fullest and most careful consideration, I should have probably come to the conclusion that he is for once mistaken; but, knowing him as I do, the conviction is forced upon me that in the statements he has made he is looking at the question from some different point of view to that usually adopted, and this belief is, to some extent, supported by his opening remarks on the occasion of the lecture in which he referred to the portion dealing with depth of focus as being the only part open to difference of opinion. It would be in every way desirable if Mr. Debenham would more fully explain his views on the subject, and it is with the object rather of "giving him a lead" in that direction than of stating any new facts that I propose to briefly recapitulate what I conceive to be the existing views of depth of focus.

Mr. Debenham's statement to which exception is taken is that depth of focus is wholly independent of focal length, and is ruled entirely by the actual, and not the relative, size of the diaphragm opening; that, in fact, with a one-inch stop, a five-inch and a fifteen-inch focus lens will give exactly the same depth, neither more nor less.

Now, the tables published in the ALMANAC by Sir David Salomons and Dr. Higgins are based on calculations, the formula of which is further endorsed by so high an authority as Mr. T. R. Dallmeyer, in which the focal length and the aperture of the lens—in other words, the relative aperture—form the working data, and it may be expressed as follows:—To find the distance at and beyond which all objects will be in focus, multiply the square of the focal length by 100 and divide by the diameter of the stop, the result being the required distance in inches. It must be observed, however, that the expression "all objects will be in focus" is only a relative one, since it is theoretically impossible that any two objects at different distances can be in equally good focus in the same plane; but the calculations are based on the supposition that, if a theoretical "point" be represented by a disc or circle of confusion not exceeding one-hundredth of an inch in diameter, a degree of sharpness is secured which sufficiently satisfies not only pictorial requirements, but also the defining power of the normal eye and the capabilities of ordinary printing surfaces. Let us see, then, how Mr. Debenham's instances work out under these conditions.

Taking the shorter focussed lens first, we shall find, either by calculation or by reference to the tables, that a five-inch lens, with an aperture of one inch, will render all objects beyond forty-two feet with a sharpness that comes within the limits mentioned. To be strictly accurate, the distance is forty-one feet eight inches, or 500 inches; but this, it may be noted, assumes objects in the extreme distance to be in perfectly sharp focus, the definition gradually falling away until at 500 inches from the camera the limit of allowable confusion is reached. For the sake of simplicity these terms will be adhered to, though in practice it would seem preferable to spread the diffusion in opposite directions by focussing sharply on an intermediate plane, when practically a much greater depth would be secured.

If now we apply the same calculations to the fifteen-inch lens, the tables not dealing with lenses of such long focus, we have the equation as follows: $15 \times 15 \times 100 \div 15 = 1500$ inches, or just three times the distance for the nearest objects in focus simultaneously with infinity. Here, at the very outset, we are met by a direct contradiction of Mr. Debenham's statement, for, when with the same actual aperture one of the lenses proves only capable of defining objects at three times the distance from the camera as compared with the other, the result is scarcely describable as equal depth. However, the matter requires to be considered from both

sides of the diaphragm, that is to say, we have to consider not only the action of the lenses in bringing different objects at different distances to a focus, but also the effect of the diaphragm in modifying the pencil of rays transmitted in either case.

So far as concerns the relative behaviour of two lenses of different focus with the same-sized stop I may quote an actual experiment made since the foregoing was written, which sufficiently proves the accuracy of the calculations quoted, and which will perhaps be more satisfactory to those who believe in the proverb that "a peck of practice is worth a bushel of theory." Two sheets of printed matter were pinned up, the one on a fence seventy-five feet distant from the camera, the other on a post at a distance of seventeen feet, and so placed that they fell side by side exactly in the centre of the ground glass. The latter condition was intended to obviate any uncertainty that might arise from curvature of field or other optical conditions.

Two lenses were selected for comparison, one a rapid rectilinear of about ten and a quarter inches focus, the other a similar instrument of about eight inches or eight and one-eighth. The iris diaphragm of the larger lens was closed until it just gripped a strip of cardboard cut to the width of the diameter of the full aperture of the other lens. Taking the lens of longer focus first, the two objects were separately focussed as sharply as possible, and the relative positions of the ground glass carefully marked upon a strip of postage-stamp margin stuck on to the fixed portion of the tailboard of the camera.

The lenses were then changed and the operation repeated with the eight-inch doublet and the separate results compared. In the first instance the difference between the two focal planes, that is to say, the distance the camera had to be racked out to bring the nearer object into focus, was found to be almost exactly three-quarters of an inch, whereas the shorter lens only showed a difference of a little over three-eighths. By calculation and taking the approximately estimated equivalent foci of the two lenses, these distances agree pretty accurately, but the next experiment proved even more conclusive.

The *f*-11 stop was inserted in the eight-inch lens, and the sharpest possible focus again obtained of the two objects, but their distance did not differ from the previous one with full aperture. The front combination of the lens was then removed, and the process repeated once more, the single lens being practically double the focus of the combination, the stop the same. In this case the distance through which the focussing glass was moved was nearly one and five-eighths of an inch, or exactly four times the difference with the complete lens. This, again, agrees perfectly with the theoretical calculation.

So far I have dealt only with the optical effects of the lenses on objects at different distances, in bringing them to an actual critical focus without regard to depth or to the action of diaphragms, for even the smaller stop used in the last experiment was far too large to in any way affect the definition of an object at twelve feet distance. Let us now turn to the other side of the lens, and study the shorter conjugate focus. By the rules generally practised, and, in fact, given by Mr. Debenham in the earlier portion of his lecture, it is easy to calculate the exact position of the focussing glass for critical focus for objects at any distance from the camera, and, by an easy further calculation, to arrive at the dimensions of the disc of confusion at any specified point. A very simple diagram, which any reader may construct for himself, will make matters perhaps even plainer. If from the extremities of a line representing the diameter of the diaphragm two other lines be drawn, crossing one another at a point distant from the diaphragm by the equivalent focus of the lens, we shall have a representation of the cone of rays meeting at the critical focal point for infinity, and then diverging to form the disc of confusion. The focal planes for objects nearer to the camera will be represented by lines cutting the diverging rays at more and more distant points in proportion as the objects approach nearer to the camera, and, if I know the distance of those points from the point at which the rays cross, *i.e.*, the equivalent focus of the lens, it is obvious that a very simple calculation will give us the dimension of the disc of confusion in any particular position of the focal plane. Thus, by a simple rule-of-three sum, as the equivalent focus of the lens is to the diameter of the stop, so is the distance of the focal plane from the equivalent focal point to the diameter of the disc of confusion.

If two diagrams such as I have described be drawn to scale, and relating respectively to the five-inch and fifteen-inch lenses, each with a one-inch stop, it will be plain that in the latter case the angle at which the lines cross is just one-third of that in the other case, and consequently the point at which a disc of confusion of one-hundredth of an inch, or, indeed, any dimensions, will be just three times as far removed from the point of intersection; or, to put it in another way, the focal plane may be removed to three times the distance before it exceeds the limits of confusion allowable. This explanation will clear the way for what follows.

Let us take first the five-inch lens working at *f*-5, which, as I have shown, renders all objects beyond 500 inches in sufficiently accurate focus. But, if we calculate the exact or critical focus of an object at 500 inches distance from the camera, it will be found to be 5·05 inches, $\frac{5}{100}$ of an inch further away than the focus for infinity; and, by the method of calculation just given, it will be found that at that distance the diverging lines have just spread the $\frac{1}{100}$ of an inch apart, or at that distance from "infinity" the disc of confusion would be $\frac{1}{100}$ of an inch. Applying the same method of treatment to the fifteen-inch lens and one-inch stop, I find that the actual focal distance for the nearest objects it will bring into focus is 15·15 inches, or just three times the distance from the equivalent focus just mentioned in connexion with the five-inch lens. But it has been shown that, owing to the narrower angle at which the rays cross one another—the difference being as between *f*-5 and *f*-15—the focal plane may be altered to that extent without exceeding the limit, and, as a matter of fact, at the distance of 15·15 inches from the lens the circle of confusion is again the $\frac{1}{100}$ of an inch.

But—and here comes the point I should like Mr. Debenham to explain—is it, can it be considered, equality of "depth" when one lens is defining to within 42 feet of the camera, and the other only to 125 feet? If we bring the longer-focussed lens on to terms with the shorter, we shall find that its focal distance for objects at 500 inches is 15·45 inches, at which distance the circle of confusion will be $\frac{3}{100}$ of an inch. In order to reduce that to the accepted $\frac{1}{100}$ of an inch without sacrificing the increased "depth," we must reduce the size of the diaphragm to one-third the dimensions; in other words, work the lens at *f*-45. How, then, can we reasonably reject the old methods of calculation?

I may conclude by repeating that probably Mr. Debenham may take a different view of what constitutes depth of focus; but, so far as I at present see, it is difficult to get away from the conditions above laid down.

W. B. Bolton.

PHOTOGRAPHIC WORKERS AT WORK.

XXI.—The New Palace of "King Kodak."

It is said that "nothing succeeds like success." Success has dogged the footsteps of the Kodak. It is now thirteen years since the word "Kodak" was added to the English language, and the word probably staggered philologists, for it was without derivation, and by no possibility could they trace it to Greek, Roman, or Sanscrit parentage. It was a foundling without relations, a waif without lineage, so that people had to ask what it signified. And yet to-day the word Kodak is known all over the habitable world, and thousands cherish the thing itself as one of their dearest possessions. It is a trade name of enormous value, and is the sole property of the inventors. They have triumphantly vindicated their exclusive right to it against other industrial concerns which have attempted to benefit by its world-wide advertisement and fame.

It was a new thing and required a brand-new name. The title "camera" would not suffice, because the Kodak resembled no camera ever made; for, in exchanging heavy and brittle plates of glass upon which to take negatives for light and unbreakable celluloid, the entire design of the photographic apparatus had to be changed to meet the new conditions. By the wave of a magician's wand even the best forms of cameras suddenly became obsolete and old-fashioned, the Kodak had usurped their place. It was a revolution as well as a revelation, and revolutions lead to the introduction of new methods and the adoption of novel ideas.

We can get a fair estimate of a successful man's progress through life

by viewing the successive houses which he occupies, from the tiny suburban villa residence to the aristocratic mansion. So it is with the Kodak, which first emerged from the Eastman shell when that shell was represented (so far as Britain is concerned) by two modest rooms in Soho-square. Two years later find the Company occupying much larger premises at 115, Oxford-street, when they rented the entire house. Next they absorbed part of the house next door, and then the whole of that house. In the mean time the two large depots at Paris and two at Berlin were supplying the wants of our Continental neighbours. Presently the big factory at Harrow, which now employs 250 hands, rose from the meadows, and business increased to such a degree that it became imperative to start branch premises in the City at 60, Cheapside. But still the Eastman Company had not room enough for its rapidly extending work, and, although fresh West-end premises were arranged for in Regent-street (these have since been opened), the want of a big head office in the heart of London from which all the various branches could be served became a pressing necessity. An enormous vacant warehouse, with a floor space of 10,000 square feet—a new building—was found in the Clerkenwell-road, just opposite the Sessions House, and in a few months the building was fitted with every modern appliance that money could buy or ingenuity suggest. To-day this place is the chief office of the Eastman Company, and the main shrine of the Kodak cult. A brief account of a visit which we recently paid to these premises will not be without interest.

The premises outside have nothing to distinguish them from the surrounding solidly built warehouses save that the magic word "Kodak" projects like a flag from over the main entrance, and gaily dots the windows all over the building. It is a very deep building of three floors, with the addition of an underground boiler and engine-house. The steam raising department is but a small installation, for the only service required from it is that it shall heat or cool the entire building as may be necessary to meet the vicissitudes of our inconstant climate. By the action of a fan filtered fresh air drawn from outside can be delivered, hot or cold, into every room of the building—a source of great comfort to the *employés*, and a provision which keeps in good order light-sensitive films and papers which require pure air.

The ground floor of the building is the busiest of all. First there is a general receiving department, full, at the time of our visit, of huge packing-cases from the American factory at Rochester; plenty of other cases there were, too, which had come by the Company's vans from the factory at Harrow. Each case bears its own particular number, and advices by post show what each contains, so that, if it be apparatus, it need not be unpacked until the goods are required. But goods do not long remain packed up and idle, for there is a constant demand for them, at times much beyond what can be satisfied. When, therefore, the contents of a case have been checked, the various items are distributed into the spacious bins in the stock-room, like so many gross of choice wines of different brands, and are placed under the care of a large staff of stock-keepers.

Here in this stock-room we have Kodaks of all sizes and patterns, cartridges with which to charge them, or spools of film for the older-fashioned sorts, packets of bromide and Solio paper, bottles of developing powders for distant countries to which it would be hazardous to send developers in liquid form, together with chemicals and photographic appliances of all kinds. Such is the general arrangement of the goods in this vast emporium, and we will now see by what means the stock in these bins rapidly becomes reduced and requires almost daily replenishing.

In the conduct of this part of the business, as in all the rest, the most careful and methodical arrangements have been made to avoid mistakes. Orders, whether they come from individual customers or wholesale dealers, are checked and counter-checked, and it is curious to see how the little paper messengers are sent to and fro by tiny lifts from one department to the other. These little formalities having been gone through almost automatically, the parcels and invoices are conveyed to the front office, where they are signed for by the messenger and taken away.

If the goods are to be sent away by carrier or rail, precisely the same formalities are observed, but the parcels, upon completion of the order, are taken to an adjoining department and placed in huge pigeon-holes labelled "Carter, Paterson," "Sutton," "G.W.R.," or "L.N.W.R.," as the case may be, and by-and-by the carman representing one of those well-known carriers will call at the office, weigh the packets at the scale standing near by, and call out the weight and other particulars to the booking clerk in attendance before placing them in his van. Here, too, is the shipping department, where similar precautions are observed. We notice, too, another lot of smaller pigeon-holes in the wall marked 1*d.*, 1½*d.*, 2*d.*, 2½*d.*, &c., where small parcels are placed which will presently have stamps affixed to their labels before being handed over to the care of the Postmaster General.

The orders received may be of another nature altogether, not for goods, but taking the form of cartridges to be developed, or negatives to be enlarged. These also are dealt with on this same floor, but in a distinct department; or a photographer may have had a spill on his bicycle and smashed his Kodak, which requires immediate attention. Here is a dark room, in which the machine can have its internal economy examined without risk of spoiling its contents by light-access. The injuries are duly noted, and the damaged article is sent up to the top floor for the necessary repairs.

A large number of cartridges for development sent by those who have pressed the button and want "we" to do the rest, naturally come from abroad, for all travellers carry Kodaks nowadays. These are contained in tin cases with a red label marked with a star and the word "Kodak." This label bears an intimation, in half-a-dozen different languages, that any but red light will be fatal to its contents. It is satisfactory to hear that this label is invariably respected by Customs officers and others, and no instance has yet occurred where injury has resulted from its injunctions being disregarded.

Leaving this busy world of goods, packing cases, and parcels, we proceed upstairs to the first floor, where quiet reigns save for the subdued buzz of the typewriters. Here the whole floor is given up to office work, if we except the handsome board-room, reception-room, and the private rooms for the managers. These offices are quite palatial in their appointments, and on entering them one immediately recognises the value of the excellent ventilating and warming apparatus already alluded to, for there is an absence of stuffiness about the place which must conduce both to good health and good work. Here, by aid of a large staff, all the clerical work of the establishment is done, including book-keeping, letter-writing and counting-house operations, and it is done in such a wonderfully systematic manner, and so checked at every point, that there is no loop-hole into which error can creep. The system is apparently elaborate, but so simple withal that a letter or order which may have been received any time during the past twelve months can be turned up at a moment's notice. There it is stamped with the day, and even with the hour, of its arrival on the premises. Here are the big wholesale and retail ledgers, and a department where prepaid orders are dealt with. A tremendous amount of business is transacted here, and yet there is no confusion, no papers lying about; everything is in order and worked upon a system almost faultless.

These vast premises have their own internal telephone system, by which any principal in any part of the building can, without leaving his seat, communicate with any other department. This is brought about by a telephone exchange on the premises. With the same ease the factory at Harrow, or the depots at Oxford-street, Regent-street, or Cheapside, can be spoken with.

We next visit the top floor, which, naturally, is as spacious as the other two. The exact destiny of all this area is not yet decided upon, but much of it is already allocated to various uses. Here is the repairing shop, where, at many benches, carpenters and other artificers are hard at work.

It is not so difficult to repair a damaged Kodak as it is to rejuvenate a camera of the old pattern, for the simple reason that all these instruments are made on the modern system of interchangeable parts. The first provision which this repairing department had to look to was the exact number of different parts in each description of Kodak. It may be thirty, forty, or fifty; but, whatever the number, a nest of drawers, with a drawer for duplicates of each particular item, is provided for each pattern of Kodak, so that we see one drawer full of shutter springs, another devoted to hinges, another to spool winches, and so on. There is, therefore, nothing to make afresh; an injured part is thrown out and a new one takes its place. Would that injuries to the human body could be treated with such delightful simplicity!

And now we have seen all that is to be seen at the giant premises of King Kodak in the Clerkenwell-road. It is a busy hive, in which every busy bee—there are more than 100 of them, queen bees as well as workers; there are no drones—knows exactly what to do, and does it with the regularity of a perfect machine. Should anything go wrong to the particular bee in default is at once spotted and told not to do it again. The organization seems to be as perfect as human intelligence can make it. It reminds us of only one thing, and that is, the Kodak itself. This little instrument, as most of us know, is made up of many parts, most cunningly devised. Every screw, spring, or other device, has its particular duty to perform, and each constituent part is so contrived that the instrument as a whole is a most perfect thing. The same brain

which devised the Kodak has designed and arranged these offices, whence it is distributed throughout the world, and where the wants of its thousands of votaries are attended to. The industry is comparatively new, but it represents the most remarkable development of photography which the world has yet seen.

FOREIGN NEWS AND NOTES.

The Lead Intensifier.—Herr Hirschfeldt, in the *Wiener Freier Photographen-Zeitung*, strongly recommends the lead intensifier, on the grounds that it gives an almost unlimited intensification, absolute clearness if there is not any fog already in the negative, a very fine grain, and with absolute permanency if a sulphide is used to blacken the film. The solutions he uses are:—

Lead nitrate	4 parts.
Potassium ferridcyanide	6 „
Distilled water	100 „

In this the negative is bleached and then blackened with an old and used hydroquinone developer. The bleached negative must be well washed prior to blackening, and the bleaching should not be carried too far, as this method gives very great intensification. When placed in the developer, the negative, which is more or less yellow from the lead bath, turns white and then dark brown. If the intensification is not sufficient, the operation may be repeated. If it is required to clear the negative before intensification, it should be left in the lead bath till bleached quite through, then thoroughly washed and placed in a ten per cent. solution of sodium sulphite till sufficiently reduced, then darkened by the developer.

The Price of Raw Paper.—The manufacturers of Saxe and Rives raw paper have doubled their prices, and the result has been a rise in the price of baryta paper as we mentioned last week. This must necessarily result in a considerable increase in the price of gelatino and collodio-chloride printing-out papers. The Photographische Verein of Berlin has by a resolution, passed by seventy-two for and five against, appointed a committee of eight to ascertain whether it is not possible to find out manufacturers who will make paper suitable for this and other photographic purposes.

An Acid Fixing Bath.—Belitzski gives the following formula for an acid fixing bath which he states he has used for some considerable time with excellent results:—

Sodium sulphite	50 parts.
Water	800 „

When dissolved, add

Sulphuric acid pure	6 parts,

and then

Hypo	200 parts.

Toning Bromides.—Dr. E. Vogel suggests the following method for improving the tones of bromide transparencies and prints, or for complete toning. Two solutions are required, a one per cent. solution of ammonio-citrate of iron, and a one per cent. solution of potassium ferridcyanide. Both solutions will keep in the dark, and should be made as follows:—

Sol. iron ammonio-citrate	50 parts.
Glacial acetic acid	10 „
Sol. potassium ferridcyanide	50 „

The fixed and well-washed prints or transparencies become first bluish-black and then deep blue in this bath. Greenish tones may be obtained by toning first with the ordinary uranium and then in the above bath, or by using the following:—

Sol. uranium nitrate (one per cent.)	25 parts.
Sol. iron ammonio-citrate (one per cent.)	25 „
Glacial acetic acid	10 „
Sol. potass. ferridcyanide (one per cent.)	50 „

Liquid Glue.—A method of preparing liquid glue has just been patented, which consists in allowing Cologne glue to swell in water for about ten hours, then melting in a water bath, and adding one-tenth of its weight of salicylate of soda.

Cement for Glass.—According to the *Chemiker-Zeitung*, an excellent cement for glass is made by mixing a saturated solution of indiarubber with a concentrated solution of water-glass. An emulsion is said to be formed which adheres very well, will withstand water, and is also transparent.

THE DETERIORATION OF PAPER.*

[Report of the Science and Art Committee, reprinted from the *Journal of the Society of Arts.*

During the present century the paper-making industry has undergone many revolutionary changes. As an industry it has grown prodigiously, and to meet the requirements of the enormously increased production a quantity of new fibrous raw materials have been introduced, and have taken their place in due course as indispensable staples. The more important of these, so far as concerns this country, may be noted in chronological order, thus: esparto, in the period 1860-70; "mechanical wood" or ground wood pulp, in 1870-80; the wood celluloses, in the period 1880-90. These substances differ in chemical composition from the celluloses obtained from cotton, flax, and hemp, which were the exclusive staple raw materials for paper-making up to this century; and, although they are efficient substitutes in most respects, it must be admitted that Time has not yet been able to pronounce a judgment upon the relative permanence of the papers made from them. There is more than a suspicion that many of them are very inferior in this important respect, and it has been the main purpose of the work of the Committee to sift the evidence upon which such suspicions have been engendered.

Paper-making as an *art*—both mechanical and chemical—has advanced in similar measure, and although a sheet of paper made to-day necessarily differs but little as a fabric from the papers of previous epochs, the auxiliary methods of treating the vegetable fibres up to the point of putting them together as a sheet of paper have been much extended and developed. It would be difficult, in fact, to imagine more perfect adjustments of means to the one end than those which have been evolved to meet the modern demand for paper in all its varieties.

The science of the art has advanced also, but not *pari passu*. The production of paper and its applications rest rather upon conventional adjustments than upon such principles as may properly be termed scientific. It is not to be objected to this statement that the industry gets on very well without conforming to such a view. On the other hand, there is no need to take the statement as implying any wholesale criticism of paper-making methods as unscientific.

What is intended in and by the statement will be more exactly appreciated from what follows in explanation of the main subject to which the Committee were asked to give their attention, that is, the question of *standards of quality of papers.*

Paper being a fabric or structure, its qualities as such admit of more or less precise definition under such heads as—

Strength, expressed in terms of the weight or strain which it will support.

Elasticity and Texture, measured by elongation under strain and tesistance to rubbing.

Bulk, expressed in the precise terms of specific gravity or weight per unit in volume.

Of not less importance than physical qualities are those which belong to paper as a chemical substance (or mixture). These are: (1) its actual composition; (2) the liability to change under whatever conditions of storage and use to which it may be subjected. Living in this age, it is impossible to resist the tendency to take these physical and chemical constants of paper into account in specific terms. Such constants have the inevitable force of scientific quantities; they must come more and more into practical consideration, and ultimately to rank as regulating the consumption, and, therefore, production of papers.

This conviction the Committee feel themselves bound to record. The forecast rests upon no prophetic insight, but upon the knowledge of what has been accomplished in this direction in Continental countries, and notably in Germany. Through the investigations of the Imperial Testing Institution of Berlin, a scheme of testing of papers has been formulated and officially adopted, by which the chemical and physical properties of paper are brought to numerical expression. A more obviously important result is that standards of composition have been promulgated by the Institution, and, being officially adopted by the Government, have exercised an important influence upon the paper trade of Germany. Other Governments have followed the lead of Germany

in this matter. The Committee, recognising this advance, have felt that they would render a service to the technical public of this country by reproducing in abstract form the whole of the official publications (reports) of the German Imperial Testing Station, so far as relates to the subject of paper, The work of abstracting these "Mittheilungen der K.K. Versuchs Anstalt" has been ably carried out by Mr. Kershaw under the direction of the Committee, and will form an appendix to this report.

It is not suggested that the standards arrived at by these investigations and adopted by the German Government will come to be recognised as regulating the English paper trade. They form an important contribution to the science of the subject, and are reproduced for this their special significance. The matter must be left to adjust itself on the basis of public opinion. The Committee cannot do more than offer this contribution of material necessarily to be taken into account by the English technical public.

The more practical work of the Committee has been to formulate positive conclusions upon a subject which is perhaps only a side issue of the wider question of paper standards, viz., the question of the "Deterioration of Papers." This matter is in a somewhat nebulous position: on the one hand, it is well known that papers have come down to us from the Middle Ages in a perfect condition of preservation; on the other, there are many instances of the total destruction of books produced within quite recent years. There are not wanting those who are so influenced by this superficial antithesis as to generalise it into a condemnation of present-day papers as compared with those of the olden times. Between this excess of zeal, on the one hand, and the total refusal on the other to admit any case at all, the Committee have endeavoured to arrive at a practical judgment on the question of the relative permanence of papers, which judgment should carry with it a more precise view of the qualities of papers as suited or unsuited to the special purposes for which they are required.

It may be pointed out that the narrower issue of liability to deterioration is no new subject. It is dealt with in general terms in standard treatises on the manufacture and uses of papers. Thus, in Herring's well-known book, *Paper and Paper-making* (Longmans: London, 1856), pp. 97–99, it is pointed out that the unregulated use of bleaching agents has been known to occasion wholesale destruction of papers and books.

Since the period when such results, following from ignorant and careless practice, were common, there has been a great advance in the general grasp of the chemistry of the processes auxiliary to paper-making, and the Committee would make no point of such occasional damages as would arise in this direction from accidental circumstances. They have occupied themselves with the question of paper as normally produced, and under the conditions of ordinary wear and tear. The Committee have examined a number of books as practical evidence of "deterioration of paper;" some submitted by librarians in a condition of complete disintegration; some of their own selection exhibiting various grades of deterioration of the paper of which they are composed. They conclude on the evidence before them as follows:—

As to the two tendencies to deterioration of papers, these are marked—(1) by disintegration, (2) by discolouration. They are independent effects, but may be concurrent. They are notably so in papers containing mechanical wood pulp.

1. *Actual disintegration* has been brought to light in papers of all grades; from those of the best quality as regards the fibrous materials of which they are composed, *i.e.*, rag papers; also of course in those of lowest quality, *i.e.*, containing mechanical wood pulp in large proportions. The books examined had in certain cases been subject to ordinary conditions of storage and use; the effect in such cases is independent of wear and tear.* It is the result of chemical change of the fibres themselves. In other cases the damages could be traced to the effects of illuminating gas upon the atmosphere of the rooms in which the books had been stored. It may be generally concluded that all papers are liable to such extreme chemical change, *i.e.*, resulting in disintegration.

As to the causes determining such changes: in the case of the rag papers examined the effects appear to be due to acid bodies; the disintegration may be generally referred to acidity. The acids may have been present in the original paper as made; or may have resulted from reactions going on in the paper itself after making; or, lastly, may have been due to products of gas combustion. In the case of mechanical wood pulp the effects are traceable to oxidation pure and simple: the disintegration is accompanied by a basic or alkaline reaction of the paper.

2. *Discolouration* may be said also to affect all papers more or less. It takes various forms: the more marked effect is a darkening of colour, which spreads inwards from the margins; but a common case is that of a uniform discolouration. The latter would be the result of changes in the paper itself; the former is determined by external agency, such as by the action of an atmosphere charged with the products of combustion of coal gas. It is a complex effect; that is, while it may be the indirect result of the action of both acids and oxidants upon the constituents of the paper, it is immediately produced by changes in products of such action; or, again, where starch is present in the paper, discolouration may arise from products which this carbohydrate furnishes under the action of acids.

Without discussing minutely the chemistry of the changes, the evidence obtained certainly warrants the general conclusion that discolouration of ordinary cellulose papers (as distinguished from those containing mechanical wood pulp) under usual conditions of storage is proportional to the amount of resin which they contain, or more generally to the resin and the condition employed for fixing it in the ordinary process of engine sizing.

From a consideration of certain special causes of discolouration it must be pointed out that mechanical wood pulp is stained a deep yellow by aniline and other coal-tar bases; esparto and straw celluloses similarly are stained pink, these effects being due to the reactions of the fibre substances with the bases in question. Such compounds are often present in the atmosphere of chemical laboratories, or where coal-tar and its products are handled. Papers containing mechanical wood pulp, or esparto, or straw celluloses, are therefore unsuitable for books likely to be used in such laboratories.*

Certain practical conclusions of the Committee from the evidence obtainable are submitted. First, as regards the points common to all printing papers:—

Sizing (engine sizing).—Where the printer raises no objection, book paper should be sized with a minimum quantity of resin. A proportion of two per cent. resin (calculated dry) on the paper may be suggested as a maximum, also that for nearly all the ordinary uses of printing papers, the quality of "hard sizing" (usually produced with large proportions of resin), is superfluous.

The presence of *starch* is objectionable, though, in the case of heavily loaded papers, its employment may be necessary.

Acidity.—The papers may be finished with the normal slight excess of alum, which gives to the paper the slightly acid reaction of the alum, *i.e.*, acid to litmus, neutral to methyl orange.

Chlorides.—Care must be taken that paper should contain a minimum of chlorides.

Colour.—Upon this question it is difficult to make suggestions. It may be pointed out that high whites in papers involving the extreme grades of bleaching of the fibres are in usual practice obtained not only at the expense of strength and elasticity, but often with production of oxidised products themselves extremely susceptible of change with formation of dark-coloured products (discolouration). Such tendencies are, moreover, increased when to the demand for whiteness or purity of colour that of hard-sizing is added; and again, when the third and very usual demand for "cheapness" is considered. This necessitates the use of celluloses other than those of cotton, flax, or hemp, in which the dangers of over-bleaching are greater in proportion to the lesser chemical resistance of such celluloses, viz., the wood and esparto classes. It is true that these dangers are minimised by graduated methods of bleaching known to practical men and employed in some mills, but in ordinary practice the question of the permanence of the colour of the paper when made is not much considered. It is suggested that, when very white printing papers are required, the sizing should be reduced to the practical minimum; and again, that for ordinary printing papers a lower standard of colour may be adopted with advantage.

Loading.—The addition to paper of mineral matter, such as china clay, has the effect of increasing opacity and improving texture. Up to a point it may be admitted that these advantages outweigh the disadvantages of diluting the fibrous constituents of the paper with inert and non-cohesive material. Above this point the loading, of course, prejudices the strength of the paper, and generally lowers the qualities of resistance. Moreover, with increase of loading, the sizing agents require to be increased, with attendant disadvantage. After careful consideration, the Committee came to the conclusion that ten per cent. of total mineral constituents is the *extreme limit* for papers for publications of permanent value.

Texture.—This is purely a paper-maker's question. It will only be pointed out here that a close and well-compacted sheet is especially necessary for printing papers. This quality is largely controlled by the mechanical process of preparation (beating) of the fibres; but this is costly, both in time and power, and as the quality is, to a certain extent, to be imitated by the addition of sizing and loading agents, the tendency is towards the latter and factitious methods. The buyer or consumer requires to bear this in mind, and, in papers selected for publications of permanent value, to see that close texture has been obtained by the more "legitimate" method of mechanical preparation. The quality is a complex one; it effectually sums up the several "physical constants" dealt with above, and, until "standards" of classification are generally adopted, the question of texture must be insisted upon.

As regards the classification of papers according to composition, or more specifically, the question of the permanence of papers in relation to the fibres of which they are composed; this is a purely chemical problem, and the principles determining the classification have been dealt with in the Society's *Journal*, vol. xlv. pp. 690-696, 1897.

The Committee find that the practical evidence as to permanence fully

* It may be noted that the cases of destruction of rag papers investigated were for the most part in books produced in the period 1850–62.

confirms the classification there given, and that the paper-making fibres may be ranged in the four classes :—

A.—Cotton, flax, and hemp.

B.—Wood celluloses, (*a*) sulphite process, and (*b*) soda and sulphate process.

C.—Esparto and straw celluloses.

D.—Mechanical wood pulp.

In regard, therefore, to papers for books and documents of permanent value, the selection must be taken in this order, and always with due regard to the fulfilment of the conditions of normal treatment above dealt with as common to all papers.

The Committee have been desirous of bringing their investigations to a practical conclusion in specific terms, viz., by the suggestion of standards of quality. It is evident that in the majority of cases there is little fault to find with the practical adjustments which rule the trade. They are, therefore, satisfied to limit their specific finding to the following, viz., 1st, *normal standard of quality for book papers required for publications of permanent value.* For such papers they would specify as follows :—

Fibres.—Not less than 70 per cent. of fibres of Class A.

Sizing.—Not more than 2 per cent. resin, and finished with the normal acidity of pure alum.

Loading.—Not more than 10 per cent. total mineral matter (ash).

With regard to written documents, it must be evident that the proper materials are those of Class A, and that the paper should be pure, and sized with gelatine, and not with resin. All imitations of high-class writing papers, which are, in fact, merely disguised printing papers, should be carefully avoided.

PHOTOGRAPHIC CERAMICS.

At the Leeds Photographic Society's meeting on the 17th ult., a lecture with practical demonstration of unusual interest was given by Mr. James Taylor, entitled "Photographic Ceramics." The lecturer opened by stating that he did not think the process had received the attention from photographers which was its due, and also that the results obtainable were as certain to those who master the details as any other branch of photography, the finished picture being permanent. A portrait fired on an enamel or copper plaque holds a position unequalled by any other photographic method and is more adapted to professional than amateur work. The details of the process are similar to carbon in the earlier stages; in both bichromated glue is used; the clear glass of the transparency allows the light to act on the positive, which makes the film insoluble, so that it will not take up colour; while under the dense portions of the transparency where the light has not acted the colour is taken up freely; the film is very hygroscopic and quickly gathers moisture from the air. The materials required for quarter-plate size in addition to those generally found in a photographic outfit are: 6-in. funnel, 3¼ plate-glasses, packet of 6-in. filter paper, quart basin, Bunsen burner, camel's, hair mop, organifier, sensitiser, collodion, colour, fat oil of turpentine, and turpentine.

Having selected a negative for a trial, (the more artistic the better) a transparency is made in the usual way, and must be perfect if you desire a perfect ceramic; density to be the same as for a good lantern slide, plucky, bright, clear, and full of detail; now take the organifier, which is composed of

No. 1. Lepage's fish glue	½	ounce.
Glucose	2	ounces.
Glycerine	5	drops.
Water	5	ounces.
No. 2. Bichromate of ammonium	½	ounce.
Water	5	ounces.

Take equal parts of each and filter.

Clean thoroughly a quarter-plate glass, and be sure there is no dust adhering, for dust is the bane of the process, warm it over the Bunsen burner, and coat by pouring a pool of the mixture upon its centre; it does not cover well, but may be spread with a glass rod, a camel's-hair pencil, or the finger. It is important to have a level surface, a thick film is no advantage, and any surplus may be poured off; it may now be dried over the burner, taking care the plate is made no hotter than can be comfortably borne upon the back of the hand: if made too hot, it forms an insensitive patch; when dry, the film is hard and glossy. This operation should be done in very subdued light; gaslight will do very well. You are now ready for the exposure. Take your transparency, dry well over the Bunsen burner, place in the printing frame with the still warm and dry film in contact, and expose to light, say, for ten minutes. In opening the printing frame, be careful not to expose the film to strong light, as it is very sensitive in its dry state. In certain positions the image may be seen if the exposure is correct. Development may be conducted in gaslight. Place on your table a piece of white opal glass, hold the plate in the left hand, film upward, dust some colour over it, and use the mop brush with a circular motion, taking care to keep it moving, or the mop may stick and spoil the film. Examine from time to time by the reflection of the opal glass, and, as soon as it appears about the density of a good lantern slide, brush all surplus powder off on to the opal glass to prevent waste.

Development should be complete in two to ten minutes, depending on the state of the atmosphere. Coat with transfer collodion, formula for which is as follows :—

Methylated sulphuric ether	1½ ounces,
,, alcohol	1 ounce,
Pyroxyline (or gun-cotton)	7 grains,
Castor oil	5 drops,

or a little ether added to good enamel collodion will answer. While coating with above, the plate must be rocked edgeways until set, so that no streaks are left across the film, which would show themselves on the finished plaque. Put the plate into clean water to remove the bichromate, as the least trace of the latter left in the film will discolour the plaque with a yellow stain. Immerse for fifteen minutes, transfer to a second bath for same time, and thence to a third for ten minutes. Several films may be washed at one time. The transfer of film to plaque must be made in a large basin containing a solution of fused borax, made by boiling the latter in water; it is used cold, forms a flux, and helps the film to adhere to the plaque, which, with its support, may now be put in the basin. The plate is taken from the washing water, and the edges of the collodion are released from the glass by cutting, or rather stabbing, through with a sharp knife; if the latter is drawn through, it drags pieces out and puckers the film. The plate may now be put in the basin, and the film will float off, any little help required being given with a camel's-hair pencil; on no account must the film be touched with the fingers, or it will be ruined; it must be gently turned over with the brush on to the plaque, which may now be raised by inserting the hand or support under it. As soon as the film is in correct position, the plaque must be lifted out of the water and rested on blotting-paper to drain and dry. The film is now reversed; the organifier, bichromate, and chemicals are all washed away, leaving nothing but the colour imbedded in the collodion. If the transfer has been correctly performed, the image will be in the same position as in the transparency from which it was made.

When the plaque is dry, it must be coated with a preservative, as a slight touch will dislodge the colour and spoil its beauty. This preparation is made by mixing one part of fat essence of turpentine with fifty parts of turpentine. The plaque is coated by pouring a little over, and setting on edge to drain, then dried by gentle heat either before the fire or over the Bunsen burner, and is now ready for firing in a muffle furnace.

The one in use is made of pure nickel, and is not so liable to break; the burner has ample power for firing a plaque 3 × 2½ inches, requires a good gas supply, and will not work with a tap having more than quarter of an inch opening.

When lighting the burner, be careful to have a clear blue flame. In about ten minutes the muffle will be red hot. You may now put on a slab of pipeclay, or a thin piece of Bath brick, which is to support the plaque. As soon as the slab is hot it is withdrawn, and the plaque placed upon it and kept at the mouth of the muffle until it turns brown without blistering. The plaque is turned constantly, so as to get the heat which is reflected from the interior of the muffle equally distributed. Now push the plaque and its support boldly into the hottest part of the muffle, and close the mouth for three or four minutes, during which time the surface of the plaque will turn quite black. A peep into the muffle may now be taken. If all is glowing red, the door may be closed again for three minutes longer. If the plaque is now clear, all is well; but, if there are dark patches on the surface, turn it round with a piece of wire to equalise the heat. Close up the muffle again for two or three minutes. If it is now quite clear, hold the wire over it, and, if you can see the reflection of the wire on the surface of the plaque, turn off the gas, and, as soon as the redness has died out of the plaque, it and its support may be withdrawn to the mouth of the muffle and allowed to cool. In cooling, the plaque will change to many hues, but will finally assume its proper colour, and is now finished.

At the close, specimens of photographic ceramics were submitted to the audience, and additional information elicited by questions of minor points of detail, and, on the motion of Mr. B. A. Burrell, seconded by Mr. Tindall, a hearty vote of thanks was given to Mr. Taylor.

THE TRIPLE ANASTIGMAT.

Recently Dr. Kaempfer, of Brunswick, read before the Vienna Photographic Association a paper on "Photographic Lenses, with Special Reference to Messrs. Voigtländer & Son's New Type, the Triple Anastigmat." After referring to the introduction of the Petzval portrait lens and the Steinheil aplanat (1865) as marking two important improvements in photographic-lens construction, Dr. Kaempfer goes on to observe: Urged on by Professor Abbe, of Jena, Dr. Paul Rudolf calculated and made the first anastigmatic doublet in which a normal pair, composed of ordinary crown and flint glasses, were placed in opposition to a normal pair combining a crown of high and a flint of lower refraction. This is the third great advance we have to record in the construction of photographic lenses. Further improvements were made during the following years by taking advantage of this principle in the construction of symmetrical combinations, consisting of double, triple, and quadruple cemented halves, and their general usefulness and good qualities soon made them very popular. If we take such an objective as, for instance, the Collinear, we find that the two halves are both composed

of three lenses cemented together. The objective places eight determining factors at the service of the optician, namely, four different radii, three lens thicknesses, and the air space between the two halves. With these, eight conditions contributing to the perfection of the image may be generally fulfilled, and it is impossible to imagine a perfect modern lens with fewer determining factors. Hitherto opticians have followed the same path, and have endeavoured to fulfil a larger number of conditions by increasing the number of determining factors. Symmetrical objectives have therefore been constructed the halves of which are composed of four, or even five, lenses, but no marked improvement the increased means and expense. Further improvements should rather come from simplification of the means, and this step in advance was first made in England.

Mr. Dennis Taylor, engaged with Messrs. Cooke, of York, an optician of great experience in the construction of astronomical objectives, returne to the long-forgotten type of triplets, and made use of Jena barium crown. He had become familiar with this construction in consequence of an improvement he had made in the calculation of triple astronomical objectives. This combination, known in England as the Cooke lens, consists essentially of three single lenses placed at definite distances from each other. The two outer lenses are double convex heavy barium crowns, and enclose a double concave lens of light flint. The simplicity of this arrangement is in a double sense astonishing: first, in comparison with other known triplets, which contain at least one compound, cemented component; and, secondly, by contrast with recent objectives of the improved type, which are formed at least of two triple cemented halves. But, at a glance, it is seen that the conditions in this simple arrangement are as numerous and sufficient as in the modern symmetricals, for there are six different radii—three thicknesses and two air spaces. Of the latter, the space between the front lenses has much greater power than the distance of separation in any of the older types of objectives. It may thus be seen that the means for obtaining perfection of image are available, and whilst it must be conceded that they are difficult of application, and require much care and considerable time, this concerns the optician only. Messrs. Voigtländer & Son have willingly occupied themselves in bringing this combination to perfection, and, as I hope, with success. For the elimination of spherical and chromatic aberration outside the axis there are adequate means, and astigmatism presents no difficulties. The elimination of distortion is difficult, but for this the means are sufficient to render it quite imperceptible up to an angle of 70°. But the practical construction of this objective is not without considerable difficulties, which lie in the cenetring of the lenses, the perfection of figure, the accuracy of the thicknesses and distances of separation. All these demand the highest care.

The advantage of the combination for the practical wants of photography are considerable, as the lens is of comparative exceptional rapidity, and the absorption by the glass reduced to a minimum. Compared with other recent combinations, there is scarcely two-fifths of the quantity of glass in this new lens, which we call the triple anastigmat. In our experience, this absorption has a greater influence on the rapidity than is usually supposed. Generally speaking, we can use the next stop, and yet have the same amount of light as with other lenses. The lens is remarkable for its crispness and brilliancy, and consequently presents in a higher degree those qualities that are found in a single landscape lens of smaller aperture, and completely avoids the fault of complicated modern combinations—the great absorption of light by the quantity of glass and the cemented surfaces.

The reflections are also very favourably placed and do not affect the picture plane.

The anastigmatic picture plane covers perfectly an angle of 65° to 70° at an aperture of *f*-6·8 to *f*-7·7.

To the foregoing communication, Dr. Moritz von Rohr makes the following reply in the May number of the *Photographische Correspondenz*: In No. 451 of this periodical, pages 173 to 179, Dr. D. Kaempfer has published the text of a lecture entitled "Photographic Lenses, with special reference to Messrs. Voigtländer & Son's new Type: The Triple Anastigmat," which he delivered on February 15 of this year before the Vienna Photographic Association. Without entering upon a criticism of those parts which are of a general theoretical character, or form an historical introduction, I will confine my remarks to the conclusions by which it is sought to give prominence to the advantages of the Cooke lens.

It is true that a distinction must be drawn between relative rapidity, as expressed by proportional aperture $1:a$, and absolute rapidity, which is determined by the value of the quotient $1:a$, reflection, absorption, and by the degree of approximation to homocentric concentration of the rays upon the sensitive film, so far as strong contrasts of light are concerned, as in astronomy and copying. Dr. Kaempfer alludes to these facts, and from amongst those factors, which have to be considered besides proportional aperture, he seizes upon absorption, in which respect the Cooke lens presents advantages, and claims for the objective the high characteristic of being "relatively exceptionally rapid."

But, setting aside the proof of this assertion for the present, it would be matter of very great scientific interest to know by what method Dr. Kaempfer arrived at the above-mentioned result. We should then be able to judge how the effect of absorption has been kept distinct from that of reflection, which the six surfaces of the triple anastigmat, placed between high refractive media and air, also favour. It would be particularly important if the coefficients of absorption for rays of short wave-length were given for the particular barium crown glasses, as we should then be able to compare by numerical calculation the various types of photographic objectives, which hitherto has been impossible, owing to the want of published observations concerning the absorption of the new Jena glasses, now of so much importance in photographic optics. Dr. Kaempfer also appears to have studied the absorption of "cemented surfaces" (Kittflächen), and what has already been said applies likewise to the importance of any communication concerning the method of procedure in this case and the results obtained. For this enrichment of our knowledge, only feelings of gratitude could be entertained towards Messrs. Voigtländer & Son, the old-established firm of opticians, founded in 1756. In concluding this notice I would point out that it is within the power of many amateurs to test the correctness of Dr. Kaempfer's assertions in the following manner.

Mount on a stereoscopic camera a Cooke lens and the objective with which it is to be compared (for instance, an anastigmatic doublet). The focal length of both should be as nearly as possible the same, so that they may be focussed alike. Let both be stopped down equally, being careful that the cones of light shall have the same diameter on entering the lenses, in proportion to their focal length. To exclude any chance of favour, make the exposure on a stereoscopic plate with a focal plane shutter placed as near the plate as possible. As in all cases, where lenses are compared, it is necessary for strictness of proof, that both objectives should be of exactly the same equivalent focus.

Herr H. Klepp, in the *Deutsche Photographen Zeitung* (April) likewise takes "The Triple Anastigmat" for the subject of the following short paper, in which he gives the results of an examination of its optical properties: It has hitherto been the practice to flatten the anastigmatic field by multiplying the number of cemented surfaces, and lenses have thus become increasingly complicated. The greater cost of production has at the same time added considerably to the price of the more serviceable modern objective. It was therefore to be desired that some other means of lens correction should be discovered, which, though not quite equal to those employed in modern lenses, should give better results than the aplanat, which is uncorrected for astigmatism.

A proposal of this kind was made by Dennis Taylor in 1893. Hugo Schroeder hit upon the same idea, 1894, probably quite independently, but he appears not to have followed the subject further. The German patent (No. 86757) of Dennis Taylor's invention, has been acquired by the firm of Voigtländer & Sohn, of Brunswick, and they have calculated a new lens according to it. This is known as the Triple Anastigmat, and a specimen now lies before us for trial. The triple anastigmat is composed of three uncemented lenses. The front and the back biconvex lenses are of barium crown glass, whilst the middle biconcave lens is of light flint. The stop is placed between the back biconvex and the middle biconcave lenses. The specimen sent to us bears the maker's number (51,213) and focus (185 mm.). The full aperture is inscribed *f*-7·7, and the other stops are in the following ratios: *f*-9, *f*-12·5, *f*-18, *f*-25, *f*-36, *f*-50, *f*-71. The size for which the instrument is made is 13 × 18 cm., and at full aperture, according to description, the plate should be covered perfectly sharp. The price, including iris diaphragm, is 116 marks.

By focussing for infinity and equal size of object and image, the focus was found upon trial to be 186 mm. The effective aperture, *f*-7·7 was correct, and the stop marked 1 : 9 was also found to be in correct ratio.

The lens at its principal focus ($b=f$, distance from image = principal focus) illuminated a circle of about 350 mm. diameter (D). From these data the angle of view, a = about 86½°. At full aperture the flatness of field is very good over an angle of about 18°, which is equal to a circle of 60 mm. diameter, assuming $b=f$. Within this circle the definition is excellent, and outside it the definition is still serviceable for landscape work, at full aperture, up to an angle of about 41°. This corresponds to a circle of 140 mm. diameter. By referring to the following table these figures, as well as some others, may be compared:—

$b=f=186$ mm.	D mm.	$\frac{D}{f}=2\text{tg}\frac{a^*}{2}$	$\text{tg}\frac{a}{2}$	a Degrees.
Circle of illumination	350	1·8816	0·9408	about 86½
Circle of critical definition at *f*-7·7	60	0·3224	0·1612	18
Circle of serviceable definition at *f*-7·7	140	0·7526	0·3763	41
Diameter of circle necessary to cover a plate 13 × 18 cm.	222	1·1935	0·5967	61½
Circle of serviceable definition with smallest stop	270	1·4516	0·7258	72
Circle of definition necessary to cover plate 18 × 24 cm.	300	1·7204	0·8602	81½

* This method, proposed by H. W. Vogel and Steinheil, for reducing the diameter of illumination, D (b being $= f$) into terms of f, offers a convenient means for the direct comparison of different lenses, without the necessity of calculating the angles.

It may be seen from this, that in using the lens for landscapes (when b generally equals f), a plate 13 × 18 cm. is not sharply covered up to the corners. In portraiture, copying, and all cases where b exceeds f, D being consequently larger also, the lens will give sufficiently good results at full aperture.

With reference to curvature of the field, we find it to be about −1 mm. at $a=30°$. But from this point there is a difference, in comparison with other known types of anastigmats, inasmuch as it amounts to about −1·5 mm. at $a=56°$, where scarcely any curvature will be found with a well-known older anastigmat. The new lens consequently stands, according to its merits, midway between the anastigmats and the older lenses not corrected for astigmatism. It surpasses the latter by being better corrected for astigmatism up to an angle of over 30°, but it is much inferior to the former in flatness of field.

Concerning the name, we would remark that "triple anastigmat," in comparison with "double anastigmat," may, by analogy of construction, suggest the idea that each of the three components of this lens is corrected spherically, chromatically, and anastigmatically, as is actually the case with both halves of the double anastigmat. This would be a misapprehension, and it would, therefore, be better in future to relinquish this misleading name.

In conclusion, we would like to add a remark concerning the assertion in the prospectus of the triple anastigmats that they are composed of three very thin lenses, "whose total thickness is less than the entire thickness of one-half of an anastigmat of the ordinary construction. Consequently, the absorption of light by the glass is comparatively very small, and, therefore, these instruments are considerably more rapid than the ordinary anastigmats at the same relative aperture." The assertion, as such, may remain uncontradicted, but that any advantage is attained must, in the first place, be proved. The quality of the image, at the same relative aperture, is unquestionably inferior to that obtained with an ordinary anastigmat. Therefore, to obtain the same quality, a smaller stop must be used, and the advantage of the asserted increase of rapidity becomes illusory. As with the name, so also with the prospectus—a more careful description is urgently recommended. The catalogues and prospectuses of the firm of Zeiss may, in all respects, serve as a model. The Zeiss instruments, as a rule, do considerably more than is ascribed to them in the catalogue.

Briefly resumed, my opinion of the triple anastigmats is that they are lenses of good anastigmatic correction, but that they should only be considered of value, in comparison with the far superior ordinary anastigmats, if the prices of the same were considerably cheaper. The triple anastigmat is but a subordinate anastigmat, and it would be unwise to purchase it when very considerably more useful instruments may be had for rather more money.

THE DECORATIVE CAPABILITIES OF PHOTOGRAPHY.

IV.

In a previous article I referred to the wide range of usefulness to which photography might be applied in textile fabrics. In many other ways also can such be utilised in any household, and once a worker gives a slight amount of thought to this subject quite a number of articles in every-day use may be furnished from his stock of negatives.

One of the most beautiful draught boards the writer ever witnessed was decorated by this means, the making of which, although, no doubt, a labour of love, did not entail any great amount of difficulty, and would most probably be within the scope of any one possessed of a fair amount of neat handiness and taste.

To make a draught board of useful dimensions, say sixteen inches square, the base is best composed of good, well-seasoned and nicely planed soft wood, or a square of stout cardboard may be used as a top to a wooden base. The writer has seen some excellent results produced with the aid of the latter. A draught board, as every one knows, consists of sixty-four squares, thirty-two of which are dark or black, the other thirty-two squares being generally white, or, at least, much lighter in colour. If cardboard be selected, let the best Bristol board be chosen, and of good thickness, and an exact square of any desired size, say, eighteen inches, having been decided upon for dimensions, let a square be ruled by means of a straight edge. The utmost care must be observed in making this first square absolutely true. There are several ways of doing this, but, doubtless, any of the readers of The British Journal of Photography will have an idea of their own how to set about it. A true square having been ruled, a glass gauge is cut exactly two inches wide, by means of which the aperture of the square is divided into eight spaces, a finely pointed lead pencil being used to draw these lines. The glass gauge is then laid across the square in the opposite direction, and other eight lines ruled; by this means we have now obtained the sixty-four equal squares that compose a draught board. In making the original or outside lines it is well to leave a fair margin, say, of one inch, to provide a nice border, which always looks better than running the squares right up to the edge. We now require thirty-two suitable little pictures to accurately fill in the thirty-two squares that should be represented as the blacks. In printing these an artist must be guided by his own taste as to subjects. I have seen a very attractive board made up of portraits of members of a football club, and another was composed of members of a local draught club, and I once saw on board a yacht a standard table the top of which was provided with a draught centre beautifully filled in with choice yachting studies. It will thus be seen there is a very wide scope for the exercise of taste in respect to the class of pictures that may be utilised.

The negatives being provided and printed to as nearly as possible the same depth, a little care being observed in always using the same printing paper and toning to the same depth, prints equal in colour or nearly so are obtained. The strip of glass that was used as a gauge to rule the lines is now used to trim the little picture to the exact size of the squares. These are carefully mounted in their positions. A fancy border is then provided to fill in the space all round the draught board. Some suitable materials for this purpose can be obtained from any fancy stationers or such shops as supply artists' materials. One suitable class of material is composed of strips of any width of stamped or embossed gold of choice designs. A little neat handiness will enable such to effect a great improvement on the bare edges of the board.

The Bristol board is then provided with a neat glass and frame of any suitable wood, according to taste, and when finished never fails to attact attention and admiration from beholders.

So far in these articles reference has been made to the decorative capabilities of photography in ordinary households. There is, however, a much wider and equally important sphere of usefulness to which professionals as yet, at least in Scotland, have given little or no attention. I refer to the decorative capabilities of photography in many outside situations where advertising is resorted to by any public company or leading firm in connexion with their business. In Glasgow somewhat recently a distinct advance has been marked in this matter of using photographs to decorate some of the panels on the large vestibules of our railway stations. In the case of the Glasgow and South-Western Railway Company for instance, very striking effects have been produced by means of large-sized and elaborately finished bromide enlargements. The panels, in which these play such an important part, are probably fifteen feet by eight in dimensions and are dome-shape at the top, being let into the walls of the vestibule so as to form a slight recess or alcove.

In the vestibule in question there are probably eight or ten of these panels, each of which have been let by the railway company to various of the leading shipping firms in the west of Scotland. One of these firms in particular may be said to have marked a new era in advertising. Illuminated lettering surrounds a very beautiful bromide enlargement of about six feet in dimension, representing one of the crack Clyde river steamers. This enlargement is elaborately framed with an oval-shaped gold edge around which strikingly coloured letterings are placed. The most important feature of the panel is the enlargement. Its finish is quite as beautifully effected as if the same had been intended for the walls of any private house. And this has a most telling effect when seen alongside some of the more commercial cheap-and-nasty illustrations got up at so much per thousand to be plastered over barricades and hoardings.

The effect of this beautiful enlargement is seen in the crowds that stand gazing and admiring the picture. And the result must be extremely gratifying to the enterprising firm who selected this novel method of advertising.

There are many other ways in which photography might be turned to great advantage in advertising by selecting striking subjects, and producing such results in only the very finest style and costly finish. Our advertising agents are, as a rule, an enterprising class, and, doubtless, before long they will be keenly alive to the advantages accruing to this form of display, which must sooner or later prove of great value to enlargers and other professional photographers.

By means of carbon tissue much may be done in the way of decoration. As I write, I see before me a relic of the *Great Eastern* steamship. This takes the form of an elegantly finished kettle stand, the woodwork of which is turned out of some of the magnificent teak which comprised part of that gigantic vessel. The centre of the stand is made of glass which formed one of the cabin windows, and is about a quarter of an inch in thickness. This glass is used as the centre of the stand, around which the teak circular frame is fitted. The glass centre has been ornamented by means of a carbon picture on the under side of the glass, and looks very effective, forming a pleasing and useful relic of the past. Of course, any ordinary print mounted in optical contact on glass is likewise suitable for subjects of this description; in this instance carbon was chosen on account of its permanency.

There are very many other household articles in which carbon pictures may be utilised, the supports for which in some cases may be tiles and in others opal glass, and when carbon transparencies are attached to opal globes, or some kinds of vases having a light surface, very fine effects are produced, especially in such articles as lobby lamps, which are composed of movable panels of bevelled glass, &c.

Another striking object particularly suitable for photographic decoration is a draught screen, upon which scrap photographs of every description are worked into apertures of every size and shape. A double or treble rough wood frame is easily obtained, and stout canvas is stretched and covered with any suitable paper. This makes the groundwork for

the photographic scraps. Such articles as these always command a ready sale at bazaars.

Those ladies and gentlemen possessed of a fair amount of spare time much pleasure may be derived by turning their attention from the beaten track in photography, and applying it to many useful articles of the household.

T. N. Armstrong.

WILSON'S PHOTOGRAPH WRAPPER.

The wrapper is cut out of a single sheet or piece of cardboard, millboard or suchlike.

Fig. 1 is a view of the blank.

Fig. 2 is a view of the same partly folded up.

Fig. 3 is a view of the same completely folded up, ready for the post and enclosing the photographs.

The cardboard or like blank, *a*, is cut into a shape somewhat resembling a cross, as shown clearly at fig. 1. The side pieces or arms, *b*, b^1, the top part, *c*, and the lower part, *d*, are scored, indented, or

Fig. 1.

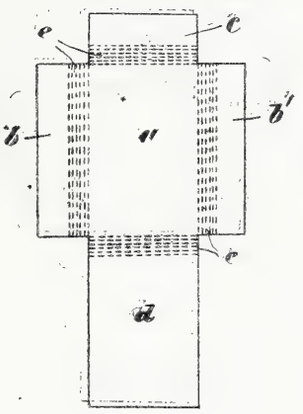


Fig. 2.

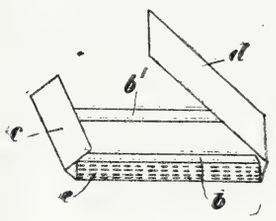
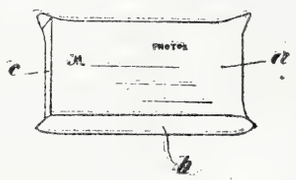


Fig. 3.



grooved on the surface which is intended to form the outside of the wrapper, along the dotted lines, *e*, so as to be capable of being easily folded over on top of the part, *a*, of the blank.

There may be six or other number of scored, grooved, or indented lines, *e*, in order that the wrapper may be readily adapted to hold either one or a number of photograph cards.

The photograph or photographs is, or are, placed in the open wrapper, and the side arms, *b*, b^1, folded over them, then the lower part, *d*, is folded up over the arms, and, finally, the top part, *c*, is folded down on top of the lower part. The top part may, if so desired, be secured by means of any suitable and well-known form of catch or equivalent, or the wrapper may be merely tied up.

BEFORE THE CONVENTION.

I. A Chat with the President-elect and the Local Secretary.

The Convention having decided to hold their annual "pow-wow" at Glasgow next month, a few notes on Scottish photographers may be interesting to our readers. With the end of presenting these in as concise and up-to-date form as possible, a representative of the Journal called on a number of the leading Scottish photographers; and it is proposed, in the following articles, to give the results of these "cracks" (*Anglice*, "talks"). But first a word about Glasgow itself.

Glasgow, the second city in the empire, has attained so much fame as a commercial centre that her other attributes are apt to be overlooked. To the photographer she proffers many inducements. Is he an architectural photographer? then the municipal buildings alone would give him work for a week, not to mention any of the other fine public buildings in Glasgow. Has his photography an "ancient" turn? then he has Glasgow Cathedral, which, besides being the oldest building in the city, is considered by many the best example of pre-Reformation church architecture in Scotland; the University will also form material for this photographer. Does landscape and river, loch and marine photography specially appeal to him? then the Firth of Clyde, Loch Lomond, &c. provide for him a very paradise. Is the portrayal of industry his speciality? where, then, could he get a better *venue* than Glasgow, whose workshops and shipbuilding yards supply the world? The *genre* or figure-study photographer will, in the public parks and streets, find work in plenty for his camera.

Naturally we first wended our steps to the studio of Mr. John Stuart, at 120, Buchanan-street, and after climbing a stair or two—Glasgow is famous for stairs—found Mr. Stuart waiting. The President-elect is a big, cheery Scotsman, who shakes hands with you, with "a guid grip" that at once awakens confidence in his visitor. Seated with Mr. Stuart in his reception-room, we cannot help inspecting the many photographic treasures on the walls. We recognise many old and new favourites. *The First Day at School*, exhibited at the Royal in 1895, has all its sunny charm, while *The Dining-room, Kilmeny*, taken by flashlight, exhibited at the same Exhibition, shows a beautiful gradation of tone and a soft lighting that is, unfortunately absent in many of the flashlights we see. Several other flashlight photographs, in the room claiming our attention, a query from us reveals the procedure. Mr. Stuart uses a simple little lamp (made in Germany) for his flashlight work, which he says is the best that he can get; it is so compact that it can easily be carried in the pocket. The flash is exploded by a percussion cap, and Mr. Stuart said he had never known it to fail, while the flash was so brilliant and rapid that he had frequently photographed dancers by its aid. Although Mr. Stuart has been over forty years in business, it is only during recent years, "since trade became dull" he explains, that he has exhibited. The "dull trade" that he gave as his reason for exhibiting was only an excuse, as the smile accompanying the remark and the scenes around us betokened anything but slack trade. The President has been very successful in his exhibiting, and during the last five months he has been awarded no less than eleven medals; perhaps his most noticeable success was at Blairgowrie International, where, in spite of strong competition, he practically swept the boards, repeating Mr. J. Craig Annan's success at that Association's previous exhibition. The photographs, "pictures" we might call them, if that word was not such a bone of contention in photographic circles, in the reception-room make a fine show, let us name a few of them, well known to many of our readers: *Merry Tommy; Little Coffee Eyes; Study of a Head* (Mr. F. A. Bridge, Hon. Secretary of the Convention); *The Tinkers' Camp; St. Leonard's Hospital, York; Fountain Abbey*, &c. There was one photograph representing the Board of Directors, Glasgow Athenæum, 1897, of which Mr. Stuart was pardonably proud. The lighting seemed very even for an ordinary room, but this was accounted for when the photographer explained that each individual in the group was photographed separately; the room was also photographed, and, a composite photograph made, the work was exceptionally well done. Mr. Stuart's work is not of the "fuzzy" order; in fact, all his pictures are clear and sharp. A particular friend of his, who ranks as a prince of pictorial photography, once told him he could never make a Salon picture, so he need not try; but try he did, and in a corner of his reception-room he shows us a rather graceful figure study, which he explains is "after the Salon." He has entitled it "What do you think of me?" and this may well rank as a *double-entendre*.

The ordinary studio work is done in two studios, the larger one being used for groups, &c. It is fitted with an Adamson's electric installation, but this is not used to the exclusion of daylight, the electric lighting being principally used in the evenings, when it is found a valuable accessory. The studio is simply, but effectively, furnished. Every square foot of room in the premises is utilised, even the odd corners are pressed into the service; to merely emunerate the rooms, there are dressing-rooms, counting house, mounting, trimming and store-rooms, retouching, printing, and carbon-rooms; most of the printing is, however, now done at Mr. Stuart's Helensburgh premises, where, free from the Glasgow smoke and fog, this work progresses more expeditiously. Mr. Stuart has a long-standing affection for carbon, but this is hardly to be wondered at, as he was the first to lease from Mr. Swan the carbon rights for Glasgow. Asked if he had tried the "bi-gum," he confessed he had, but the results did not please him; he got far better results with the carbon, so he saw no reason to desert his old love. Mr. Stuart thinks the taste of the public in matters photographic is undoubtedly improving, in the early days he used to supply a considerable number of large paintings (portraits), generally with a photographic basis, but his clients, at Mr. Stuart's suggestion perhaps, although he was modestly silent on this point, now prefer first-class enlargements, frequently in carbon. There is one branch of the President's business that the photographic public are not generally cognisant of, to wit, photographing machinery. This is purely technical work, and the specimens we saw speak well for the ability of the worker. The negatives are taken in all parts of the country, mostly on 15×12 plates, and large numbers of prints are supplied to the makers of the machines, who, no doubt, use them to advertise their wares; this method is simple for the traveller, who would find it slightly awkward to carry about a locomotive and exhibit it to prospective customers.

Mr. Stuart is very enthusiastic about the coming Convention, and a few minutes' talk with him on this subject convinces one that the Convention have secured a treasure in their President; he is not merely an ornamental figure-head, although his appearance is all in his favour, but he is in very truth a worker. He, as may be expected, is a little dis-

appointed with the action of the municipal authorities, but it is very evident that it is the action of a clique. From what we could learn in conversation with Mr. Stuart, the Lord Provost deeply regrets the *contretemps*, but one of the standing orders of the Council is that no decision can be revoked until a period of six months has elapsed. The Lord Provost will, however, attend the opening ceremony and welcome the Conventioners; at this meeting will be shown the *crême de la crême* of lantern slides; a large attendance of outsiders is expected. The Town Clerk, Sir James Marwick, has become a member of the Convention, and all the public buildings will be thrown open to Conventioners. Asked what was to be the subject of the President's address, Mr. Stuart was rather reticent, but finally he said he thought of giving the Convention an address on the progress of photography in his own experience during the last forty or fifty years. He also intends giving some special advice to young professionals and amateurs. He has an idea of using the blackboard to illustrate his remarks, but is rather dubious of appearing as a lightning artist; it is to be hoped the Committee will be successful in overcoming these scruples, as we are sure the blackboard illustrations, in Mr. Stuart's hands, would prove a feature. The lecture arrangements are not yet completed, but Mr. Stuart was kind enough to give us the following particulars: Mr. E. J. Wall will probably give three short lectures on photography in natural colours, describing the processes of Lippmann, Ives, and Joly. A lecture will be given on the newest features of radiography by Dr. MacIntyre, the Glasgow X-ray expert. He also expects a lecture from Mr. Paton, Curator of the Corporation Galleries, Glasgow, and also one from Mr. J. Craig, Annan on "Art as represented in Photography." There will also probably be a paper by Professor Bothamley. Mr. Stuart has been plotting with another member of Committee, and the probability is that, at the dinner on the Wednesday, the Conventioners will receive an agreeable surprise. What it is we are not permitted to say, but it is something different from ice pudding.

During his long connexion with photography, Mr. Stuart has made the acquaintance of most of the leading men; for the veteran, "H. P." Robinson, he has a profound regard; Mr. Swan, the inventor of the carbon process, is a personal friend, and Mr. Stuart is in hopes that he (Mr. Swan) may yet return to take a prominent part in photographic circles. Mr. Stuart is President of the Glasgow Photographic Society, the oldest in the city, and in honouring him by electing him to the position of President the Convention honours itself.

Mr. Wm. Goodwin, the Local Secretary of the Convention, is a busy man, but he managed to spare an evening for a "crack" with us. He is Secretary of the Glasgow and West of Scotland Photographic Society, probably at the present time the largest in the city. As the Secretary of the International Exhibition, in Glasgow, in 1891, he exhibited organizing powers of no mean ability, while the success with which he conducted last year's International must still be fresh in the minds of our readers. Happy, indeed, is the Secretary with a £500 balance. Mr. Goodwin is very modest in speaking of these achievements, and gives much of the credit to the energetic assistance he had from his colleagues; we observe a considerable number of these on the Local Committee of the Convention, so members may rest assured that everything possible will be done for their comfort and convenience. Mr. Goodwin expects a good show in the trade exhibition, as he believes that many of the Crystal Palace exhibits will be sent to the Convention. When questioned as to the probable attendance, Mr. Goodwin explained that any attempt at giving numbers would only be a very wild guess, but latterly he put the probable figures at 400. Any private individual desiring to photograph in the Cathedral must first obtain permission, but Mr. Goodwin has received a free pass for all Conventioners; a similar permit has been received for Linlithgow Palace, and he understands that permission will also be given for Holyrood, where there are some interesting interiors. Similar permission has been obtained for all the places of interest in and around Glasgow. Mr. Goodwin has been successful in arranging for a dark room, about twenty feet square, in the Fine Art Galleries, where the Convention meetings will be held. Quite close to the Galleries, namely, at 180, West Regent-street, is the club-room, &c., of the Glasgow and West of Scotland Photographic Society. The premises leased by the Society include a meeting-room, a very comfortable smoking-room with a photographic library, enlarging-rooms with suitable apparatus, and a splendidly fitted-up dark room. Mr. Goodwin informed us that it was the intention of his Society to put a special caretaker in these rooms during Convention week, and give the members the free use of them; probably other societies will grant a like privilege. Most of the dealers have dark rooms, so there will be no deficiency in this respect. The photographic societies are to give a special exhibition of lantern slides, and, although Glasgow photographers do not compete largely in lantern-slide classes, still, judging from the quality of their work we have seen, the men of the south will have to put their best foot foremost to beat them.

Mr. Goodwin is sparing no trouble to make the Convention a success, and, if experience, tact, and an ability for hard work count for anything, the visitors to Glasgow will all appreciate the benefits of the Local Secretary's labours on their behalf.

Our Editorial Table.

THE YEAR-BOOK OF PHOTOGRAPHY, 1898.

Edited by E. J. WALL, F.R.P.S. Published at the *Photographic News* Office, 9, Cecil-court, Charing Cross-road. 627 pages. Price 1s. Illustrated.

ONE feature of Mr. Wall's annual should ensure the book no end of popularity during the summer and autumn seasons. We allude to Section II. ("The Photographer's Gazetteer"), which purports to give information to the tourist photographer on the important subjects of where to go, where to stay, and what to photograph. This section takes up over a hundred pages, and it supplements former compilations of a like nature. Some scores of beautiful places, at home and abroad, are minutely described with reference to the opportunities they offer for photographic picture-making, and on this account alone the book should successfully appeal to every photographer who makes the camera a holiday companion. "Notes on Chemicals," by the editor, gives the synonyms, solubilities, properties, and uses of most of the chemicals in photographic use. This is a section of very great value. The contributed articles are few but practical. Mr. John A. Randall exhaustively treats of "Portraiture in Rooms," Mr. Welborne Piper of "Hand and Stand Cameras," and Mr. Child Bayley of "Lanterns and Lantern Work." Many illustrations and formulæ, and a review of novelties of the year complete a well-edited volume, in which there is something to instruct and interest every photographer.

EXPOSURE TABLES FOR PAGET PRIZE PLATES.

Published by the Paget Prize Plate Company, Watford.

USERS of the Paget plates should find the data here worked out of great service in giving accurate exposures. A lettered table for time precedes the exposure tables with stops ranging from *f*·5·6 to *f*·32, the XXXXX times Paget plates being supposedly employed. "Subject" is also included in the data, while guiding notes on the strength of the light and instructions for the application of the tables are supplied in the little compilation, which may comfortably be stowed in the vest pocket.

CATALOGUE RECEIVED.

The Albion Albumenising Company, 128, Sauchiehall-street, Glasgow, N.B.

THIS is a supplement to the Company's photographic catalogue, extending to 24 pages and dealing chiefly in tourists' cameras, hand cameras, shutters, lenses, and other apparatus of recent introduction.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, June 8, at eight o'clock, Members' Open Night.

MESSRS. GEORGE MASON & CO., of Glasgow, notify their change of address from Sauchiehall-street to new premises, 120–124, Buchanan-street.

THE present address of H. E. Cheesman, photographer, is required by his late employer, Mr. A. W. Johnstone, of Rotherham. Cheesman was last seen in Sheffield on or about May 16.

NOTICE OF REMOVAL.—Mr. R. H. M'Bean, photographic material merchant, 25, Albert-place, Edinburgh, intimates that he is removing to more commodious premises at 14, Albert-place, a few doors further down. A revised price-list is in preparation, and will be forwarded as soon as ready on receipt of post card.

CITY AND GUILDS OF LONDON INSTITUTE.—An Exhibition of Specimens of Practical Work of candidates at the Technological Examinations, May 1898, will be held, by permission of the Governing Body, at the Imperial Institute, S.W. It will be opened by the Right Hon. Lord Herschell, G.C.B., Chancellor of the University of London, on Thursday, June 9, at four p.m.

IN the present age of this fast-dying century art criticism has become rather conventional, not to say *blasé*, says a daily contemporary. It is, therefore, quite refreshing to hear fresh and unsophisticated views on the subject from people whose views are untrammelled by the rules and regulations which professionals observe in these matters. Canning Town has recently been in the enjoyment of a picture exhibition, and, according to *London*, which has been collecting specimens of the remarks passed on the canvases by the spectators, narrates the following: "One picture, entitled *Till Death us do Part*, revived memories of happier days in the heart of an old lady. 'Ah,' said she, as she gazed at the picture of an old man kneeling by his wife's death-bed, 'that must have been in the country. Men don't love their wives like that in the town. Perhaps,' she added, a little pathetically, 'they love like that in the country yet.' A party of old ladies had reached Etty's *Before the Flood*, and one good soul asked their guide what it meant. After it had been explained, she very quietly remarked, 'Oh, that's ancient history, isn't it?'"

Re WILLIAM EDWIN ALEXANDER DRINKWATER, Photographer, Devonport.—The Official Receiver for the Plymouth District, has now issued particulars under this failure, from which it appears that the debtor has carried on business at 33, Catherine-street, Devonport, under the style of Gill & Drinkwater, photographers. He bought the business from Mr. Gill under an agreement to pay him or his wife, or the survivor, a sum of thirty shillings per week during their lifetime. They were both over sixty years of age. He

was afraid he had not given thorough thought to the probable lifetime of the annuitants. The business was taken over by the debtor in April 1896, and since then it had done nothing to warrant the terms he had made. Prior to his taking over the business the year's takings had been 150*l.*, of which perhaps a third would be profit. Debtor had improved on this, for his takings had been nearly double that amount. He carried on the business very economically, and, but for the heavy liability of the annuity, he believed his wife and he could have made it pay. The summary of accounts filed by the debtor show gross liabilities amounting to 517*l.* 13*s.* 5*d.*, of which 485*l.* 16*s.* 5*d.* was expected to rank against the estate for dividend. The debtor returned his deficiency at 447*l.* 2*s.* 6*d.*

Patent News.

THE following applications for Patents were made between May 16 and May 20, 1898:—

PHOTOGRAPH-HOLDER.—No. 11,128. "Improved Device for Collecting and Holding Post Cards, Photographs, and suchlike, and Apparatus for Exhibiting the Cards thus Collected." O. STROHBACH and R. SIERCKE.

PHOTOGRAPH FRAMES.—No. 11,294. "Improved Means of Attaching Supporting Legs to Photograph and like Frames to facilitate their use either in a Vertical or Horizontal Position as desired." D. HART.

APPARATUS FOR DEVELOPMENT.—No. 11,301. "An Improvement in Apparatus for the Development of Photographic Plates or Films." T. BROWN.

WASHING TANK.—No. 11,354. "Improved Photographic Washing Tank." J. MOPPAY.

FINDER.—No. 11,380. "Improved Pocket Finder for Photographers, which may also be used for facilitating Drawing in Perspective and the like." H. C. KEMP.

SENSITIVE SURFACES.—No. 11,420. "Improvements in the Preparation of Argentiferous Sensitive Surfaces for Photographic Purposes." P. MERCIER.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

June.	Name of Society.	Subject.
6	North Middlesex	Informal: Sixth Lantern-slide Competition.
6	South London	*Gum-bichromate Process.* W. Howell.
7	Gospel Oak	*Cloud and Stereoscopic Photography.* W. Beyer.
7	Hackney	Sale and Exchange Night. W. L. Barker.
7	Rotherham	*Paper Negatives.* Paper lent by W. T. Wilkinson.
8	Photographic Club	Members' Open Night.
9	Gospel Oak	Excursion: Kew and Richmond.
9	London and Provincial	Paper by S. H. Fry, F.R.P.S.
11	Borough Polytechnic	Excursion: Barnes to Richmond.
11	Hackney	Excursion: Molesey. Leader, Major Woolmer-Williams.
11	Liverpool Amateur	Surprise Excursion.
11	Oldham	Excursion: Rostherne. Leader, C. A. Hempstock.
11	South London	Excursion: Teddington. Leader, F. Goddard.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 26,—Mr. A. L. Henderson in the chair.

Being an Open Night, when members are free to bring forward topics requiring elucidation and discussion, the observation made by Mr. Howard Farmer in a recent paper to the effect that the practice of looking at a plate during development in order to judge of the density was merely a fad on the part of the operator, was likely to call forth an interesting expression of opinion. It was thought that the majority of photographers were hardly prepared to agree with this view of the matter, unless was implied the provision for an exact exposure, when perhaps the examination of the plate might be dispensed with. But, considering how large a proportion of exposures were either under or over-exposures, the observation could hardly, it was thought, be expected to hold good for one and all exposures.

Mr. P. EVERITT thought that by using a developer of a certain strength, at a certain temperature, and knowing the time taken by the plate in development, it was possible to place the plate in the developer and remove it at the end of a certain time completely developed.

Mr. A. THOMAS said his experience told him that development should be followed by the eye, and thought that Mr. Farmer must have meant something to be taken in conjunction with the statement under discussion.

Mr. EVERITT recounted the particulars of a visit by Mr. Cowan to Hurter & Driffield's laboratory, where his portrait was taken; it was decided how long the exposure should be, and given accordingly. Upon Mr. COWAN expressing a wish to see it developed, the plate was put into the developer for so many minutes, removed, washed, and fixed, when it was seen to be perfectly exposed and a first-rate negative.

Mr. H. C. RAPSON held that there were occasions when there was no advantage in looking at the plate. Take, for instance, a rapid isochromatic plate, to preserve which it must not be exposed for more than a minimum of time to a minimum of light, otherwise fog would result. He found in working with these plates that, with subjects which allowed him to keep the exposure practically constant, and with a constant developer, he could proceed entirely by time and get clean negatives. Had he tried to examine them, not only was it impossible to form a sound judgment because they seemed so dark before there was sufficient density in them, but he would invariably get fog. With ordinary plates he certainly believed in examination.

Mr. J. S. TEAPE fully believed in using one's eyesight, and should not think of acting on such a method as described by Mr. Farmer. Having heard the paper read, however, he would say that Mr. Farmer, in the same paper, advocated a method of developing without a dark room, protecting his plates with a coloured solution formed by the addition of caramel to the developer, the operations being but for this carried out in an actinic light. The plates developed at the meeting were evidently exposed under fixed and known conditions, and, having a knowledge of the exposure and of the results to be got in a given time, he could dispense with the ordinary periodical examination of the plate during the development. He could not think, however, that Mr. Farmer meant to advocate the method where the plates were exposed under uncertain conditions.

Mr. E. J. WALL remarked that, so long as one developed in a particular manner, there was no necessity to look at the plate. Since the publication of Mr. Watkins's method he had developed entirely by time. Placing the plate in the dish, he poured on the developer, and, calculating upon the time before any appearance of the image manifested itself, knew exactly when the plate was finished. The method was simplicity itself, and could be carried out with the utmost certainty as to the result.

The CHAIRMAN thought there was a good deal in the addition of colouring matter to the developer; but, as regards deciding the time of completion upon the time of appearance, he knew plates which had the characteristic of requiring a long soaking before any sign of image appeared, after which the growth of density and detail was most rapid. How would such a case reconcile itself with Watkins's system?

The question was raised as to whether there was any connecting link between Watkins's and Farmer's methods. The one looked at his plate for the appearance of the image, and the other advocated no examination at all.

PHOTOGRAPHIC CLUB.

MAY 25.—Mr. W. D. Welford in the chair.

Mr. FRANK HAES, commenting on the induction of Mr. Stretton into the office of Secretary *vice* Mr. Bridge, resigned, said it was with mingled feelings that he spoke of the loss of Mr. Bridge. It wanted no words of his to acquaint the meeting with the extent of the debt owing by the Club to Mr. Bridge in every way, who, during both his first and second tenures of office, had done truly yeoman's service. He called upon the meeting to give its hearty vote of thanks to Mr. Bridge upon his retirement, while to his successor he could pay no higher compliment than to say, "Do likewise."

Mr. NEWELL had great pleasure in seconding the motion, and testified his personal appreciation of Mr. Bridge.

The meeting adopted the resolution with acclamation, to which Mr. Bridge replied, expressing his wishes for the welfare of the Club, and his intention to be amongst them on all possible occasions.

Mr. H. SNOWDEN WARD gave his promised chat on

REMINISCENCES OF AMERICAN PHOTOGRAPHY,

to give additional interest to which he showed specimens of American work and lantern slides by several well-known photographers across the water. Referring to some examples of portraiture, he remarked that all were printed by the platinotype process. For several years the American agents of the English Platinotype Company had been fighting a very up-hill fight indeed against the highly glazed printing papers which had obtained such a strong hold of photographers in that country, and the last two years had seen a decided change in the character of the work turned out. There had also been a welcome substitution of backgrounds and accessories of a darker hue for those in former use, which partook very largely of lighter shades, and in this change the introduction of matt papers had helped considerably. This change of fashion was a valuable opportunity for adopting platinum paper, and its popularity was growing. It would be seen that the portraits illustrated the danger of overdoing the "black" vignetting. This was done in the camera; but, while the portraits were good, it seemed to him that, from an artistic standpoint, the practice was quite meaningless. There was to be seen some work by entirely unknown men, which, nevertheless, was very fine. He was impressed with the advances made by second and third-class photographers in point of quality during the last few years. He could not agree with the form of mount showing a diagonal graduated tint which had recently appeared. For a few special cases it was suitable enough, but the indiscriminate use to which it had been put was far from pleasing. Some very delicate platinotypes by Hollinger, of New York, were exhibited, and the remarkable strides made by this man from quite the lowest stage traced to his present high position. His business methods were as bold as they were peculiar. He insists upon a pose acceptable to himself, as also in size and the number of sittings. These are finished, and prints of all the negatives which have his approval are sent to the sitter. The sitter has the option of selection or may refuse to have any, while for those he may take over he pays a guinea for the first, and half a guinea for further prints. Business on identical lines was shortly to be tried in London. As an indication of business enterprise he instanced a studio at St. Louis, where a notice was posted, stating that all sittings made that day (December 23) would be completed before Christmas, and he found that such sittings were accepted until ten o'clock that night. The prints were made upon Velox paper, which was meeting with a very extended use in the States, bromide or a bromido-celluloid, which latter gave a kind of ivory picture, specimens of which were shown. Mr. Ward gave a good deal of information about General Greely's work in the War Department, with photography applied to military purposes. Particular attention was paid to the series of pictures made by Mr. Brady, and taken during the Civil War, which has been acquired by the United States Government. A complete catalogue

has been issued, and the series forms a most valuable collection, Mr. Brady having followed the troops very industriously, and included pictures of many of the battlefields and actions which render famous the history of this contest. Other Government departments employ photography largely, notably in the Geological Survey, and the observatories. Of the latter, that at Harvard uses photography more than any other in the world. At present it is engaged in charting the heavens on a very complete scale. At the close of his remarks Mr. Ward showed a selection of American work upon the screen, and added a few words about the American photographic society life, which was more of the social, open meeting style, for mutual criticism, numbering amongst their members fewer qualified investigators than our own societies and clubs.

A vote of thanks was passed to Mr. Ward.

Hackney Photographic Society.—May 24, the President in the chair.—Before a large attendance of members and visitors, Mr. C. T. Fleetwood lectured on the subjects of

X Rays and Wireless Telegraphy

in a most able manner. The value and interest of the lecture were greatly enhanced by the lecturer illustrating his explanations with a number of experiments, which were successfully carried out. In dealing with the first subject he took his audience through the elementary physics of light and radiant matter, and showed that X rays are rays of extremely short wavelength coming from beyond the ultra-violet. An essential for producing these rays was an electric current of great tension passing through a high vacuum. In connexion with the fluorescent screen, Mr. Fleetwood said that, although there were many substances fluorescent to the rays, yet only about three were suitable for screen-making. He then showed some very fine examples of fluorescence by sending a current through vacuum tubes containing respectively selenite, dolomite, ruby, Iceland spar, and calcined whelk shell. In the course of the lecture two radiographs were taken. On the question of the source of the X rays, the lecturer said he doubted the suggestion that the rays were produced within the tube and passed through the glass; he rather thought that they were induced outside the tube by the current passing within. In that part of his lecture devoted to wireless telegraphy, Mr. Fleetwood said that in 1874, while testing the telegraph wires between the G.P.O. and Paddington, the galvanometer gave indications of the existence of a current which could not be accounted for, as the wires were in good order and the insulation perfect. Investigation led him to form the idea that the current in question was induced by currents flowing through adjacent wires, and was formed on the same principle as that of a Leyden jar. Later in the year the Engineer-in-chief read a paper on induction from wire to wire. Further experiments were made, and in 1877 the knowledge of the fact that currents were formed by induction between insulated wires led to his, the lecturer's, devising an instrument for simplifying the operation of finding any particular wire among a number of wires. The old method was by pricking the gutta-percha covering and testing by actual conduction, and it might readily be imagined that, when a certain wire was to be sought out of a large bundle of wires, this method of testing was very tedious, since every wire had to be pricked and the covering repaired again until the right one was found. But, acting on the newly discovered facts, the instrument in question was made to show the presence of a certain current by induction so that the latter could be located without pricking the wire. In 1884 information was received from the Telephone Company that one of their operators had heard a telegraphic message passing through one of the G.P.O. wires. On investigation this was found to be correct, and it was proved that an induced current had been established between a telephone wire overhead and a telegraph wire underground. Experiments made in different parts of the country during the following few years proved that currents could be induced between parallel wires a considerable distance apart, so much as half a mile in one case. In 1895 a circuit was established between Oban and the Isle of Mull. This was brought about owing to the cable breaking down and no ship being available to repair it. Communication was established by utilising parallel wires on each side of the channel and transmitting signals across this space by means of electro-magnetic waves. Mr. Fleetwood detailed Mr. Preece's experiments in this direction, and described the instrument used by him. In July 1896 M. Marconi arrived in England with an instrument which Mr. Preece recognised as being superior to his own. In connexion with this, the lecturer said that credit was due to Lieut. Jackson, R.N., who invented independently a system similar to that of Marconi, and had the latter arrived but three weeks later Jackson's instrument would have been patented. The lecturer then showed Marconi's instrument, and demonstrated its working by transmitting a message across the meeting room. In reply to questions, Mr. Fleetwood said that the greatest distance over which a message had as yet been sent was fifteen miles; and, further, that as yet it had not been found possible to localise a message.

North Middlesex Photographic Society.—May 23, Mr. Leslie Selby delivered a lecture on

Printing Processes.

He reviewed most of the well-known processes from albumen to carbon. In a general way the lecturer said that developed silver processes were more permanent than print-out, and for that reason he preferred Alpha, bromide, and Velox. He spoke particularly in favour of Alpha and Velox on account of the facility with which various shades of brown could be obtained. Platinum, of course, he had nothing but praise for, but said it was hardly suitable for beginners, as considerable practice was necessary to work it successfully. Carbon he thought king of all printing processes. It was easily worked, any colour could be obtained with absolute certainty at will, and paper, rough or smooth, wood, stone, canvas, or, in fact, any surface, could be used as the support with equal facility. Gum bichromate, he said, was but a branch of the carbon process, but thought that the worker whose weakness lay in that direction had better give up photography and take to the brush entirely.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

SOME FACTS ABOUT FOCUS.

To the Editors.

Gentlemen,—There can be no doubt that Mr. W. E. Debenham, in his lecture, made a mistake which it seemed hardly worth while to notice, as it was manifest to every one who had experience; but it would seem, from the letters of your correspondent in yesterday's issue, that there is some blundering in the matter.

If any one will compute the distance beyond which all objects will be in focus for the same measured aperture for two lenses, they will have an example. For instance, take an aperture of half an inch on two lenses of six and twelve inches. It will be found by Mr. Dallmeyer's rule (as corrected later by him) that, for the former, the distance is 300 inches, and for the latter 600, and it is evident that the distances beyond these are a measure of the depth of focus in these two cases.

It would be out of place to offer any more elaborate proof in your pages, but I think this simple case will convince any doubter.—I am, yours, &c., J. F. T.

May 28, 1898.

To the Editors.

Gentlemen,—I am not surprised that Mr. Muncey should find the statement, that "depth of focus depends upon the aperture of the lens, irrespective of its focal length," somewhat staggering. The proposition is not a new one; I have demonstrated it at society meetings years ago; but I think it was first brought prominently before photographers by Mr. Dennis Taylor, the designer of the "Cooke" lens.

The definition of "depth of focus," associated in my "North Middlesex" lecture with the above proposition, was "Depth of focus is the power of defining at some distance from the focal plane, and the depth of focus of two lenses giving good definition is equal, if the images of nearer and farther planes *contain* equal definition in the two cases, so that if projected of equal size (in case the image is too small in one case for the detail to be made out by the unassisted eye), the definition in these out-of-focus planes shall be equal."

It *is* rather surprising that your somewhat sarcastic anonymous correspondent does not see that his two propositions, viz., that depth of focus is increased by the insertion of smaller diaphragms, and that the shorter the focus, the more depth is obtained, so far from being in opposition to the one he disputes, are directly in support of it.

It is generally known that depth of focus (intensity being assumed equal) increases with shortness of focus. What is not generally recognised is that the increase is so great as it actually is, so great, indeed, as is declared by the proposition, which has excited so much surprise.

W. E. Debenham.

P.S.—In the report of my lecture I see there is a mistake in the statement of the ratio for the shorter conjugate focus in the example given. It should read: Focus = 6 × ratio $(\frac{1}{3})$ = 2 + one focus more (6) = 8.

THE ACTION OF ELECTRIC CURRENTS IN PRINTING IMAGES.

To the Editors.

Gentlemen,—*Re* Mr. Friese-Greene's demonstration at the Croydon Camera Club, noticed in the Journal, p. 349, will you allow us to point out that Mr. Friese Greene, in the practical part of the lecture, wherein he uses a specially prepared paper, is infringing the patent rights which we hold for an instantaneous method of printing from metallic plates upon prepared paper by chemical decomposition. The specification of this was published in your issue of September 24, 1897. In his procedure the use of an electric current is a superflux, which can be succinctly demonstrated by damping a piece of paper with a solution of either silver nitrate, lead nitrate, copper chloride, mercury bichloride, or other salt of like nature, and pressing upon it a type or half-tone metal block; or a more available method, perhaps, would be to damp a piece of P.O.P. and bring this into contact with a metal relief, as, for instance, the capsule to be found upon a bottle of pyro. The results thus obtained will amply verify our claim that the electricity claimed by Mr. Friese-Greene to be essential for the formation of the print is fallacy. Apart from this the process is obviously the same as that made out in our specification. Therein we stated that relief blocks could be utilised, but we get our printing surfaces more readily, it not being necessary to proceed to the

etching of a relief, the resist being sufficient to prevent chemical contact between the metals under most circumstances.—We are, yours, &c.,

85, *Grove-road, Bow.* H. SOAR & J. W. COOPER.

THE CONVENTION OF 1899.

To the EDITORS.

GENTLEMEN,—From a paragraph in your last issue I see that the place of meeting for next year's Convention is unlikely to be determined by any invitation. In the event of none being given at the General Meeting, may I be allowed to suggest what appears to be in every way a very desirable locality for our yearly gathering—the English Lake District. So far as the Convention is concerned, the district, I believe, is entirely virgin ground. Good headquarters could be obtained at Keswick, Grasmere, Ambleside, Bowness, or Coniston, from any of which driving and boating excursions of every variety could be arranged. The scenery is unequalled, and varies from that of a wild, rocky, subalpine character to richly verdant woods and pastoral flats. As to the associations, the country is rich in memories of Wordsworth, Coleridge, De Quincey, and others, but especially the first-named, whose poems have hallowed many a spot around Grasmere.

It is quite possible that the co-operation of local photographic societies might be secured, but, with the assistance and advice of one or two gentlemen residing in the district, it would be no difficult matter to make all the necessary arrangements.—I am, yours, &c., PERCY LUND.

Bradford, May 25, 1898.

A GUM-BICHROMATE POSTAL CLUB.

To the EDITORS.

GENTLEMEN.—In view of (1) The vast possibilities and the great permanence of the gum processes—(2) The improvements, or variations, in procedure constantly ensuing—(3) The advantages which would accrue by scattered workers periodically comparing notes and results,—I am inviting those interested to submit their names for election to a *select* monthly postal club, limited to twenty members, which has for its object the familiarisation of knowledge respecting the production of gum-bichromate and allied prints.

Applicants for membership should possess a good average of artistic or technical ability, and should, *without delay*, forward me a print, together with 3*s.* 6*d.* (being one year's subscription); these will be returned in case of non-election.

Influential promises of support have been received from various amateurs, including Mr. A. Horsley Hinton, at whose prompting I am taking this step.—I am, yours, &c. HECTOR MACLEAN.

34, *Birdhurst-road, Croydon, May* 30, 1898.

STORE PRICES FOR CARBON ENLARGEMENTS.

To the EDITORS.

GENTLEMEN,—Your correspondent, "Grateful," does not say which Civil Service stores he refers to; but, according to the price-lists of the two most important, his information is altogether incorrect. At the Civil Service Supply Association a 12 × 10 carbon paper enlargement costs 35*s.*, or second quality, on opal only, 27*s.* 6*d.* The lowest price mentioned is 20*s.* for 10 × 8, second quality, on opal; and, moreover, these prices only apply to enlargements from the negative. If made from copies, one-third more is charged.

The Civil Service Co-operative give no details, simply stating that their prices are from 21*s.* upwards. I regret that I cannot give him any information with regard to other stores of which I am not

May 27, 1898. A MEMBER.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

John Patrick, 52, Comiston-road, Edinburgh.—*Photograph of Swanston Cottage, near Edinburgh. Photograph of front view of Carlyle House. Photograph of Carlyle's attic study. Photograph of Carlyle's statue on Thames Embankment.*

WANTA E.—Either that or Brunswick black, we should think.

G. P.—We believe Messrs. Marion, Soho-square, W., supply them.

G. E. WALES.—We are much obliged. We may have occasion to refer to the documents on a future occasion.

AJAX.—You must pardon us for pointing out that you did not read the notice through, otherwise you would have seen that the last seven lines give our personal experience of the developer. To that there is nothing that can advantageously be added.

BURNISHER.—P. R. O. F. The marks on the prints show that the bar of the burnisher is scratched, and badly too. This has arisen from careless usage. The only way to get rid of the scratches is to work them out on an oil stone, working the bar longitudinally on the stone.

H. W. JOHNSTONE.—We should say that a prosecution is your right course; but have you not taken legal advice in the matter? In matters of this kind a respectable solicitor should be immediately consulted.

DEVELOPER DISCOLOURED.—S. HOLMES. The trouble is most likely due to your being supplied with *sulphate* of soda instead of *sulphite*. The village chemist's is not the place we should select for purchasing sulphite of soda, or indeed, by choice, any other photographic chemical.

SHUTTER.—T. A. (Leeds). To take such subjects as you desire, sharply, a shutter working at the one-thirtieth of a second will suffice, and, with a lens the aperture of which is *f*-16, any of the extra-rapid plates will answer. It is against our rule to recommend any particular maker's plates; but all you mention are good, and will yield good results under the conditions just named if the light is tolerably good.

XYLONITE.—T. MASSEY. 1. Your experience is not at all phenomenal, and it is quite what was to be expected in drying negatives by alcohol in a xylonite dish. Xylonite, or celluloid, is soluble in spirit, hence it is not surprising that the dish became soft. These trays must also not be used for acetic acid, as the material is soluble in that. 2. Neither ebonite nor papier-mâché would behave in the same way with either spirit or acetic acid.

PATENT LAW.—B. W. R. says: "I have taken out a provincial protection for a new piece of apparatus, but I cannot afford to complete the patent. Now, as I have applied for the patent, and the provisional has been granted, can I affix the word patent to the apparatus. Several friends tell me I can, but one friend who professes to know says I can't?" —Neither can you. If you mark the thing "patent" when you have no patent for it, you infringe the law, and subject yourself to a heavy penalty.

DIAZOTYPE.—T. SCOTT. The primuline process has not, so far as we know, been largely practised, and we are not sure that the patent for it is still in force. Primuline may be had from Brook, Simpson & Spiller, Hackney Wick, but we think only in wholesale quantities. It may also be obtained from Hopkin & Williams, Cross-street, Hatton Garden. Messrs. Watson & Son were agents for the supply of all the necessary materials for working the process, but whether they are still we are unaware.

TRANSFER OF COPYRIGHT.—C. R. A. In purchasing the business and the copyright negatives you have not acquired the copyright in them unless that has been legally assigned to you in each individual negative and duly registered. Unless that has been done, we fear you have no redress against the pirate. Your predecessor, however, can prosecute and recover damages, as well as obtain an injunction. That he can do on your behalf, and possibly will. The pirate is quite right in saying you have no copyright in the pictures.

BICHROMATE POISONING.—SURGEON. The symptoms of your patient are very like those of the ill effect of bichromate, but we have some doubt in the matter, as we have never heard of any one being affected by only practising the gum bichromate a couple of dozen times or so. The best, and, so far as we know, the only, remedy is to discontinue the use of the bichromate, or to work in future in indiarubber gloves. Strong nitrate of mercury, sparsely applied to the affected parts, is said to be beneficial, and a lotion of alcohol, carbolic acid, and glycin will greatly allay the irritation.

REDUCING GELATINE PRINTS.—H. R. W. writes: "I see, in your issue of May 20, an answer to 'Reducer' stating that you are not aware of any method of reducing over-prints on P.O.P. without altering their tone. May I say that a solution of cyanide of potassium has done this very satisfactorily in my hands? I saw a strength of ten per cent. recommended some time ago, when it was said to alter the colour to black. I found it reduce too energetically, but without alteration of tone. A three per cent. or four per cent. answered perfectly when used after washing from the hypo; of course, another washing is necessary to finish with."

BROMIDE PAPER.—T. BETTS writes: "In contact printing on bromide paper I find great difficulty in hitting the right exposure, owing to the varying light at this time of the year; is it possible to time it better by using one of the actinometers recommended in carbon printing? At present, the percentage of under or over-exposed prints with me is very great." —Instead of trying any of the actinometers alluded to, we should recommend our correspondent to make the exposures to artificial light, and by preference to a Governor gas burner. Then, when the right exposure is arrived at for a given negative, any number of prints, with equal exposure, may be relied upon. We always make our bromide prints by artificial light for that reason.

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Contents.

	PAGE
EX CATHEDRÂ	369
METHYLATED SPIRIT AS A DEHYDRATER	370
HEADERETTES:— Vignettes and Vignetting — Another Limelight Accident — The Picture Season — Greenwich Observatory - More Arctic Expeditions — A False Report	371
DEPTH OF FOCUS. By W. B. Bolton	372
BEFORE THE CONVENTION	373
THE HAND CAMERA. By P. M. Macintyre	374
HINTS ON FILTERING. By G. E. Brown, F.I.C., F.C.S.	375
THE SPEED OF PLATES. By T. N. Armstrong	376
SOME POINTS OF INTEREST WITH REGARD TO APPRENTICES. By J. Pike	377
THE TRIPLE ANASTIGMAT	377
TRAQUE PROJECTION	377
ART AND LABOUR	378
PHOTOGRAPHIC SPECTRUM OF THE AURORA	378
PRISMATIC SPECTRA	379
EARLIER OPENING OF KEW GARDENS	379
OUR EDITORIAL TABLE:— The Yale Hand Camera — *Photography*—Protalbin Paper—Catalogue Received	379
NEWS AND NOTES	380
PATENT NEWS	381
MEETINGS OF SOCIETIES:— London and Provincial Photographic Association—Photographic Club — Woodford Photographic Society — Hastings and St. Leonards Photographic Society — Preston Scientific Society (Photographic Section)	381
CORRESPONDENCE:— Keeping Properties of Films—Mr. Debenham's Equations—Depth of Focus — Some Facts about Focus—Photogravure with the Ruled Screen — Photographing Interiors—Very Rapid Photography	382
ANSWERS TO CORRESPONDENTS	384

EX CATHEDRA.

THE Secretary of the Manchester Chamber of Commerce has issued the following circular relating to licences for working patents in the United Kingdom: "Until recently the British public has not been aware of the immeasurable loss sustained by the industries and trade of the United Kingdom in consequence of the unfortunate language of Section 22 of the Patents, Designs, and Trade Marks Act, 1883. The purpose of the section was to ensure the 'working' in this country of inventions for which the privilege of British registration has been granted, either by the patentee or by others. In order to secure this object, Section 22 confers upon the Board of Trade authority to order the granting of licences on equitable terms. Although the Act has been in force for fifteen years, this authority has never been used, because the prosecution of a petition for the exercise of such authority involves what is practically a very costly legal contest at the expense of the petitioner. Upon the invitation of the Board of Trade a petition has at last been carried through with the approval of this Chamber. The facts and issue of the prosecution of it are set forth in a pamphlet prepared by this Chamber, a copy of which is obtainable from Mr. E. Helm, 44, Mosley-street, Manchester."

In a recent number of *Comptes Rendus*, M. Jarry has the following note with reference to ammoniacal bromides of silver: When submitted to the action of liquefied ammonia gas, dry bromide of silver loses its yellow colour and is transformed into a white powder; the excess of liquid is evaporated off, keeping the temperature at $-30°$. If now the temperature be gradually raised, at about $+4°$, an abundant disengagement of ammonia is observed, though the powder still remains white; towards $+35°$ another disengagement of ammonia gas takes place, and this time the bromide returns to its original yellow colour.

* * *

We are pleased to learn that the Glasgow Corporation at its last meeting rescinded the resolution passed some weeks ago in which it declined to accord an official reception to the Photographic Convention of the United Kingdom in July next. According to a report that has been sent us, Mr. Shearer, seconded by Mr. Bilsland, moved the suspension of the standing orders for the purpose of reconsidering the decision at that meeting not to give an official reception to the Convention. Mr. Boyd moved, seconded by Mr. William Stevenson, that the decision be adhered to. The resolution was carried by thirty-four to twelve, and on the motion of Mr. Shearer, seconded by Mr. Primrose, it was remitted to the magistrates with power to make arrangements for an official reception. Mr. Shearer said there would be no expenditure in connexion with the reception. The magistrates would simply attend the meeting in their official capacity, and welcome the Convention to the city.

* * *

On the same subject Mr. John Stuart, the President, writes us: "I saw the senior magistrate to-day who was in the chair at the meeting yesterday, and he informs me that we are to be officially received at the Fine Art Institute on the Monday evening by the Lord Provost and magistrates. Bailie Murray (the above-mentioned magistrate) says that our friends, who proposed the motion to the Council yesterday, made a great mistake in committing the magistrates to no expenses, as we would otherwise have had quite a superior reception from them, for they think that we deserve it. He says they were quite inclined to do so something really handsome for us, but now it will just be an official reception. By the bye, I think it will be as well to point out that there is no danger of 'sea sickness' at our trip on the Thursday. The water will be

as calm and placid as a mill-pond on a good day, so that even those most susceptible to sickness will not be uncomfortable. You might mention this, as some ladies have a fear on this point. A friend of mine tells me that we are exceedingly fortunate this year, as there will be the biggest turn-out of new 'crack' yachts on that day that there has been for many years now."

* * *

We have received the prospectus of the Yorkshire Photographic Exhibition to be held under the auspices of the Yorkshire Affiliated Photographic Societies, with the co-operation of the Art Gallery Committee of the Bradford Corporation, at the City Art Gallery, Bradford, from November 15 to December 15, 1898. It is stated that the object of the Exhibition is purely artistic; only pictures will be shown which, in addition to good technical execution, possess a real artistic character in regard to choice of subject, lighting, and composition, whether of landscape, *genre*, portrait, &c. The Exhibition will be open to the public free of charge. All communications should be addressed to the Hon. Secretaries, Messrs. Ezra Clough and Frank Nicholson, 13, Chesham-street, Bradford.

* * *

Mr. H. Walter Barnett, the well-known Australian photographer, late of Sydney, N.S.W., one of whose fine studies of heads was medalled at the last Exhibition of the Royal Photographic Society, recently arrived in England for the purpose of practising photography. Six weeks ago he took the studio formerly in the occupation of Mr. John Edwards at 1, Park-side, Hyde Park Corner, and has promptly had the premises redecorated and refurnished in a tasteful and artistic style. Mr. Barnett's portrait work is fully up to the level of the best professional productions of this country, and he thus begins his British photographic career in the happiest circumstances; but, more than that, Mr. Barnett is an enthusiastic admirer of the "advanced" school of photography, in the progress and possibilities of which he has the greatest faith, so that we may contemplate his future with feelings of more than ordinary interest. For the present we welcome Mr. Barnett as one who is likely to add to the dignity and the prestige of British photography.

* * *

Mr. F. J. Shippey, of Shippey Bros., Limited, 13 & 14, King-street, Cheapside, London, E.C., has recently patented a process for photographing on china, and, with a view to introduce his invention to the British public, he proposes to supply 50,000 proof copies of the new "ceramic china" portraits of the late Mr. Gladstone. These photographs, the inventor states, will become a lasting memorial of the late statesman. By the electro-ceramic process, as it is termed, the photographs are transferred to china plaques and placed under a specially prepared "glassy glaze" and burnt in. We learn that a company will shortly be formed to develop the process in all its branches for the production of china photographs of the leading celebrities of the day, and to take copies of valuable paintings, &c., in miniature so that they can be used and applied to various decorative purposes. The special glaze, the firing in an electric furnace, and the adaptability of the process to colouring and gilding are the features chiefly claimed. Some of the results were submitted for our inspection, and they struck us as having the elements of popularity for dinner services, &c.

We are requested to announce that on Tuesday next, June 14, the President of the Royal Photographic Society, the Rt. Hon. the Earl of Crawford, K.T., will hold a reception of members of the Royal Photographic and Affiliated Societies at 8 p.m. at the Grafton Galleries, Grafton-street, Piccadilly, W.

METHYLATED SPIRIT AS A DEHYDRATER.

The employment of methylated spirit for the quick drying of negatives, &c., has been recommended in these columns for many years past, but, as far as we can learn, its use is by no means so common as the value of the method might lead one to expect, or as the opportunities or need for some agent to subserve the same purpose are frequent. This neglect of a most useful servant appears to be attributable to two main causes—the supposed expense that would be involved, and the old difficulty of the milky deposit between film and glass.

Taking this last fault first into consideration, we are prepared to admit that it is a very serious trouble, and as common as serious; just the sort of thing that usually presents itself when there is greatest need for dispatch. A print is required in hot haste; the negative is "spirited," and all goes on well till it is nearly dry, when the dreaded opalescence appears and all one's extra labour is lost. Let us here at the outset interpose a piece of information which we have reason to know will be new to great many, even experienced workers. The milkiness need only be temporary; of course, valuable time—on occasion the very essence of the value of the negative—is lost, but the plate need only be soaked in water for a short time and redried, when it becomes as transparent as ever.

As to the actual cause or nature of the peculiar appearance, a complete explanation is yet wanting. Our skilled *collaborateur*, Mr. W. B. Bolton, has shown in a recent article how it can be traced to the employment of spirit denaturised under the present excise system, the addition of a mineral oil in place of the older crude methyl acohol. Unfortunately, this is only one cause, for we have recently had before us a very glaring example of this "milk fog," if we may coin a new phrase, accompanied by the methylated spirit in which the plate had been soaked. The latter had been purchased as, and it undoubtedly was, the old kind, and was free from mineral oil. The cause of so apparently simple a disaster—for such, indeed, is often the only term applicable—ought not to remain in doubt, and we are at present arranging an investigation, by means of which we hope to read the riddle. As far as our present examination goes, the deposit appears to be amorphous. Is it a case of coagulation of a substratum, precipitation of dissolved matter, or, and this seems to us the most feasible explanation, a layer of air, or, rather, of extremely minute air vesicles, between film and glass? If it were a continuous layer of air, there would be no adhesion between film and glass, and the film would be readily detachable, but this condition has not occurred in our own practice. The question naturally arises, "If the milk fog be air in any form, how does it get into the particular spot?" It is easy to devise a theory, one too that seems to possess every element of probability. As is well known, all water, except such as has been very carefully treated by an expert chemist, contains a certain amount of dissolved air, which, under certain circumstances, it can be made to part with; thus the ebullition

of liquids by the application of heat is, in the main, the expulsion of dissolved air. Now, the time of all others when milk fog appears is when, owing to a desire to expedite the drying, the negative, apparently nearly dry, is gently warmed by placing it before a fire or even in a warm room in the sun's rays. Too frequently then the evil comes about. Then, again, the addition of alcohol to water always predisposes the mixture to give off air bubbles, and that heat is another determining factor, especially if alcohol be present, needs not to be pointed out. The bubbles could be carried off through the film in part, those driven in the opposite direction would be obstructed by the glass and, as it were, deposited in excessively minute spherules or vesicles. This explanation is favoured by a fact of observation which, though confined to so few instances so far, may yet be one of general application. The milk fog has presented itself more frequently in cases where the soaking in spirit has been hurried over, when, presumably, a large proportion of water remains in the film, but mixed with enough alcohol to cause it to readily give off the dissolved air, which would not be dissipated or separated if water only were present. The disappearance following the rewetting may be explained by the air being redissolved in fresh water. So far this is pure theorising; we intend, as we said, to put it to the test of experiment.

There are several practical considerations regarding the use of methylated spirit for the purposes we are describing which might usefully be brought under our readers' notice, and this we hope to do at no distant period.

Vignettes and Vignetting.—Comment has frequently been made on the want of taste displayed in the vignetting of ordinary photographic portraits. We are not here alluding to finished enlargements that are vignetted, as with them the same thing does not prevail—or, at least, to the same extent. With the "usual" portrait we have the regular pear-shape vignette and plain white margins, with sometimes an indication of a sketchy background. In most instances the extreme whiteness of the margins by contrast seriously impairs the high lights of the portrait, and the whites of the drapery, if there are any. We were recently shown some vignetted portraits, produced on the Continent, that were free from the defect here complained of, and they were very excellent; hence we call attention to the subject here, though it is by no means new. The portraits were of the cabinet and boudoir sizes, and were mostly full-lengths, sitting or standing, or, rather, they would have been full-lengths had they been printed fully out on those size papers. But they were softly and skilfully vignetted off, much after the style that the late Mr. T. R. Williams made his own, with his whole-plate vignettes. After the printing of the portraits in question was completed the picture had been covered up, and the margins tinted in by a brief exposure to light. So slight was this that, except by comparison, it might almost have passed for white paper. Yet the effect was very striking, as it threw up the lights of the portrait and light drapery in a very marked degree, as quite different from what they appear in the ordinary vignette portrait. The pictures were on albumenised, not highly albumenised, paper, and toned to rather a deep colour. We are quite aware that the idea of tinting the margins of vignettes is by no means new, yet we have never before seen it carried out so artistically as in this case; hence our allusion to the subject.

While on the subject of vignettes: in more than one article, on lessons of the late Exhibition at the Crystal Palace, we suggested that some old and obsolete styles might possibly now be revived with profit. Here is a style of vignette, introduced by the late Mr. O. Sarony, thirty or more years ago, and called, we think, the Richmond Vignette, as the hatching was somewhat after the style of the celebrated "Richmond heads." They were produced by double printing. The portrait was printed as an ordinary vignette, then a negative, which had been made from some suitably hatched lines on white paper, was laid on the print, and the lines lightly printed in. The effect was good, but it was scarcely suitable for the pictures then in vogue—*carte-de-visite*. If the same style were now worked, with the picture of the sizes now so general, it would, doubtless, meet with more commercial success than it did on its first introduction, particularly if the pictures were on a matt paper, such as the platinotype. Reference has just been made to much not being done with this style of picture on its first introduction. The same remark will apply to others, as it may be accounted for in this way. At the time they were first brought forward the *carte furore* was at its full, and photographers were then so overrun with work that they had little or no desire for fresh novelties, as the public were quite content with the "regular thing."

Another Limelight Accident.—While a promenade concert was being held in the cricket field, Cork, one day last week, an accident happened. The account given in the daily press is very vague; but, according to it, the grounds were illuminated by oxy-hydrogen lights, and "one of the apparatus exploded, and was driven several feet in the air, and the illuminating material flew about the place, burning all within reach." The report also says that some of the injured were badly "scalded" as well as burnt. Although the account, as first given, is vague enough, it is pretty clear that there was a bad accident, which might have been very much worse if it had happened in a crowded room instead of in a cricket field. Is this another case of the incautious use of an ether saturator? From the report it would almost seem so.

The Picture Season.—The picture season is now at its height, as will be seen by reference to the advertisements in the daily papers of exhibitions now open. The Continental cities are also holding their annual exhibitions. At Munich, for example, there are two international shows now on—one by the old Society, and the other by the new. For many years past an International Art Exhibition has been held annually in the Bavarian capital, which may be said to be a seat of art. At these Exhibitions medals were awarded, and our English R.A.'s and A.R.A.'s were not above competing for them, and frequently with success. A few years back, the new school of art, the Impressionists, took umbrage at something done by the old Society, and started a Society of its own, and now holds its annual show. This somewhat resembles what took place about the same time at the Royal Photographic Society when the "Salon" was started. The new Society at Munich does not call itself a "linked ring," however, but the "secessionists," and candidates advertise their show as the Secession Exhibition. We are told that there are in it many works after the style, except that they are in colour, and plenty of it, too, of some that have been shown in the Salon here. Some doubt is even said to exist as to whether some of them are really hung the right side up. In the old Society this year a change has been made. Hitherto, as just mentioned, medals have been given, but this year it has been decided not to give any. The Exhibition, however, does not seem to have suffered from this new regulation, as it is pronounced to be a most excellent one.

Greenwich Observatory.—Saturday last was Visitation Day at Greenwich Observatory. In the course of his annual report, Mr. Christie, the Astronomer Royal, informs us that there were forty-two days (as compared with six in the preceding year) on which the sun was wholly free from spots, and on a proportionately large number of days there was increased "poverty of the displays of spots." Magnetic observations showed small agitations, due to the running of trains on the South London Electric Railway, the nearest point of which is at a distance of four and a half miles from the observatory. These small effects do not seriously interfere with the magnetic or earth current registers. But the proposal (" which

has been successfully opposed") to use electricity for a tram line in the neighbourhood of Deptford Cattle Market, at a much less distance from the observatory, would, if carried out, have probably destroyed the value of the magnetic records. The new sunshine recorder, which has been in use since the beginning of 1897, gave for that year a total of 1543 hours of sunshine, as compared with 1575 hours at Kew Observatory, and 1279 at Bunhill-row. The mean temperature of the year was 50·3°, being 0·9° above the average of the past fifty years. The highest daily temperature in the shade was recorded on June 24, being 90·2°. It appears that we only had 1529 hours of bright sunshine out of the 4454 hours when the sun was above the horizon; and we had an average of 288 miles per day of wind, and a rainfall of 17·33 inches, being 7·21 inches below the fifty years' average. The number of rainy days was only 149. This is described as a very small annual rainfall. One failure of the Greenwich time signal only is recorded—namely, on January 14, 1898, when it was 0·5 of a second late.

More Arctic Expeditions.—If the North Pole is not eventually reached, it will not be for the want of effort on the part of explorers. Two fresh expeditions, both of American origin, are about to set forth. Lieutenant Peary will attempt to reach the Pole from North Greenland. The other expedition, which is under the direction of Mr. Walter Wellman, will make the attempt from Franz Josef Land, and he leaves shortly for Tromsoe to join his ice steamer, the *Frithyof*. The latter expedition has the support of a large number of influential Americans, including President McKinley. It is stated that one of the objects to be kept in view by the party is the finding, if possible, of Andrée, who, Mr. Wellman thinks, is likely to be in Franz Josef Land. Several scientists accompany this enterprise, and photography, it is proposed, is to be largely utilised to record the discoveries, if any, made. With the number of expeditions that have set forth to reach the Pole, one is inclined to wonder who, and of what nationality, will be the first to reach the goal, or if anybody ever will?

A False Report.—A fortnight ago we referred to a rumour that an Englishman, who was arrested while taking a photograph near some fortifications at Puerto Rico, and had for the offence been sentenced to nine years' imprisonment, had been shot. One account said, by accident from a shot fired at the Town Hall by the Americans; another, that he was more probably shot by the Spaniards. These different rumours, however, are no more contradictory than others we have heard since the commencement of hostilities, and probably shall hear in the future. In this case, however, it turns out that both accounts are equally wrong, for, according to a Reuter's Special Service Telegram, Mr. Halstead is still alive, and has been sent to a convict camp to undergo his sentence of nine years' imprisonment. As we said before, nine years' imprisonment for taking a photograph is a tolerably severe sentence.

DEPTH OF FOCUS.

I GATHER from Mr. W. E. Debenham's letter in last week's issue that, as I expected, his definition of the term depth of focus differs very materially from my own, and, I think, the generally accepted one. I am not sure that I quite understand exactly what his definition means, but it seems to me that Mr. Debenham claims that, with a given size of diaphragm, all lenses, regardless of focal length, give the same equality of definition to the same distance on either side of a given focal plane; or that if the images be enlarged or reduced to the same dimensions, the departure from absolute sharpness will be the same in either case.

If such be really Mr. Debenham's proposition, I must confess that I cannot, so far, by any process of calculation or of reasoning, arrive at anything like similarity of result; but if, on the other hand, it is intended to convey that, with the same-sized aperture, the image formed by the lens of shorter focal length of objects at any given distance will bear enlargement to the dimensions of that produced by any lens of longer focus, without passing the limit of want of sharpness represented by a disc of confusion of $\frac{1}{100}$ of an inch, then I think I am fully able to follow. But if this be the case, with all respect to Mr. Debenham, I would submit that the definition in that form is one that rather interests the optician or scientific student than the practical camera worker, who, over and above the simple principle involved in the definition quoted, wants to know, with any given lens and opening, how far from, or how near to, the camera he may venture to bring his subject without trespassing too far into the region of fuzziness. In other words, the information that a one-inch stop will give the same depth of focus with all lenses, in any given focal plane, is of less value to him than the knowledge of how to locate that focal plane, and here I think that Sir David Salomons' formula and method are of more practical value, and represent a truer definition of what depth of focus consists than the new plan.

I notice in reading over my article of last week, that I have been guilty of carelessness of expression in laying down the terms of Sir David Solomon's formula, for I find I have stated, "Multiply the square of the focal length by 100 and divide by the diameter of the stop." Clearly it should read "divide by the *intensity* of the stop," that is, that with an eight-inch lens and a one-inch stop, the division would be eight, and not one. With that slight correction I think the figures will pass.

But, as that method of calculation and the published tables are at present applied, it seems to me that the best result is not arrived at. For instance, taking the bare figures I quoted last week which, as I then stated, I adhered to for the sake of simplicity, we have, with a five-inch lens and one-inch stop, the distance of 500 inches, at and beyond which all objects will come within the degree of sharpness represented by the $\frac{1}{100}$ of an inch limit. But this assumes that the focus is fixed at "infinity," and that distant objects are perfectly sharp, the definition gradually falling off as the foreground is approached. Now, I think in practice these conditions would be about the most unsuitable one could choose, for not only is the extreme distance perhaps the one portion of the picture that least necessitates critical sharpness, but the range of depth is practically limited to one half of that really attainable, while foreground objects which should be the sharpest actually represent the poorest definition.

But, if, instead, the lens be fixed at its principal focus, we take the figures given in the tables, or arrived at by calculation, as representing the distance of objects that should be critically sharp, then we have a very different state of affairs, and, in fact, the widest range of equality of depth that is obtainable, since it ranges from infinity to half the distance of the objects in sharp focus. The mid distance of the picture, then, represents the sharpest part of the subject, the extreme distance and foreground showing the limits of diffusion.

By means of a simple diagram, such as I described last week, this can be made very plain, and, by calculation, it will be found that, if an object at 500 inches distance be selected for focussing purposes, or, what amounts to the same thing, if the camera be set at that distance by scale, the cone of rays will spread in both directions, and the limit of confusion will be reached at "infinity" on one side and at 250 feet on the other. Of course, it does not follow that this distance, 500 inches, is necessarily the best to select, for, as a matter of fact, for a great majority of snap-shot subjects, it would be altogether unsuitable. It is possible that, in general landscape work, that is, open landscape, the entire range from infinity to immediate foreground may be sometimes desirable, but I think, as a rule, even in landscape, it will be found better either to select a nearer point than that given in the tables as the point of critical sharpness, or, what is perhaps better, except where rapidity of exposure is essential, to use a smaller stop than that on which the calculation is based.

For instance, in the case of a five-inch lens let us adhere to the figures already given in connexion with a one-inch stop, and select 500 inches, or forty-one feet eight inches, as the distance of critical sharpness. If, instead of a one-inch stop, we then insert, say, *f*-8, the range of sharpness will be brought to within about twenty-six

feet of the camera, and correspondingly extended in the opposite direction.

But, of course, for close subjects, such as groups and studies of one kind and another, the circumstances are altogether altered, and there is probably no better practical method than actual focussing where it is possible. I question whether it is possible to compile any really useful tables for such purposes, unless, perhaps, it be for interior work, where it is an easy matter to measure accurately the range of objects it is desired to include, and then a simple calculation or the necessary "table" will at once indicate the point at which critical sharpness should be obtained in order to spread the definition as evenly as possible.

I have been trying to put in as simple a form as possible an easy rule for making such calculations, and when I have time to complete the arrangements shall most probably communicate it to these columns.

W. B. BOLTON.

BEFORE THE CONVENTION.

II. MESSRS. J. CRAIG ANNAN AND W. M. WARNEUKE, GLASGOW.

MR. J. CRAIG ANNAN, of the firm of Messrs. T. & R. Annan & Sons, 230, Sauchiehall-street, is one of the two Scottish members of the Linked Ring, and consequently our visit to his studio was tinged with not a little expectant curiosity. We could not forget his great success at the Salon, and perhaps it might be well, "right here," as the Yankees say, to take a look at his more prominent successes there. It has now almost become a truism that the visitor to the Salon will find an exhibit from Mr. Craig Annan that will astonish him, so much will it be different from previous works shown by the versatile Glasgow worker. Let us look for a moment at his more successful Salon pictures; we use the word *pictures* advisedly, for they are pictures produced by photography. At the first Salon show, in 1893, Mr. Craig Annan exhibited; his exhibits being mostly landscapes, but he had two figure studies, one, entitled *Crysanthemum*, being a little girl standing beside a big pot of these flowers, and *Reflections—Amsterdam*, a quay with beautiful reflections of the houses on the quay side; that part of the photograph representing the houses themselves was trimmed, so that only the first story of the houses was included in the picture, while the full reflection was seen in the water. This caused much criticism, favourable and otherwise; but next Salon showed several imitations. It was also at this Exhibition that *A Utrecht Pastoral* made its first appearance. Next year, 1894, that photograph of an old lady, *Janet Burnet*, caused quite a sensation, and paved the way for further triumphs. In 1895 *The Little Princess*, a picture that has never waned in popularity, made its appearance. Mr. Annan printed this picture through cloth (a fashion now popular), and thought he had made a great discovery, but he found that others had done likewise. 1896 saw the advent of *Eleanore*, that mystic and speaking picture, and *The Lady in White*, one of the pictures chosen for reproduction this year in the catalogue of the Crystal Palace Exhibition. *The Church and the World*, that picture round which has waged so much wordy warfare, also appeared this year. It is somewhat singular that this picture should be wrongly titled in the Crystal Palace Exhibition catalogue; we thought every one in the photographic world knew the difference between it and *Eleanore*. Last year Mr. Annan only sent three pictures, of which *All in a Garden Fair* was the most noticeable. This is a picture taken at Mr. Annan's home at Lenzie, and he has been singularly successful in portraying the contrasting shadow of the porch with the brilliant sunshine in the "garden fair." Most of Mr. Annan's landscapes are Continental scenes, taken during his tours on the "Coninong" with a hand camera, and enlarged. It may be mentioned in passing that Mr. Annan is partial to travel, and never loses an opportunity of a tour—when he gets it—but he finds the demands of business too pressing to allow as much travel as he would like. It is to be hoped that he will be able to carry out his projected tour this season, so that we may have some more of these delightful Dutch pictures adorning our exhibition walls.

But we started with Mr. Annan's studio, and the Salon has taken us away from our original starting-point; let us return. Entering by the usual lobby, at each side of which are cases containing the work of the firm (including some beautiful miniatures on celluloid), we reach a miniature hall, the walls of which show quite a number of framed photographs; just beyond, we catch a glimpse of one of the offices. Mr. Annan very seldom competes for medals, but in a case here we see a tidy little collection of these trophies, mostly commemorative, including a goodly show gained at last year's Glasgow International. Ascending a staircase, we reach the reception and show-room. This room is a veritable exhibition, but this might be said about the whole building; here, there, and everywhere masterpieces greet us on the walls. We are struck with the singular success displayed in the framing of the photographs, but then Mr. Annan takes a special pride in this, and many of his frames have been specially designed for him by Mr. George Walton, the decorator, whose work at the recent Eastman Exhibition caused such a *furore* in London. Messrs. Annan have made a speciality of autotype (carbon) reproductions of famous pictures, and have now accumulated an extensive collection of these. It is mostly these copies that are displayed in the reception-room, and we were much surprised to find Mr. Craig Annan's own works conspicuous by their absence; was this absence due to the innate modesty of the worker? The studio is delightfully plain, with a startling absence of the conventional backgrounds; two or three plain backgrounds and a screen of grey velvet comprise the stock in trade. Two cabinets of antique design are part of the studio furniture and form artistic settings in some of his photographs. An artistic friend, wishing to compliment the photographer on the cleanliness and tidiness of his studio, said it reminded him of a milk house; the compliment requires a little thought to be appreciated, but it is undoubtedly a clever and original one. We asked Mr. Annan what particular branch of photography his inclinations led him to; he hesitated, but ultimately thought it was figure studies; this answer quite coincided with the opinion we had previously formed, because a careful observer will note that in most of Mr. Craig Annan's pictures, figures form the *motif*, look even at the group in *On a Dutch Shore* or the figures in *A Lombardy Pastoral*—but we were describing the studio, &c. The dark room, printing rooms, &c., are adjacent to the studio, but the majority of the printing is done at the firm's works at Lenzie. In the top flat we were shown an interesting part of the business, viz., photogravure printing; this has become a speciality of the firm, and during our visit they were printing a large edition of copies of Orchardson's *The Farmer's Daughter*; this was to be used as a frontispiece for one of our popular monthlies. The work is very fine, and the lightness of touch and dexterity of the workmen was amazing. We thought printing a large edition would be a little tedious to the workmen, but Mr. Annan informed us that they preferred to work a big edition. The retouching on the photogravure necessitates a fine discrimination in the use of the graver, &c., and we were not astonished to find that the most of it was done by Mr. Craig Annan himself. Photogravure also brings to the firm a large trade in the better class of Christmas cards, the trade for which commences about January for the following Christmas. A number of books, illustrated by photogravure, have been published by the firm, including *Glasgow University, Old and New*; *George Paul Chalmers, and the Art of his Time*; *Roman Stones in the Hunterian Museum*; *Atlas of Head Sections*; *Rev. John Thomson, Duddingstone*; *Art Club Book* (1885), &c. They have also printed a portfolio, entitled *Venice and Lombardy*, of eleven photogravures, by Mr. J. Craig Annan; this is a beautiful work, the small photogravures on Japanese paper being exceptionally pretty.

Personally Mr. Annan is of a suave and obliging disposition, and advantage is taken of this quality to enlist his services as Judge at an increasing number of exhibitions. He has had no set training at any of the art schools, but an innate artistic tendency, and a personal, intimate acquaintance with the Glasgow artists has evolved a knowledge of art that has proved invaluable to him in his profession. His artistic tastes are catholic, and he declines to be bound by any school; still, insensibly it may be, the Glasgow school (an undoubted factor now in the art world) has unmistakably exercised an influence on his work. The special feature of the Glasgow school is "breadth," and this breadth of treatment is noticeable in all Mr. Craig Annan's pictures. We look for some noteworthy sayings from him in his Convention lecture on "Art as Represented in Photography," as, although not obtrusive, he has some very decided opinions of his own.

Mr. W. M. Warneuke, 153, Sauchielhall-street, had, unfortunately for us, been unable to return and meet us, but an assistant very courteously showed us over the premises. Those who remember that striking figure study—

> "*Oft roaming highest hill-top*
> *I scan the ocean, thy sail to see*"—

which Mr. Warneuke exhibited at the Royal Photographic Society's Exhibition in 1895, would naturally expect that the specimens displayed would betoken good work, and in this they would not be disappointed. The studio is well lighted and well furnished with the various studio accessories, betokening a fashionable trade. The prevailing colour of the studio is a pleasing shade of green. At one end a smaller studio, with a stronger lighting, branches off. This is principally used for children, an important part of Mr. Warneuke's business. All the workrooms adjoin the studios, the dark room being immediately adjacent to them. There are enlarging and printing rooms, Mr. Warneuke's private room, carbon-room, retouching-room, and in another room a considerable number of workers are busily engaged in black-and-white work, &c. Electric light is used, but it is evident that daylight is preferred. Mr. Warneuke is not what could be called a prolific exhibitor, but the few pictures he has exhibited have been singularly successful. His work will generally be found at the Royal Photographic Society's Exhibition, where the critic usually gives it more than a passing notice.

Mr. Warneuke's work and studio deserve a fuller notice, but, owing to his absence, our visit was a brief one. Visitors to the Convention will have the privilege of a closer acquaintance with him there, as his duties on the Introduction Committee will bring him closely in touch with the several members of the Convention.

THE HAND CAMERA.

[*Transactions of the Edinburgh Photographic Society.*]

HOWEVER much the extra-superior photographer may talk about his art methods, it is well known to all that the real artist, in the current acceptation of the term, has no great opinion of so-called photographic art. But, if ever this unfriendly and unsympathetic attitude gets broken down—and it is being broken down now—it will be done by the hand camera, and not by the stand camera. The mere servile copying of nature may not be art, but art must always be based on nature, and referable back to nature; and the respects in which nature is itself most artistic, or at least most suggestive to the artist, are just under conditions which can be constantly caught by the watchful hand-camera worker, but which, in nine cases out of ten, would be lost by the stand-camera worker. In what respects does nature supply most material for the artist? Is it not in the constantly varying effects of light and shade; in the fleeting influences of cloud shadows and gleams of sunshine upon wide moor, rugged mountain, or watery expanse; in the influences of the passing breeze upon the waving verdure of the land, or upon the sensitive surface of lake or sea; in pose and expression of man or animal; and last, but not least, in the ever-changing form and lighting of cloudland? What would the artist be without the aid that nature gives him here, and how fleeting it all is? How helpless in face of it all is the over-burdened but self-satisfied stand-camera worker, with his wonderful paraphernalia of hinged baseboard, expanding bellows, focussing screen, double dark slide, focussing cloth, and unmanageable tripod stand. At an odd time he may catch a good subject, by waiting patiently for an hour or so, although even then the effect he does get is not the one for which he set up his camera, but only something approximating to it. The original effect had vanished before he had the tripod legs opened out and the camera levelled. But, while the stand-camera worker has thus been losing one effect and waiting for another, the hand-camera worker has been quietly and comfortably securing half-a-dozen artistic effects which are of enduring value. The hand-camera worker may keep his soul in patience, and let the stand-camera man air his superior criticisms, for, in the regions of real artistic effect, and in the sphere of true human interest and intelligent observation, the hand camera will reign supreme when the stand camera has become a mere piece of quaint lumber and the stand-camera worker a mere antiquarian fossil.

With reference to this theory as to the limitations of the hand camera, I shall show on the screen at the close of this paper a classified series of slides from hand-camera negatives, illustrating the following classes of subjects: Cloud and sky effects, wave studies, seascapes and shipping, landscapes, figure studies, architecture, mountaineering, and interiors. The special points in connexion with these slides will be spoken of as they are shown on the screen; but, assuming for the present that they are tolerably presentable representations of their respective subjects, I claim for such a range of subjects that it supports and justifies the contention that the hand camera, properly and intelligently used, can do *almost* all that the stand camera can do, and can, in addition, do a number of things practically excluded from the suitable range of stand-camera work. The corollary from this is that the hand camera is the most useful and instructive all-round instrument of the two.

Setting aside any question as to the mere technical quality of the actual slides to be shown, they may be subjected to two leading criticisms by the exclusively superior exponent of the modern school of photography. It may be said of the bulk of them, first, that they are purely topographical in character; and, secondly, that they do not possess artistic qualities. These two criticisms are really intended to mean the same thing in the long run, but they state it in a slightly different form, and I should therefore like to say a word or two about them at this stage.

When a disciple of the modern school of photography wants to be particularly scathing and crushing with regard to any kind of photographic work but his own, he thinks that he has finally disposed of it, and ruled it out of all civilised society, by dubbing it topographical. I was almost beginning to stand in awe of this term myself, until I got to realise that it simply means "descriptive of a place." The distinction, therefore, between hand-camera work which is topographical, and stand-camera work which is artistic, is that the former is recognisable as being like a particular place, while the latter is like no place in particular. To put the matter in plain English, this topographical character of hand-camera work means that the picture is fairly sharply focussed, supplies a good deal of detail, and shows particular places, and persons, and subjects as they appear in ordinary daylight, and to the average eye. The fact of the matter is that this topographical photographic work, due in great measure to the hand camera, has done more to disseminate among mankind an accurate and intelligent idea of the world we live in, its scenery, human inhabitants, animals, manners and customs, &c., than any other single agency, and by means of illustrated books and illustrated lantern lectures has conveyed both instruction and pleasure to hundreds for every one who has derived either pleasure or instruction from the contemplation of artistic photography. It is the hand camera which we have to thank in great measure for the most of this pleasurable instruction.

The second probable criticism is that the work turned out by the hand camera is not artistic. Now, in this particular case, we are not expected to go to a dictionary for a definition of the term. The definition is simply this: Everything that is turned out by the modern school of photography is artistic; everything turned out by any other school of photography is inartistic. Finally, a picture, to belong to the modern school of photography, must be fuzzy, either by being taken with the lens out of focus, or by being printed on paper as rough as an unrolled macadamised road. And why does this sort of thing become entitled to be designated artistic, and it alone? Because it is said that it shows the individuality of the worker, while all else is a mere mechanical reproduction of nature, and apparently there is hardly anything, except, perhaps, a topographical photograph, of which a disciple of the modern school of photography has so poor an opinion as of nature.

The despised hand-camera worker is content to go forth for a day's outing, or a holiday tour, and to bring back photographic records which will afford pleasure and information both to himself and a wide circle of friends by recalling the actual character of the places he has visited. The art photographer goes moping around, considering every phase and feature of nature under reference to the question whether it will afford him scope for showing his individuality by producing "an impressionist interpretation of nature," and turning out a medal picture for an exhibition, as if the be-all and end-all of photographic work is to figure at exhibitions and compete for medals. If, at the cost of some trouble, I focus a subject sharply, and produce a photographic representation evidently like the place, I am a mere mechanic. If, with very little trouble, I take the same subject out of focus, and produce something so blurred and indefinite that it could one day be shown as *A View on the Clyde*, and next day as *An Italian Lake*, I show individuality, and am an art photographer If, after taking a sharply focussed negative, I make a print from it in the ordinary way, I am again a mere mechanic. If I adopt the simple subterfuge of turning the negative film side outwards in the printing frame, so as to have the thickness of the glass between the film and the paper, with the result of producing a fuzzy print, I again show individuality in my work, and am an art photographer. If I take advantage of the skill of an optician, and by the aid of eyeglasses see surrounding nature clearly and recognisably, I am thereby depriving myself of all artistic sensations. If I discard my eyeglasses, and fall back on my natural short-sightedness, so that in looking across a field where an animal is browsing I am unable to tell whether it is a long-horned cow or a long-eared donkey, I am then experiencing the elevating delight of the artistic observer, because I am then looking at the mere arrangement of masses of light and shade, instead of at obtrusive details, and am having the harshness of nature softened and subdued by a blurred focus. The fact of the matter is that the fully developed devotee of the so-called artistic photography can talk more nonsense in a week than an ordinary individual can work out in practice in a month.

If we are to take the "modern school of photography" as an infallible guide, there are only two conditions under which nature has any beauty—either when seen through a mist (reproduced photographically by a blurred focus), or in the gloom of evening (reproduced photographically by an under-exposed negative and an over-exposed print). By these means a few workers produce some effects which are admittedly artistic and beautiful, and every one else as well as themselves rushes to the conclusion that nothing but these few phases of nature is either beautiful or artistic. As long as these workers are in an atmosphere of mist or gloom, they are entirely happy. The last thing they seem to desire is the open light of a clear day. The hand-camera worker, who blesses the clear daylight, is almost apt to become suspicious of this other class of workers, and to repeat to himself the Biblical text, "This is the condemnation, that light has come into the world, and men loved darkness rather than light because their deeds were evil." We are all familiar with the superior airs assumed by the producers of this kind of work, and know how much they are inclined to lord it over their more humble colleagues, by surrounding themselves with the awe-inspiring glory of such terms as "artistic feeling" or "impressionism." But, when we screw up our courage to analyse it all in a critical and prosaic spirit, we find that a great deal of it is really little more than a high grade of "trick photography." The modern artistic photographer may be quite entitled to *ex*press and *im*press his opinion that a certain style of photography is not art, but he is not entitled to insist dogmatically and superciliously that the exact converse is necessarily true, and that what is not art is not photography, no matter what may be its technical excellence and skill. In the hands of a few carefully trained, conscientious and persevering workers, the attempt to secure artistic effect often produces results beautiful of their kind, although very limited in their range of expression. This has the twofold danger and disadvantage, first, of tending to blind the particular class of worker to anything beautiful in nature except the few special phases which he affects for photographic purposes; and, secondly, it tends to encourage in less carefully trained or less conscientious photographic workers a lack of exactitude, and the idea that slipshoddedness and artistic expression are synonymous terms; just as in the case of the fearful and wonderful "Glasgow School of Painting," which, in the hands of a few skilled and carefully trained artists, turns out some clever and striking work, but which, in a great many cases, is simply used as a cloak to cover a lot of slovenly work, poor composition, and very bad drawing. It is a kind of epidemic which will run its course

sooner or later, and in the mean time, in the sphere of photography, the preservation of the theory and practice of a more rational method will be guaranteed by the non-artistic but useful and thoroughly sane hand camera and its user.

P. M. Macintyre.

HINTS ON FILTERING.

Filtration is so often a necessary operation in photographic work that a few notes on how it may be best and most expeditiously effected will, no doubt, prove useful. Paper is the material most usually employed for filtering moderate quantities of liquids, and special paper of many varieties is manufactured for the purpose, the principal brands being Swedish (used chiefly in delicate analytical work), Rhenish, French, and English; the last two qualities are of a much coarser character. In selecting a paper several points have to be borne in mind. The paper must be fairly strong if it has to support a large volume of solution; it must be free from holes, which would allow suspended matter to pass, and it must permit the rapid passage of the liquid. One can hardly hope to obtain one paper uniting these qualities in a high degree, but, for the kind of work a photographer is likely to meet with, the following papers can be recommended. For filters up to about nine inches in diameter the Rhenish paper, No. 597, made by Schleicher & Schüll, is excellent, filtering quickly and being fairly stout. For larger sizes the French stout papers do well, and are cheaper. These papers can be obtained at any chemical apparatus dealer's, such as Griffin, Garrick-street, W.C., or Baird & Tatlock, Hatton-garden. E C. They are sold in sheets measuring about 24¾ × 24¾ inches, or in packets containing 100 circular cut papers. Unless all sizes (and a good many of the smallest) are to be cut up out of the sheets, it will be found considerably cheaper to purchase the papers ready cut.

The sizes and prices of the above two brands of papers are as follows:—

Schleicher & Schüll's No. 597.

Diameter	3½	4½	5	5⅞	7¼	9½	10⅝
Price per 100	7*d.*	10*d.*	10*d.*	1*s.*	1*s.* 4*d.*	2*s.* 1*d.*	2*s.* 9*d.*

French Grey.

Diameter	6	7½	9½	13	15½	17½	19½
Price per 100	8*d.*	10*d.*	1*s.*	1*s.* 6*d.*	2*s.*	2*s.* 3*d.*	2*s.* 6*d.*

Paper filters are almost always supported on glass, stoneware, or porcelain funnels. If the reader has consulted a text-book of practical chemistry, he will have noticed that it is strongly insisted that the angle of the funnel should be 60°. This is certainly the case for many operations in chemical analysis where a well-fitting paper and funnel are necessary to avoid loss, but for ordinary work, in which rapidity is the most urgent end, this point is not important. Ribbed funnels are best, and a spiral direction of the ribs is better than a vertical; the deeper the ribbing the better. A good funnel in this respect for quick filtering is Hehner & Richmond's, sold in two sizes, measuring two and three-quarters and four and a quarter inches in diameter respectively. With regard to the size of the stem, general experience teaches that for large funnels (seven inches diameter and upwards) the size of the stem is unimportant within moderate limits, a broad stem filtering as well as a narrow, but for small funnels a narrow stem filters much quicker than a wide one if the paper is fitted properly. A narrow stem fills up much more rapidly when the liquid is poured on to the filter, an advantage, inasmuch as a full stem means increased speed of filtration.

The way in which the paper is fitted into the funnel has a very great deal to do with the rate of filtration. This applies particularly to small funnels. First fold the circular paper into two, and then again into four, making the last crease lightly. Insert the paper into the *dry* funnel, and, gently placing the finger in the front of the filter, see what amount of play is possible. If the funnel has an angle of 60°, there will be practically no room for the point of the filter to "waggle" to and fro. The best results are obtained if the filter be folded so that the point can have about a quarter of an inch play in the point of the funnel. If the first folding does not give this, try again, laying down one edge of the semicircular paper a little short of the other, and opening out the filter to form either a cone of angle greater or less than 60°, as required. Next place in the funnel, and press down the threefold side of filter, so that the single thickness of paper is pushed against the glass on the opposite side, and the point of the filter turned away from the threefold side. Now, holding the funnel in the hand, single paper lowermost, pour water into the film on the single side. Bring into the vertical position, and, taking hold of the two sides of the filter at the points where the single and treble thicknesses meet, slightly lift up the paper in the funnel. The stem will at once fill with water, and filtration will take place very rapidly, and, unless there is a precipitate in the liquid which chokes up the paper, will so continue. When first pouring the liquid on the paper, do not fill the filter, or the weight of liquid will force the paper lightly into the funnel, with consequent slower filtration. The best result is obtained by keeping the filter about half full. Although this simple procedure takes some time to describe, it is the work of only a few seconds when fitting a paper into its funnel. For filtering as rapidly as possible with large filters a good many devices are used. The writer will describe the simplest and most practical of these. The less adhesion there is between a paper and its supporting funnel the more rapidly filtration will proceed. A piece of muslin, folded with the paper so that it comes between the latter and the glass, greatly helps filtration besides supporting the paper. A cone of coarse hair cloth fitted to the point of the filter answers even better. In cases where any substance has to be filtered which chokes up the paper, a piece of hair cloth or coarse flannel fitted inside the filter will retain the greater part of this, and will allow the liquid to pass rapidly through the paper. Another good plan is to fold the filters into "star" or "plait" form. This is done as follows: Fold the paper into a semicircle, next fold this semicircle into two quadrants, divide each of these quadrants into two by bringing up the edge of each side to the central mark and creasing. The semicircle is at this stage divided into four sections. We require to divide each of these into two. Bring right-hand edge upon crease in centre of left-hand quadrant and crease; bring left-hand edge upon crease in centre of right-hand quadrant. Next bisect the two outside sections by bringing outside edge upon the crease next to each. This divides up the semicircle into eight equal sections. All the creases must have been made in the same direction. Now turn the semicircle over, and bisect each sector (one-eighth of a semicircle) by a crease made in the opposite direction to those of the first series. This completes the folding to be done. Strengthen the creases by running them between the thumb and finger, open out the filter, and place in funnel. One word of caution: Do not let the creases meet exactly in the centre of the paper, or the excessive creasing will very likely rupture it at this point. Hence, direct the creases around the centre of the paper and gradually soften off the crease as this central point is neared. The writer is afraid that this description may appear somewhat complicated, but try one or two filters, and the process once mastered will repay you for the trouble in rapidity of filtration.

Another simple dodge is to bend three glass rods (each the length of the sides of the funnel) into a hook at one end. These, hung at three points around the funnel, will keep the paper from too close contact with the glass. A more elaborate means of increasing the rate of filtration is by the use of one of the many forms of filter pump, whereby the pressure in the vessel into which filtration takes place is reduced. In the writer's opinion, this is not likely to be as useful to the photographer as the simpler methods referred to above. Filter pumps of many patterns are made in glass, or, in a few forms, in brass. A good and cheap pump is Geissler's, which costs only eighteenpence. This is fixed to the nozzle of the water tap with a piece of stout rubber tube (water tubing, not gas tubing) each end of which must be wired on. The side tube of the pump is connected by a piece of stout walled tubing to the flask or bottle which is to receive the filtrate. The connexion is made by a bung or cork fixed into the neck of the bottle and pierced with two holes, through one of which a glass tube is pushed and the rubber tube from the pump slipped over it, whilst the stem of the funnel occupies the other. Papers which are used in conjunction with a pump require support, or rupture will be not infrequent. A piece of muslin or calico folded around the cone of the papers answers well. Another neater method is to dip the cone of the paper into strong nitric acid, and to then well wash with water. The nitric acid parchmentises the paper, but the process does not render it impervious to water, as is the case with paper parchmentised with sulphuric acid. One of the best forms of funnel for use with a filter pump is Hirsch's (obtainable from chemical dealers). This consists of a perforated plate, supported by a specially shaped funnel. A piece of paper, muslin, or other filtering medium, is laid on the plate, and, on the pressure being reduced below, is kept securely in place.

When filtering large volumes of solutions it is a great convenience to ensure constant filtration without the trouble of continually filling up the filter. Two methods by which this can be easily done may be mentioned. The first is due to E. E. Robinson. The liquid to be filtered is placed in a bottle on a shelf, above the level of the filter. A syphon is placed in it, and to the longer leg of the syphon a short piece of rubber tube is attached, the length of which is so adjusted that the end of the tube is a short distance (about half an inch) above the level of the liquid in the funnel when the latter is nearly full. In the end of this rubber tube a small conical float works, being loaded with two or three small shots so that it moves steadily. The syphon having been started, the float is held loosely in the mouth of the rubber tube until the liquid rises sufficiently high to buoy it up; then, as the liquid rises higher, the float wedges in the rubber tube and stops the flow of liquid. As soon, however, as the level of the liquid falls, owing to the passage of the same through the filter, the float falls and admits the liquid again to the funnel. Once started, this arrangement goes on without attention. The second method which, like many excellent things in chemical manipulation, hails from the other side of the Atlantic, requires the use of a filter pump. A funnel is provided with a perforated plate over which the filtering medium (paper, &c.) is laid. This funnel is fitted into a flask, the interior of which is connected with the filter pump. The rim of the funnel is ground flat and has cemented to it a flat, fairly thick (quarter-inch) ring of soft rubber. A second funnel—rim also ground flat—is pressed down on the upper surface of the ring, the stem of the funnel being, of course, uppermost. By means of a piece of rubber or glass tube

the stem is connected with the liquid which it is desired to filter. On suction being applied at the pump the liquid is drawn out of its containing vessel, and continually passes through the filter. A neat and efficient device for automatic filtration will, no doubt, prove useful to photographers who have to draw their water supply from a tank or cistern, which is liable to be contaminated with suspended matter, a fruitful source of spots, &c., in toning operations. The filter is made very simply as follows: A wide glass tube is closed at one end with a cork through which passes a narrower glass tube (about three-eighths in diameter) which is bent twice at right angles so as to form a syphon with a long leg. The wide tube—on a small scale a lamp chimney answers well—is packed with a piece of clean sponge next the cork, then with absorbent cotton, and again with a piece of sponge. It can be easily taken to pieces and cleaned. Other media which are occasionally useful for filtering are muslin, calico, swan's-down, flannel, &c. For filtering the precipitate of ferric hydroxide obtained in the preparation of ferric oxalate, a filter of coarse flannel is very suitable. Such filters are best not supported on a funnel, but, a semicircular piece having been cut out, a conical bag is formed by sewing the two half-lengths of the diameter together. This bag is then stitched to a ring of cane or stout wire.

G. E. Brown, F.I.C., F.C.S.

THE SPEED OF PLATES.

To a beginner, as well as any one who for the time being is not just in touch with the exposing of sensitive plates, and whose experience of photography may be confined to its practice some years ago, no doubt there must necessarily be more or less difficulty connected with the arriving at a proper estimation of the speeds of the various plates now placed upon the market, both in this country as well as on the Continents of Europe and America.

In the earlier days of the modern dry plate there was less difficulty than at the present time in this matter, simply because there were not so many different brands of plates upon the market, nor so many varying grades of rapidities manufactured by the makers, and for all practical purposes the indications of speed the makers at that time gave led to a fairly correct estimate being formed of the rapidities of the emulsion used in the coating of their plates.

One of the methods in earlier days was the Warnerke sensitomer system and of which Messrs. Wratten & Wainwright continue to make to use in their standard and universally known as nineteen sensitomer plate; likewise, that employed by the Paget Company, who adopted the simple distinction of labelling their plates as XXX in the case of their slower plate, and XXXXX for their fastest make; and, so long as one or other of these methods was virtually all an operator or beginner had to contend with, but little difficulty in forming a correct estimate of the speed of the plates he was employing was experienced.

At present, however, quite a different state of matters exists and, instead of at the outset there being, say, about a round dozen of firms making plates for the public markets, we have now this quantity increased at least tenfold, with, in but a very few instances, anything like a correct guide being given whereby a novice or any one out of practice may form an idea of the relative speed of any two brands of plate, which, for example, we may take, in the one case, labelled ordinary, and, in the other, rapid.

Then, again, take the case of an old hand, even possessed of a fair amount of past experience in photography, but who has been out of practice for, say, half a dozen years or so, but has again made up his mind to expose a few plates. In his case there is a great liability for errors being made, simply through there being no standard of speed whereby he is able to compare what is a rapid or extra-rapid plate of the present day with the speed of, say, such a plate as Wratten's nineteen sensitometer or Paget's XXX; for what is now termed a rapid plate is, in reality, a very much faster plate than a rapid plate of eight or ten years ago.

This difficulty, again, is intensified in another way, for example, the more modern system of testing the speed of plates by the Hurter & Driffield System (a method entirely unknown in the early days of the dry plate), and any one not just in touch with photography for several years is very much at sea to know the actual meaning of the speed numbers which several of our makers who have adopted his system attach to their plates, and any one asking a salesman in a photographic store, or dealer for that matter, for guidance in this respect is almost sure to meet in with a reply far from satisfactory, or at least such as assists but little in his arriving at a tolerably correct estimate of the very great difference there is between a batch of plates labelled, say, 320 Hurter & Driffield of the present day, and the nineteen or twenty-five sensitometer-plate of a few years ago.

No doubt much of this difficulty has arisen through the action of plate-makers themselves adopting different systems of labelling their boxes whereby the public may be able to form an idea of their different speeds. Were there only one method, and such based upon a standard of speed agreed upon by a convention of delegates from all our leading photographic societies, and plate-makers, and professional makers, there is no doubt a very great boon would be conferred to photographers generally.

In other matters of less importance, such as the adoption of a standard system of diaphragms or apertures, such a step has been followed by marked success, and there would appear to be no reasonable ground for such a standard not being agreed upon in the matter of the plates so essential to a proper practice of photography; for what is the use of a standard rule of lens, apertures where so much error or misguiding is rampant in the chief esssential with an operator in photography.

We are about to have a have a meeting of the Photographic Convention of the United Kingdom in Glasgow; and this would surely form a fitting occasion for such an important matter as the adoption of a universal standard being arrived at in the matter of labelling the speed of our plates.

It would perhaps be too much to expect such an important step being promulgated and carried through to a successful issue at the forthcoming meeting, but it certainly is a subject that well deserves being prominently brought before the Convention for discussion with the view of the appointment of some committee which might be able thrash the matter out, and place forward some valuable suggestions before the 1899 Convention and at which a definite result might be arrived at.

It is not the writer's desire or intention at this stage to offer any suggestion as to what at present or would in the future be probably the most acceptable system to adopt as fixing the standard whereby any plate may be estimated in regard to speed; he would merely in the mean time point out the need for such a standard being introduced, and to which all plate-makers should be asked to conform. As matters stand at present, there is a great desire that something should be done in this direction, whereby a pupil may be able to see at a glance what the speed of any batch of plates relatively bears to that of another.

Some of our leading makers have for a long time recognised the importance of such being done, and have endeavoured to carry out a system of their own, or at least in respect to the plates they make; but this does not go far enough, for what is wanted is the adoption of some system that would be applicable to every plate placed upon the market.

In respect to the plate-makers of the United Kingdom, there should be no difficulty in getting their consent to the adoption of one simple standard.

As matters stand, nearly all our leading makers manufacture from three to five different degrees of rapidities, and, although in one or two instances special claim is made for a certain plate being the fastest on the market, it may be generally taken that each of these makers produces a very fast plate, a medium and a slower one, and between which any two of the fastest there is really very little to choose between on the score of rapidity; for it is well known that the fastest plate is not the sole factor that weighs with professionals for all-round working; therefore the claim for being the maker of the fastest plate on the market need not enter into the matter at all, for the plate in one case labelled special rapid may in reality be quite as sensitive as one labelled, say, 320 to 350 Hurter & Driffield (and, for that matter, very probably is just as fast), but what is wanted is some distinctive method, whereby the public know that such an expression as special rapid means something definite, whatever that may be.

Then, again, the Hurter & Driffield system, as applied to plates at the present day, shows no indication of the speed standard adopted in the earlier days of the dry plate. If the general public even had some idea of the differences that exist between a plate of nineteen sensitometer speed as arrived at by the Warnerke system, and which was in use for so many years, as against what is now termed, say, a plate of about 300 Hurter & Driffield system, there might be some guide to the wide difference in rapidities that exists, but no such guide is forthcoming on the various boxes.

No doubt there is a similarity to a great extent in the speeds of many of the brands now on the market; but there are no simple means whereby a novice or any one slightly out of practice can ascertain such similarity. True, one or two specially prepared tables connected with mechanical contrivances for the arriving at an approximately correct exposure of plates do profess to give relative speeds of the different makes of plates, but these little aids are not in the hands of every one, and among professionals generally there is a prejudice more or less against actinometers of every description, most, if indeed not all, of which are based upon the gauging of the light's intensity by means of a sensitive spot of paper, assuming the exact tint of the actinometer by means of daylight, a method first brought into practical use, if we mistake not, by Mr. Hugh Reid, of Glasgow, who many years ago invariably tested the value of the light at command by means of a rapid series of printing papers made specially for that purpose by Mr. Wm. Carmichael, the courteous manager to Messrs. George Mason & Co.

Mr. Reid's little contrivance consisted of a matchbox with a slit in the lid, through which was passed the end of a roll of sensitised paper about half an inch in width, and with which he was enabled to test the actinic power of light in a wonderfully correct manner. This little aid Mr. Reid continues to use to this day, and it is upon this principle that all the modern actinometers are based, at least in so far as ascertaining the light intensity.

To pupils in photography these actinometers, no doubt, do render some aid in arriving at a fairly correct estimate of the exposure, but they are liable to be used in an erratic manner, and possibly, after all, it is better for any one to depend upon their judgment and the appearance of the image on the ground glass of the camera.

T. N. Armstrong.

SOME POINTS OF INTEREST WITH REGARD TO APPRENTICES.

A few weeks ago a correspondent of the Journal mentioned, in a letter criticising or explaining a certain law-suit in which he had been concerned, as a point of interest to photographers, "that, where there is no stipulation as to holidays in the indenture, the master is legally justified in refusing them."

Taken by itself or in connexion with that which accompanies it, whether relating to holidays or any other incidental matter, the sentiment must be, I think, considered most deplorable, and the expression of it, deplorable.

There is not such an amount of good will and generous feeling between masters and assistants prevailing that we are able to pass quite without notice or remark such a point of interest as this.

We know that when indentures are discussed these matters are, as a rule, arranged quite pleasantly. Says Mr. Palette: "Oh, it's hardly worth while making any hard-and-fast rule about such a simple matter as holidays; there will be no difficulty about this whatever. I like a holiday myself, and I will take good care that your son is well looked after," and so on. The parent and son depart with memories of that pleasant smile and lingering pressure of the hand; the son is full of hope, and the father or mother thinks what a nice man Mr. Palette is, and how lucky is the boy. Possibly a premium, hardly scraped together, has been handed over in all good faith, and the youth enters on his new career with a reasonable ambition to succeed. He has read something about photography, knows the names of some of the best of those clever men who practise the art, and he yearns to follow in their footsteps as well as he may. Printing, enlarging, operating, retouching, all the various branches of the art he hopes to study and achieve in the course of the next three or four years; for has not Mr. Palette a big business and a reputation for all this sort of thing? What does the lad or his parent know of professional retouchers, professional enlargers and printers, and how is he to gauge the abilities as a teacher of Mr. Palette?

The reality is often painful, a *reductio ad absurdum* hardly conceivable, a condition of things to which the hackneyed term, "truth stranger than fiction," aptly applies.

Take one or two instances: A. B. a well-educated youth is apprenticed for five years, premium 30*l.*; a week after he entered his master's premises the errand boy was dismissed, the work, sweeping—cleaning, errand-running and general drudgery—falling to A. B.; this continued until remonstrance through the family lawyer brought about a better state of things; A. B. never got any regular tuition in retouching except by payment for it out of business hours and by arrangement with another professional.

C. D., a youth, age fifteen years, apprenticed for three years, premium 25*l.*; all this lad had the opportunity of learning was to print in P.O.P., he possessed at the end of three years the barest notion of retouching a negative, and had had no studio practice whatever. This youth was worth as an assistant practically nothing, and similarly to A. B. had to pay for tuition over again before he was qualified to take a situation with reasonable remuneration attached.

I think the above must be, so far, typical cases; they are at any rate authentic, they were not disastrous simply on account of the relatively better position of the parents. But I can quite believe that in many cases the results of an apprenticeship of this kind would be distressful.

Take the matter of working hours and holidays, the irregularity of the former and uncertainty of the latter; I suppose there are thousands of photographic workers who absolutely cannot count upon holidays other than Sundays and Christmas Day. I can quite believe this to be the fact, though I am not personally acquainted with any one so unfortunate. On the other hand, I know of the irregular hours, that is to say, so far as the leaving off work is concerned, and I know of other young people who are allowed holidays, but have to take them between November and March!

Speaking generally, one would imagine that great changes have come about with regard to the engagement and treatment of apprentices, though in what particular direction it is hard to say. For one thing, premiums, solid payments of cash, should be, as a rule, quite out of date. No one but a man in good position, established, and capable of imparting all the necessary routine of the professions has, in my opinion, any right to ask for a premium. What happens sometimes in other professions? I know a firm of electrical engineers who are able to command an almost unlimited number of youths at a high premium; that, however, but a small point with them, it is not the premium they want so much as sharp, intelligent youths, they will take such readily and *pay them well*. It is easy to understand a clever man taking at a high premium, and as a special favour, a dull youth, honestly intending to do his best to make something of him, but after one experience of the kind is it ever repeated?

If a premium is part of the agreement, it should be considered in the light of a guarantee for good and faithful service and attention to duties, and should be, in most cases, refunded to the lad in the form of pocket money, or in addition to such small salary as might be paid him during the term of apprenticeship. Of almost more importance is a liberal view of the words "art and practice of a photographer;" in the interests of all parties, it is best to be explicit as to what is to be taught, and as to hours and recreation. All these things inevitably come to be points of great interest, more or less, as time passes. As a matter of fact, it is better to take nothing for granted on either side.

Breakages, waste prints, and so on, form a point of interest, at any rate to *employers;* I know what this kind of thing means as well as most. It is the new boy who generally makes a clean sweep, possibly to the extent of a fortnight's salary; the new girl who empties out your tub of residues; but it will be the assistant who breaks your best and most expensive dish! I know very well that at such times it is as difficult adequately to express one's feelings as to keep them in. People have different ways of dealing with this point of interest, very often bad, illogical, and unreasonable ways. One of the best methods I am acquainted with is to make each delinquent, from the manager downwards, the rule in a certain house, enter his breakage in a book provided for the purpose; this, simple as it was, acted as a great moral deterrent, and led to careful working. Nothing was said, but I know that not one of us but would have preferred to pay up rather than put our names down.

But I am afraid this is running away from what I wanted particularly to emphasise, the folly of stirring up ill feeling between our assistants and ourselves; simply because something has not been provided for in an indenture or agreement (and we often know well enough how and why this has come about)—"therefore, &c." Indentures and agreements should be as clear and explicit as possible, and it is for the master to set the example of a liberal interpretation of the same. J. Pike.

THE TRIPLE ANASTIGMAT.

A correspondent (Dr. R. E. Chesterman) writes: "The extracts from the German photographic press relating to the Voigtlander-Cooke lens (the Triple Anastigmat) which you printed last week cannot be pleasant reading to Messrs. Voigtländer or to Mr. Dennis Taylor, to say nothing of the English manufacturers and users of the lens. Is Mr. Dennis Taylor really aware that his lens, which, upon its introduction four years ago, was claimed to be a first-rate piece of optical work, has had to be sent to Germany, either to have its outstanding errors removed or to be converted into a fairly good instrument? Having a vivid recollection of what was said in the discussion upon the Cooke lens when Mr. Dennis Taylor read his paper before the Photographic Society on November 13, 1894,* I can hardly help giving way to the feeling that the claims then made for the lens have been tacitly withdrawn by its inventor.

"I am sure your readers will be glad to have Mr. Dennis Taylor's views on the subject. It seems to me that, in justice to his own reputation as a mathematical optician, he is bound to state the grounds upon which it has been found necessary to call in the assistance of a German optician to do that which we must conclude could not be done in England. But, unfortunately, if we are to accept Herr Klepp's searching scrutiny of the lens as it has been 'improved,' not even the combined talent of Drs. Kaempfer and Miethe has proved equal to the task. By the way, to the first-named Doctor I would recommend a closer study of British optical history than he at present makes. The system of correcting two biconvex outer glasses by means of an intermediate double concave appears to have been suggested over thirty years before the apparition of the Cooke lens (The British Journal of Photography, November 30, 1894). It is not accurate to say that the triplet type was forgotten, of course.

"I trust Mr. Dennis Taylor will appreciate my motive in drawing his attention to this matter. For the credit of British optics, I should be glad to know that the Cooke lens is really all that is claimed for it in the advertisements and pamphlets. If it is, why was it sent to Germany? and why, when it reached Brunswick, has it been found impracticable to place it anywhere but 'midway between the anastigmats and the older lenses not corrected for astigmatism?'

"According to Dr. Kaempfer, Messrs. Voigtländer have occupied themselves in bringing the lens to 'perfection' (The British Journal of Photography, June 3, page 362). Klepp says (page 363) that 'the triple anastigmat surpasses the older lenses by being better corrected for astigmatism up to an angle of over 30°, but it is much inferior to the anastigmats in flatness of field.' Is this Dr. Kaempfer's idea of perfection?"

OPAQUE PROJECTION.

M. Picard's invention relates to a cylindrical apparatus serving for the projection of opaque bodies without the necessity of using a special lamp; it allows of utilising any source of light and of projecting all

* One gentleman expressed "satisfaction that our German cousins were not having all the optical honours to themselves," and congratulated Mr. Taylor on introducing a lens equalling anything that had preceded it.—The British Journal of Photography, November 16, 1894, page 732.

kinds of bodies, with any desired degree of amplification in their natural colours.

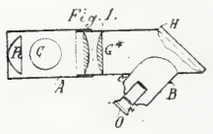
Fig. 1 is a horizontal section.

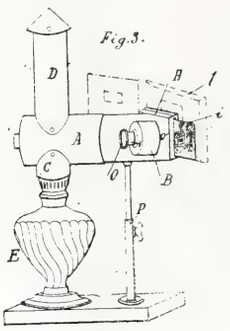
Fig. 2 a plan.

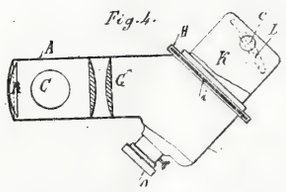
Fig. 3 a perspective view; and

Fig. 4 a part sectional view adapted for transparencies.

The apparatus comprises two tubes, A and B, arranged obliquely, relatively to each other, and connected together at *o*. The large tube, A, is the illuminating tube, and is provided with a lower tubular portion, G, which can be adapted to a lamp, E, and a chimney, D, which surmounts



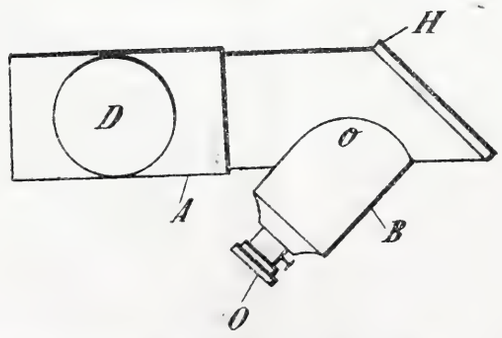




the said tubular portion, and serves for the escape of the gases from the illuminating apparatus, which may be of any kind, as, for instance, a lamp. This tube is further supported by a sliding pedestal, P, by which the height of the apparatus can be adjusted according to the height of the lamp or illuminating apparatus used.

At the end of the large tube, A, is arranged a reflector, R, which throws back the whole light through the condensing lenses, G*, which concentrate the light upon the opaque image placed at *i*, in an inclined

Fig. 2.



frame, H, passing perpendicularly to the projection tube, B. This tube is provided with an object-lens, O, which projects the image upon a screen, while simultaneously magnifying the same.

The rear shutter of the frame, H, can be withdrawn, so that any picture or impressions printed upon the pages of a book, placed in position at *l*, as shown in fig. 3 of the drawing, can be projected.

This apparatus likewise permits of projecting transparent views upon glass, or upon any other substance capable of allowing the passage of luminous rays, in short, all views employed in ordinary projecting appliances; for this purpose I arrange behind the body, B, a movable cylindrical frame, K. As shown in the plan view (fig. 4), this cylinder, K, is provided at its bottom part with a concave mirror, L, which is supported vertically by means of two movable screws, *c*. These screws serve to give the desired degree of inclination to the mirror, in such a manner that, receiving the rays of the lamp, it reflects them in the direction of the objective, after having passed through the sheet of glass or transparent plate, *i*.

The light issuing from the lamp passes around the transparent plate. If this transparent plate is held by a glass, which occupies the whole surface of the frame, while the plate, that is to say, the image, occupies only the central part, the light from the lamp will pass through the glass. It is this light which, thus passing around the image or plate, strikes the reflector, and is sent back by this through the plate proper, that is to say, the image which has transparent and opaque parts according to the drawing, to produce an enlarged projection through the object-glass.

In a word, the light from the lamp illuminates the reflector by passing around the image; it is reflected by the reflector, and it is the reflected rays which pass through the central part or image, which is shown by projection upon the screen.

The apparatus is equally adapted for projecting directly either a transparent or an opaque view, without the use of any cone, mirror chamber, or megascope.

ART AND LABOUR.

The following correspondence recently appeared in *Justice*:—

"To Walter Crane: Dear Comrade,—I am only a poor wage-slave, and, having just committed the sin of getting married, would like to ask if Walter Crane (our artist comrade) would give me an idea as to suitable pictures for an ordinary common or garden front room (viz., the *best* room in the house of a common worker). I like pictures, but the wherewithal to get them, as well as the knowledge to pick good ones, is only limited, hence my appeal to you for intervention on my behalf. I would go up to 5*l*. or 6*l*. for what I would like. Cannot afford any more.

Nemo."

In reply to "Nemo," I would say that whatever pictures a man hangs upon his walls they should honestly represent his own likings in that way. Good photographs or photogravures of first-rate pictures, old masters or modern, are better than poor originals, and, with the limit "Nemo" names, it would be safer to keep to photographic reproductions.

Very fine ones can be obtained of the choicest pictures in our National Gallery, at Hanfstaengl's (Pall Mall East, London, S.W.), or the Autotype Company (74, New Oxford-street), but, as "Nemo" writes from Manchester, he could not do better before investing his 5*l*. or 6*l*. than pay a visit to Charles Rowley & Company's shop in St. Anne's-street, where he could see these and other beautiful things nicely framed and cheap.

With an Albert Dürer print, a Van Eyck or a Memling, a Botticelli (*Allegory of Spring*) a Titian (*Sacred and Profane Love*), you may have the cream of pictorial art of the world in photographic reproduction for a few shillings.

In modern men one could not do better than Burne-Jones and Madox Brown. What an epitome of modern life is the latter painter's *Work!*

If our friend wants a purely decorative colour arrangement, he could not do better than hang his walls with a set of Japanese colour prints. These can be had, good ones—figures and landscapes—from 2*s*. 6*d*. each and upwards. These are hand-painted proofs from the original blocks, and are full of artistic qualities. Walter Crane.

The friend who draws our attention to the above remarks: "I think the man with 5*l*. to spend on pictures is an increasing quantity, and it is clearly to the interest of photography that it should be spent as Mr. Walter Crane suggests." We cordially agree.

PHOTOGRAPHIC SPECTRUM OF THE AURORA.

Various attempts have been made at this observatory (Harvard College) to photograph the spectrum of the aurora. In 1886, on several occasions, long exposures were given to plates during bright auroras, but no result was obtained. On April 1, 1897, Mr. Edward S. King succeeded in obtaining a photograph in which four bright lines were visible, but uncertainty existed regarding their wave-lengths. The exposure, says Professor E. C. Pickering, in *Knowledge*, was one hundred and forty-seven minutes. During the bright aurora of March 15, 1898, he obtained a forty-one minutes. The brightest of these lines extends in wave-length photograph showing two bright lines. The exposure was one hundred and from about 3892 to 3925, and the wave length of the second is 4285. Assuming the two brighter lines photographed in 1897 to be identical with these, the four lines on that plate have the wave-lengths 3862, 3922, 4288, and 4694. The first of these lines is very faint.

The errors of measurement of these lines do not exceed one or two units, but much greater uncertainty exists in the reduction owing to difficulties in comparing them with the lines of the solar spectrum, which was photographed upon the same plate. Probably the two auroras gave different spectra. That in 1897 was taken with a wide slit, but the images of the lines were well defined on the edges and of equal width, so that the line 3922 was probably really narrow and coincident with the edge of greater wave-length of the line 3892 to 3925. The spectroscope

used was not especially designed for photographing faint surfaces, and it is hoped that better results may be obtained with a new instrument now in course of construction. As is the case with all results announced in these circulars, it is expected that full details will be published later in the annals of the observatory.

PRISMATIC SPECTRA.

Before the last meeting of the Physical Society, a paper by Messrs. Edwin Edser and C. P. Butler, on a simple method of reducing prismatic spectra, was read by Mr. Edser. The production of interference bands in a continuous spectrum is capable of furnishing a reference spectrum, which can be employed to determine the wave-lengths corresponding to the bright lines in a spectrum of a metal or of a gas. The authors discuss various methods by which such bands can be formed. In their final experiments, an air film between two plane parallel glass plates is inserted in front of the slit of the spectrometer, in the path of the incident light. Owing to the interference of the direct ray with that twice internally reflected, bright bands separated by dark intervals are observed in the spectrum; these bright bands correspond to a series of different waves, whose lengths are easily determined for the whole series when two of them are known. The bands are much improved by partial silvering of the two internal surfaces of the glass. It has been found that ordinary plate glass, if well chosen, is good enough for all these experiments. In order to adjust for parallelism, a spot of light, or the filament of a glow lamp, is viewed through the silvered surfaces. A long train of images is generally visible; these must be brought into coincidence. If now a sodium flame is looked at through the film, interference bands are seen. These bands must be adjusted by pressure, to be as broad as possible. An arc lamp is used for illuminating the collimator slit. The authors exhibited the apparatus, and showed photographs of spectra scales with the appropriate wave-lengths, calibrated upon them by this method. The results there obtained were read from the spectrometer to 0·4 of a tenth-metre, with an ordinary pocket lens. A simple graphic method enables wave-lengths, corresponding to a great number of spectral lines, easily to be determined by inspection. The phase changes introduced by the silver do not affect the final result. Professor Threlfall congratulated the authors on their discovery of a method that would greatly reduce the labour of calibrating spectra, and at the same time give such accurate results. Professor Boys said the simplicity of the apparatus added greatly to the value of the method. It would seem to him better if the slit were somehow contrived within the film space. All want of definition due to rays falling at different angles upon the collimator object-glass would thus be avoided, and only a small part of the glass plates, *i.e.* the slit, would require to be strictly parallel planes. The limit of accuracy in the authors' method depended upon the collimator, not upon the optical perfection of the silvering of the plates. Mr. Butler pointed out that previous methods had always required experienced spectroscopists for mapping out results. In the new method that work could easily be done by an assistant. Mr. Edser said that by putting the two plates immediately in front of the slit only a very small part of the glass is concerned in the action, light coming through at an angle would not reach the lens in the collimator.

EARLIER OPENING OF KEW GARDENS.

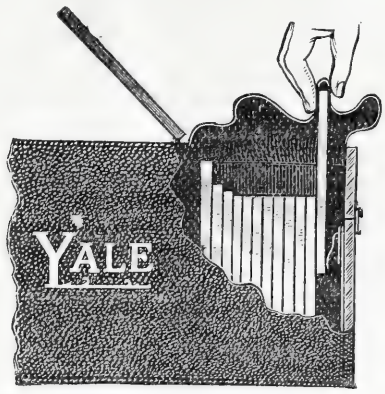
To commemorate the success of the agitation which has resulted in the opening of Kew Gardens to the public two hours earlier than hitherto, a dinner was held on Monday evening, June 6, at the Star and Garter Hotel, Richmond. Mr. A. B. Deane occupied the chair, and the attendance numbered about eighty, among those present being the Mayor of Richmond (Councillor A. Chancellor, J.P.), Mr. Skewes-Cox, M.P., Colonel R. D. Routledge, Major C. E. Cresswell, Mr. E. C. Morgan, Mr. H. M. Dennes (Hon. Secretary of the Committee), and many members of the Corporation and prominent residents of Richmond and neighbourhood. In proposing the toast, "Success to the earlier opening of Kew Gardens," the Chairman traced the history of the movement, which it appeared originated about fifty years ago. Among the other toasts was that of the "Kew Gardens Earlier Opening Committee," coupled with the name of Mr. H. M. Dennes (Messrs. Morgan & Kidd), whose services as Hon. Secretary of the Committee for the last eighteen months were cordially acknowledged. It was pointed out that the agitation in favour of the earlier opening was a national and not merely a local one, and the Chairman and other speakers expressed the opinion that the privilege, which after so much difficulty had been obtained from the First Commissioner of Works, would be very widely appreciated.

Our Editorial Table.

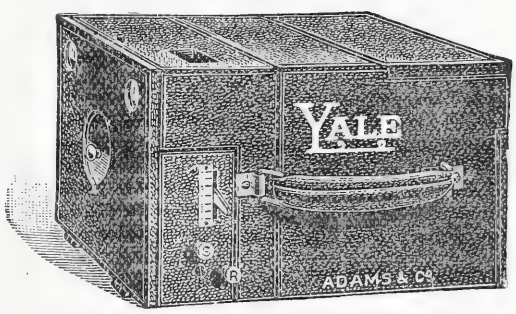
The Yale Hand Camera.

Adams & Co., 26, Charing Cross-road, W.C.

The feature of the Yale Hand Camera above all others which makes the instrument, in our eyes, an exceedingly practicable and workmanlike one, is the changing system, one of the simplest and most certain we have tried—and we have tried not a few. The first illustration shows the principle at a glance. The plates or films are inserted in their sheaths, and placed in the changing box or camera. The front plate stands higher than the rest, and can thus easily be raised and placed at the back of the



others. What was the second plate, therefore, now becomes the first, and this stands above the remainder. The same action applies if reversed. A light-tight bag of soft, pliable leather is placed over them to keep all light-tight, and with the fingers the plates are changed as desired from the outside of the bag. This description enables the reader exactly to realise how the changing is effected, and we can only say that after several practical trials we did not succeed in making a failure. A "stop" sheath tells you when you have exhausted your exposures. The other features of the Yale Hand Camera, which is admirably made and



finished, are:—A rapid rectilinear lens, working at *f*·8, and fitted with iris diaphragms; the Yale shutter, a metal shutter, working at various speeds from $\frac{1}{2}$ to $\frac{1}{100}$ of a second, as well as ordinary time exposures; such speeds as $\frac{1}{8}$, $\frac{1}{4}$, or $\frac{1}{2}$, cannot be obtained with most shutters, but can with a Yale; two brilliant Daza finders. The camera takes either plates or films, focusses from two yards to infinity, and it is altogether a capital instrument.

"Photography."

Published by Ward, Lock, & Co., Ltd., Salisbury-square. Price 1*d*. 90 pp.

We are not reviewing our esteemed contemporary of the name quoted, but a little book which professes to "explain the principles of photography in as clear a manner as possible." The author, whom we sincerely congratulate on the master stroke of genius which impelled him to withhold his name, tells us on the very first page that, "in 1839, Daguerre discovered that, if a sheet of iron or copper were coated with an emulsion of iodide of silver and afterwards exposed to the rays of the sun in a photographic camera, the plate, on being exposed to the vapour of mercury, underwent a physical change, *i.e.*, the rays of light had altered the state of the plate, and had affected it in a peculiar way. The plate, in fact, was found to have "sensitiveness." The emulsion was made by pouring the nitrate of silver evenly over the plate"!! If such appalling nonsense as this be any clue to the value of the rest of the book, we can only pity its readers.

Protalbin Paper.

Agent: C. A. Rudowsky, 3, Guildhall-chambers, E.C.

Some charming results on this paper, having all the delicacy and beauty of the very finest albumen prints, have been shown us by Mr. Rudowsky.

The paper, which is a vegetable albumen emulsion paper, is worked the same as ordinary albumen paper, and is stated not to crack, scratch, or peel off, while it is insoluble in ether or water. It prints as quickly as collodion, giving all the half-tones of good albumen prints, and does not bronze in the shadows.

The principal directions are:—

Keep dry in a dark, cool place. Do not touch the surface with moist hands; keep it in pure packing paper. Printing: The same as albumen.

First washing: 15 minutes in frequent changes or in running water. Toning: The sulphocyanide bath is recommended. Second washing: 1—2 minutes. Fixing: 12 to 20 minutes in a ten per cent. hypo solution: stronger solutions are to be avoided: use the fixing bath once only, at the utmost twice and throw away. It is necessary to use fresh fixing solution to obtain brilliant prints. Final washing: 2 hours in running water or in frequent changes.

We hope to take an early opportunity of trying the paper.

CATALOGUE RECEIVED.

Frederick V. Lloyd, 3 & 5, South John-street, Liverpool.

MR. LLOYD'S catalogue runs to over a hundred pages; it particularises a good selection of apparatus, and is very freely illustrated. He has three dark rooms for customers on his premises, and instruction is given to all purchasers free of charge.

News and Notes.

THE "Mount" Postal Photographic Club has a few vacancies, chiefly quarter-plate. Send specimens to Mr. C. R. Fowler, Schoolhouse, Wimborne.

MESSRS. JOSEPH LEVI & CO. (Leviathan, London), 97, Hatton-garden, Holborn, London, E.C., ask us to state that they are connected with the telephone. Their number is 1001, Holborn.

OUTSIDE THE PHOTOGRAPHER'S.—BROWN (*from the country*): "That's a beautiful woman. Who is she?" JONES (*of London*): "Oh, she's at the Frivolity Theatre." BROWN: "Is she a great actress?" JONES: "M'yes. She's a great Kodaktress."—*The Referee.*

THE next meeting of the Manchester Photographic Society will be in the form of an excursion to Winkle and Ludchurch. Train leaves London-road station (London and North Western Railway) at one p.m. for Macclesfield, from which place carriages will convey the party to Winkle and the Dane Valley.

PHOTOGRAPHIC CLUB.—Wednesday evening, June 15, at eight o'clock, "Holiday Reminiscences," by Messrs. Müller and Newell. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. W. B. Stretton, 4, Queen-street-place, London, E C.,) will be pleased to forward on application.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.—Mr. H. J. Fisher writes: "Would you be so good as to note in your JOURNAL that, through illness, Mr. Durston has unfortunately been compelled to resign his post as Secretary to the above Society, and the vacancy has now been filled by Mr. H. J. Fisher, 37, Elwood-street, Highbury, N., to whom communications should now be sent."

MESSRS. LEVI, JONES, & CO., Limited, late of 71, Farringdon-road, E.C., advise us that, in order to cope with increasing business, they have now removed to more commodious premises, 29, Hoxton-square, Old-street, E.C., which they are fitting up with plant and machinery suitable to their requirements as makers of cameras, lanterns, the Matagraph, solid leather cases, and other scientific instruments.

Re W. E. A. DRINKWATER, photographer, Devonport.—The public examination of the above-named debtor was held on the 1st inst., at the Plymouth Bankruptcy Court. The debtor, in reply to questions put by the Official Receiver, stated that he commenced business without capital purchasing it from Mr. Gill on the understanding that he allowed him, or his wife, or the survivor, 30*s.* per week. Debtor alleged that it was represented that the gross takings amounted to 250*l.* per annum, but he afterwards discovered that they only amounted to about 150*l.* He also discovered that it was utterly impossible for him to pay so large a sum as 30*s.* per week. The amount was now considerably in arrear. The Official Receiver stated that the sole cause of the debtor's failure was his entering into this agreement. Eventually the debtor was allowed to pass his examination.

THE LYING IN STATE AND FUNERAL PROCESSION OF THE LATE MR. GLADSTONE.—Messrs. Fuerst Brothers state that, although the weather was extremely dull on the occasion, they have been able to obtain the following cinematograph pictures: Lying in State, showing Westminster Hall and crowds of people passing into view (the stained-glass windows can be seen right through the Hall). Procession of the House of Commons, Serjeant Horsley and the Speaker heading the procession; Mr. Chamberlain, Sir Michael Hicks-Beach, and other prominent members of the Government. Procession of the House of Lords, showing the Lord Chancellor, the mace-bearer, heralds, &c., and peers. Procession of the hearse, drawn by two horses, with the Princes, Lord Salisbury, Lord Rosebery, and members of the late Mr. Gladstone's family following and easily recognisable. Royal Family leaving the Abbey in their carriages. Lord Mayors of London, Edinburgh, and Dublin leaving the Abbey in State carriages.

PHOTOGRAPHIC FRAUD.—At the South-Western Police Court, on the 3rd inst., before Mr. Francis, Henry Freeman, aged thirty-one, a dark-haired melancholy looking man, described as a teacher, residing at 20, Coleford-road, Wandsworth, was charged with obtaining money by means of false pretences. It appeared, from the evidence of Mrs. M'Dougall, wife of a musician, residing at 24, Chivalry-road, Clapham Junction, that the prisoner called at her house, and offered to enlarge a photograph for her, representing himself as agent for a firm of photographers at Marble Arch, called Herbert & Co. She handed him a photograph and gave him sixpence, which he demanded for the carriage of the enlarged photograph. She heard nothing more of him for a long time, until she heard him touting in the same road, when she at once gave him into custody. Detective Stephens stated that the prisoner had only recently come from America, and had been defrauding several people. No such firm as Herbert & Co. existed. The prisoner said he met a man named Herbert, who induced him to canvass for orders, and then disappeared with the photographs. Mr. Francis sentenced prisoner to one month's imprisonment with hard labour.

MESSRS. TAYLOR, TAYLOR, & HOBSON, write: "It may interest you to know that we are planning a new factory, which we hope to occupy before the end of the year. To meet our growing business, ground is secured for a factory four times the size of our present Slate-street works. The portion now to be built will have capacity for 400 yards of benching and machinery, and will comprise glass-working, metal-working, and machine shops and stores, together with cloak-room and lavatories for the workpeople and stores for cycles. The office building, separated from the factory by a fireproof staircase and elevator, will contain private offices, counting-house, drawing office, experimental room, testing room, photographic studio, and stock room. The buildings will be lighted electrically, and warmed and ventilated by a special plant in the basement, which will blow fresh air through flues to the various rooms, freeing it from dust, moistening it when too dry, automatically warming it to 60° Fahr., and finally discharging through special turrets above the buildings. There will be in the factory a service of gas for heating, compressed air for blowing and cooling, and electricity for motors and other purposes. Power will be supplied by a twenty-five horse-power gas motor."

PRODUCTION OF GROUND GLASS.—Lainer recommends the following process in the *Chemiker Zeitung*: Mix 240 c. c. of commercial hydrofluoric acid of 1·258 sp. gr. with 600 grammes of pulverised soda crystals, then dilute with 1000 c. c. of water. After standing for some time a sediment is formed, and over it a clear solution. The thoroughly cleaned glass pane is provided with a wax edge (prepared by kneading yellow wax with tallow, colophony, and asphalt powder) and pre-etched with common hydrofluoric acid (1 : 10) for some minutes to obtain an absolutely clean glass surface. Then wash with water and wipe the plate with a clean, soft sponge until the surface is only very slightly moist. Stir up the paste of the etching acid and pour the mass ½ to 1 cm. high upon the pane. With this mixture a nice normal deadening is obtained after one hour. If the acid is old, having been used often, it may be made to act longer upon the plate of glass. The liquid is poured back into the vat and the glass is rinsed off with water. Then the water is allowed to remain upon the pane until a skin, formed from the surface of the glass, can be removed with the finger or a brush. The strong deadening obtained by this method can be fixed to any desired degree of transparency by etching with hydrofluoric acid.

HERR ERNST BERGER, in his *Contributions to the History of the Development of Painting*, describes the way the colours of the ancients are examined by chemists as follows: "The colour layer is first carefully scratched off with the knife in order to separate the colours from the lower ground. A portion of the colour powder thus obtained is dissolved in water and heated in a retort; then the binding materials, dissolved in water, are separated from the colour pigments by filtration. The filtrate is evaporated, and from the residuum the binding agent present is determined, according to whether it contains organic substance or not; ashes which turn brown with a burning smell point to organic binders, likewise the presence of ammonia (ammonia is recognised by the odour or by means of turmeric paper, which is dyed brown by ammonia vapours). A second portion of the scraped-off powder is treated with boiling alcohol, which dissolves the fatty resinous substances; the mass is filtered as above, and the filtrate is evaporated in like manner; from the residuum, which takes on a dark colour, an oily or resinous binder results, which can be determined more closely by the odour. In order to recognise the presence of lime, a drop of hydrochloric acid suffices, which causes effervescence. The colour substances remaining in the filter are then tested by means of different reagents for the presence of metals, earths, &c, and conclusions are drawn accordingly. In exactly the same manner the foundations on which the painting was are tested."

THE South London Photographic Society made a trip to Dorchester-on-Thames for their Whitsuntide excursion, and they have every reason to be satisfied with their outing. Situated some four or five miles from the railway stations of Culham and Wallingford, on the Great Western Railway, and about a mile from the banks of the Thames, it is not much frequented by visitors, and to many the name is confounded with another of our towns down Somerset way, but the South London men explored the nooks and corners of this pretty and old-fashioned village in search of photographic tit-bits, and were compelled to leave behind them, through lack of time, many interesting pictures. All around the neighbourhood and on the Thames, camera and tripod was to be seen from Clifton Bridge to Benson Lock. Old Father Thames must indeed have been proud that he received so much attention. But true it is that this part of our well-known waterway affords ample scope for the camera. It seems impossible to carry enough plates to satisfy one that full justice has been done; but, on the other hand, the crave is for more. Also the villages around afford abundant food for either the hand-camera man or the tripod. As usual, where such interest is to be found for the camera, the railways do not cater for the amateur, but perhaps they are wise. The earnest worker who desires to visit this part must be prepared to spend the ordinary 1*d.* a mile for railway, and be content with moderate hotel accommodation and attendance at a fairly decent rate. If he can put up with this for a day or two, this part of our native heath is well worth a visit by any amateur.

Patent News.

HE following applications for Patents were made between May 23 and May 3, 1898:—

HOTOGRAPHIC APPARATUS.—No. 11,552. "Improvements in Photographic Apparatus." J. E. THORNTON.

ILM-HOLDER.—No. 11,563. "An Improved Film Developing Holder for Sensitive Photographic Films." J. HENDERSON.

HOTOGRAPHIC CASES.—No. 11,659. "Improvements in Photographic Cases or Books." H. H. HUITT.

RINTING FRAMES.—No. 11,703. "Improvements in Photographic Printing Frames." A. WILKINSON and A. E. MUNDY.

INEMATOGRAPHIC APPARATUS.—No. 11,834. "Improvements in Cinematographs or Apparatus for Obtaining and Viewing Animated Photographs." W. SHAW.

AMERAS.—No. 11,850. "Improvements in Photographic Cameras." W. J. LANCASTER.

CTINOMETERS.—No. 12,025. "Improvements in Actinometers." Complete specification. J. A. CHEAPE.

TEREOSCOPIC PHOTOGRAPHY.—No. 12,160. "Improvements in Apparatus for Receiving Coin and Displaying Stereoscopic or other Pictures or Effects in Exchange." Complete specification. H. WOOLFE.

AMERAS.—No. 12,194. "Improvements relating to Photographic Cameras." F. B. NYE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

June.	Name of Society.	Subject.
.....	North Middlesex	*Is Diffusion of Focus Desirable?* Discussion to be Opened by H. W. Bennett and A. J. Golding.
.....	Birmingham Photo. Society	*Some Practical Photographic Dodges.* Cecil M. Hepworth.
.....	Hackney	*Outdoor Photography.* F. W. Gosling.
.....	Borough Polytechnic	Improvement of Negatives.
.....	Croydon Camera Club	*A New Print out Paper.* V. Bender.—*Gaslight Scenes.* Mr. Taylor.
.....	Photographic Club	*Holiday Experiences.* Messrs. Müller and Newell.
.....	London and Provincial	Demonstration of the Gum-bichromate Process. G. H. James, R.P.S.
.....	Borough Polytechnic	Excursion: St. Paul's Cray and St. Mary Cray.
.....	Hackney	Excursion: Zoo. Leader, G. Guest.
.....	Southsea	Excursion: Selsea.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NE 2,—Mr. Herbert Fry in the chair.

Mr. T. E. FRESHWATER showed some photographs of the procession at Mr. adstone's funeral. The particulars of the exposures were given as follows: llmeyer stigmatic lens at *f* 6, drop shutter exposure of about one-eighth of a ond, developed with pyro soda.

PHOTO-LITHOGRAPHY.

Mr. A. E. SMITH described the operations to be performed in reproducing line bjects by lithography with the aid of photography, and accompanied the ture by a demonstration of the various details of the process as he himself rks it. Lithography may be described as that process by which a design of y kind, made in a greasy ink, is transferred to stone, and from which an limited number of copies may be taken. It was hardly necessary to point t, he proceeded, that before making the transfer one must have a good ginal—black ink on white paper. This, if it were not for photography, uld have to be redrawn, specially for transfer to stone, a matter of some uble, varying with the nature of the subject. However, by photography, a gative is made of the original either in collodion or gelatine. Good reproctions may be made upon gelatine plates, and those known as photochanical plates are most suitable for the purpose. A good negative should w, when pressed up against white paper, all the details of the original, d should be at once dense and clear in the proper parts. The negatives ssed round were all suitable reproductions, and showed about the margins the plate a coating of black paint, the object of which is seen when printing e transfer. The paper upon which the transfer is made is prepared with a ting of gelatine or albumen, or sometimes gelatine and albumen, and is a nmercial article, although it can be prepared at home. The lecturer used e transfer paper of Husnik, but finds that this differs with every batch; metimes albumen is used, and at others gelatine. Personally he found umen the better of the two. This transfer paper requires to be sensitised the manner of carbon tissue, a five per cent. bath of bichromate of potash, h the addition of a little ammonia to counteract the acidity, being used. e printing behind the negative may be followed in the usual way, and is ried to that degree at which the background just begins to print. The nt upon the negative makes it easier to tell when the background comnces printing, and this is the reason for its use. Excessive printing makes lines too dark and heavy; it must therefore be stopped at the above ge. The sensitising, by the way, may be done over night, and the paper l to dry in a warm room. It is interesting to compare the sensitiveness of h bichromated paper with ordinary silver paper. Some of the printed nsfers shown by Mr. Smith were completely printed in twenty seconds in bright sunlight, whereas a piece of silver paper was barely coloured. Thus it would be seen that the bichromate process was very quick, indeed incredibly quick. Having made the transfer, it becomes necessary to ink the same. As a matter of convenience, Mr. Smith applied the thin and greasy transfer ink with a sponge, carefully spreading it over the whole of the paper. A roller was the proper tool, and with it a more even coating could be made, but, however done, it should be just possible to detect the picture or design through the layer of the ink. Such an inked transfer is laid aside for a time to allow the turpentine used for thinning purposes to evaporate, when it may be soaked in water until the surface assumes an appearance of relief in the unprinted portions. The superfluous ink has then to be removed by rubbing with a wet sponge. In the printed portions the ink sticks, but where light has had no action it yields to the friction of the sponge. A constant flow of water is maintained upon the transfer, which is supported upon a glass or metal plate, and the loosened ink carried off the paper. Care has to be exercised in rubbing the picture, or parts may be damaged; for instance, in very fine work the operation of developing may require twenty minutes. The original, if possible, should be near by, that one may judge better when sufficient of the ink has been removed. Mr. Smith produced in this way a transfer ready for laying upon the stone, which was admitted very good, being clean and sharp in line. The transfer is then dried. The stone used by the lithographer is of an absorptive nature, and has a smooth and polished surface when prepared for his use. The dried transfer is damped and applied to the previously warmed stone with not too much pressure. The ink is absorbed by the stone, and the paper removed. A sponge dipped in a little weak gum water is passed over the stone, which absorbs the moisture except where the ink is present, after which it is inked up with a roller, the greasy material taking only on the design, when pulls can be taken in the lithographic press.

Replying to inquiries, Mr. Smith said sponge was preferable to wool for the transfer, as it was better adapted for scratching out from the fine parts of the image. Hot water could be used, but it tended towards the removal of the substratum with the ink, thus leaving the image in little ridges. Zinc in place of stone may be employed, the surface being slightly etched to enable it the better to hold the moisture. It was somewhat difficult to remove the ink from a stone, and it was found better to reface it with snake stone. As regards the use of a screen for half-tone work, he said that a very coarse screen would be necessary, as lines running closely generally went together. Printing could be done direct on the stone in much the same way as for half-tone zinc blocks, but it was less easy. By prolonging the exposure to twenty minutes in a dull light instead of as many seconds (as in the case mentioned), the same result would follow, but there was no advantage in printing slowly. There was hardly any latitude in exposure. The nature of the ink, or alteration in the inking of the transfer or stone, did not help to make up for any error in this direction. Transfers could be made with very little loss in sharpness from one stone to another, and the method was often used for printing a number of impressions of the same picture at one time from one big stone. It was possible to correct errors upon the stone, as also to print from transfers of type matter in conjunction with pictures or designs.

PHOTOGRAPHIC CLUB.

JUNE 1,—Mr. E. A. Newell in the chair.

Mr. F. W. Dowell showed negatives with a view to tracing the source of a certain scratch in one place, which appeared now and then with a certain camera he was using, in which the plates were carried in sheaths. The opinion was unanimously given that some projection in one of the sheaths caused the mark in the changing operation.

The subject for discussion was

MODERN DEVELOPERS.

Mr. Williams showed a plate developed with ortol. It seemed to require a less lengthy exposure than others, and appeared good for instantaneous work. The advantages claimed were that it did not readily fog the plate or veil over the image.

Mr. DRAGE was partial to rodinal for negative work. It seemed to produce a very fine deposit, and a good, clear, quick-printing negative. He mentioned Mr. Teape's developer of rodinal and hydroquinone, which had the merit of being suitable for very short exposures. Mr. Drage had not been so successful with it, but thought a lot of rodinal.

Mr. MACKIE believed that rodinal of to-day differed considerably from that of early times, which produced a poor, thin negative.

Mr. WELFORD found nothing came up to his standard pyro soda developer.

Mr. BRIDGE mentioned the fact that a professional who used pyro soda always kept a bottle of metol near, and, if the exposure was short, dipped a spoon into the latter, and added a few grains to his standard developer, so getting increased gradation without any more density.

Mr. WELFORD found the addition of hypo to nearly every developer he had tried it with was beneficial, giving more detail and a better printer.

Mr. STRETTON said it also arrested the tendency to fog possessed by metol. Added to metol and hydroquinone, it gave a pyro-like negative.

Mr. J. BROWN said the quickest developer he ever used was hydroquinone and caustic barium, which gave a negative in less than two minutes.

The CHAIRMAN favoured pyro ammonia or soda.

Mr. CROFTON described his experiments with hydroxylamine, which generated gas in the film, and broke it up. He had not found any improvement by the use of glucose or baryta water, which had been recommended.

Mr. DRAGE found glycin as quick as any other, used with a proper amount of alkali. It could be slowed also, and gave clean results.

Mr. WELFORD asked whether there was a developer which produced a finished negative quicker than did pyro ammonia, which took about a minute? Many of the new developers were quicker in starting, but took a long time for completion. He did not use sulphite.

It was mentioned that with pyro ammonia less sulphite was recommended than with any other.

Mr. WELFORD named metol and hydroquinone as a good all-round developer for instantaneous work, lantern slides, and bromide paper.

Mr. MÜLLER said that citrate with rodinal gave enormous additional contrast with an over-exposed plate.

Woodford Photographic Society.—The first of a series of excursions took place on Saturday last, and proved a great success. The party met at Theydon Bois station, and thence proceeded, under the leadership of Mr. Ashby, into the heart of Epping Forest. Various little tit-bits of forest scenery were photographed, and then Epping was made for. As a good deal of time had been spent in the Forest, nothing was done in the town, the party passing on to Coopersale, where the last hour was very profitably spent. In the somewhat picturesque neighbourhood of the Merry Fiddlers, hay carts, sheep, and other things all contributed material upon which exposures were made. Tea was arranged for at the Merry Fiddlers, and by 7.30 the whole party of eighteen were quite ready for it. The 9.3 p.m. train from Epping took the party home, this part of the day's proceedings being enlivened by songs, fun, chatter, rackets, &c., the whole proving a very enjoyable afternoon's outing.

Hastings and St. Leonards Photographic Society.—The judging of the prints sent in for the competition (previously announced in our columns) for illustrating Poems on Fairlight Glen, by Mr. J. Morgan, and conducted by the above Society, took place on Saturday, the 4th inst., the Judges being Dr. Gray, President of the Society; Mr. M. Sullivan, Head Master of the local school of art (selected by the competitors themselves); and Mr. J. Morgan, the founder of the feast. One print from each, with a prize of 2*l.* 2*s.* each, was selected from the three following competitors: Messrs. Joshua Smith, H. J. Godbold, and H. Warschawski. The cheques, with Mr. Morgan's usual promptitude, have been placed with Mr. Brooker, who conducted the details of the competition, for distribution on production of the respective negatives.

Preston Scientific Society (Photographic Section).—May 23, Meeting to consider the resignation of the Chairman, Secretary, and several members of the Committee.—After due consideration, the resignations of the Chairman and Secretary were accepted with regret, but the resignations of the Committee were not accepted, a resolution being passed that they be asked to reconsider their decisions. Mr. J. H. Tonge was then elected Chairman in the place of Mr. J. Bushy, and Mr. A. W. Cooper was appointed Hon. Secretary in place of Mr. F. Ketton.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

KEEPING PROPERTIES OF FILMS.

To the EDITORS.

GENTLEMEN,—As some of your readers may have an interest in the duration of sensitised films, and my own experience of their serviceable existence has not always been favourable, I think the result of of an experiment which may be called a severe test will be of use to them. About 1893 I had to fit out the first Lottego Expedition to Central Africa, and supplied it with Carbutt's Eclipse, which I preferred to the orthochromatic, and the same make, as, in my opinion, more likely to be durable. The films supplied were already, unknown to me, one year old, and to keep a check on those sent I retained two or three packages for concurrent experiment, adding to them some of orthochromatic. Those taken to Africa which had not been exposed were good when they came back, and the packages kept that I experimented on from time to time, until two years ago, when other occupations left me no time for photographic experiments; but, finding a package each of Eclipse and orthochromatic still in my cabinet last week, I decided to try if there was any virtue left, and, to my surprise, I got from them perfect negatives, of which I send you two. The orthochromatic was coated in June 1892, eclipse in September 1891.—I am, yours, &c., W. J. STILLMAN.

Rome, June 3.

MR. DEBENHAM'S EQUATIONS.

To the EDITORS.

GENTLEMEN,—In a recent issue of your esteemed JOURNAL I read the report of a lecture by Mr. Debenham, whence I gathered some rather surprising information about the depth of focus of a lens being dependent upon the size of the stop and independent of the focal length of lens area. Also, I noted two lines of equations containing some very startling results. In my innocence, or ignorance, I concluded that some typographical errors had crept in. However, in this week's JOURNAL I note that Mr. Debenham only corrects a very obvious error—*i.e.*, changing i the second equation a 3 into $\frac{1}{3}$. Therefore I presume that he is dispose to accept the report substantially as printed, and so my puzzle remain very much *in statu quo ante*. It is somewhat as follows:—

Presuming that Mr. Debenham, of course, knows what every schoolbo in his teens nowadays knows—viz., when an equation is written in cor tinuous form, A = B = C = D, &c., that the several members, A, B, C D, &c., of the equation are indiscriminately equal, hence, from Mr Debenham's corrected equation, viz., Focus = 6 × ratio ($\frac{1}{3}$) = 2 + on focus more (6) = 8, we are compelled to the conclusion that 6 multi plied by $\frac{1}{3}$ is equal to 8. Hitherto I have been under the impressio that 6 multiplied by $\frac{1}{3}$ would be 2. Unfortunately, the very number of th JOURNAL containing the original report has already found its way into th W.P.B.; but, so far as my memory serves me, the other equation read somewhat thus:—

Focus = 6 × ratio (3) = 18 + one focus (6) = 24.

From this we are compelled to deduce that 6 multiplied by 3 equal 24.

My puzzle is, first, that 2 equals 8—*i.e.*, 2 = 8; therefore 1 = 4 Secondly, 18 = 24; therefore 3 = 4. Hence I deduce 3 = 1. Perhap Mr. Debenham can help to clear up this puzzle; for, when compare with Mr. Debenham in his extensive knowledge and experience,—I am yours, &c., A BEGINNER.

DEPTH OF FOCUS.

To the EDITORS.

GENTLEMEN,—I have followed with a great deal of interest th correspondence, &c., regarding Mr. W. E. Debenham's lecture on "Dept of Focus."

He tells us that (Mr. Bolton's article) "depth of focus is wholly in dependent of focal length, and is ruled entirely by the actual, and not th relative, size of the diaphragm opening; that, in fact, with a one-inch stop, a five-inch and a fifteen-inch will give exactly the same depth neither more nor less."

Your correspondent, J. F. T., tell us that "there is some blundering in the matter" (and I believe him), and then proceeds to shelve the cas by quoting the rule as given by Mr. Dallmeyer, tables for which will b found in the ALMANAC.

Now, with Mr. Debenham I agree, *i.e.*, it will be found that, if a lens of five-inch focus be focussed upon objects lying between two planes, with a one-inch opening, the same comparative degree of sharpness will b obtained with a lens of fifteen-inch focus, having the same actua opening; therefore, in my opinion, the depth of focus is the same in both cases.

Now, can theory prove otherwise? By the above-mentioned tables, and as quoted by Mr. Bolton, we find that, with a fifteen-inch lens, th nearest plane would require to be placed a distance of 1500 inches away so as to bring it into focus with the planes beyond, and that with a five inch lens it would only require to be 500 inches away, *i.e.*, each having the same actual opening. This is all perfectly correct, but I don't see that this has anything at all to do with the case whatever, as some seem to think. It appears to be overlooked that, in focussing two differen lenses upon two *different* objects, we are instituting an unfair com parison, or no comparison whatever. What we should do is to focus our two lenses upon the same object, lying between the two same planes, then the results will be same, *comparatively*.

I see, in referring to Mr. Bolton's article, that (to reduce as few word as possible), for a fifteen-inch lens to define between forty-two feet an beyond, our calculation will have to be based on a confusion disc of no less than $\frac{3}{1000}$ of an inch, *i.e.*, three times that which is necessary for five-inch. This is all right and perfectly correct, as it should be, for is a fifteen-inch lens not three times the length of a five-inch? And will on not give a picture equal to three diameters of the other? Can we expect a church steeple to be the same size on a picture taken with a fifteen-inch lens as on a picture taken with a five-inch? I think not, neither will a point, represented by a disc of $\frac{1}{1000}$ of an inch be the same size taken with two different lenses, but it will be comparatively, *i.e.*, as one is to five so will x be to fifteen.

Again, suppose two pictures are taken from the same spot, one with each lens, the picture taken with the five-inch lens will be less in every detail than the other, whether it be the mythical point or a church steeple; but, enlarge the smaller to the exact size of the other, and then they will correspond.

Therefore, I say that depth of focus is governed—no matter what th lens—by the actual size of opening, and and not by the aperture ratio other conditions being the same.

It is not possible to take a picture with a fifteen-inch lens at *f*-8 tha will exhibit the same minute detail as a picture taken with a five inch (even if the five-inch picture be enlarged) at the same aperture ratio but, if the aperture in the larger lens be reduced to the same *actual* siz as that in the smaller one, then the results will compare, *i.e.*, the enlarge five-inch and the direct fifteen-inch pictures.

It will be seen that the only advantage derived from the use of a shor focus is the greater speed at which it works, *i.e.*, in taking a picture tha

will require enlarging to bring it up to the same size as a picture taken direct with a fifteen-inch lens; otherwise, if length of exposure is of no consideration, the same result can be secured by taking a large picture direct.—I am, yours, &c.,

A. GREGSON.

2, *Windermere-street, Bolton.*

To the EDITORS.

GENTLEMEN,—There is one aspect of the question of the relative depth of focus possessed by lenses of different focal lengths with the same actual aperture that appears to have been overlooked by Mr. W. B. Bolton in his article in THE BRITISH JOURNAL OF PHOTOGRAPHY of June 3, and equally so by your other correspondents.

There is no definite standard recognised by which depth of focus can be estimated excepting the arbitrary one-hundredth of an inch circle of confusion, which, although it has received the approval of eminent authorities, as Mr. Bolton points out, still it is in practice quite valueless in comparing the capabilities or working of lenses that differ much in focal length. A degree of blurring that would be ruinous in a quarter-plate picture taken with a four-inch lens would be inappreciable in a 24 × 18, taken with one of twenty-four inches focus, and it is self-evident that the same standard of a one-hundredth of an inch could not possibly be held to apply for ordinary practical purposes to both, although it is from this basis that your correspondents have questioned the accuracy of Mr. Debenham's statement that depth of focus is dependent entirely on the actual size of the diaphragm aperture irrespective of the focus of the lens with which it is used.

Mr. Debenham's contention can easily be supported by this very practical test. If two negatives are taken from the same point of view, one with a five-inch lens, and the other with a twenty inch, using a one-inch aperture and focussing carefully the same object in each case, the other parts of the picture will be blurred in the same proportion relative to the size of the image in each, though one has been taken with *f*-5, and the other with *f*-20, and if the smaller is then enlarged four times, that is, made the same actual size as that taken with the larger lens, the two images will be absolutely identical. The following working will make this apparent: Assume that there is a well-defined object fifty feet from the camera that is focussed as sharply as possible, and another, a church spire, for instance, so far that, while it is still a test for sharpness, its distance may be regarded as infinity. Taking the five-inch lens first, the distance of the object focussed, fifty feet, is 120 times the focus of the lens, consequently the camera would require extending 5″ ÷ 120 beyond its principal focus, or ·0416. The church spire at infinity would now be this amount out of focus, and with a one-inch aperture, that is *f*-5, blurred to the extent of one-fifth of this amount, or ·0083″. Substituting the twenty-inch lens, in order to focus an object fifty feet away, as it is only thirty times the focus of the lens, the extension beyond the principal focus would be 20″ ÷ 30 = ·66, and the blurring of the church spire would be now ·66 ÷ 20 = ·033, as the one-inch aperture is now *f*-20. It will be seen that the blurring in the larger image is four times that of the smaller by actual measurement, both being taken with a one-inch diaphragm, and for that reason, if the smaller is enlarged four times, the two images will be absolutely identical as regards the sharpness of all parts of the picture, the blurring of the church spire in the smaller ·0083 × 4 = ·033, the same as in the larger, and this applies to every object at whatever distance.

Strictly speaking, this is slightly inaccurate, as the extension would be $\frac{1}{19}$ of the focus in the one case, and $\frac{1}{21}$ in the other, but the working adopted appeared to show the reason for arriving at these figures more clearly; the difference in the result is infinitesimal, the actual blurring in the enlarged image being ·036″, and in the large direct one ·034″.

There is one method of expressing the principle to which Mr. Debenham has called attention that will probably meet Mr. Bolton's objections to the expression originally used, and that is, When an object at any distance from the camera is sharply focussed, the degree of blurring of all others relative to their size or the size of image depends entirely on the actual aperture of the diaphragm, and is quite independent of the focus of the lens. If, for example, a photographer were making an exhibition picture of a telegraph post on the banks, and after focussing his post another at greater distance were included and with a five-inch lens appeared on the screen $\frac{1}{16}$ in. in diameter, and blurred to the extent of $\frac{1}{64}$″, or one-fourth of its diameter, with a given aperture; then the substitution of a twenty-inch lens would make the distant post appear $\frac{1}{16}$ in diameter, and the same diaphragm as used in the other lens would blur it one-fourth of its diameter as before, though in this case it would be $\frac{1}{16}$″.

This is obviously only one aspect of the subject of depth of focus; but, when it is considered that the destruction of form and structure of the images of objects in a photograph through their being out of focus depends entirely on the relation of the blurring to the size of the image, it becomes a point of view that cannot be overlooked, as it is of more importance in practical work than an arbitrary standard, such as $\frac{1}{100}$ of an inch which can never be considered while actually working; and, regarded from this point of view, Mr. Debenham's statement is correct.—I am, yours, &c.,

HENRY W. BENNETT.

[We have been obliged to hold over several communications on this subject, including an important article "on the so-called depth of focus in round field lenses."—EDS.]

SOME FACTS ABOUT FOCUS.

To the EDITORS.

GENTLEMEN,—Mr. Bolton's difficulty appears to have arisen from his accepting Sir David Solomon's tables as a basis for calculation. I pointed out at the time they were produced that any particular limit of confusion, such as the $\frac{1}{100}$ of an inch (the French put it at the $\frac{1}{50}$) can only be right for some particular length of focus, or some defined distance of inspection, and to fix any such limit for use in all cases was more likely to mislead than anything else. That it should have done with such a writer as Mr. Bolton is a striking illustration in support of my objection.

Again, if the $\frac{1}{100}$ of an inch is accepted as a permissible limit, it is not true to say that points are in focus at that limit if they *can* be focussed more truly, and for a general investigation applicable to all lengths of focus scientific accuracy is requisite.

As to the impertinences of anonymous detractors they are, to quote the words of one of them, "Scarcely worth notice;" at all events, I am not going to waste time over one who poses as an authority without the courage to add his signature.—I am, yours, &c.,

W. E. DEBENHAM.

PHOTOGRAVURE WITH THE RULED SCREEN.

To the EDITORS.

GENTLEMEN,—*Apropos* of an article that appears in last week's BRITISH JOURNAL OF PHOTOGRAPHY, we herewith send you a few examples of intaglio work from a cross-lined screen, 175 lines per inch. They are impressions from copper-etched plates, bitten with perchloride of iron, and the resist is the usual fish enamel. As you see, the usual screeny effect is scarcely noticeable.

We agree with you that the screen cannot be too fine, and we ourselves had one on order from Levy, 250 per inch, but we had to abandon process work altogether, as it did not pay.

We shall be pleased, however, to have your opinion of the few examples in parcel submitted.

We may state that the whole work of engraving and printing on usual copper-plate press was done by ourselves, and not by a skilled pressman.—We are, yours, &c.,

G. & W. MORGAN.

393, *Union-street, Aberdeen, June* 1, 1898.

[The specimens sent are exceedingly good. They embrace a variety of subjects—portraits, views, and copies of pictures. We congratulate Messrs. Morgan on the excellence of their work. Mr. J. A. C. Banfill has also shown us a capital specimen, which he produced by the process some two years ago.—EDS.]

PHOTOGRAPHING INTERIORS.

To the EDITORS.

GENTLEMEN,—Permit me to communicate through your columns to the users of my exposure meter a new means by which they can use a comparatively large stop in the lens, and still follow my original method of exposing the plate and the actinometer simultaneously.

I find that the sensitive paper commences to visibly darken in about one-sixteenth the time required to darken to the full tint. If, therefore, a stop sixteen times the area (quarter the numerical *f* value), of that correct for the full tint be used, the exposure can be made for just the time the paper takes to attain the first visible darkening, judged by pulling out and pushing back for an instant. Thus, with P·70, *f*-64 is right for the whole tint, and *f*-16 for the first darkening of the paper.

It is always best, notwithstanding recent assertions to the contrary, to expose in dull lights for rather longer than the actinometer indicates.—I am, yours, &c.

ALFRED WATKINS.

Hereford, June 4.

VERY RAPID PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—Possibly the public in general, who know very little about photography, especially the technical working of it, will consider the fact of a Sidcup photographer successfully (?) photographing 438 sitters in ten hours (nearly one per minute) as being an astonishing and wonderful performance.

But that a professional photographer should boast of such a day's work, especially in a professional paper, seems to me—and, I feel certain, will to any and every photographer whose aim it is to make portrait photography what it should be—an art, to give his clients faithful portraits, carefully studied as to pose and lighting, and, by so doing,

making for himself a steadily increasing reputation — something too ridiculous, and by no means worthy of emulation.

Possibly those of the profession who choose to earn their living on the beaches of our seaside resorts may read this statement with envy. I fail myself to see how any one can benefit by such a proceeding, and it would be interesting to know what fees were charged, whether the proceeds were for some charitable institution, or any such laudable object, and what honour it showed to Her Majesty's birthday.—I am, yours, &c.,

A. B. C.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

Samuel Whitbread, South-street, Havant.—*A painting entitled "England's Glory."*

George W. Gibson, Coldstream.—*Five photographs of Charles Faa Blyth, King of Yetholm Gipsies.*

Francis Preece, 24A, Commercial-street, Hereford.—*Photograph of Jones's Stylish Brockhampton Car.*

James Leach, 2, Dinorwic-street, Carnarvon.—*Two photographs of Mr. and Mrs. Gladstone at Hawarden Castle.*

W. Cartwright, 47, Roscoe-street, Oldham.—*Photograph of Sir Henry Robertson and Family, of Llanderfel, North Wales.*

Patrick Halket, 12, Iona-place, Clydebank, Dumbartonshire, N.B.—*Photograph of Lusset Glen, Old Kilpatrick, Dumbartonshire. Photograph of Cat Linn, Duntiglennan, Dumbartonshire. Photograph of Duntocher, Dumbartonshire. Photograph of Roman Bridge, Duntocher, Dumbartonshire. Photograph of Lake Edenbarnet, Dumbartonshire.*

JESSOP.—No. 1 on your list.

J. A. RANDALL.—Many thanks.

NEMO.—The first-named for choice.

THOMAS POWELL.—Many thanks, but we think it preferable to withhold.

ACETATE.—1. No; make the addition a few hours before. 2. It improves by keeping.

COLOUR.—They are produced by a secret process as to which we can give no precise information.

ALFRED UNDERHILL.—The address is in the Strand, No. 346 or 347, we believe. Price 3*d.* monthly.

"SUBSTITUTE FOR GROUND GLASS."—In our ALMANAC for 1897 Mr. Valentine Blanchard has a suggestion which may answer your purpose.

F. LOVE.—Sorry we can give no further information. A letter addressed Dr. Phipson, care of the Editor of the *Chemical News*, London, E.C., may possibly result in helping you.

INQUIRER.—1. We should be inclined to think that the mount is at fault, but only very careful analysis could confirm this idea. 2. Can you give us a nearer date than "some time ago?"

MARKED PLATES.—DOUBTFUL. If the marking can be seen on the films, either before or after exposure, or before development, it is clear that it is the plates at fault, and not your manipulation, as insinuated by the vendor.

BARNET.—1. Add sufficient iron sulphate (not perchloride) until no further precipitate is thrown down. 2. Yes, if you do much toning. 3. To intensify, not to reduce. See Mr. Dollond's method for the former in the ALMANAC for 1895.

W. J. H.—To the best of our recollection, the system employed is that of an arc lamp in a concave radiator, or reflector, as it is termed. The whole apparatus is swung, and thus the light can be directed to any part of the studio. The system is a fairly common one.

YELLOW PLATINOTYPES.—T. PAGE. The cause of the yellowness in the whites of the platinum prints is that the iron was not all removed from the paper after the pictures were developed. A further treatment with the hydrochloric acid will most likely take out the yellow tint, and not injure the pictures.

ENLARGED NEGATIVE.—BEGINNER. The enlarged negative from which the print was made is at fault. It was evidently produced from an unsuitable transparency, one that was thin and under-exposed. Transparencies for making enlarged negatives from should be fully exposed and made tolerably vigorous in the development.

H. BARRACLOUGH.—1. Use a medium rapidity plate, a small stop, and give about half a second's exposure. The subjects you allude to are a speciality of the gentleman named. 2. The yellow screen is used to cut down the more actinic rays of the spectrum. Any dealer will supply you with one. 3. We should not consider such pictures permanent.

PHOTOGRAVURE.—T. BINNEY. There is no stated time for the copper plate to remain in the different etching baths, as so much depends upon the condition of the resist film as well as the depth of the etching desired. The class of subjects is also a factor in the case. Read the paper by Mr. A. E. Smith, given, with his demonstration, at the Photographic Club a short time back.

SULPHUR.—We can assign no reason for the discolouration beyond this, that in all probability you have left some silver hyposulphite in the prints. In other words, you have not perfectly fixed your prints. The method of toning, in our opinion, has nothing to do with the matter. Sorry our answer had to be held over on account of the holidays.

WOODBURYTYPE.—S.L.I.D.E. If you cannot succeed in drying the tissue in less than five days to a week, it will be very little use to attempt to print reliefs upon it, as in all probability it will turn out to be quite insoluble and undevelopable. There should be no difficulty with the calcium drying box you have. We suspect that the chloride of calcium you use is not completely dry, to begin with.

MARKED NEGATIVES.—T. REED asks: "Can you explain the fine lines running across the negative sent herewith? I put a dozen plates in the hand camera, and all the negatives have turned out the same. I have never had a like experience, though I always use the same brand of plates."—The lines are, no doubt, caused by the plates having been dusted with a brush that was damp or, more probably, slightly greasy.

WOODBURYTYPE.—YORK asks where he can obtain tissue suitable for making Woodbury reliefs, and whether it is supplied ready-sensitised as well as insensitive? also, who supplies paper prepared for printing from the leaden moulds?—We are not sure that the tissue is made for sale. If it is, the Autotype Company is the most likely source. We doubt also if the paper is to be had in this country ready-prepared. Try Waterlow & Sons, they are the most likely people to supply it. Liesegang (Düsseldorf) used to supply the paper, and probably does so now.

RECOVERING DEBT.—PROVINCIAL PHOTO writes: "Some time ago I took the portrait of a young lady, and submitted proofs, one of which was highly eulogised at the time as being the best she had ever had taken. Two dozen copies were supplied, and the account for them rendered. After waiting two months I applied for the money, and now they say the likeness is so bad they will not pay, and offer to return all they have left."—Sue the lady in the County Court, and produce at the hearing the letter you received approving of the portraits. You will recover the amount. Doubtless, the money will be paid into Court.

ANNIE M. TRAVIS.—The formula recommended by Dr. Hauff is :—

A.—Ortol	15	parts.
Metabisulphite	7	,,
Water	1000	,,
B.—Soda carbonate	100	parts.
Soda sulphite	125	,,
Water	1000	,,

Add one grain of bromide per ounce of developer. You can reduce the water by one-half and make up to full quantity when you come to develop.

PYROXYLINE BY RAIL OR POST.—EMULSION. We think you will find a difficulty in obtaining pyroxyline from Germany either through the post or the usual means of conveyance. We imagine that there, and in the countries through which it would have to come, the restrictions are much the same as they are in England as regards its carriage. You can, however, get celloidine without difficulty, as the restrictions do not apply to that. Messrs. Zimmermann are the agents for that here, so that you need not get it direct from Germany. They might also be able to supply you with German pyroxyline; if so, it would save you a deal of trouble. Messrs. Zimmermann's address is St. Mary-at-Hill, E.C.

THE EYES.—DEVELOPER writes: "I am developer at ——'s, and often am in the dark room for two or three hours together, and when I come out into the strong light of the studio my eyes become painful and water very much, and in a short time I get a violent headache. I do not feel any inconvenience until I leave the dark room, however long I may be in it. Can you suggest a remedy?"—The inconvenience appears to be due to the sudden transition from the dim light of the dark room to the strong one of the studio. A remedy would probably be to put on and wear for a short time, a pair of coloured spectacles—those known as "London smoke" glasses will be the best. Try them, and wear them for half an hour after coming into the light.

L.—1. A very difficult point. We think your only plan is to proceed by combination printing, that is, to make a separate study for the feet, and print in that portion. See articles on the subject in recent volumes. Sorry we cannot spare the necessary space to give full details. 2. The lens is suitable for enlargements. A $7\frac{1}{2} \times 5$ is the largest size you might expect to be well covered with the smallest stop. 3. The plate named would be too slow for the work, which is not difficult. Use a rapid isochromatic plate without a screen, a small stop, and give four or five seconds by way of trial. 4. Not of reducing. See Mr. Dollond's paper on intensification in our ALMANAC for 1895. That is a practicable process. 5. No; keep both sets of prints in distinct dishes.

*** Several answers to correspondents, Editorial Table, and other matter are unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1989. Vol. XLV.—JUNE 17, 1898.

Contents.

	PAGE
Cathedrâ	385
me Bypaths of Business: Sun Printing.—I.	386
adderettes:— Photographic Papers — Röntgen Rays through an Opaque Tube— The Electric Light and Coloured Reflectors — A New Element — The Greenwich Visitation — Medals for English Painters	387
ttings. By Cosmos	388
the So-called Depth of Focus in Round Field Lenses. By R.	389
epth of Focus	390
fore the Convention	392
hotography in Relation to Science	393
me Flippant Remarks on a Serious Subject. By S. Herbert Fry	394
e Triple Anastigmat	395
e "Spectrum" Plate — New Rapid Series	395
ypton	396
e Camera Club	396
Our Editorial Table:— The Leviathan Transparent Roll Film-holder—Acetylene Gas and Calcium Carbide — *Practical Pictorial Photography — The Wonderful Century: its Successes and Failures — Illustrated Guide to Leamington Spa, Warwick, Kenilworth, and Coventry* —Catalogues Received	396
News and Notes	397
Patent News	397
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club — Bradford Photographic Society — Sheffield Photographic Society	397
Correspondence:— Depth of Focus—Mr. Debenham's Equations—Acetylene as a Light Standard — The Triple Anastigmat, or "Cooke" Lens — The Hand Camera—The Convention Slides — Another Limelight Accident	398
Answers to Correspondents	400

EX CATHEDRA.

ast week, in the House of Commons, there was a discussion the medical arrangements at the Battle of Atbara. General ussell asked why no apparatus for the application of the ntgen rays was carried, and whether there was not reason to lieve that some lives of wounded officers and men might have en saved had these appliances been available. Mr. Brodrick plied that the Röntgen-ray apparatus, which is a very recent vention, is very difficult to adapt for field service, and was t carried with the field army in the recent operations. "From e returns the medical authorities do not consider there was single case in which life could have been saved by the use of e apparatus. Two sets are now in Egypt, and one more will sent out shortly. Two have been adapted, as far as possible, r field service, and one is for use in the base hospital."

* * *

In the course of a letter on the above subject to a Birmingm paper, Dr. Hall-Edwards remarks: "The unsatisfactory swers given in Parliament to questions asked relating to e application of the Röntgen rays during the recent operations in Egypt is another glaring example of the apathy exhibited by our War Department in dealing with questions relating to the saving of life and suffering. In June 1896 (at my instigation) Sir Benjamin Stone made inquiries of a similar nature, when the answer of the Director-General of the War Office (which I now have in my possession) was as follows: 'The application of the Röntgen rays to practical surgery is in daily use at Netley; and in the next campaign, if the transport question can be satisfactorily solved, the necessary apparatus will form part of the field equipment.' Several induction coils have already been designed for work in the field, and investigation has proved that good results can now be produced with instruments weighing a little more than a quarter of those at first found necessary. The chief difficulty undoubtedly lies in the source of electricity; but, inasmuch as no trouble has been spared in designing powerful search lights for field purposes, surely there should be little difficulty in obtaining the small amount of current necessary for generating the X rays. A couple of small specially designed accumulators and a small dynamo which can be driven by hand would meet all the requirements. If the X-ray apparatus were an instrument for dealing death and destruction, there would be little time wasted in getting over the transport difficulties; and why, may I ask, because it is otherwise, should such a fuss be made over so trivial and easily remedied a matter? Not having used the apparatus, it necessarily follows that every possible excuse should be raked up to prove why it was not used; hence the senior medical officer's report must be taken *cum grano salis.* He says that 'he was unable to trace a single instance in which the apparatus would have been specially useful, or in which an operation would have proved more successful by the use of the Röntgen rays.' I note particularly the 'specially useful,' as to those who are aware of the powers of the X rays it must be apparent that they would have proved 'useful' in every case. A radiographic examination of these 400 wounded men, when they return, would undoubtedly prove an object-lesson in military surgery of more than passing interest."

* * *

Mr. A. A. C. Swinton, in *Nature*, draws attention to the effect of printed matter on negatives. It does not appear to be generally known that photographic negatives, he points out, after they have been developed and fixed, and especially if they have been intensified by means of the bichloride of mercury

and ammonia process, are often strongly impressed by prolonged contact with printed matter. He first observed this many years ago, and has a large number of negatives in his possession which show the effect very strongly. "I enclose a photographic negative taken by myself in 1882, which has remained since 1886 wrapped up in the accompanying advertisement sheet of the *Electrician*. As will be observed, the greater portion of the print in contact with the film is clearly legible. It is, however, worthy of note that it does not appear to be the printer's ink in this case that has produced the chemical action, but rather the paper itself, or some ingredient therein. Those portions of the film protected from contact with the paper by the ink have retained their original colour, while the other portions not so protected have become very considerably bleached. The printing on the side of the paper removed from the film does not seem to have had any effect. It has probably been noticed by others that ordinary albumenised and sensitised photographic paper is also strongly affected in the course of time by contact with printed matter. In this case also the printing comes out as white lettering upon a darker ground."

* * *

According to a contemporary, M. L. Decombe, of the Paris Academy of Sciences, now enjoys the record for rapid photography, having been successful in photographing the period of the Hertzian oscillation, which occupied less than the five-millionth of a second. A rapidly rotating mirror was employed, and the explosive spark reflected from it through a collimating lens of very short focus, so as to present the spark in the focal plane of the lens. Previous to this, Professor Boys' photographs of bullets in their flight was the best achievement in the photography of rapidly moving objects.

* * *

Anthony's Photographic Bulletin reports a photographic find, consisting of several negatives made upon paper, and which were undoubtedly produced under the process patented by Fox Talbot, in England, in 1841. Many of the negatives are signed by their maker, Victor Prevost, and a number of them bear, in addition to the signature, the title, or a serial number, and the date, which latter ranges from 1852 to 1854, and the subjects are such, in several cases, as to establish the correctness of the dates. The negatives are of extremely good quality, both chemically and artistically, and vary in size from about 6 by 10 to 15 by 19 inches. The subjects cover a wide range, including copies of paintings, out-of-door views, and a number of interiors, several of the views presented being made in and about New York City, and including among others a number of the old Crystal Palace in process of erection, and others of its interior after it was opened to the public, which, with many other earmarks, conclusively establish dates. The technical perfection of the negatives, their size, and the magnitude of the collection seem to show that their maker was an adept in the then young art of photography, and the choice of view and subject prove him to have been an artist of no mean ability. Our contemporary will be very glad to receive any information that may tend to throw light upon their probable history, and how it is that a man with the abilities of Victor Prevost is not better known to-day in the annals of photography.

* * *

With reference to Mr. G. E. Brown's article on "Filtration" in our last issue, General Tennant has been kind enough to show us a form of glass funnel bearing the mark D. R. Gebrauchs Muster, which he finds, in conjunction with the ordinary Swedish filter papers, to be more effective than the plain or ribbed funnels commonly in use. The funnel in question is so channelled from the rim towards the neck that a number of deep passages are left behind the paper, and thus the solution passes rapidly through to the neck, and filtration is more quickly and completely accomplished than when plain or ribbed-sided funnels are employed. Perhaps, with the particulars here given, some reader may be able to say where this obviously useful form of funnel may be obtained.

* * *

With reference to the forthcoming Convention at Glasgow we are informed by Mr. Bridge that there will be a special excursion from London and the Eastern Counties to Glasgow on July 1, comprising the following stations: Liverpool-street and all Great Eastern suburban stations within twelve miles of London, Yarmouth (Vauxhall), Lowestoft, Cromer, North Walsham, Aylsham, Norwich (Thorpe), Trowse, Wells, Fakenham, Dereham, Swaffham, Lynn, Wisbeach, Ipswich, Stowmarket, Bury, Cambridge, Ely, March, Spalding, Sleaford, and Lincoln. Return tickets from London, available for four or ten days, 1*l.* 5*s.*, special rates from other stations. Return tickets at single fares will also be issued to Glasgow from the same stations available for return on any day (except Saturday) within sixteen days, including day of issue and return.

SOME BYPATHS OF BUSINESS: SUN PRINTING.

I.

Various suggestions have been put forward from time to time as to the branches of work which the photographer may take up in addition to portrait and out-door business. Three years ago in the Journal we directed the attention of the profession to collotype* as a medium for producing prints in considerable numbers for catalogues or view albums. We are still of opinion that it is in such a direction as this that the photographer will most easily enlarge the sphere of his business. A new style of portrait, a novelty in mount or pose, may attract trade for a time, but the demand for these is merely ephemeral. What is wanted is a development of business which shall supply some continual want. Such a development, easily worked by the photographer, and, in manufacturing centres, presenting every likelihood of extensive patronage, is the subject of the present article. We refer to the reproduction of drawings, tracings, &c., by the processes known to the engineer as "sun printing." The outlay for work of this kind is much less than that demanded by collotype, whilst the manipulations are easily within the powers of the most ordinary photographer. A little experience will enable any one to turn out first-rate work. The reproduction of a number of copies of, say, architectural plans, engineers' working drawings, survey maps, municipal and sanitary schemes, &c., is a matter of constant necessity, and, while some firms find enough work to justify the employment of a sun printer, there are many who will be ready to place their work in the hands of a local man in preference to sending it away to the various houses who make a speciality of this kind of business. We here propose treating of the practical

* The British Journal of Photography, May 10, 1895.

etails involved in the most generally employed of these reproduction processes. Those who wish to make themselves informed of the chemical facts upon which they are based may refer to the editorial article in the ALMANAC for 1889, or to an article in the *Practical Engineer* for April 23, 1897 (also obtainable in pamphlet form, price threepence, from the Hon. Secretary G.W.R. Engineering Society, 23, Wellington-street, New Swindon). First as to the apparatus required. Printing frames and dishes of suitable size, together with some arrangement for suspending and drying the finished prints, are all that is necessary. Drawings and tracings are met with of various sizes as follows:—

Foolscap	18 × 14 inches.
Demy	22 × 16 ,,
Royal	25 × 20 ,,
Imperial	32 × 24 ,,
Double Elephant	42 × 30 ,,
Antiquarian	55 × 32 ,,

With others of larger and special sizes. The printing frame is the most important item of the outfit. It is made of form similar to the better quality of frames sold for printing from negatives, being fitted with a front of plate glass on which the tracing to be copied is laid. In all but the smallest frames the back is made in several separate parts, and pressure is applied by means of a number of spiral springs (held in place by upright pegs attached to the back), the external end of the spring being pressed down by a cross bar, hinged to one side of the frame and secured by a catch on the opposite side. It is most essential that the tracing and sensitive material should be pressed into uniformly intimate contact. Any want of this will permit a scattering of the light passing through the tracing to take place with consequent blurring of the lines. A thick pad of felt is therefore used between the sensitive paper and the back of the frame. Frames of all sizes can be obtained of the firms dealing in sun-printing apparatus (*vide* later), an Imperial size being quoted at 2*l.* 10*s.* The number of trays required for the operations subsequent to printing depends upon the process selected. For water, zinc trays are best, owing to their freedom from rust; but they cannot be used for acid solutions. For these, wooden trays lined with lead, gutta percha, or papier-mâché, are necessary. Such dishes are rather expensive. An efficient substitute which can be constructed with the assistance of the local carpenter at much less expense is a wooden tray, lined with paraffin wax. The tray is made of yellow pine, dovetailed together, the bottom pieces being let into grooves. Paraffin wax is obtained from the large candlemakers, or best hard candles used. Melt sufficient of these in a saucepan, removing the wicks, and pour the melted wax as evenly as possible into the hot tray; work the wax evenly over the bottom and sides with a hot flat iron. The outside of the tray should be varnished with shellac varnish. Some tin cases for storing the sensitised paper should also be procured. The prints can be hung on lines to dry or suspended from a wooden rod fixed horizontally into the wall, the print being clipped by its edges by a wooden peg shaped like an inverted U. The accommodation for the work may be of the roughest description provided a good supply of light is available for printing, and premises, moderately darkened, are at hand in which the developing and washing operations can be conducted.

Although the photographer cannot stipulate how the tracings to be copied should be made, and must take them as he finds them, yet, whenever possible, attention should be drawn to the method of procedure giving the best copies. The tracings should be made on thin, bluish tracing paper or cloth. They should on no account be folded or creased, since all such inequalities will be visible in the print. Lines, dimensions, &c., should be put in with fairly thick Indian ink, to which a little chrome yellow or burnt sienna has been added. If Prussian blue is to be used at all, it should be rendered more opaque by the addition of flake or Chinese white. Indigo is better than Prussian blue for blue lines, and vermilion is the best colour for red.

Photographic Papers.—The amalgamation of the Saxe and Rives paper-makers and the raising of the prices of the raw material is a serious item with the manufacturers of photographic papers generally. These papers are costly enough already, and the prices are far beyond what they are for other papers of similar quality, from a paper-maker's point of view, that are not specially adapted for photographic purposes. For several decades the manufacture of all the photographic paper used throughout the world has been principally confined to three concerns—two in the Rives' district and the other in Malmedy. A few years ago the two former were merged into one concern, and now the latter have joined with it, and, as a consequence, the price of the raw paper is something like doubled. Is the "ring" thus formed to have things all their own way for the future?"

Is it not somewhat a reproach that English paper-makers, who produce some of the finest papers in the world, cannot, or do not, make a paper for photographic purposes? They make papers quite as fine, though unfortunately they are not well adapted for photography. Either they do not take the albumen well, or, if they do, they do not tone well. Hence the albumeniser has always been at the mercy of the firms alluded to. At present the preparers of photographic papers—emulsion papers—are less dependent upon the raw paper than are the albumenisers, as the paper itself is usually insulated by a baryta coating which supports the emulsion. This baryta coating is now of greater importance than the paper itself. Now, surely English manufacturers can produce a suitable raw paper, and the paper enamellers can apply a suitable baryta coating to it. Some of the emulsion papers contain no free silver nitrate, so that there is none to combine with the sizing matter of the paper, as there is in the case of albumen paper, and in the majority of P.O.P.'s there is the baryta coating intervening. Now that matters are thus far simplified, it is to be hoped that some English paper-makers will take the matter in hand.

Röntgen Rays through an Opaque Tube.—In reference to this subject, before referred to by us, some experiments by Villari will be found of interest; they were brought before the Naples Academy of Sciences. When the rays were passed through a long tube made of a material opaque to the rays, he found an undoubted change in their properties in one direction—they lost their power of discharging an electrified conductor. Professor Villari's explanation simply is that the lateral rays, which by their action on the surrounding air would accelerate such discharge, were cut off by the tube. When the photographic action came to be examined and compared, he found the result of passing the rays through the tube to be *nil*. He came to the conclusion that the rays are neither reflected nor diffused by the walls of the tube, and that the transmitted rays are probably in no way modified by its presence.

The Electric Light and Coloured Reflectors.—In a recent number of the *Electrical Engineer*, of New York, there is given an excellent table, by Mr. J. C. Thompson, of the amount of incident light reflected from a large variety of surfaces—white, and

coloured. The following list gives the amount per cent. reflected by the different surfaces named:—Black velvet, 0·4 per cent.; black cloth, 1·2; deep chocolate, 4; black paper, 4·5; dark blue, 6·5; dark green, 6·1; dark brown (!), 13; bright red, 16·2; dirty yellow, 20; dark brown, 23·2; white sandstone, 24; blue paper, 25; yellow cardboard, 30; straw yellow, 30·4; yellow paper or paint, 40; green paper, 46·5; yellow paper and grey paper, 50; light-coloured wood, 50; bright yellow paper, 50·3; light orange paper, 54·8; white paper, 70; freshly fallen snow, 78; whitewashed ceiling, 80; dead white, 80; white blotting-paper, 82; mirror, 83; white cardboard, 92·3.

A New Element.—The latest scientific excitement is the discovery by Professor Ramsay and Mr. Morris W. Travers of a new element found existing in atmospheric air. The discoverers propose to call it "Krypton" from a Greek word meaning concealed. The history of its discovery is the history of the patient following out of a slight clue. They were, through the kindness of Dr. Hampson, provided with about a pint and a half of liquid air, and this they allowed to slowly evaporate till all but about a third of an ounce was left. This was treated in various ways to get rid of other gases, and ultimately 26·2 c. c. (the bulk of nearly a fluid ounce) was left. Spectroscopic and other examinations proved it to be a new element.

The Greenwich Visitation.—This inspection, which is of annual occurrence, generally brings to light many matters of photographic interest, and the present is no exception to the rule. In the Astronomer Royal's own room are to be found the most interesting exhibits of the year. There are five photographs of the moon taken with the Cassegrain reflector, a series of prints of close double stars taken with the largest telescope of the Observatory—the twenty-eight-inch refractor—six beautiful transparencies from the recent solar eclipse photographs, taken by the Astronomer Royal in India, the sun's disc being four inches in diameter. It has most unfortunately happened that the Observatory photographs have been stored in damp rooms, and have become seriously injured, especially in the case of the negatives, for the great stellar map, some of these films having actually left the glass, or showed indications of so doing. Out of 909 plates for the catalogue 166 have gone wrong, and 70 chart plates out of 828. Glass positives from the 90 damaged plates are all right. This sounds as though the negatives had not been varnished, but surely such an obvious precaution would not have been neglected.

Medals for English Painters.—The jury of the Vienna International Art Exhibition have made their awards. With the diplomas of honour, there are twenty large and thirty-nine small State medals. Three of the large medals and five of the smaller ones go to British artists—not a bad proportion in an international Exhibition. It has been argued, by the opponents of medals at photographic exhibitions, that artists, as at the Royal Academy, consider it sufficient honour to have their works accepted and hung. The same is said to be the case at the Photographic Salon. But, as a matter of fact, English painters do exhibit their pictures in competition at foreign exhibitions; also some members of the "linked ring" do exhibit their works at shows where there are medals offered for competition, and feel very proud if they get one, even at minor societies.

JOTTINGS.

THREE weeks will see the opening of the Convention, and take, it is to be hoped, a great many of us to the banks of the Clyde for a few days' enjoyment and photographic study. It is, of course, in its capacity for making good or better photographers of those who attend it that a Convention meeting always lives in the memories of its members. Private letters from Glasgow tell me that between the local committee and the London Council some little friction on points of detail has arisen. For example, there appears to be some doubt as to whether members will be entitled to invite ladies who are non-members to accompany them on the excursions. The Council is said to be opposed to the idea. I do not think that any obstacle should be placed in the way of the free exercise of our Scotch friends' chivalry; and, if I know anything of the minds of Southern Conventioners, I should say that they would be "agin the Government" on the point. The more ladies who can be induced to attend the Convention outings, the more popular photography is likely to become. Is it not one of the Convention's aims to make photography popular? A short rule giving members power to invite friends to the excursions might meet such a case as I am discussing.

The Voigtländer-Cooke lens seems to have made some of the German opticians quite angry, and, if all they say of it be true, the despised and nameless French lens of the cheap set is not very much inferior to Mr. Dennis Taylor's much-discussed production. I find it hard to believe that Dr. Von Rohr and Herr Klepp can be right in their estimate of the lens—indeed, I should not be surprised if the remorseless severity with which they pick the Cooke lens to pieces, and relegate it to a place among instruments of the pre-anastigmatic type, is not instigated by chagrin at an English optician having presumed to enter the field against Messrs. Zeiss and others. It should not be so, of course, but scientific men are very jealous persons. However, out of evil cometh good. A reaction appears to be setting in just now against flat-fielded lenses for certain purposes, so that, assuming Herr Klepp to be right in assigning the Cooke the unsuspected property of considerable curvature of field, it will have uses not anticipated when it was first introduced.

I have a note to refer to a little paper called "Individualism in Photography," April 22, 1898, p. 250, which my friend, Mr. Oakden, the President of the South London Photographic Society, read to his members a couple of months ago. It amounts to a plea that photographers should be individualistic, in so far as the cultivation of a particular style of work is concerned, and should not imitate or copy the styles of one another. This is good advice, but it is, nevertheless, very trite. Mr. Oakden, I fancy, missed the mark he aimed at. What is obviously wanted in photography is not so much the quality of individualism—the particular way of doing a particular thing—but more individuality: the mind, the imagination, the sentiment of the man showing in his work. The Salon people desiderate this individuality when they ask for work having evidence of "personal feeling." I quote the phrase from memory; but, so far, they have only succeeded in discovering three or four individualists, Demachy, Puyo, Craig Annan, and perhaps one other. The rest are mostly photo-fakers, photo-imitators, photo-quacks.

Two of the best papers recently read before societies, and printed in these pages come from Scotland. They are specially distinguishable by the sound common sense which we look for in the photographic writings of our northern brethren. The first of these papers is by Dr. J. K. Tulloch (p. 327, May 20), and it is on the "Gum-bichromate Process." I have for years admired the clear and incisive reasoning which Dr. Tulloch always exhibits when he takes a debatable subject in hand, and in the little paper on gum-bichromate to which I refer he brushes aside the sickly mass of pseudo-artistic rubbish that has been written about that process, in a manner that practically silences retort. He dismisses the claim for "artistic power" which the process is supposed to afford by a series of cogent arguments, leading up to the formidable proposition that, "whatever power one has over his results in this process, there is no more evidence in them of human intention than in an ordinary photograph." "Fakes" are what he calls gum-bichromate pictures, and the "best dodge to improve a faulty negative is to do another without the faults." I commend a perusal of the paper to those silly photographers who affect, or are being led, to imagine that a little pottering about with bichromated gum will make "artists" of them.

The second paper is by Mr. P. M. Macintyre (page 374). Incidentally writing on the Hand Camera, he puts in a forcible defence of topographical work—work which is "fairly sharply focussed, supplies a good detail, and shows particular places, and persons, and subjects as they appear in ordinary daylight and to the average eye." "The fact of the matter is," goes on Mr. Macintyre, "this topographical work has done more to disseminate among mankind an accurate and intelligent idea of the world . . . than any other single agency." It is needless to add that, in a subsequent passage, Mr. Macintyre throws keen ridicule on the present prominence given to "impressionist interpretations of nature"—a phase of photography with which we of late have been so sickened and nauseated that Mr. Macintyre's vigorous scorn of it comes with all the refreshment and reinvigoration of a cool breath of air on a moist and clammy night. It is pleasant to note that, when every shop boy or mill hand is being told to go "moping round" (I quote Mr. Macintyre) in search of gloomy or misty effects, under the delusion that he is thereby producing "pictorial" photographs, some photographers have kept their heads, and are protesting against the verbose and inflated penny-a-lining twaddle with which some hermaphroditic photographers and others are deluging us, in the persuasion that they are teaching "art." We could not have a more effective and complete demolition of the mountain of nonsense that has recently been piled round the ricketty flagstaff of "pictorial" photography than Mr. Macintyre has put into his little paper on the Hand Camera.

What exciting reading the report of the last meeting of the Royal Photographic Society (p. 349) supplies, to be sure. Mrs. Bishop, who lectured on her photographic experiences in the Chinese Far East, tells us that "in the attempts which she made to set up her camera in Western China she was mercilessly knocked about, beaten and pelted with dangerous missiles, and the camera was overturned. . . . . Photography," she adds, "as practised in Western China, was anything but a recreation." One can readily understand that. The fact that the intrepid lady went through some really wonderful adventures for the purpose of securing photographs of this strange land and its people, and was successful in her object, should make photographers in particular feel proud of her. Fancy the skill with which she turned "fluid river mud" to account for developing purposes, and brought home the negatives! There ought to be a kind of photographic Victoria Cross for such achievements, and Mrs. Bishop should be its first recipient.

Last week's daily papers, in their Parliamentary proceedings, reported the Under Secretary of State for War as informing a questioner that no radiographic apparatus was on the field during the recent Battle of Atarba, because it was difficult to adapt for field service. It is a curious commentary on this admission of official impotence that in this JOURNAL for May 27 (p. 342) Surgeon-Major W. C. Beevor, of the Army Medical Staff, gives a description of the working of a radiographic outfit during the Indian frontier campaign at Tirah-Peshawur, an apparently difficult country for transport. One is therefore wondering why an X-ray outfit was sent to India, and not to Egypt. Is it another case of departmental blundering? COSMOS.

ON THE SO-CALLED DEPTH OF FOCUS IN ROUND FIELD LENSES.

"For, as I have proved amid the purlieus of Drury Lane . . . . there is no scene which cannot be obtained by its [the portrait objective's] agency, and, whereas on an open landscape scene only a very limited portion of the field would be sharp, here, owing to the convergence of the subject and the well-known law of conjugate focus, the field on the sensitive surface is flat, and the picture sharp up to its very margin."—J. TRAILL TAYLOR ("Lenses for Hand or Detective Cameras," THE BRITISH JOURNAL OF PHOTOGRAPHY, 1889, vol. xxxvi. No. 1529, pages 553, 554.

IN these words of the late Editor of this JOURNAL we have the clue to certain apparent differences between theory and practice as regards depth of focus in old and new forms. As practical photographers are aware, there is a saying that lenses of the old rapid symmetrical or rectilinear type, in certain cases, will work sharper at a comparatively large aperture (*f*-8, *f*-*i*) than modern anastigmats do. The difference between theory and practice does not in reality exist; it exists only, here as in many other cases, because theory is misunderstood and misapplied. The question is not one of depth of focus, but of curvature or flatness of field. Remembering the deduction of the formula for depth of focus in lenses of different construction but of equal focal lengths and relative apertures, we shall easily see that the alleged independence of depth of focus from the type of the objective exists only for plane objects situated immediately on, or so near to, the axis, that their sharp images may be considered as quite flat and as lying on the plane surface of the sensitive plate. In the case of plane objects giving *curved* images, the entire theory does not hold good for oblique pencils, and cannot be applied.

In our case, the distinction between old and new lenses is made

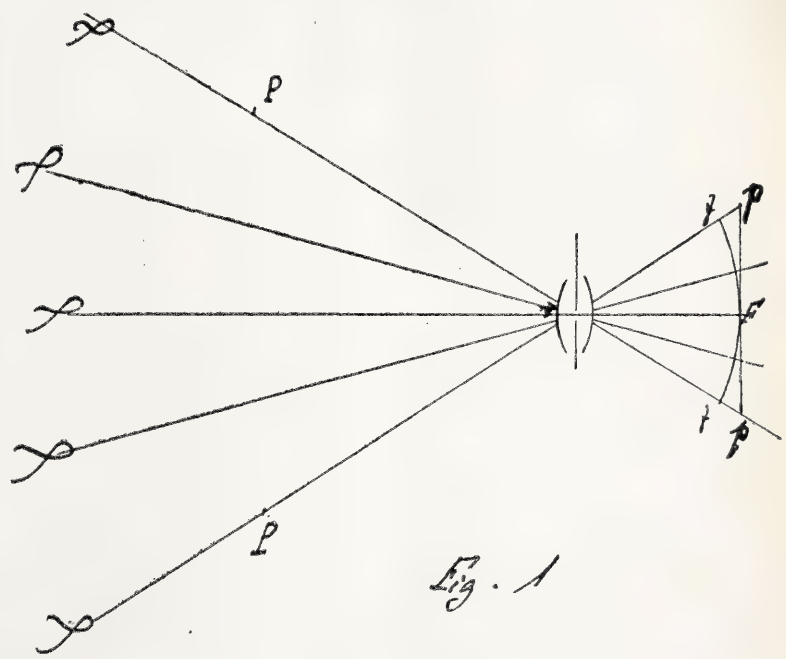


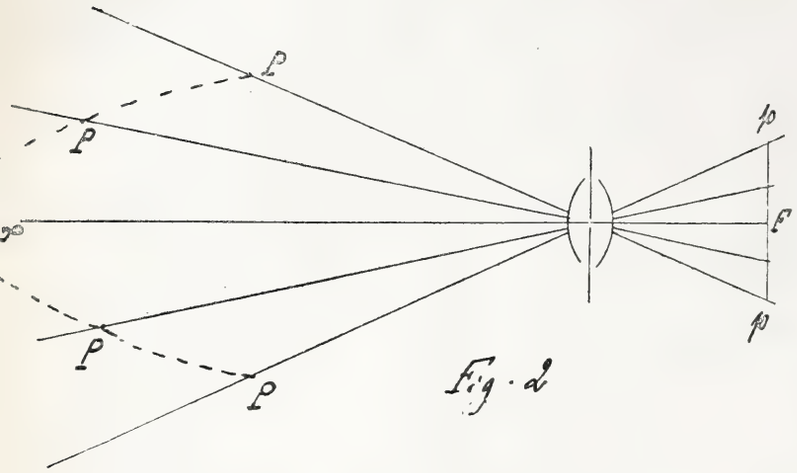
Fig. 1

with respect to a certain property of these lenses, viz., the property of a curved and a flat field. The old lenses used for landscape work have mostly a field concave to the lens, certainly concave if corrected for astigmatism. Let the fig. 1 represent a section through such an old lens and through the cone of rays passing through the middle of the diaphragm, and suppose the light to move from left to right, and the sign ∞ to mean infinity, the objects from which the rays come are, as we may always assume in landscape photography, at infinite distances, at any rate at infinity compared with the equivalent focus of the lens, then, as we pointed out, the sharp field of such a lens used with a certain aperture is generally rounded, turning its hollow side to the lens.

If we take fig. 1 as representing a horizontal section through an anastigmatically corrected lens of the old glasses, through the cone of rays passing through the middle of the diaphragm, and through the focal surface *f* F *f*, of distant objects, then we must draw the line, *p p*, vertically to the axis, in order to represent the sensitive plate. If this line, *p p*, touches the curve, *f* F *f*, in F, we describe it in photographic language as focussed for the centre of the plate, and then the question arises, what will become of the margin of the plate, viz., the places marked by *p* and *p*? Objects at infinite distances will *not* be sharp there, for these images are formed at *f* and *f*, but there is no difficulty at all in finding a point on the rays ∞ *f p*, which will have its sharp image at *p*. This point will be nearer to the lens, for every photographer is aware that he must rack out his camera in focussing for nearer objects, and therefore,

if we place the plate at p, it is not the infinite point ∞, the image of which is at f, which will be sharp, but a point, p, nearer to the lens. Thus we find that the distances between the lens and the points, p, sharply defined on the plate, decrease with increasing obliquity of the rays.

The fig. 2 represents these points placed on five rays at the necessary distances, and a curve connecting them. From the preceding it is evident that every point on, or very close to, this curve



will have its image in, or in close proximity to, the plane, $p\ p$, so that, in photographic language, all objects arranged on such a curve will be represented sharply, even with large aperture, on the sensitive plate.

Now, suppose we take a flat-fielded lens, the case is different. Here the objects situated at infinite distances (fig. 1) would be represented with full aperture at the plane, p F p, and, to obtain a sharp definition for the curve above mentioned, it would be necessary to stop down the lens to a very high degree. Thus it is obvious that the old lenses, with the peculiar form of the curve of sharply defined objects, are much more adapted for rendering convergent objects, such as street views, interiors of cathedrals, and so on, than the new lenses, with their plane fields; and, were it simply the task of the photographer to take objects arranged on a line concave to the lens, the opticians, from J. Petzval down to those of our own time, would not have tried their utmost to flatten the fields of lenses. With perfect justice we may describe this property of the round field as a drawback to the lens, even if sometimes we are able to make it of use. There is certainly no practical difficulty in arranging a group according to the curve described, and the different persons will come out quite sharp; but, if we take a lens with a remarkably round field, we are of necessity bound to bring the persons on the sides of the group so close to the lens that they are represented on a much larger scale than those in the centre, and we should find fault not with the precision, but with the perspective, of the picture; whereas, in using a flat-field lens, the persons may be placed on a line vertical to the axis of the lens, and with the same aperture we shall obtain the same sharpness, but a decidedly better perspective, because the scale of reduction remains unchanged for every person. This deficiency becomes even more apparent in reproduction work. The round-field lens, corrected for astigmatism, and incapable of defining with a large aperture a plane object on the plate, has to be stopped down considerably to obtain sharp definition throughout the picture, whereas the flat-field lens, corrected for astigmatism, gives equal sharpness on the plate with sufficient intensity.

Thus, from the foregoing, we may sum up as follows: The old lenses, which could not be corrected for astigmatism without the introduction of roundness of field, do not come up to the new flat-fielded anastigmats in general applicability, but there are some instances of outdoor photography in which one is able to make this very deficiency, the roundness of field, of use. In these cases, and in these only (convergent objects such as street views, interiors of cathedrals, &c., with comparatively large apertures), they will be superior to the new type of lenses. R.

DEPTH OF FOCUS.

Possibly, at the present time, the following extract from Pizzighelli's *Handbuch der Photographie* may be of interest:—

If a distant object be sharply focussed with a lens that is stopped down, it will be found that the focussing screen may be shifted a little to and fro without sensibly diminishing the sharpness to the eye. It will be further found that, without altering the position of the ground glass, objects which may be before and behind that focussed on will appear sufficiently sharp.

This power of the lens to define sufficiently sharp for the eye, upon the focussing screen, the images of objects at different distances from the camera, is called "depth," or "depth of focus." It is of great value in photographic work, since it permits one to obtain foreground and distance equally sharp.

As has already been mentioned in the explanation of the action of the diaphragms in lessening some lens aberrations, the phenomenon of depth

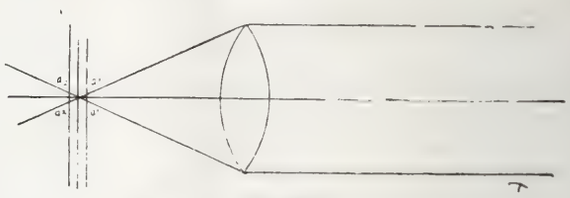


Fig. 92.

of focus relies on the fact that, with rays which meet at a very acute angle, the focussing screen may stand somewhat in front of or behind the point of intersection, without the image of a point formed by the rays being appreciably altered. Figs. 92 and 93 explain this. With the lens without diaphragm (fig. 92), a very small shift of the focussing screen v, towards v^1 or v^2, is sufficient to form, instead of an image in the form of a point, a circle with a diameter $a_1\ a_1$ or $a_2\ a_2$, and thus a fuzzy image. If, however, a diaphragm, B (fig. 93), is inserted, v, as well as v^1 and v^2, may be formed on the focussing screen. On the other hand, in the first

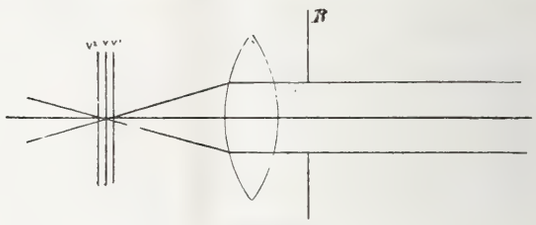


Fig. 93.

instance, there would only appear sharp on the screen, v, that point the image of which would be exactly formed at this place, whilst in the second case the images of all points would appear sufficiently sharp, that is, they would appear as points which, according to the principles of conjugate foci, must be formed in v^1 or v^2.

Thus, therefore, the required sharpness for the depth for any special case, to be satisfactory, the diameter of any bundle of combined rays must be within the limits in which the image of any individual point of the object to be taken is formed, and so small that it appears as a point. For the unaided eye this will be the case if this diameter amounts to the most to 0·1 mm.; for small work, which is to be enlarged later, and still appear sharp in the enlargement, it ought not to exceed more than 0·05 mm.

From what has been said it is obvious that, under otherwise equal conditions, the depth of focus increases with decrease of the aperture of the lens (diaphragm aperture), and can therefore be increased by the insertion of smaller stops. The decrease of the diaphragm aperture in the endeavours to increase the depth ought not, however, to be carried too far—it ought not to go too much below f-60, or otherwise a certain flatness, and also fuzziness, will be formed in consequence of the diffusion of light.

Under all circumstances, however, the depth of focus is dependent on the fact that the object to be taken is sufficiently distant, so that the images of its individual parts fall in the vicinity of the principal focal plane. They are then so close behind one another that a focussing screen in the position of the mean plane can reproduce them sufficiently sharp. The following table, which is reckoned out for objects at various distances, and for a lens of 10 cm. focus, and shows how much greater

the individual distances of the picture planes are than the principal focus, makes what has been said quite clear :—

Distance of object in m.	Difference between image plane and focal plane in mm.	Distance of object in m.	Difference between image plane and focal plane in mm.
10,000	0·001	3	3·5
1,000	0·01	2	5 3
100	0·1	1	11 1
50	0 2	0·5	25 0
10	1·0	0·4	33·0
5	2·04	0·3	50 0
4	2·6	0·2	100·0

For distant objects, to 50 m., the focussing screen is removed only a very little, as far as 0·2 mm. from the plane of the principal focus. If it is placed at the equivalent focus, all objects from 50 m. distant appear sufficiently sharp. With objects which lie nearer, the differences in the image planes will be greater, however, and it will be then more difficult to obtain them simultaneously sharp on the focussing screen. Objects, for instance, at 1 and 2 metres' distance will be reproduced with this lens at 11·1 – 5·3 = 5·8 mm. behind one another.

This explains also the difficulty, in taking portraits in the studio, where the distances are proportionately small and the use of small diaphragms in consequence of the loss of light is not permissible, of obtaining absolute sharpness of all parts. With groups, therefore, it is necessary to arrange people with as little depth as possible.

The Depth of Sharpness in Hand Cameras without Focussing.

With all apparatus in which focussing is done before exposure the necessary degree of the depth of focus is judged by observation, and regulated by the insertion of stops ; but there exist a very large class of hand cameras which are used without previous focussing. This class of apparatus has no focussing screen, and the lens is in most cases once for all focussed on infinity—that is to say, the distance of the sensitive plate from the lens is constant and equal to the equivalent focus. The question is now to determine the conditions under which, with these cameras with fixed extension, the depth of focus of the objective used is sufficient so that the maximum indistinctness shall not exceed the limits of 0·1 mm.

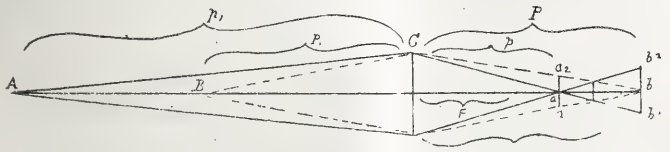


Fig. 94.

In fig. 94 let a and b be two images of two points, A and B, formed by the objective, C D, of the aperture, d, and focus, f.

If these are taken on one plate, and the focussing screen placed at a, the image, a, of the point, A, will be sharp, that of the point, B, however, will not be a sharp point, but appear as a circle of the diameter, $a_1\ a_2$. Similarly, by placing the screen in b, a sharp image of the point, B, will be obtained, but a fuzzy image of the point, A, as a circle of the diameter, $b_1\ b_2$. If the points, A and B, are sufficiently distant, or the aperture, d, of the lens be reduced by the insertion of a diaphragm, the circles, $a_1\ a_2$ and $b_1\ b_2$, can be so reduced that they are no longer recognisable by the eye, and therefore do not exceed the permissible indistinctness of 0·1 mm., so that the depth of focus will amount to the distance, ba, and the focussing screen may be placed, according to the point which is to be obtained sharper, either at a or b, without the image of the other point exceeding the permissible fuzziness.

Instead, however, as in this case, of allowing the indistinctness to successively decrease from 0·1 mm. to 0 mm., it may be distributed by placing the focussing screen at c, at which the circles of confusion of the points, A and B, are equal to one another. By such distribution of the sharpness the advantage is obtained that this can be extended over a greater stretch. Fig. 95 shows this, if not in the correct proportions.

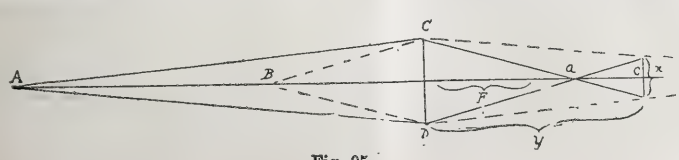


Fig. 95.

If, for instance, in fig. 94 the circle, $b_1\ b_2$, had the diameter of 0·1 mm., and if one would obtain an equal fuzziness by placing the screen at c ($x = a_1\ a_2$), thus by keeping the position of A (fig. 95) constant, the point, B, the image of which must have the same degree of sharpness as that of the point, A, may be brought considerably nearer.

If in fig. 94 we designate the image planes with p, P, and y, and the corresponding distances with p_1, P_1, and y_1, the focus as f, the ratio aperture as d, and the permissible confusion at c with x, we have then the following equations :—

$$1. \quad p^1 = \frac{p\,F}{p - F}$$

$$2. \quad P_1 = \frac{p\,F}{p - F}$$

$$3. \quad y^1 = \frac{y\,F}{y - F}$$

It further follows that from the similar triang'es C D $a \sim a\,c_1\,c_2$ and C D $b \sim c_1\,c_2\,b$

$$4. \quad \begin{aligned} x : (y - p) &= a : p \\ x : (P - y) &= a : P \end{aligned}$$

From which it follows—

$$5. \quad p = \frac{y\,d}{a + x}$$

$$P = \frac{y\,d}{a - x}$$

Substituting the values of p and P in equations 1 and 2, we have—

$$6. \quad p_1 = \frac{y\,a\,F}{y\,a - (d+x)\,F} = \frac{F}{1 - \frac{(d+x)}{y\,a}F}$$

$$P_1 = \frac{y\,a\,F}{y\,a - (d-x)\,F} = \frac{F}{1 - \frac{(d-x)}{y\,a}F}$$

And substituting the value of the permissible confusion $x = 0{\cdot}1$ mm.

$$7. \quad p^1 = \frac{F}{1 - \frac{(d + 0{\cdot}1)}{y\,d}F} \text{ mm.}$$

$$P^1 = \frac{F}{1 - \frac{d + 0{\cdot}1}{y\,a}F} \text{ mm.}$$

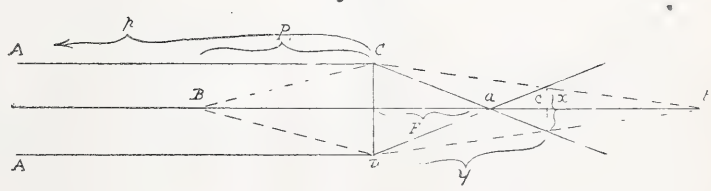


Fig. 96.

From these equations the distance (p_1 and P_1) of any points (A and B) can be reckoned so that they shall be formed on the focussing screen with the permissible disc of confusion with any objective of known focus. Focus F, and for any ratio aperture (a), and for any position of the focussing screen (y).

When the point A is at a very great distance, and $p^1 = \infty$, the first equation 7 takes the form.

$$\infty = \frac{F}{1 - \frac{d + 0{\cdot}1}{y\,d}F}$$

which can only happen when the denominator of the fraction = 0 ; therefore—

$$1 - \frac{(d + 0{\cdot}1)}{y\,d} = 0$$

wherefore

$$8. \quad y = \frac{d + 0{\cdot}1}{d}F \text{ mm.}$$

which gives the distance of the focussing screen from the lens, so that the permissible confusion shall extend from the point B in the foreground to the point A in the distance.

For the distance (P_1) of B there results by substituting the values of 8 in the second equation 7—

$$9. \quad P_1 = \frac{d + 0{\cdot}1}{0{\cdot}2}F$$

By means of the equations 8 and 9 may now be reckoned for the different effective apertures (d) of a lens, the distances at which the fore

round (point B) to the distance shall still appear equally sharp, and also the corresponding distances of the focussing screen from the lens.

The following Table XI. contains the required results for six objectives from 5 to 30 cm. foci with different effective apertures.

TABLE XI.

THE DEPTH OF SHARPNESS FROM ∞ WITH ANY EFFECTIVE APERTURE WITH THE CORRESPONDING PICTURE PLANE AND A PERMISSIBLE CONFUSION OF 0·1 mm.

Ratio aperture d=	For lenses of foci F in mm.						The picture plane y, corresponding to the ratio aperture and in mm.
	50	100	150	200	250	300	
	The distance of the nearest point of the foreground will be in m.						
f·5	2·5	10·1	22·6	40·0	62·5	90·0	$y=F+0·5$
f·10	1·3	5·1	11·3	20·0	31·3	45·0	$y=F+1·0$
f·15	0·9	3·4	7·6	13·3	20·9	30·0	$y=F+1·5$
f·20	0·7	2·6	5·7	10·0	15·6	22·5	$y=F+2·0$
f·25	0·5	2·1	4·6	8·0	12·5	18·0	$y=F+2·5$
f·30	0·5	1·8	3·8	6·7	10·4	15·0	$y=F+3·0$

This confirms the fact already established by experience that the depth of focus increases with the decrease of aperture, and that with equal ratio aperture the objective with shorter focus works deeper than that with longer focus. Thus with an equal aperture, *f*·10, the point in the foreground, which is still sharp with the distance, is with an objective of F=50 mm., only 1·3 m. from the camera, whilst with a lens of F=250 mm. it is 31·3 m., which is considerably further off.

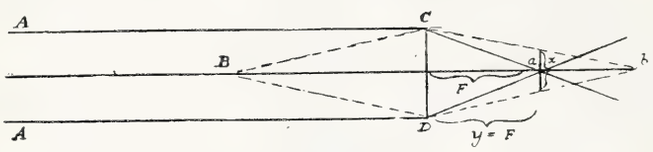


Fig. 97.

If the position of the focussing screen is not altered in a corresponding manner to the ratio aperture (Equation 8), but is placed once for all at the equivalent focus (y=F, fig. 97), the very distant points will appear sharp, and the sharpness towards the foreground gradually decrease—that is to say, the fuzziness will increase. If the latter should not exceed the suitable degree of 0·1 mm., the image plane of the nearest point of the foreground, which will still be sufficiently sharp, can still be reckoned, when in the second equation, 7, y is assumed to be equal to F. It then takes the form of—

$$P_1=\frac{d\,F}{0·1}=10\,d\,F.$$

The value of P_1 for different lenses of F=50 mm. to 300 mm. for the different effective apertures is given in the following table:—

TABLE XII.

The depth of sharpness from ∞ when the picture plane = the equivalent focus, with a permissible confusion of 0·1 mm.

Ratio aperture a=	For lenses of focus in mm.						
	50	100	150	200	250	300	
	The distance of the nearest point of the foreground will be in m.						
f 5	5·0	20·0	45·0	80 0	125·0	180·0	
f·10	2·5	10·0	22·5	40·0	62·5	90·0	
f·15	1·7	6·7	15·0	26·7	41·7	60·0	
f·20	1·3	5 0	11·3	20·0	31·3	45·0	$y=F$
f·25	1·0	4·0	9 0	16·0	25·0	36·0	
f·30	0·9	3 4	7·5	13·4	20·9	30·0	

A comparison of the corresponding values of the two tables shows at once that, with a displacement of the focussing screen corresponding to the ratio aperture (Table XI.), the depth of sharpness is considerably greater than if the focussing screen, and with it the sensitive plate, be placed once for all in the focus (Table XII.). Thus, for instance, with a ratio aperture of *f*·10, and with the same lens of F=150 mm. in the first case, the foreground, which is sufficiently sharp, reaches to 11·3 m., and in the second case, however, to 22·5 m. from the apparatus.

The result of the researches in the above-mentioned notes, as regards cameras without extension, as most detective or hand cameras are used, in which there is no focussing on the ground glass, lead to the following conclusions:—

1. To increase the depth of the sharpness it is advisable to be able to shift the objective a little, so that its distance from the sensitive plate (last column, Table XI.) may correspond to that of the diaphragm aperture for the time being.

2 If the camera has a fixed focus—that is to say, if neither the objective nor the sensitive plate is movable—and if, as is actually the case with many hand cameras, the lens is provided with only one diaphragm, the distance of that should be determined for this aperture, in order to obtain the greatest depth of sharpness.

3. If the camera has a fixed focus, and the objective is used with several diaphragm apertures, the picture plane must be assumed to be equal to the equivalent focus, and the depth of the attainable sharpness with any diaphragm is equal to the values in Table XII.

4. As in the use of hand cameras, the objects which are found to be nearest to the apparatus are very near, it is advisable to obtain sufficient sharpness to use only very small lenses; one gains thus not only in sharpness of the near objects, but on account of the less stopping down and the lesser thickness of the lens also in rapidity. By the choice of small objectives it is also necessary to build the cameras as small and as portable as possible.

5. In the two Tables the distances of the objects which are equal, or approximately equal, to 100 times the focus of the lens, are printed in underlined. It will be seen how, with increase of the focus, the ratio aperture must always be smaller in order to obtain a point, which is 100 times the focus distant, sufficiently sharp. The generally expressed opinion, that an object distant 100 times the focus of the lens appears sharp on a focussing screen stationed at the equivalent focus, is therefore only conditionally correct, that is to say for any focus only with a given diaphragm aperture.

BEFORE THE CONVENTION.

III. MESSRS. CHARLES SWEET, ROTHESAY; AND CHARLES REID, WISHAW.

IT is only natural that visitors to Glasgow at Convention time will not spend their holiday entirely within reach of "St. Mungo's Tower," but will travel afield; in fact, the particulars already published in the JOURNAL show that arrangements are being completed to allow them to do this with as little trouble and expense as possible. Edinburgh is one of the all-day excursions, and we propose to deal with it next week, but meantime we intend devoting attention to two photographers near by the metropolis of the West. The Thursday excursion should be one of the most pleasant trips of the series to those who are not troubled with *mal-de-mer*. During the cruise the Convention steamer will visit Rothesay Bay, and the visit may be the more enjoyed if we know a few facts about "Sweet, Rothesay Bay." This is a pun, but I decline to become sponsor for it; it is the method by which Mr. Charles Sweet, photographer, Rothesay, impresses his address upon his friends, and not a bad method, you will admit.

Mr. Sweet is a "Glesca' loon;" after duly serving his apprenticeship with Mr. Alex. McNab, of that city, he went to Mr. Adamson, Rothesay, with whom he laboured three years. He then started business on his own behalf; his capital was small, but he succeeded, and his rise was thus described to us by a personal friend of Mr. Sweet's, who we trust will pardon its use here: "By sheer brute force, combined with a love for his profession and a strong objection to strong drink, he raised himself to his present position." Mr. Sweet is yet a young man, full of enthusiasm for his profession, and, now that he has taken up exhibition work, he may be prominently heard of at future exhibitions, even although he declares he is too busy a man to be troubled with them.

His studio, a block of buildings three stories high, occupies a prominent position in "the Brighton of Scotland," as Englishmen delight to call Rothesay; the proud Scot, however, will have none of this, and, in reply, dubs Brighton "the Rothesay of the South." It is a corner building, and has been specially constructed for the business.

In the three windows he makes a telling display of specimen photographs; this display is continued in the spacious show-room. The specimens include ordinary studio work and enlargements; while for the more artistically inclined there are displayed carbon prints and studies for exhibition work. From the show-room a neat staircase leads to the reception and dressing-rooms. In the reception-room are shown a number of huge enlargements. Another staircase leads to the studio and dark-room adjoining. The studio is large and well lighted; the

blinds are simple but effective, and the accessories show a number designed by Mr. Sweet himself; these indicate that he is no mere copyist, but believes in striking out on original lines.

Mr. Sweet is better known to the general public, apart from the good folks of Bute, as a marine photographer, and in this branch he has turned out some first-class work. His picture—measuring five feet by four feet, of the *Britannia* (the Prince of Wales's yacht) is said to be the finest of the many photographs taken of this famous boat, and the skipper, Captain Carter, thoroughly endorses this opinion.

Let us look for a moment at Mr. Sweet's Exhibition work. It is all direct work, ranging from 15 × 12 in. to 24 × 20 in., and is printed by the carbon process, double transfer. He first tried his luck at Leeds in 1891, when he took first award for marine work; a similar award fell to his lot when he next exhibited, to wit, at Aston, in 1894. He again retired into his shell, and devoted himself strictly to business until last year, when the International Exhibition at Glasgow again tempted him, and here, in spite of the strong competition, he gained two prizes in portraiture and one for still life. After that he exhibited at Calcutta, Glasgow *Evening Times*, and Blairgowrie, at all of which he was successful. He has a lovely picture of the *Boy in Blue*, a carbon print, 4 ft. six in. by three ft. 6 in., which he considers the finest child portrait he has yet done; it will probably be heard of yet, when the exhibition season returns. His picture, *The Scotsman*, is too well known to need description here.

Mr. Sweet's artistic training has been picked up here and there; from picture galleries and the reproductions of pictures he derived much education, and, being a lover of nature and children, and having an observant mind and a retentive memory, he learned much from actual experience.

Mr. Sweet intends being present at the Convention, where perhaps he may be induced to take part in some of the discussions, and give the benefit of his experience to his brother photographers. Conventioners always delight in the wisdom of a "new man."

Journeying by rail from Glasgow to Wishaw, we pass countless smoke-begrimed but money-making works. A weary wait at Holyton was enlivened by the arrival of some Newhaven fishwives, who sadly bothered the station officials with their affectionate "My bonnie wee lamb." One official tried to reply to their banter, but he was not calibre for the supple tongues of the fishwives, and he was compelled to beat a speedy retreat. Wishaw, the habitat of Charles Reid, the well-known animal photographer, is a smoky town, entirely given over to business. It is not squalid entirely, however, as we noticed some very good buildings in the town; and, as we neared it by rail, the aspect of the country became more inviting, there was a rather picturesque glen, although it was, to some extent, marred by an offensively modern bridge; there were some fine hedgerows, and we saw a few rather pretty (from a photographic, not a sanitary point of view) thatched cottages. Right up on the hill, in Young-street, stands Charles Reid's studio, a plain, substantial structure, especially built for the business about five years ago. Mr. Reid, unfortunately, had been called away to London on business, but he had left instructions with his son, Mr. Robert (he has three sons in the business) to show us over the premises and give us any information required. We were astonished to find so few specimens of animal photography in the reception-room, but this was explained by our guide, who informed us that the people of the district took comparatively little interest in that branch of Mr. Reid's work; another proof that "a prophet hath no honour in his own country." The studio is well lighted with a north light, and has an efficient arrangement of blinds; the accessories are simple. There is a large working-class business done in the studio; this can be easily understood when we state that Mr. Reid is, practically speaking, the only resident photographer for a population of about twenty thousand inhabitants. Attached are convenient dressing-rooms, dark-room, printing, toning, and mounting-rooms. There are also two rooms specially devoted to the storage of negatives, and a room is set apart as an office and for storing the "animal" prints and lantern slides. We asked Mr Robert what caused Mr. Reid to take up animal photography, and the reply was that it was animals that made Mr. Reid take up photography. He was with a gentleman in Aberdeenshire, who made a hobby of photographing animals, Mr. Reid had at times to assist him, and in course of time became enamoured of the pursuit, and purchased a camera for himself. After being in business for some time in Aberdeenshire, he took up his abode in Wishaw, some twenty-two years ago. When he commenced business in Wishaw, he determined to have one day in each week to devote to his open-air photography, and consequently he advertised that he would be in attendance at his studio every lawful day except Wednesday. Now that his sons are in the business, it is not necessary that he should confine himself so closely to the studio; this "one day closed" practice has consequently been given up for some ten years; notwithstanding this, people come occasionally to the studio inquiring on which day it is shut. An American, who sold a large number of Mr. Reid's animal studies in New York, being in this country, determined to pay Mr. Reid a visit. He was grievously disappointed with the "location," as he called it, of the studio, he had pictured it embosomed in green fields. We are not sure but that the situation of Mr. Reid's studio, in the smoke and hurry of a manufacturing town, is an incentive to him to hie away to the country and there practise the art he loves so well. He originally started animal photography to please himself, but it has now grown into a vast commercial enterprise, and orders come to Mr. Reid from all parts of these islands to photograph the specialities or pets of the animal kingdom. A considerable number of his photographs are used for artists' studies, and not a year passes but he recognises many of them amongst the Academy pictures. A large number of his prints are sold in Paris and in almost every quarter of Britain, especially in photographic circles. "Reid, Wishaw," is a familiar phrase. Strange to say, he never uses a hand camera; as a matter of fact, he does not have one, his photographs are all taken with a stand camera, mostly on whole-plates. This fact makes it easy to believe Mr. Reid's verdict that *the* necessities for successful animal photography are patience and rapidity in working. Every month in several of the magazines we find reproductions of Charles Reid's photographs. This led us to ask our guide where and when a reproduction was first made from Mr. Reid's photographs. He did not know when, it must have been many years ago, but he thought the first appeared in some of the photographic papers, but nowadays the reproduction of the Reid photographs entails a considerable amount of clerical work. Last year a speciality was made of photographing birds and their nests, but this year it is intended to devote more attention to animals. Last year they took more photographs than they could publish, so they had to keep them over until this year. The animal photographs keep them busy, as they have to be making prints the whole year round, and it is with ever-increasing difficulty that the supply is kept equal to the demand. The lantern slides are all made by reduction whenever a spare moment can be obtained.

In reply to a query as to what pictures were most popular, our informant said that a photograph to be successful, besides being a true representation of the animals or birds portrayed, must be something of a picture as well.

In the Reid family the photographing of animals or birds seems to be hereditary, for Mr. Robert, who formed a most courteous informant to our queries, told us incidentally that he has a different class of pets each year, of which he makes a series of photographic studies. One photograph that he wants to get has hitherto eluded him, namely a wild rabbit feeding; but he is on the track, and is confident of yet having this subject included in the collection.

Unfortunately there is little likelihood of meeting Mr. Reid at the Convention, as during that week he has to be in constant attendance at the Highland and Agricultural Society's Show, where, as might be expected, his services are very much in request.

PHOTOGRAPHY IN RELATION TO SCIENCE.*

My object in this paper is to point out how useful, and, indeed, I may say necessary, photography is in almost every branch of natural science. Anthropology, archæology, architecture, astronomy, botany, geology, geography, mining, metallurgy, natural history, and zoology, one and all, may be with advantage joined with photography for the benefit alike of the teacher and the student. There are now so many photographic societies, or scientific societies which include photographic sections, that I need make no apology for insisting on the fact that good, useful, and permanent work can be done by all these. I do not wish to decry what is called picture-making by photography, or photography as an amusement, but it is in the application of photography to science that the real, the true value of the process is to be found. The society to which I belong, the Croydon Microscopical and Natural History Club, has always held this opinion, and now, I am glad to say, is giving expression to it by the formation of an album of scientific subjects, which bids fair to be a success. Objects of this class abound everywhere, though, of course, they are not so abundant or so easily found as so-called pictures. How much more is conveyed to the mind by *looking* at a photograph with descriptive accompaniment than can be by any *merely verbal* description. Things *seen* are retained by the memory more easily, and for longer, than things *heard*, hence the popular saying, "In at one ear and out at the other."

You will see from the diagram on the screen that I propose to-night to say a few words on half-a-dozen of these subjects, illustrating my remarks with lantern slides applicable to each subject and its subdivisions. Starting, then, from photography as a centre, the six subjects radiate from it, and first I will take "Bacteriology," which, although a very important, is perhaps not a very generally interesting, subject, and can only be made available for the purposes of illustration by means of microscopy combined with photography. These bacteria, germs, or microbes, as they are variously named, exist everywhere; they are in the air we breathe, the water we drink, and the dust we inhale. But it must not be supposed that all bacteria are, as it were, the invisible agents of death; some are not only harmless, but actually indispensable; we owe to bacteria the ferments by which we are able to produce bread, beer, wine, vinegar, &c. Certain species are also found to be useful to the farmer, and these are cultivated in France and Germany; the seeds before being sown are soaked in these cultures previously dissolved in water. But it is not to the useful, but rather to the pathogenic, microbes that I

* Paper read at the Congress of the South-Eastern Union of Scientific Societies, held at Croydon, on June 2, 3, and 4, 1898, by J. H. Baldock, F.C.S.

refer to-night, and I will content myself with throwing on the screen a few forms which have been found associated with certain well-known diseases (ten in number) It is foreign to the objects of this paper to enlarge on this branch of this subject, but I cannot dismiss it without reiterating what has so often been said before, that it is owing to the improved knowledge obtained with regard to bacteria that led to the astonishing results achieved by Lord Lister in antiseptic surgery, and which have been elaborated by Pasteur, Koch, and others.

The next branch of the subject is "Botany," and although here, as in bacteriology, the ultimate structure of plants can only be demonstrated by the combined use of the microscope and camera, yet a very vast field is open, and much valuable work can be done by the photographer alone. Photographs taken of herbs, shrubs, and trees as they grow *in situ*, showing their habitat and the difference between different species belonging to the same genera; the different effects of soil and climate on different plants; and, again, the effects produced by cultivation on the same plants as compared with those grown in a natural state. All this, and much more, is quite within the compass of the ordinary photographer, and I venture to think would prove more *permanently* useful and interesting than the generally adopted method of taking so-called pictures promiscuously. Results such as have been attained by Mr. Lodge, Mr. Saville Kent, and the brothers Kearton—results which may be attained by any photographer who chooses to put into his work sufficient patience, perseverance, and intelligence — command instant attention, and excite a general interest. Added to all this there is, of course, the probable ultimate extinction of certain genera and species; consider, then, how valuable a good photograph of such extinct species would be. Ten slides illustrated this branch of the subject.

Archæology now claims our attention, and this furnishes plenty of scope for the photographer, inasmuch as examples everywhere abound. There are numerous relics of a bygone age still existing; ruined castles, ruined abbeys, ruined monasteries, and ruined churches; all of these could be secured photographically ere they pass for ever away. (Six slides in illustration.) In our own day improvements are always being made; old houses and ancient landmarks disappear, leaving nothing, unless, happily, a photograph behind. In our own town of Croydon the old Town Hall, the old Greyhound, old Bell Hill, old Middle Row, are gone, and, maybe, the time is not far distant when the old almshouses at the corner of George-street and North-end must go too. (Five slides in illustration.) The old Roman villa at Darenth, of which I show you a couple of slides, has been well described by one of our past Presidents, Mr. W. M. Holmes, in the Club's *Transactions*, and, supposed to be 1500 years old, connects us with the past; and another slide I am able to show you, thanks to our sectional Secretary, Mr. H. D. Gower, who took the negative, is of a curious old lock in the Female Orphan Asylum at Beddington. This lock, which is described by Hughson in his *History of London*, 1809, vol. v. p. 302, and is engraved in Pugin's *Examples of Gothic Architecture*, shows that it was executed before 1508, and probably late in the fifteenth century. In connexion with archæology, one can but regret that Dr. Schliemann and Mr. Gladstone, that marvellous man who seemed to have time for everything, and to whom nothing came amiss, could not have had the assistance of photography in their researches on the buried cities of Troy.

The fourth branch of my subject is "Meteorology;" and this, again, affords ample opportunities for the photographer, a little experience and practice being all that are necessary to secure results of some of the most interesting of natural phenomena. The various and ever-changing forms of clouds; those forms which portend fine weather, wind, or rain; the height above the earth of the different forms of clouds, and the superposition of the clouds in layers one above another, all form subjects of interest to the meteorologist, and could be made subjects of equal interest to the photographer. (Four slides in illustration.) The curious and beautiful forms assumed by ice, snow, and hoar frost are not only interesting meteorologically, but likewise afford some of the most beautiful objects which can be thrown on the screen. (Six slides in illustration.) Then, again, in lightning, we have abundant opportunities of observing, by means of photography, the extraordinary forms assumed by the lightning flash, and the no less extraordinary effects produced by it. (Three slides in illustration.) I now show you another flash, but this is what is now called "Artists' lightning," and represented what was (until photography taught us better) supposed to be the form of the flash. Turner, in his representations, was, however, nearer the truth. We now know, from very numerous photographic results, that lightning never takes the retrograde movement shown in this picture; it is always progressive and sinuous, and the retrograde movement is only *apparent*, and *not real*. Another picture will show the *effect* produced by lightning where a tree has been struck; the trunk is literally broken up into splinters, and even when this is not *visibly* the case, the tree on being cut down will often be found to have its tissues disintegrated.

For the fifth branch of my subject, *i.e.*, "Geology," I need make no apology; its great interest and importance are obvious to all students of nature. If photography had only been "as old as the hills," instead of, as it is, a very modern science, how very many of the difficulties relating to the stratification of the earth's crust, the extinct fauna and flora, which now confront the geologist, would be simplified, if not entirely explained. Tunnels are being constantly driven, cuttings made, wells sunk, and mining operations always going on, each and all of which enable the photographer to obtain records of the different strata passed through. If he goes abroad, his chances are numberless; mountain ranges, glaciers, volcanoes, coral reefs, &c., will afford constant occupation for the camera. (Three slides of coral reefs.) But in this, as in all other cases, the worker must have *some definite object in view*. It would be perfectly useless, from a scientific point of view, to take such subjects as he would take an ordinary picture. For instance, if a mountain be taken, the object should be to show its comparative height in reference to adjacent peaks; the work of disintegration which is going on, caused by wind, rain, and frost. If a glacier, the photograph should show its movement down the valley, and the scoring it causes on the adjacent rocks. If a volcano, the changes in form and size which the crater undergoes after an eruption, the effect of rain, &c., on the heated lava. And in every case it is of importance to introduce something into the photograph which shall give some indication of size; a person standing by the side of a rock or against a tree will give a much better idea of the size of the rock or the height of the tree than would be obtained were the figure absent. When the subject is not too large, a two-foot rule may advantageously be employed. (Seven slides in illustration.) Then, again, photographs may show whether the different strata are horizontal or whether they have been tilted up at various angles till sometimes they are nearly perpendicular; whether they have been contorted and thrown into anticlines and synclines; whether there has been a break in the continuity so that the strata on one side of the fracture, instead of being continuous, are at a lower level; and, lastly, whether any intrusive rocks, as granite, feldspar, or basalt, are present, such intrusive rocks having been forced up through the superimposed strata by some mighty force from below. (Seven slides in illustration.) Such are a few examples of what photography can do for the science of geology.

I now come to the concluding branch of my subject, in which photography, combined with the telescope and spectroscope, has been for the science of astronomy of the very greatest assistance. You have all heard recently in this neighbourhood of what photography has so recently done in the matter of a total eclipse of the sun (three slides); what it has done for the sun it has also done for the planets of our solar system, the moon, the stars, the nebulæ, and comets. As materials are gradually being collected by means of photography of sun spots, as to solar rotation and sun-spot level, so is a map of the moon, showing craters, mountains, walled plains, and the great crater of Tycho, which is the centre of the most disturbed region of the moon, and from which issue some of the most important and beautiful of the "streak systems," being gradually compiled. (Three slides.) In like manner photographs of the nebulæ are being accumulated, which lead to important and interesting results. For one thing, these show that some of the drawings of Herschel and Rosse were not correct; for instance, the "Owl" and the "Crab" nebulæ, when photographed, show no owl-like details on the one hand, or crab-like structure on the other. (Two slides.) Lastly, there are the stars, and here photography comes in and shows us stars which are at present invisible to the most powerful telescopes. When applied to the Milky Way, in the region of η Argus, no less than 400,000 stars are shown in an area of two square degrees with an exposure of twenty-four hours. (Three slides.) The crowning work in this direction is the "International Photographic Chart of the Stars," in which the heavens are, as it were, divided into fields of so many degrees each, which are distributed among the principal observatories of the world. This, of course, involves the exposure of a vast number of plates, and a vast amount of measurement and calculation, but a great deal of work has already been done, and there can be no doubt but that the results ultimately obtained will compensate for the great expenditure of money, time, and energy on this monumental work. It is, of course, unnecessary to insist that all photographic work done for scientific purposes should be untouched by hand or tampered with in any way whatever. I think I have now shown pretty fully what photography can do for science, and, although all the points touched upon are not available to the ordinary photographer, there yet remains a vast field in which he will find valuable results to be obtained for his labours.

SOME FLIPPANT REMARKS ON A SERIOUS SUBJECT.

[Paper read before the London and Provincial Photographic Association.]

It is an easy thing to promise to address a meeting of this Society, but it is a far less easy thing to find the material for an interesting paper or discussion. And yet the reason, or a valid reason, for the difficulty is far to seek. We are all Photographers, Photographers with a capital P, and are full of interest and enthusiasm for our—what shall I call it, Art, Profession, Hobby, or Trade?—let us say for the common bond of interest which knits our Association together.

What is it that brings us here from time to time? We have probably as many differing interests in photography as we have members. To some of us the following of photography is bread and butter itself, to others but a relaxation from the pursuit of bread and butter, but with us all there must be, I take it, some underlying principle, some continuous attraction in photography, and that attraction or principle, for

the sake of the evening's discussion, I will call the "Photographic Instinct."

I am not at all sure that I know what I mean by the phrase; but it seems to have a round and pleasantly modulated sound, and, the next best thing to good subject-matter in a paper being a good title, I have no hesitation in adopting the words. Still, I have no doubt there is such a thing as the photographic instinct. Some, indeed, we know must have it. They make good pictures, for is not the chief instinct in the practice of photography to make pictures? Not necessarily good ones perhaps, but still pictures of a sort, pictures which can be understood and appreciated when there are fore-words to explain the attitude of mind in which we are to contemplate them, and criticisms in the press to make it clear to us what they mean and how good or bad they are. Yes, I think perhaps *that* is the photographic instinct to make pictures, pictures without any qualifying adjectives. Though it may be the result of accident what the pictures are like when produced (owing to uncertainties in the process or in the worker), but still the instinct of photographers is to make pictures.

Has it ever occurred to you that only pictures produced by instinct, or a lucky chance, *are* good ones? No! Well, it may be so, and I am inclined to think it is so. How many of our best pictures, do you think, were made or produced "of malice aforethought?" Do you think Browne's *Way through the Wood* was a deliberate composition, or was it the result of the reckless discharge of his last plate because he didn't want to take any unexposed ones home? Don't you know that Jones made 200 roll film exposures during his holiday in Spain, and that only two were printable, and one of them was his medal picture, *A Moorish Girl?* Have you heard that Mountain's *Study of a Lady* was printed from the back of the negative by an oversight, that it looked more artistic that way, and was medalled?" Have you—but I won't weary you by going through a long list. We know that instinct, and we know the happy chance that made a medal picture. *Our* negatives are made for measurement, and with an exposure meter; by these means we can assure quite different or indifferent results.

Yes, instinct is a great factor in photography, and influences our work far more than we think. Perhaps our instincts are changing from those which obtained with the fathers of photography—the men who lived in the good old times, and made money in hatsful and spent it more quickly than they made it. They did all there was to do, they took instantaneous pictures so easily with collodion, and made such permanent photographs on silver paper, and printed an occasional carbon print equal to anything that can be done now. Yes, and they dressed fantastically in velvet coats and had other excellencies. Photography was a profession in those days, now it threatens to become but a trade—the accident by which we get a living.

But still, whilst we find the conditions to be those of change, the photographic instinct remains. And that, as I have said, is to make pictures. We make them "to measure" now, with true values, we time development and treat the examination of the image during the latter process as a fad, but possibly the best photographers know nothing of these devices. They trust their instincts and avoid the devices of the cranks.

To be a good photographer it is almost necessary to be a laggard—to let the cranks do the "progressing"; and I do not mean by the words, "a good photographer" a man who makes good pictures, but rather one who possesses the true instinct. I have already pointed out the lack of necessary connexion between a good photographer and the production of good pictures. A good photographer is one who has the instinct, and such a one will make more pictures (good or bad) in a week than that other, who makes use of many instruments of torture and precision, will do in a lifetime, except for the chance or luck which may come to each—or neither. No; by being a laggard, I mean that the good photographer must not listen to every foolish word uttered by the cranks. Cranks are men, generally speaking, who know too much to be practical men, and not enough to be men of scientific attainments. But they perform a useful, if thankless, part at times, and serve to elucidate the instinct.

When a good photographer—the man with the instinct—is found in his dark room trying to develop by time, but neglecting to look at his negative during the process because it is a fad, then you know he is in the power of the crank. His photographic plate is awful. He has learned to distrust his instinct, and has not learned to succeed better with the newer method; but he has always a source of consolation at hand—he is struggling towards the light. Soon he may be able to develop in daylight, and then he won't want the clock, nor to lift his plate out to examine it. Yes, the crank performs a useful part to the man of instinct. He works out all his worries for him, and saves him trouble.

When the good photographer would examine a negative and form an opinion—an intuition, the child of instinct, like his pictures either good or bad—upon a negative, the measuring crank is down upon him. The good photographer is not accustomed to measurements; he takes his pyro, like his snuff or mustard, by the pinch or spoonful, and his accelerator like his whisky—so many drops. But the crank will have none of these. For him measurement is a necessity, and the picture or plate must submit to measurement or be bad.

These are not all the cranks; there are others, but they are similar in type. The photographer has in the main always been a man of instinct. It is possible he may remain so; unless, indeed, he should happen to become a visionary or degraded person, viewing photography as a commercial pursuit; then it may be possible for him to take a different view still, and be neither a faddist nor a man of instinct. He need be only intelligent, gentlemanly, and well educated. These, at least, are the qualifications which, according to a recent advertisement in a photo paper, are stated to be essential to any person aspiring to acquire the "methods" of a well-known photographer. It is added that photographic knowledge is not important. Who would not be a pupil to acquire the photographic instinct so easily? S. Herbert Fry.

THE TRIPLE ANASTIGMAT.

Dr. Kaempfer sends a letter to the current number of the *Photographische Correspondenz* in answer to Dr. Moritz von Rohr, of which the following is a translation:—

"Dr. Von Rohr wishes to know by what scientific method I have come to the conclusion that the triple anastigmats are relatively rapid. The relative rapidity, independent of the ratio of the diameter of the effective aperture and the focus, was estimated by the absorption in the lenses, the loss by absorption and reflection in the cemented surfaces, and the loss by reflection from the uncemented surfaces. In order to test this according to scientific methods, not only would there be required great instruments, but also a very great leisure, both of which are not at my disposal. This work ought rather to belong to the scientific institutes, the laboratories of the high schools, or similar establishments; we practical men are only connected with science in so far that we use its results and technically make use of the methods founded on and worked out by it.

"Thus it was far removed from my thoughts to give rise to the view that I founded my conclusions as to the relative rapidity of the triple anastigmats on any special scientific researches. Moreover, I believe that every hearer and reader of my previous communication would have come to the conclusion that I had determined, or had had determined, relative rapidity by practical trials; and this has, to a great extent, as I also now firmly believe, happened almost without exception. Not only we, but also a large number of distinguished amateurs, are convinced of this fact, and, as I believe, it is plausible also on the grounds given by me without anything else; for we certainly know, and every practical photographer is to-day convinced, that the older aplanatic objectives possess a relatively higher rapidity, on account of their thin lenses, than the symmetrical anastigmats of newer construction. The triple anastigmats, however, share this advantage with the slow constructions, and according to my experience, they possess it even in a higher degree.

"Naturally are our comparative experiments always made at the same time, with objectives of equal aperture and focus, and Voigtländer & Sohn are always willing to place at the disposal of any one interested such triple anastigmats for test and comparison.

"That also other opticians are not afraid of introducing further reflecting surfaces is shown by Zeiss & Co., who, in their Planar, have introduced two more reflecting surfaces than the triple anastigmat possesses, namely, eight in all. In spite of this, they comment in their circular on the (relative) rapidity, although still every one knows how he has to expose with *f*-4 or *f*-5; it is even recommended to use restrainers in developing; also the difference in the light transparency of the various barium crown glasses plays an important part, which also, in 'scientific' researches, must be taken into account."

THE "SPECTRUM" PLATE—NEW RAPID SERIES.

Manufactured by Cadett & Neall, Ashtead, Surrey.

Messrs. Cadett & Neall are issuing a new high-speed orthochromatic plate, to which, in *Dry Plates* for June, they make the following reference:—

"We take advantage of a small space at the extreme red of the spectrum to use a sufficiently safe light for the manufacture of these new plates. It is in the deep red, or rather the extreme red, end of the visible spectrum that the new plates show a falling off in their sensitiveness, and this fact has enabled us to manufacture a rapid orthochromatic plate. There is one recommendation, however, we have to make, and it is that it will be better to put the plates in the slides in *complete darkness*, and also to develop them in a covered dish for a given time, with the developing solution at a given temperature; in this way far more regularity, as regards the development factor or density, will be obtained than could ever be done by attempting to examine the density of the negative in the very feeble lights which are required in the manufacture of these plates. It is of no use to use red glass, or the so-called deep ruby found in commerce, these being unsafe. For the manufacture we use a light obtained through baths of suitable dyes, which in practice would not be easily found in the dark room of the photographer, and for this reason the plate should receive no light other than it gets from the lens. There is not the slightest difficulty in working the plates under these restrictions, as, once the developing dish is covered over with another larger ebonite dish, the ordinary dark-room light can be turned up until development is finished."

Great pressure upon our time and attention just now obliges us to defer until next week some notes of our experiences with the new plates.

KRYPTON.

On Monday, June 6, 1898, the discovery of yet another element was announced, in a communication made by Professor Ramsay, of London, to the Academy of Sciences of Paris. The communication was read to the Academy by M. Berthelot. This new element is a gas, and makes a fifth constituent of the atmosphere; it is, however, present in very minute quantities, viz , one part in ten thousand of its volume. Krypton, says *The Chemical News*, belongs not to the argon, but the helium group; its density is greater than that of nitrogen, being, according to the corrected measurement, 22·47.

The discovery of this new gas is in a way due to the kindness of Dr. Hampson, who supplied Professor Ramsay with about 750 c. c. of liquid air; this was allowed to evaporate away slowly, until not more than 10 c. c. were left. This gaseous residue was freed from oxygen and nitrogen, and then sparked in the presence of oxygen and caustic soda, when a spectrum was obtained showing the argon lines feebly, but in addition to this a new spectrum was observed.

This spectrum is not yet entirely disentangled from the spectrum of argon; it is, however, characterised by two very brilliant lines, one almost identical with D_3, and another one very strong in the green.

Measurements made with a grating of 14,438 lines to the inch give :—

$$D_1 = 5895{\cdot}0$$
$$D_2 = 5889{\cdot}0$$
$$D_3 = 5875{\cdot}9$$
$$D_4 = 5867{\cdot}7$$

The green line, which is comparable with the helium line in intensity, has the wave-length 5568·8, and the somewhat weaker line which accompanies it has the wave-length 5560·6.

The wave-length of sound was determined in the gas by the method described in the "Argon" paper. The data are :—

	I.	II.	III.
Wave-length in air ...	34·17	34·30	34·57
,, in gas ...	29·87	30·13	—

Calculating by the formula—

$$\lambda_2 \text{ air} \times \text{density air} : \lambda_2 \text{ gas} \times \text{density gas} :: y \text{ air} : y \text{ gas}$$
$$(34{\cdot}33)^2 \times 14{\cdot}479 : (30)^2 \times 22{\cdot}47 :: 1{\cdot}408 : 1{\cdot}666$$

it is seen that, like argon and helium, the new gas is monatomic, and therefore an element.

The atomic weight of krypton will probably be found to be eighty.

THE CAMERA CLUB.

The June issue of the Club's *Journal* announces that a studio class has been formed under the direction of Mr. N. Luboshez. The lectures are to include studio lighting, posing, development, home and outdoor portraiture, use of diffusing screens, &c. The Pictoral Supplement to the *Journal* has been discontinued. Mr. Alfred East contributes some critical notes on the members' Exhibition, recently on view at the Club. The number further contains papers on the "Physiology of Thought and Memory," by Mr. P. W. Ames, F.S.A.; and "Photo-micrography," by Dr. T. Charters White.

Our Editorial Table.

The Leviathan Transparent Roll Film-holder.

Joseph Levi & Co., 97, Hatton-garden.

Messrs. Levi have sent us a sample of a new roll film-holder, for use in development which they are putting on the market. Transparent celluloid is employed, and the film is held in position by turnover edges. The holder is made in all sizes from pocket Kodak upwards, and for any number of exposures. It is a convenient device for holding roll film in development.

Acetylene Gas and Calcium Carbide.

By G. F. Thompson. 88 pp., price 3s. 6d. Liverpool: Published by the Author, Lombard-chambers, Bixteth-street.

Mr. Thompson's book has been prepared with a view to its being a complete *résumé* of the subject. He effects his purpose in the course of about a dozen chapters, in which the allied themes, calcic carbide and acetylene, are exhaustively dealt with. The author has gone to the best authorities for his information, and has got together material for a handbook that must prove exceedingly useful to all interested in the new illuminant. Photographers as such are not specially addressed in the book, but they will find much matter in it that bears on the applicability of acetylene for purposes of photographic lighting. This is the first and only book on the subject yet published in this country, and it has been "approved by the executive of the Imperial Executive," a compliment the exact value of which we are unable to appraise. Anyhow, we can recommend Mr. Thompson's book.

Practical Pictorial Photography.

Part I. By A. Horsley Hinton. 108 pp. Price 1s.
London: Hazell, Watson, & Viney.

A general statement of the theory and practice of pictorial photography as the author understands it is the theme of this book; a second volume will contain a series of examples which are intended to show the application in actual work of the principles laid down in the first book. The work before us is illustrated by a number of sketches by Mr. Hinton, as well as reproductions of his photographs, and it tells us what we have often been told before—viz., how the author obtains his results, and what his ideas are on the subject of pictorial photography. Some of Mr. Hinton's sketches are charming—there are many good judges who much prefer them to his photographs—and the more technical information at the end of the book relating to hand work, the introduction of effects, and so forth, will be found useful by those who are desirous of imitating Mr. Hinton. That gentleman is obviously so full of his subject that he appears to be blind to the probability of any other kind of pictorial photography but his own being worth consideration, for it is only his own work that he writes about. If it be true that "no branch or application of photography has been so misunderstood or has suffered so much by such misunderstanding" as pictorial photography, the fault can scarcely be laid at the doors of those who, like ourselves, being of an eclectic taste in such matters, are not disposed to allow that any one man has the right to hold himself up exclusively for the imitation of others. On the other hand, if we can possibly concede Mr. Hinton that right—if, indeed, there is no pictorial photography but his—then we must accept his book without demur, and agree that it is a most admirable publication. But we think that, when the inevitable reaction comes against the class of work of which Mr. Hinton is unquestionably an able exponent, he will perceive that he might advantageously have widened the scope of his book.

The Wonderful Century: Its Successes and Failures.

By Alfred Russel Wallace. 400 pp. London: Swan Sonnenschein & Co.

The author terms his work "an appreciation of the century—of what it has done and what it has left undone." Among the century's successes he treats of modes of travelling, labour-saving machinery, fire and light, astronomy, and many other subjects that must suggest themselves to the reader who is acquainted with the history of progress during the last 100 years. Photography comes in for reference, and in a chapter of ten pages Mr. Wallace acknowledges the part which "this beautiful and wonderful art plays in the daily life and enjoyment of all civilised people." The author has produced a readable and instructive volume, the second part of which deals with the failures of the century, some of the chapters treating of the "neglect of phrenology," the "opposition to hypnotism and psychical research," "vaccination a delusion," &c. It is no business of ours to follow Mr. Wallace in his references to these highly debatable subjects, but we admire him for the evident earnestness with which he condemns many of the blots on modern civilisation. The work has a portrait of the author by way of frontispiece.

Illustrated Guide to Leamington Spa, Warwick, Kenilworth, and Coventry.

By B. C. P. Walters. Illustrated by W. T. Whitehead. 150 pp., price 1s.
London: Dawbarn & Ward, 6, Farringdon-avenue, E.C.

Mr. Whitehead's illustrations to this little volume are singularly good and delicate. The author, whose style is terse and simple, supplies many details of interest concerning this richly historical and picturesque district of England, and the volume should be found a very useful guide to visitors. Besides the illustrations, there is a plan of Leamington and a map of the district. We were much interested in the book, in which the author appears to have put a deal of painstaking work.

Catalogues Received:

The Photochrom Company, 121, Cheapside, E.C.

The catalogue before us is in three sections and it runs into 170 pages. The Company appears to have a stock of some thousands of views of the principal show places of the world. As we were among the first to predict that the colour photographs of the Company would be very popular, we feel to some extent entitled to congratulate them on the magnitude to which their business has grown. A feature is made of a series of scenes of the Holy Land from views taken in 1895.

R. & J. Beck, 68, Cornhill, E.C. 60 pp., gratis.

Messrs. Beck's catalogue treats of lenses (the Autograph), the Frena hand camera and magnifiers, stands, dark-room lamps, Frena film-holders, tourists' cameras, studio cameras, lanterns, and, indeed, all the principal requirements of the modern photographer, as may be deduced from the fact that there are nearly 300 illustrations. A separate pamphlet of sixteen pages is devoted to the Frena hand camera, and both productions, which are very useful, are sent free to applicants.

Lindsay Hemery, 282, Brockley-road, S.E.

MR. HEMERY'S catalogue and price-list for 1898, which will be sent free to any address, treats of enlarging, printing, retouching, enamelling, developing, and copying for the trade.

Thomas Illingworth & Co., 5, Soho-street, W.

STUDIO accessories, backgrounds in considerable variety, and studio furniture take up about sixteen pages of Messrs. Illingworth's catalogue, the remaining fifty odd pages of which are devoted to general photographic goods—lenses, shutters, cameras, stands, and other apparatus, as well as chemicals, sundries, printing papers, mounts, &c. We note that Messrs. Illingworth have a hire department.

News and Notes.

ROYAL PHOTOGRAPHIC SOCIETY.—Ordinary Meeting, Tuesday, June 21, at eight p.m., at 12, Hanover-square. A paper will be read by Captain W. de W. Abney on "Photographic Images."

THE SWISS TRANSPARENT FILM.—This is a new roll film, for which Mr. Archibald Rider, of 83, Mortimer-street, Regent-street, W., is the agent. It is claimed to keep well, to be easily handled in the developer, very rapid, and free from flaws. We hope shortly to speak of it from personal trial.

THE names of the prize-winners in the Warwick Monthly Competition for June are: First prize, 20*l.*, Mr. Fred. Marsh, 7, Caxton-terrace, Henley-on-Thames; second prize, 10*l.*, Mr. R. M. Evans, The Magnet Studio, Rhyl; third prize, 5*l.*, Mr. S. Lambert Weston, 23, Sandgate-road, Folkestone.

MESSRS. EDWIN OBORNE & CO., Photographic Stationers, of Red Lion-square, London, W.C., inform us that they will shortly have their sample books of Christmas and New-year Mounts and Folders for Photographs ready, and, as the number issued will be limited, early application to see them is advised.

PARIS EXHIBITION OF 1900.—The Royal Commission are now prepared to circulate information respecting the Exhibition. The classification and rules for exhibitors, together with forms of application for space, can be obtained by applying to the Secretary of the Royal Commission, Paris Exhibition 1900, St. Stephen's House, Westminster, S.W.

PHOTOGRAPHIC CLUB.—Wednesday evening, June 22, at eight o'clock, "Selection of Slides," by well-known workers. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. W. R. Stretton, 4, Queen-street-place, London, E.C.,) will be pleased to forward on application.

IN consequence of the success of the Exhibition of International Art, the Council has decided to issue an Illustrated Souvenir Catalogue. The catalogue will contain over 100 reproductions, by photogravure and half-tone, of the finest works in the Exhibition, by special permission of the artists. The Council has entrusted the whole of the work to Messrs. Carl Hentschel & Co., of Fleet-street, London, E.C., who will shortly publish same.

WE regret to announce that Mr. Henry Perigal, the Treasurer of the Royal Meteorological Society, died on Monday week, at the advanced age of ninety-seven years. Mr. Perigal, who was an amateur photographer, a member of the Camera Club and of the Royal Photographic Society, was the author of various works on astronomy, bicycloidal and other curves, kinematics and the laws of motion, probable mode of constructing the Pyramids, &c. He was a constant attendant at the meetings of various London scientific societies until within two years of his death.

CLEANING COVER GLASSES.—Braun recommends the following process for cleaning microscopical covers: Collect the cover glasses to which cedar oil adheres in a glass containing methylated alcohol. Pour off the alcohol, wash with benzine, boil for about half an hour with soda solution, stirring with a platinum needle. When rinsing, rub the glasses with the hands to remove any adhering matter; then place them for twenty-four hours into acetic acid, and finally into 96 per cent. spirit. Rub dry with a piece of soft leather, and pass through a flame.—*Ph. Ztg.*, xlii. 762.

THE Warwick Dry Plate Company, it need not be said, are the manufacturers of the dry plates known as the "Warwicks," which, being made at their works at Warwick, on the Avon, are, for obvious reasons, so named. We note that Messrs. Macguire & Baucus, whose business is in Warwick-court, London, have, since the birth of the Warwick Dry Plate Company, adopted the name of "The Warwick Trading Company." Associated as this firm is with photographic trade, even though not actually plate-manufacturers, the similarity of name may lead to confusion. We can hardly believe that the adoption of this name is intentional, and so we shall, doubtless, hear that the newer concern has altered its title.

PHOTOGRAPH OF THE HOLY SHROUD.—The *Osservatore Romano* publishes a letter from Turin, relating that a photograph of the Holy Shroud, taken by electric light, has given an admirable reproduction of the body of Christ. The Holy Shroud was recently exposed to veneration, and King Humbert, who is its hereditary guardian, at first hesitated to give authority to have it photographed, lest the photographs should be used for purposes of commercial speculation. Eventually, however, His Majesty gave the requisite permission to Signor Secundo Pia, a lawyer, and member of the Committee on Sacred Art, who had offered to photograph the Holy Shroud at his own expense solely in the interest of religion and history. Signor Pia prepared his plates according to a special method rendering them sensitive to the yellowish tint of the Holy Shroud by means of powerful electric reflectors (*sic*). "Formerly," the letter continues, "the appearance of the Holy Shroud gave an idea of the contour rather than of the facial lineaments and body of Christ. On the other hand, the photographs, on being developed, showed a perfect representation of the face, hands, and limbs of Christ, the general effect being that of a photograph of Christ, and not of His shroud."—*Reuter.*

MANY amateur and professional photographers assembled at Messrs. Knight, Frank, & Rutley's Conduit-street Auction Galleries on Thursday last to witness the dispersal of Messrs. Watson's stock of photographic apparatus. Sharp competition prevailed and good prices ruled mostly throughout, here and there good bargains being secured, as is generally the case in an open sale. The catalogue also included a large collection of scientific instruments: a microscrope, with extra powers by Ross, and Smith and Beck, sold for 19*l.*; a twenty-light Phœnix dynamo, 10*l.* 15*s.*; a five-inch transit theodolite, 5*l.* 5*s.*; a Röntgen-ray set, 4*l.* 7*s.* 6*d.*; a half-horse power horizontal engine, 5*l.* 5*s*; a binocular telescope, one and a half inch objective, 4*l.* 15*s.*; a Premier camera, 10×8, 5*l.* 15*s.* 6*d.*, &c., nearly 400 lots being disposed of.

FORMATION OF CHLOROPHYL.—W. Palladine finds that oxygen is essential for the reproduction of the green colour in etiolated leaves, and in greater quantity than is necessary for respiration. Thus, when leaves which had been etiolated for forty-eight hours in the dark in a ten per cent. solution of saccharose were exposed to the light, immersed in water in a test tube, it was found that the green colour was restored most rapidly to those leaves which were in the upper part, in contact with the air, although the light was equally distributed over the whole length of the tube. The action of solutions of various carbohydrates on the formation of chlorophyl was also experimented with. Thus leaves almost entirely free from carbo-hydrates were obtained by etiolating them in boiled water. A portion of these, when exposed to light, still immersed in water, showed scarcely any development of chlorophyl. When immersed in a ten per cent. solution of saccharose, however, an intense green colour was developed; raffinose in a five per cent. solution acted in a similar manner. Dextrose and fructose gave rise to the green colouration somewhat more slowly, and with galactose, for the first five days, the leaves showed no colour; after then the colour developed very rapidly. Dulcite solution, mannite, asparagin, urea, alcohol, and ammonium hydrochloride prevented the formation of chlorophyl, while inulin and tyrosin appear to be neutral in their action.—*Comptes Rendus.*

Patent News.

THE following applications for Patents were made between May 31 and June 4, 1898:—

RELIEF PHOTOGRAPHS.—No. 12,272. "Process for Production of Relief Photographs without the use of Mould or Block." E. NEUHAUS.

STANDS.—No. 12,284. "Photographic Camera Stands." Complete specification. M. LEVY.

SHUTTER.—No. 12,339. "Improved Shutter for Photographic Apparatus." O. A. ERICSSON.

APPARATUS.—No. 12,499. "Improvements in Apparatus for Recording and Reproducing Photographic Pictures and the like." C. RALEIGH.

SHUTTERS.—No. 12,528. "Improvements in Photographic Shutters of the Roller-blind Type." J. E. THORNTON.

BAS-RELIEF PHOTOGRAPHS.—No. 12,564. "An Improved Process for the Production of 'Embossed' or 'Bas-relief' Photographs." Complete specification. I. FARIS and F. W. MASON.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

June.	Name of Society.	Subject.
20	North Middlesex	*Preparation of the Negative for Printing.* H. Stuart.
20	South London	*What a Hand Camera should be, with Apparatus and Slides.* A. Thomas.
21	Gospel Oak	*Hints for Economical Photographers* (Series II.). J. E. Rayner.
21	Leeds Photo. Society	Conversational Meeting.—Arrangements for Summer Excursions, &c.
21	Hackney	*Portraiture.* Harold Baker.
21	Royal Photographic Society	*Photographic Images.* Captain W. de W. Abney.
22	Birmingham Photo. Society	Excursion: Ledbury, Eastnor, and Birts Morton. Leader, C. F. Jarvis.
22	Croydon Camera Club	Conversational Meeting.
22	Photographic Club	Selection of Slides by Well-known Workers.
23	London and Provincial	Nomination of Officers.
25	Ashton-under-Lyne	Excursion: Monsal Dale. Leader, W. Leigh.
25	Croydon Camera Club	Excursion: Penshurst Place. Leader, The President.
25	Croydon Microscopical	Excursion: Strand-on-the-Green, near Kew. Leader, H. D. Gower.
25	Gospel Oak	Excursion: Pinner and Neighbourhood.
25	Hackney	Excursion: Molesey. Leader, Major Woolmer-Williams.
25	Oldham	Excursion: Miller's Dale. Leader, Jas. Hall.
25	South London	Excursion: Leigh-on-Sea. Leader, A. E. Allen.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 9.—Mr. A. Haddon in the chair.

Mr. S. HERBERT FRY read a paper entitled

SOME FLIPPANT REMARKS ON A SERIOUS SUBJECT [see p. 394].

Mr. A. L. HENDERSON, selecting for his remarks a reference to the so-called

fad of looking at the plate during development, said he should like to see what sort of result would be got by the photographer working in such a manner, in a case where twelve slides had to be produced from twelve negatives totally different in colour and other characteristics.

Mr. R. BECKETT gathered from the paper that a good photographer who produced good pictures was like an artist, who was born an artist and not made one after he was born. If by the photographic instinct was meant a capacity to produce pictures, Mr. Beckett expressed a wish that such a thing could be communicated. He was of opinion that much time was taken up by that which was nothing less than "crank" work.

Mr. T. E. H. BULLEN understood that to be an artistic photographer a man must be born such. The principle applied equally to any other art, music or singing, and, although one might learn a certain amount by study or rote, it was hopeless to aspire, without the gift, to reach the top of any such pursuit.

Mr. PHILIP EVERITT observed that it was curious that the cranks of the past were generally the authorities of the future. For instance, the system of plate speed measurement of Hurter & Driffield which, but a few years ago, was hailed with a storm of ridicule, was growing in universal use and appreciation, and promised to be still more largely used in the future. The results of abuse of the system could not detract from its value when used in a rational and sensible manner.

Mr. HENDERSON would be disinclined to employ an assistant who might be called a theorist, but rather one who, being ignorant of the why and the wherefore of the processes involved, would not, by experiment and similar research, be tempted to waste his employer's time. He was reminded of two firms, of the wet-plate days, whose assistants never made up a silver bath, this being intrusted to chemists, and yet they were successful in their work.

An endeavour was made to define so-named "successful" work. It was suggested that, judged by the small minority in which ordinary successful professional work stood at exhibitions generally, it could be well styled work that was sufficiently bad to be accepted by the public only, as such productions rarely met with aught but rejection at the hands of the committees of selection. The public must necessarily lag behind the judges and men similarly educated to a higher ideal, and thus it was that photographs showing a little beyond the average did not, as a rule, meet with the full appreciation of the general public.

Mr. HENDERSON confessed he had been one who, to study himself, went in for cheap photography and work suitable to the public taste. In a word, he had made photography a business, and thought that the most sensible way in which to view the matter.

Mr. FRY said the real underlying drift of his remarks was in the possibility that photography some day might be regarded as a commercial pursuit, and that, he took it, was the only outcome for photography. The instinct had been to regard photography as itself the end and not as a means to an end, a means of business pure and simple by which the public were supplied with what they wanted. Photography was not an art, or, if it were an art, one so limited that photographers could well afford to leave it to those who had both time and inclination to make that large number of exposures out of which one might appear artistic and pleasing; but extremely rare were the photographs which appealed to the emotions. His gibes at the crank were in good part; he had been a crank himself and derived much benefit from them, he confessed. As regards the Hurter & Driffield system, to the user of plates its value was very limited, but the plate-maker had reaped enormous advantage. By applying the investigations of Hurter & Driffield, they were enabled to learn when their emulsions were really fast and when they were fogging, and by the application of the development factor were able to ascertain the characteristics of the plate, and, again, by the careful construction of its curve and the location of its period of correct exposure, they knew more of what their plates could, and could not, do. Makers of plates and sensitive material were largely incapable photographers, and the system gave them a reasonably sure method of ascertaining the exact qualities of their productions. Since the publication of Hurter & Driffield's conclusions, the advances in the quality of plates turned out respecting speeds and density-giving properties at the same time were beyond anything dreamed of before. A successful photographer was best defined as one who was making a good thing out of it, as it was obvious that such a man was pleasing his customers.

The CHAIRMAN held that the work of cranks often resulted beneficially, and was not to be discouraged. He feared that the universal adoption of Mr. Henderson's principle, that an operator should not be an experimenter or theorist, would have boded ill for his craft, and photography would have never reached its present advanced stage.

PHOTOGRAPHIC CLUB.

JUNE 8,—Mr. E. Crofton in the chair.

Mr. Frank Haes exhibited several photographic reproductions of paintings, some of them by Meissonier. Notwithstanding the fact that they had been roughing it from thirty to forty years, there was no change of colour worth speaking of in the prints, which were on silver paper and from collodion negatives. They were before the advent of isochromatic plates, and, although the colour values might perhaps be open to improvement, the photographs, nevertheless, gave a very good idea of the original pictures.

Mr. R. CHILD BAYLEY, touching the subject of old prints, said that about 1856-7 the London Photographic Society Club, a club connected with the now Royal Photographic Society, published albums of their members' work. The albums were sumptuously got up, containing each about fifty prints, the value of which was enhanced by the very complete particulars which were appended to each picture, setting forth the exposure, lens, &c., and describing the scene. He thought the Club's library, which was already fairly complete and a valuable one, should find a place for these volumes, some of which he believed were to be had now and again.

The idea was received very favourably by those present, and hopes expressed that the volumes, which were well known to some present, would be acquired.

Mr. Dowell passed round some prints of firework displays and other subjects of a general nature, to which Mr. Snowdon added some photographs of some of the Hertfordshire meets.

Bradford Photographic Society.—June 6, Mr. G. O. THISTLETHWEITE read Mr. Thomas's Affiliated Society lecture on

THE HAND CAMERA.

Notwithstanding the fact that it is rather hard to read a paper of this character when the opinions therein may be diametrically opposed to one's own, Mr. Thistlethwaite did very well indeed, and the slides thrown on the screen, as illustrating the matter in hand, were some of them very effective. Considerable discussion ensued when Mr. Thistlethwaite had completed his part of the business, and questions were put, which he did his best to answer for Mr. Thomas. Mr. OLIVER NICHOLSON complained that he had never yet been at a lecture where the diagrams illustrating composition had been thoroughly explained, and followed up immediately by photographs in which the same lines were leading ones. Mr. SNOWDON gave it as his opinion that in Mr. Hersley Hinton's lectures this subject was thoroughly dealt with, and the reason for the lines explained, and photographs in which they had been employed exhibited. Mr. NICHOLSON replied that he did not think so, and he wished to learn about these lines; whereupon Mr. NEWSTEAD remarked that if Mr. Nicholson *did* know all about these lines, he would cease to be a photographer, turn artist, and be a Royal Academist. Some discussion then followed as to the best way of holding a camera, some members pointing out that, Mr. Bynoe had given them to understand that underneath the arm was the best place, while Mr. Thomas seemed to favour holding it against the chest. It was finally agreed that it really did not matter how the camera was held so long as it was kept steady at the moment of exposure.

Sheffield Photographic Society.—June 7.—A lecture and demonstration on the

GUM-BICHROMATE PROCESS

was delivered by Mr. SPARHAM CAMP. The lecturer explained that, although the process was discovered as far back as 1859, it had not been worked on much until the last two years. It was welcomed to-day as practically the only process which gave opportunity for the expression of personal taste and feeling, with a power of control over results, and, while these advantages are most emphatic, they do not exhaust the list of its qualities, as it is also capable of giving half-tones of great variation of colour, with freedom from chemical complications, and, lastly, absolute permanency. Such qualities must recommend the process to the man who is able to determine what should be kept or suppressed in any particular photographic rendering. After a lucid explanation of the process, the lecturer proceeded to sensitise and coat some paper with the pigment, and also developed some prints which had been exposed to light under a negative during the earlier part of the day, using both cold and hot water to achieve various results. Pictures by the above process by the lecturer, and a loan collection by R. Demachy, of Paris, were next handed round for inspection, and discussion took place on the subject.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEPTH OF FOCUS.

To the EDITORS.

GENTLEMEN,—If I add a few words to what I have already written and in reply to Messrs. W. E. Debenham, Gregson, & Bennett, in your last, it will be chiefly to express a feeling of satisfaction that there seems to be some chance of thoroughly discussing a matter that has for a long time been surrounded by a vast amount of mystery.

The time is not far distant when opticians told us that there was no such thing as "depth of focus," and probably the optician was right from his point of view, though I hold there is no necessity to judge a photographic lens from the same standpoint as an astronomical objective. Now that it has been forced upon the optical mind that, though there *may* not be such a thing as "depth of focus," there is, at any rate, a something that has to be reckoned with in connexion with photographic lenses in practice, and in default of a better name the old term has been allowed to remain. But, and this is the troublesome point, in using the term, different people attach to it different meanings, and apply it in such a careless manner, that it is little wonder misunderstandings arise, and are likely to continue until some distinction is recognised between its different phases. From the bare reports I have seen of Mr. Debenham's lecture I cannot gather whether he amplified his remarks on depth of focus, as published, by any explanation. But certainly as they appear in print, bearing in mind the other and more commonly accepted view of depth of focus, they appeared rather startling.

I will not deny that Mr. Debenham's definition is perhaps the best one to apply to the term, for, as a matter of fact, we want a better name for what the practical hand-camera man understands as depth of focus. But it is not much use out of doors, whereas Sir David Salomons' table is. The knowledge that all lenses, regardless of focal length, give the same depth of focus on the same definition, with equal apertures, when brought to the same scale, may be an interesting scientific fact, and one pretty well known to all who have dived at all

below the surface in such matters; but it is useless without some means of arriving at actual figures and distances. There we are obliged to fall back upon Sir David's tables or similar calculations.

"Depth of focus," as defined by Mr. Debenham, is a quality wholly dependent on the stop; let that, therefore, remain as the accepted description of depth of focus.

But what are we to call the property, power, or capability of getting objects at different distances from the camera into approximately equal focus on a fixed plane? This is the old form of depth of focus that was said not to exist, because, being entirely dependent upon the laws of conjugate foci, it is impossible, or is as completely independent of the stop as what I must call "Mr. Debenham's depth of focus" is of focal length. It is only when we mix the two up together, give a little here and take a bit there, that the popular idea of depth of focus takes shape. And now we want a name.

As regards the acceptance of any particular limit of confusion as a basis for calculation, I dare say that depends a good deal upon circumstances as well as upon individuals, but it is very certain there must be *some* basis for calculation. The limit adopted by Sir David Salomons is not only a convenient one on which to base calculations, but it seems to meet the practical requirements of hand-camera work, which is the main thing. To say that it is the best under all circumstances would be to say a foolish thing, for, although with normal sight and pictures to be viewed within the ordinary limits of distances it answers the purpose, it would be folly to say that it would satisfy the requirements in a micro-photograph, or that it would be at all necessary in the drop scene of a theatre.

Again, a limit or degree of sharpness that will satisfy one eyesight will not suffice for another. I, myself, often see a picture "sharp" that younger eyesight declares to be "fuzzy," and, if I focus with my ordinary reading glasses, I can almost invariably improve the result by using a magnifier; for which reasons, again, the establishment of an arbitrary or fixed limit is impossible, but we must have some basis for calculation, and that which comes nearest to every-day requirements would seem to be the best. It is an easy matter for special purposes, or for abnormal eyesight, or to satisfy any peculiar whim, to make the necessary calculations for any disc of confusion, be it one-hundredth or one-thousandth of an inch.

I quite agree with Mr. Debenham that, if objects "can be focussed more truly," they are not in focus at the one-hundredth of an inch limit, but I have never said so. In my calculations I have spoken of the "critical focus" and the "limit of permissible confusion," and have, moreover, objected to the phrases "in equal focus," or "the distance at and beyond which all objects are in sharp focus." There is only one distance with a theoretically perfectly flat-field lens, at which objects can be in "sharp focus." And this is true of all lengths of focus and all sizes of stops. I do not think there is much difference of opinion between Mr. Debenham and myself; all we want is a new name.—I am, yours, &c.,

W. B. Bolton.

MR. DEBENHAM'S EQUATIONS.

To the Editors.

Gentlemen,—"Beginner," having pointed out an inaccuracy in my lecture on "Focus," shall, although anonymous, receive first attention. If the matter had been a written article prepared for publication, I should have been careful to insert brackets and make the expression complete. In my view, diagrams given in a lecture, accompanied by running commentaries and explanations, do not quite come under the same category as a formal paper. The audience was, of course, mixed. Those who were mathematicians would not misunderstand, and those who were not would, in my judgment, understand the more readily the fewer the signs employed. When correcting the mistake of the report, I confined myself to that only, and did not go further. Moreover, with the help of the rule as worded in the report, even a real beginner should find no puzzle in the figures as printed.

"Beginner" also speaks of my proposition as to depth of focus as "surprising information." It has proved surprising, not merely to beginners, but to others from whom a knowledge of the subject might be reasonably expected.

Two points which I thought it useful for photographers to realise were: (1) A ready means of calculating focal distances for images of any given proportion to the subject; and (2) that, with the definition of depth of focus given, depth is dependent upon aperture alone. Thanks to the opposition of critics, the facts that I have pointed out will have received more attention, and so should prove useful to a larger circle of photographers than would otherwise have been the case. If there are any who wish to understand the matter and do not fully do so at present, I would suggest that they should read carefully the letters from Messrs. Bennett and Gregson which appear in your last issue.

Amongst other things discussed in my lecture and not reported was the effect of curvature of field in making an apparent difference of depth of focus, either favourable or the reverse, according to the disposition of the subject. As I see you are to publish an article on this subject, it may not be necessary for me to say more.—I am, yours, &c.,

W. E. Derenham.

ACETYLENE AS A LIGHT STANDARD.

To the Editors.

Gentlemen,—In your issue of 20th inst, I notice a short article, entitled "A New Light Standard," in which it is stated that "the latest suggestion in this direction is that of M. C. Fery, who, in a paper recently presented to the Paris Academy of Sciences, proposes an acetylene flame."

Believing that the *first* suggestion of the use of acetylene for this purpose emanated from myself, I would beg leave to state, that in a paper on "The Use of Acetylene Gas for Photo-micrography," read before the American Microscopical Society at its annual meeting in August 1896, I suggested the use of this illuminant as a standard limit of light, as per the following extract from its published proceedings for that year.

Extract from a paper read before the American Microscopical Society, in Pittsburgh, Penn-ylvania, at annual meeting, by W. H. Walmsley, August 18-20, 1896.

"The crowning advantage of acetylene, however, is its absolute uniformity. Sunlight varies under differing conditions, as is well known. So do all artificial illuminants hitherto in use. The so-called candle power is a delusion and a snare. It has been tolerated so long as the unit in light measurements simply because nothing better was available. But it seems to me that in acetylene we have the long-hoped-for perfect standard. This gas, in its pure condition, is stable and uniform, whether generated from calcium carbide, yielding four cubic feet or less to the pound, or the very richest, of more than six cubic feet. Given a burner of known capacity under a predetermined and uniform pressure—two inches of water, for instance—the light produced would always be the same. It would thus seem to be a very simple matter to give the world a standard unit of light, from which measurements could be made with a far greater degree of accuracy than is possible at present. I think this a subject entirely within the scope of our Society, and earnestly recommend that it take some action in the matter. It would be a very gratifying thing for it to have the honour of naming a universal standard unit of light."

I may add that favourable action was taken on the subject, and that it was referred to one or more of the members connected with the faculty of Cornell University, by whom some valuable work was done in the direction indicated; but I have not the result of their labours by me at the present moment.—I am, yours &c.,

W. H. Walmsley.

4248, *Pine-street, Philadelphia, May* 31, 1898.

THE TRIPLE ANASTIGMAT—OR "COOKE" LENS.

To the Editors.

Gentlemen,—Will you permit us in reply to Dr. Chesterman's letter to say that to those of us who are "behind the scenes" the matters which so puzzle your correspondent are capable of very simple explanation.

The "Cooke" lens has not been sent to Germany for any reason such as Dr. Chesterman appears wishful to insinuate, but simply because, owing to the exigencies of the German patent law, Cooke lenses sold in Germany must also be manufactured in Germany.

The German makers, Messrs. Voigtländer & Son have a very high reputation. They are the inventors of the "Collinear" lens, which is admittedly one of the most perfect of the more complex anastigmats, and Mr. Voigtländer with Dr. Kaempfer and Miethe his associates are amongst the ablest of modern scientific opticians. For this reason, the high opinion which they formed freely of the "Cooke" Anastigmat before they applied for a licence to manufacture it in Germany, and which they are now publishing with the results of their experiments, cannot lightly be set aside.

Of course, with interests in other anastigmats so strong as they are in Germany, it is natural that the makers of a simpler and less costly instrument should meet with a storm of opposition such as we experienced when we first introduced the "Cooke" lenses in England.

Of the two communications reprinted in the Journal, and which have inspired your correspondent's letter, that from Dr. Moritz von Rohr, upon the effects of absorption in glass and of cemented surfaces, contains fair and able remarks on part of Dr. Kaempfer's paper. But to opticians familiar with the characteristics of the "Cooke" lens and its corrections, the communication from Mr. Klepp to the *Deutsche Photographen-Zeitung* is, to say the least of it absurd.

A reply to this, signed by Dr. Kaempfer and Dr. Miethe, is published in the May issue of the same Journal; and they there give details of their comparative tests of the "Cooke" and other anastigmats.

From these tests they show why, when the entire field and character of definition is considered, and not merely the special points or strong zones which some anastigmats possess, the "Cooke" lens in respect of flatness of field is not inferior, as Mr. Klepp so carelessly asserted, but is decidedly superior to the others.—We are, yours, &c., Taylor, Taylor, & Hobson.

Slate-street Works, Leicester, June 13, 1898.

To the Editors.

Gentlemen,—In your issue of June 10, under the guise of a professedly friendly letter, Dr. R. E. Chesterman indulges in one of the most ungenerous perversions of facts that is possible.

The real fact is, that Messrs. Voigtländer, on their own initiative, offered to manufacture the "Cooke" lens in Germany, under licence from us, because they thought very highly indeed of its capacities; and we, on our side, knowing the legal necessity of having it manufactured in Germany in order to keep the patent valid in that country, readily assented.

The lens was sent to Germany simply to have its sale increased, and the German patent kept in force.

I wish to say very emphatically that there are no claims which I originally made for the "Cooke" lens which I do not uphold now.

So far as I am aware, the curves and other data used for the "Cooke" lens made by Messrs. Voigtländer have been those originally supplied by myself.—I am, yours, &c., H. Dennis Taylor.

York, June 13, 1898.

THE HAND CAMERA.

To the Editors.

Gentlemen,—Will you kindly allow me to ask Mr. P. M. Macintyre if they take the measurement of eyes in Edinburgh, and what is the exact size of the average eye? Perhaps, at the same time, he will tell us the number of outrages on everything that is good and beautiful by the hand camerist.

For my own part, I think it would be unbecoming, even for an R.S.A., to give our old and firm friend the cold shoulder with the literary force of a "Jamie Montgomerie."

The camera and stand have been used and carried by men of the highest capacity and intelligence. When will their pupils, the great unknown public artist and the "knowing ones," own up and give the honour where it is justly due and honestly earned?—I am, yours, &c.,

High-street, Banff, N.B. Henry Holman.

THE CONVENTION SLIDES.

To the Editors.

Gentlemen,—The undersigned have been appointed a sub-committee to prepare for the opening night of the Photographic Convention a set of lantern slides illustrating the applications of photography. The pictorial side will be slightly represented, but the principal feature of the series will be an attempt to illustrate such applications as microscopical, astronomical, meteorological, surgical, and similar work, and also such subjects as underground photography, night scenes, &c.

We have already the bulk of the necessary slides, but, lest we should inadvertently overlook any subject which would add to the interest of the set, we shall be obliged if you will allow us to notify the fact in your pages. The final selection will be made on Wednesday, June 22, and meanwhile we shall be glad to have suggestions from Conventioners or others.—We are, yours, &c., A. Horsley Hinton,
E. J. Wall,
H. Snowden Ward.

6, *Farringdon-avenue, London, E.C., June* 4, 1898.

ANOTHER LIMELIGHT ACCIDENT.

To the Editors.

Gentlemen,—Referring to your note of the 10th inst., "Another Limelight Accident," the account which appeared in the London daily papers was totally wrong as regards the details. I have made inquiries, and find that no oxygen, hydrogen, or ether, had anything to do with it. The accident was really caused by the explosion of one of those paraffin burners used by showmen and contractors for illuminating a large area, the paraffin being forced, in the form of vapour, out of a drum under considerable pressure. The exact reason for the explosion has not yet been ascertained.—I am, yours, &c., Charles Douglas Norton.

38, *Marchmont-street, W.C., June* 11, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries, must be addressed to* "The Editors, The British Journal of Photography," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 24, *Wellington-street, Strand, London, W.C.*

Photographs Registered:—

F. Preece, 24a, Commercial-street, Hereford.—*Photograph of "Brockhampton Ride-easy Car," by J. Jones, Hereford.*

Mrs. Emily Henwood, 359, High-road, Chiswick.—*Two photographs of the late Rev. Lawford W. T. Dale. Three photographs of the Rev. Canon Tuke.*

Medicus.—See reply to F. H. Fenton.

A. Campbell.—See page 1032 of the Almanac for 1898.

Light.—Of the Photo-Beacon Company, Chicago; price, we believe, one dollar.

Ajax.—We do not think you would have any remedy. We advise you to let the matter drop.

F. Facey (Torquay).—We do not answer letters by post. Sorry we know of no such situation.

F. Richards.—We do not give the addresses of contributors. Send us a stamped letter and we will forward it.

Constant Reader.—We do not give such opinions as you ask for. Better obtain one of the lenses for trial and satisfy yourself.

P. W.—There is a book on the subject, Bigelow's *Album of Posing and Lighting*, which is out of print. A copy might be obtained by advertising for it.

A. Mallett.—Try the effect of evaporating the solution down to a small bulk and then add three or four times the quantity of concentrated iron solution. Possibly your bath was exhausted, hence your failure to throw down any gold.

P. V. E.—We think you can claim the remaining fortnight's wages, as you appear to have been engaged for a month. But, before taking any further action, we should advise you to lay the case before a respectable solicitor, you can so easily throw good money after bad.

A.—1. No; if anything, that in the case of the longer-focus lens theory would not be borne out in practice, and it would be actually the slower of the two, on account of the extra distance the light has to travel from lens to plate. This is a factor often lost sight of. 2. No.

J. Sparll.—We recommend the Polytechnic. The session does not commence till the autumn and the fees are very moderate. Retouching is taught. Your best plan will be to address the Secretary, 309, Regent-street, W., asking for a prospectus of last session, which will give you full information.

Thomas H. Fenton.—We have no further information than that given in the extract quoted. The matter has already been referred to in the Journal. Inventions described by newspaper correspondents should be accepted with a considerable amount of caution. Send us a stamped, addressed envelope and we will return the cutting.

Damaged Studio.—J. R. W. We fear you have little redress, unless you can show that your neighbour was aware of the unsafe condition of the chimneypot that fell through the studio roof. As a matter of courtesy, most neighbours would have repaired the damage without demur. As you have the premises on a repairing lease, you cannot expect your landlord to do the repairs.

Rapidity of Lens.—Amateur (York) asks: "Which is the quicker lens, focus for focus and aperture for aperture, a rapid rectilinear or a single landscape lens?"—Theoretically, the single lens will be the most rapid of the two, because it has only two reflecting surfaces, while the other has four; but, in practice, no difference will be noticed in corresponding negatives taken with them, the difference is so very trifling indeed.

Cracked Albumen Prints.—Cambrian complains that prints made on ——'s double albumen paper are terribly cracked on the surface, and asks if the addition of glycerine to the last washing water would serve as a preventive. Very likely it would, but it would be unadvisable to use it on account of its hygroscopic properties. If the prints be dried flat between blotting-paper, under pressure, or they be mounted while wet, the cracks will be avoided.

Yellow Patches on Prints.—A. Mullins writes: "Can you explain the cause of the yellow places on the enclosed prints? They are on ——'s P.O.P., and were toned in the sulphocyanide bath, and fixed in new hypo for ten minutes."—The cause of the yellow places is this: The prints were not kept moving when they were first put into the fixing solution, and, by sticking together, the hypo did not have an equal action. It is more imperative that the prints should not be allowed to stick together when they are first put into the fixing than at a later stage, though they should be kept in motion all the while they are in the solution.

Impure Water.—R. C. Osman writes: "I have recently moved into a new house, and the water, as it comes through the pipes, is sometimes quite red with iron rust from them. Two or three batches of prints I have toned since I have been here were covered with spots; are they likely to be caused by the water?"—Very likely indeed; in fact, the trouble might well have been expected with such water. It is quite possible that the water will improve as more is drawn through the pipes. It is probable, if the house is a new one, or had been unoccupied for a long time, that the pipes remained empty and thus became rusty. Continual use will probably wash out the rust.

L.—1. The article appears at page 770 of the Almanac for 1895. 2. So far as we know, the papers of the Röntgen Society are not published and printed, but you can obtain further information from the Hon. Secretary, Dr. David Walsh, Temple, E.C. 3. Mrs. Cameron's, of Mr. H. H. Hay Cameron, George-street, Portman-square; Captain White's we do not know. 4. Your simplest plan will be to procure a little book, *Photo-ceramics*, published by Dawbarn & Ward, 6, Farringdon-avenue, E.C., price 1*s.* 6*d.* This gives you a great deal of useful information. We can hardly advise you, however, to take up the process, unless you are prepared to go to a vast amount of trouble. It took one gentleman of our acquaintance, a professional, nearly twelve months of close application to produce a good result.

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Contents.

	PAGE
Ex Cathedrâ	401
Some Bypaths of Business: Sun Printing.—II.	402
Leaderettes:— Ammoniacal Bromides of Silver—A Peculiarity in the Use of Fluorescent Screens — Liquid Hydrogen — Uranium and Thorium Radiations — The Moon and the Telescope	404
By the Way. By Dogberry	404
Foreign News and Notes:— The Acid Fixing Bath—Ethnographic Records by Photography—Acetylene — The Removal of Rust — Photographs in Two Colours — Transparencies — Photography in Colours — Magnesium Paper — Print-washing — Exposure — Photography and Woman's Work—A. Lumière et ses Fils	405
On New Optical Sensitisers for Silver Bromide. By E. Valenta	406
Before the Convention	408
The Gum-bichromate Process	409
Portraiture for Amateurs	409
Pressure Prints from Metallic Surfaces without Electric Currents. By Henry Soar	410
Pictures for Schools	410
Tattersall's Photographic Shutter	410
Portable Dark Rooms	411
The New Poisons Bill	411
Patent Statistics in 1897	412
Photographic Convention of the United Kingdom	412
Our Editorial Table:— Fitch's Celluloid Films—Panorama of Epsom Racecourse	412
News and Notes	413
Patent News	413
Meetings of Societies:— Royal Photographic Society—Photographic Club—Borough Polytechnic Photographic Society—Croydon Camera Club	413
Correspondence:— Depth of Focus—The Cooke Lens—Acetylene Gas	415
Answers to Correspondents	416

EX CATHEDRA.

Lord Crawford, as President of the Royal Photographic Society, invited the members to a *Conversazione*, at the Grafton Galleries, Grafton-street, Bond-street, on Tuesday evening, June 14. A large number of ladies and gentlemen accepted his Lordship's invitation—indeed, it may be said that the chief personages of the photographic world were present. Instrumental music was provided, and the visitors also had the opportunity of examining his Lordship's celebrated collection of rare and early manuscripts, and of inspecting the paintings with which the walls of the Galleries are covered. Supper was afterwards served to the guests, all of whom were evidently much delighted with the pleasant evening with which Lord Crawford had provided them.

* * *

There is some probability of the Royal Photographic Society securing the Grafton Galleries next year for the purposes of its annual Exhibition in the autumn. It may at once be said that the change would be a vast improvement on the present exhibition rooms, and would place greater scope at the disposal of the Society for the organization and arrangement of what is the most important photographic exhibition of the year. At Pall Mall, as is generally known, there is merely one large gallery available, which practically denies the Society the opportunity, if it be desirable—and a great many people think it is—of arranging the Exhibition in several distinct sections: Art, Technical Apparatus, and so forth. At Grafton-street the facilities offered are exactly what would be required for this purpose. There is a main gallery, nearly as large as the one in Pall Mall, and leading from it a series of smaller galleries, each of which is capable of containing a separate section, and of giving it adequate space for its display. For lantern entertainments, demonstrations, and meetings, the large gallery could not be improved on, and there is a great deal of available basement space.

* * *

We are convinced that, if the Society can secure the Grafton Galleries for its Exhibitions, it will be generally allowed that it has obtained a venue alike worthy of modern photography and satisfactory to those who have at heart its adequate representation before the public. In the mean while the thanks of the photographic world are due to the Earl of Crawford for the inception of this admirable idea, and for giving the Society the opportunity of taking it into consideration in the very agreeable manner that was experienced on Tuesday evening last week.

* * *

We are in a position to state that arrangements have been made for the delivery of the first Traill Taylor Memorial lecture. The Committee invited Mr. Thomas R. Dallmeyer to give the lecture, and that gentleman has accepted the invitation. The subject of Mr. Dallmeyer's discourse will very appropriately be Photographic Optics, and it will, doubtless, be treated comprehensively and in detail. It is expected that the lecture will be delivered on an evening while the Royal Photographic Society's Exhibition is open, and in the Exhibition Gallery at Pall Mall, the use of which it is hoped the Council of the Society will grant for the purpose.

* * *

We announced, a few weeks ago, that there was a probability of Mr. Joseph Wilson Swan, F.R.S., accepting the Presidency of the Photographic Convention of the United Kingdom for 1899, were the position offered him, and we pointed to Newcastle-on-Tyne as a likely meeting place in such circum

stances. We, however, learn that Mr. Swan would not find himself able to spare the necessary time for the office, so that the matter cannot be proceeded with. Thus, so far as we know, there are no visible suggestions for next year's meeting place of the Convention. This is a point that will, of course, be dealt with at Glasgow; but it is one upon which it is as well to have all possible preliminary discussion, and we shall therefore be pleased to have the ideas of any Conventioners who may care to address us on the subject.

* * *

It is announced that, in connexion with the seventieth meeting of the Society of German Naturalists and Physicists, to be held at Düsseldorf in September, a series of exhibitions of scientific apparatus and objects has been arranged. Among others, an exhibition of apparatus and photographs illustrating scientific applications of photography will commence in August and continue open until the end of September. New instruments and apparatus will be exhibited from September 17 to September 28, and prizes will be awarded for the best of them. Any machine, apparatus, preparation, or object invented since 1888, may be entered for this exhibition. Objects illustrating methods of instruction in physics and chemistry will be exhibited from September 17 to September 25. Communications referring to the exhibitions should be addressed, Herrn Director Frauberger, Düsseldorf, Friedrichsplatz 3/5.

* * *

With reference to Convention railway arrangements, Mr. Bridge informs us that the London and North-Western will run excursion trains to Glasgow on Friday evening, July 1, from London (Euston), Watford, St. Albans, King's Langley, Boxmoor, Berkhampstead, Tring, Aylesbury, Leighton, Dunstable, Oxford, Banbury, Bletchley, Wolverton, Cambridge, Bedford, Thrapstone, Wellingborough, Northampton, Peterborough, Stamford, Market Harborough, Rugby, Leicester, Nuneaton, Tamworth, Derby, Burton, Lichfield, Birmingham, Dudley, Walsall, Wednesbury, Wolverhampton, Leamington, Warwick, Kenilworth, Coventry, Stafford, Crewe, Stoke-on-Trent, &c.—available for four or ten days at from 17*s.* to 25*s.*, or, to return any day within sixteen days, at single fare. The Midland Railway Company run excursion trains from their principal stations the same day, at equally cheap rates. The Great Northern Railway Company also run excursions on the same date at similar rates, and have offered to provide for members of the Convention, without extra charge, one or more large saloon carriages by the train leaving King's Cross at 9 p.m. on Friday, July 1. Return tickets available for four or ten days, 25*s.*; or, to return any day within sixteen days, at 33*s.* "I shall be pleased," adds Mr. Bridge, "to arrange for these saloons if a sufficient number desire it. Applications must reach me not later than Tuesday, June 28, and must *in all cases* be accompanied by a remittance for the railway fare. This train is due to arrive in Glasgow on Saturday morning, at 8.45."

* * *

We are informed that the Lord Provost and Corporation of Glasgow have invited the members of the Photographic Convention of the United Kingdom to a reception and "afternoon tea" at the City Chambers, on Wednesday, July 6, at three o'clock.

* * *

By the way, the Convention Handbook has been issued to members, and we must congratulate Mr. Bridge on the taste and care that have been expended in its production. It has an effective green binding, with gilt lettering, and it contains a street plan of Glasgow, a brief history of the City by Mr. W. Lang, and two or three large maps of Scotland and the British Isles. There is also a striking portrait of the President, capitally printed by Messrs. Wellington & Ward, on platino-matt bromide paper, some half-tone illustrations of Rothesay; the "Lady Rowena" (a Convention excursion steamer), and a very well-executed Barnet platino-bromide print of a pastoral study, "Hill Children," from a negative by Mr. W. M. Warneuke. The Handbook contains all the arrangements for the week, and a great deal of other information likely to be useful to Convention visitors.

* * *

It is no uncommon thing to hear of photographers plying their favourite art unconsciously in too close proximity to the fortifications in some foreign country, and, upon detection, of being subjected to considerable inconvenience at the hands of the military authorities whose edicts they have unwittingly violated; but it is seldom that a similar case occurring within the limits of our own islands reaches our notice. A few days ago, however, Mr. W. F. Slater, the well-known South London photographer, was using his camera on the banks of the River Thames a few miles below Gravesend, when he was stopped by a soldier, on the ground that photographs were being taken within a prohibited zone of the Gravesend forts. Mr. Slater was subjected to some mild form of "arrest," his dark slides were, it is to be hoped only temporarily, confiscated, and he himself was put to the inconvenience of having to remain in Gravesend all night. It appears that before photographs can be taken within a certain distance of a fortification a War-Office permit has to be obtained—a fact which tourist photographers will do well to bear in mind. If we remember aright, Mr. Jackson, the American photographer, suffered, through ignorance of this regulation, much inconvenience when photographing near Plymouth some few years ago.

SOME BYPATHS OF BUSINESS: SUN PRINTING.

II.

Turning now to the various processes which can be used, these are—(1) White line on blue ground; (2) Blue line on white ground; (3) Black line on white ground; (4) White line on brown ground, or *vice versâ*.

The first of these processes is familiar to all photographers as the ordinary blue print or ferro-prussiate process. The tracing in this, as in other processes, is laid face downwards in the frame, and a piece of blue paper placed in contact with it. A portion is allowed to project outside the tracing, so that the action of light can be observed. The colour of the paper slowly passes from yellowish-green through bluish-green, and bluish-grey to olive green, and, when this stage is reached by the outside portion, the paper may be examined. An olive-green tint in the parts which are to form the ground indicates correct exposure. Under-exposure produces a pale blue ground with clear white lines, whilst over-exposure results in a deep blue ground, accompanied by blue staining of the lines. On removal of the print from the frame it is washed in water until the lines are white, the process being assisted by gently rubbing the surface with a soft sponge or brush. When the salts are removed from the paper—which takes

about fifteen minutes—the print is finally rinsed in clean water, and dried.

Blue Line on White Ground.—The progress of printing of this paper cannot be judged by examination during printing, as in the foregoing process. The tracing and paper having been placed in the frame, a strip of tracing cloth or paper, selected to match as nearly as possible that upon which the tracing has been drawn, is placed alongside near the edge of the frame. The small strip of tracing cloth has ruled upon it five or six lines in Indian ink, corresponding as nearly as may be with those of the tracing. A stock of these sample strips should be kept for the purpose. A few strips of sensitive paper are placed crosswise behind this strip, the length of the sensitive strips being sufficient to allow of their being turned at right angles, and projecting outside the back of the frame. The whole arrangement is then exposed to light. The time of exposure varies from sixty seconds in bright summer light to half an hour or more in dull winter weather. To judge whether exposure is complete, one of the test strips is removed from the frame and dipped into ferrocyanide solution for about half a minute. If the lines develop to a vigorous blue while the ground shows no sign of blue colour, the exposure has been correct. If the ground of the test strip assumes a blue colour, the exposure must be continued until the right point is reached, as ascertained by another strip. If the exposure has been too prolonged, a white ground with broken lines is the result. After exposure the back of the frame is removed, and the edge of the paper turned up half an inch all the way round and the corner pinched together so that it forms a shallow tray. In this form it is floated—sensitised side down, of course—upon the ferrocyanide bath—

Yellow prussiate	1 ounce.
Water	10 ounces.

The whole of the print is now brought into contact with the surface of the bath by a light rubbing with the palm of the hand, the four corners having been previously raised in turn to about half the length of the print to get rid of air bubbles. Any portion not wetted by the ferrocyanide solution means a blue stain on the finished print. The print is raised from the bath after the expiration of about twenty seconds, and development watched while it is held up by two corners. The total time of development should not be more than for forty to fifty seconds. Too long development causes a spreading of the lines. As soon as all lines are visible, flush the back and front with plenty of water, laying it in a separate bath for that purpose, and transfer at once to an acid bath for five minutes. The acid may be either sulphuric (one and a half ounces to the quart of water) or hydrochloric (three times the above strength). Keep the print moving about in the acid bath by means of a wooden spoon (to save the fingers). Remove at the end of five minutes and flush well with water to remove the blue colouring matter which adheres to the surface. A stream of water from a rubber tube is more suitable for this purpose than a brush, which is liable to weaken the lines. The print is next washed free from acid, rolled up wet, and stood aside to drain. It is then hung up to dry. A ground, stained blue, shows that the print has been insufficiently exposed. Weak and broken lines are caused by over-exposure. Blue stains are also caused by ferrocyanide getting on the back of the paper during development. Spreading of the lines while in the ferrocyanide bath is due to insufficient exposure or too strong a solution of ferrocyanide. If the fingers get stained blue by the acid bath, dip them in a weak solution of potash (a few grains to the pint), as the prints are liable to be stained if handled by fingers in this state. The tray used for washing the print as it comes out of the acid bath should be regularly scrubbed with potash solution and a hard brush.

Blue stains on the print can be removed by painting with a solution of oxalate of potash (one part of salt in six parts of water). Thorough washing should follow the use of this solution, or the blue marks will reappear; they are, in fact, liable to do so in any case, and the most reliable method of removing lines, dimensions, &c., is to paint over with Chinese white.

The Black-line process is obtainable in two varieties, one necessitating a chemical developer and another developing in plain water. The exposure of the paper takes place in the way just described for blue lines, except that the test strip is immersed in the developer or in water.

Developer Method.—On removal from the frame, the print, on which the image is visible in yellow lines on a white ground, is totally immersed in a solution of equal parts of gallic acid and alum, the strength of the solution varying for different brands, but averaging about one ounce of each to a gallon of water. The print remains in this bath for about one minute, when it is well washed and dried. The developer can be used repeatedly until black.

Water-bath Method.—The paper used in this simplified form of the process contains the gallic acid in the sensitive coating. The exposed paper is carefully laid face downwards on the surface of a dish of water and allowed so to remain for about a minute, being smoothed down with the palm of the hand so as to obtain close contact. After washing in several changes of water it is ready for drying. In both processes under-exposure causes a violet coloured ground and thick blurred lines. Weak and broken lines are the result of over-exposure. Defects and dimensions can be removed by a weak solution of oxalic acid.

The Brown-line process, a speciality of Messrs. Bemrose, of Derby, possesses several points of interest. Printing is conducted in about the same time as the blue-line paper, and on removal from the frame the print is washed in water for three or four minutes, and then placed in a fixing bath of hyposulphite of soda (one ounce) dissolved in water (three and a quarter pints) for one minute. It is again washed and hung up to dry. This gives a copy in white lines on a brown ground, which copy can take the place of the tracing in the printing frame, and, a similar piece of paper being used, will then give positive copies (brown lines on a white ground). This is sometimes an advantage when the original is urgently required, and, in cases where a large number of prints are required in a short time, several negatives can be made, and each used for printing positives.

The rapidity of the foregoing papers is by no means equal. The blue-line and brown-line processes are about equal in this respect and much more rapid than the black line paper. The white-line paper is the slowest of all, although paper is now obtainable, in which a different iron salt is used, which prints much more rapidly than the usual brands; a fully exposed print can be made from a tracing in about a minute and a quarter. The makers, or agents, of the paper are Allot & Jones, Liverpool.

The following figures give the approximate prices of the foregoing brands, although, where the factors of time and labour enter largely into the calculation, a more expensive paper may prove cheaper in use.

PRICE PER ROLL OF 32 FEET 30 INCHES WIDE.

White Line.	Blue Line.	Black Gallic Bath.	Line Water Bath.	Brown Line.
5*s.*	7*s.* 6*d.*	7*s.* 6*d.*	9*s.*	8*s.*

Makers of papers are: Bemrose and Co., Derby; Marion, Soho-square, London; J. R. Gotz, Shaftesbury-avenue, London; J. Halden and Co., Albert-square, Manchester; from any of whom lists and samples can be obtained.

The following figures (from an actual price-list) will enable the reader to gather what prices are usual for this class of work.

PRICE PER COPY.

	White Line.	Blue Line.	Black Line.
	s. *d.*	*s.* *d.*	*s.* *d.*
Imperial	1 6	2 6	2 0
Double Elephant.....	2 6	3 6	3 0
Antiquarian.....	3 6	5 0	4 0

In conclusion, prints, &c., are sometimes asked for mounted on linen and varnished, after which treatment they are in much better condition to withstand wear and tear. Tack the canvas tightly to a smooth board and coat the back of the tracing evenly with fresh flour paste. Leave the pasted tracing to stand a few minutes so as to allow it to swell to its utmost. Then lay face up on the canvas, taking the precaution to let the straight edge of the paper coincide with the straight threads of the linen. Roll up a duster to make a pad, and, working from the centre in all directions outwards, smooth out the paper, and press down on to its linen support. When dry give a coating of size (one ounce of glue in ten ounces of water). Then varnish with "Church" or "Oak" varnish, using as little as possible.

Ammoniacal Bromides of Silver.—It has long been known that chloride of silver forms a definite compound with ammonia, and it has recently been shown, by M. Jarry, that a similar combination takes place with bromide of silver. Exposed to liquefied ammonia gas, the bromide loses its yellow colour, and is transformed into a white powder at a temperature of −30°. If, now, the temperature be gradually raised, an abundant evolution of ammonia takes place at +4°, the powder still remaining white. Raising the temperature gradually towards 35° another disengagement of gas takes place, and the bromide reassumes its original yellow colour.

A Peculiarity in the Use of Fluorescent Screens.—M. Villard states, in a communication to the Paris Academy of Sciences, that, if an object is placed between the Crookes tube and the screen and then removed after a time, the screen is found to be more luminous on the parts previously protected by the object than on those which were fully exposed.

Liquid Hydrogen.—One of the greatest achievements of physical chemistry is the liquefaction in measurable quantity, by Professor Dewar. Sufficient bulk of liquid hydrogen has been obtained to enable its density and boiling point to be determined. The latter, in air, is −238° C., that is to say, just 35° above the absolute zero, the point when heat ceases, and the body at that temperature, were it able of attainment, would be devoid of heat. The specific gravity of liquid hydrogen is rather less than 0·07, about one-fourteenth that of water. The apparatus used for producing the liquefaction took a year to construct, and no doubt ere long we shall hear of liquid hydrogen by the pint. It will be interesting to see whether light will be thrown on any photographic theories by this low temperature, though it will scarcely be expected, for some time ago, at a temperature much above this, it was shown that all photographic action with the substances tested entirely ceased.

Uranium and Thorium Radiations.—According to a lady experimenter, Madame de S. Curie, the radiations given off by uranium, some details of which have on a previous occasion been given by us in references to M. Le Bon's experiments, differ from the Röntgen rays in their capability of penetrating, not only air or aluminium, but glass itself. It is further found that, the greater the proportion of uranium in the salt, the greater its activity. It is interesting to note that the atomic weight of uranium is the highest of the whole list of elements, the other next highest—thorium—being, as shown by analyses of commercial mantles, used largely as a radiator, though at a high temperature, for the incandescent gas lights. These mantles, consisting mostly of thorium, with a small percentage of cerrum oxide, and varying traces of didymium, yttrium, zirconium, lime, magnesia, and silica.

The Moon and the Telescope.—The favourite French popular writer on astronomy has recently published another of his fascinating works on astronomy, one of the chapters in which is devoted to an exposure of the fallacy which, some time ago, went the round of the papers, that, at the forthcoming Paris Exhibition, a telescope will be exhibited capable of bringing the moon within a metre of the earth. Later he gives an interesting account of the various attempts to photograph the moon, from the earliest picture by De la Rue downwards. He deprecates the employment of greatly enlarged photographs of the moon, of which the well-known writer on astronomical subjects in the *English Mechanic*, "A Fellow of the Royal Astronomical Society," writes: "Assuredly we get more of the grain of the photographic plates than of real lunar detail in them."

THE real facts as to a large telescope are that M. Mantois (to whom the French Photographic Society is stated to have awarded the triennial prize of the Exhibition of 1889 for improvements in optical glass) is experimenting with zinc and baryta bases, and is endeavouring to produce a disc of glass 1·25 m. (about 4 feet) in diameter. It is asserted that this lens will enable the moon to be apparently brought within 40 kilometres' distance from the earth.

BY THE WAY.

I CAME across a suggestion a week or two back that I can fully sympathise with, to the effect that it is distinctly desirable that some agreement should be come to by plate-makers as to a uniform method of marking the rapidity of plates. Of what earthly use, I should like to ask, is the Hurter & Driffield system as at present applied? Let me give an instance. A short time back I ran out of my usual brand of plates while away from home, and procured a dozen from a dealer in the town in which I happened to be. They were not the sort I wanted, but it was a case of "Hobson's choice," and they were selected out of two or three other kinds, because, for one thing, their name was best known to me, though the plates were strange, but chiefly because they were H. & D. marked and happened to bear exactly the same figure as those I had been recently using. I do not think I was in the slightest degree influenced by the advertised statement that these particular plates are extremely quick; but, at any rate, here I had no chance of going wrong in the matter of exposure. The speed number was marked on the box, and, as I have said, it was identical with the number given to the plates that I had previously been using.

It happened that I had two or three of my old plates left in the slides, which were filled up with the new ones, and this was fortunate or I should have certainly given myself an undeserved "wigging" for carelessness or worse. The plates were all exposed

upon the same day, a very favourable one as regards quality of light, though the subjects varied from open landscape to a few, two or three, interiors. Now, I might easily have blamed myself for having grossly over-estimated the value of the light, had it not been that the only negatives I got that day, including absolutely the most difficult subjects, were upon the old plates, showing that my judgment had not been in fault. But the new plates, though of exactly the same speed, were hopelessly under-exposed, even in the case of the better-lighted ones, while, as for the interiors, the difference between the two brands of plates was too absurdly great to leave the slightest loophole for excuse.

Which was really the correct Hurter & Driffield measurement is not for me to decide, but so long as plate-makers continue to claim a higher or it may be a lower, I care not which, sensitiveness than Hurter & Driffield's system really intends, so long I think will consumers have just cause for complaint. I don't care whether it is the result of a wrong way of looking at the matter, whether it is a deliberate attempt to get a fictitious value on the plates, whether it is sheer "cussedness" or downright carelessness, the public has a right to demand that Messrs. Hurter & Driffield's name be not taken in vain to its detriment. At present I honestly confess that 18 or 22 Warnerke means far more to me than "x H & D," and, more than that, it is generally more reliable. Why cannot the "Royal," which has practically hall-marked the Hurter & Driffield system, insist on its proper application and, if necessary, appoint a select committee to see the matter put on a proper basis as in the case of standard stops and flanges?

But I am sadly afraid that before the Committee would be of any practical use it would be necessary to subject it to some form of treatment analogous to the process by which Messrs. Hurter & Driffield eliminate the "inherent fog" from their estimate of a plate's character, only in this case the Committee would have to be subjected to a very drastic process for the removal of the "cranky" element, which, I fear, is the chief cause of all this trouble, and by the time that result was arrived at I am afraid the Committee would be reduced to much the same form as one of Messrs. Brock's erections the morning after the display is over. I think Mr. Herbert Fry's definition of a "crank" is a very good one, or, at least, part of it is. I beg to pat him on the back, for "cranks are men, generally speaking, who know too much to be practical men," but I to some extent object to the completion of his formula, "and not enough to be men of scientific attainments." I think no one will deny that there are really scientific and competent cranks, but who are none the less deficient in the practical quality. Who, for instance, but a couple of "cranks," of the better kind, of course, would have had the pluck to spend so much time—"waste" it, the practical man would say—in working out the different problems that Messrs. Hurter & Driffield themselves did? but I have never yet heard any one venture to dispute their claim to the possession of scientific attainments. Still the outcome of their labours had perforce to be submitted to a considerable amount of "practical" furbishing up before it became applicable to every-day requirements, and now I am afraid some of the practical polishers have since developed cranky symptoms, and the original method is not benefiting thereby.

That the Hurter & Driffield system, properly worked, can do all that the photographer requires is, I think, undisputed; but something more than the mere exposure value of the plate is required, as, for instance, its relative sensitiveness to different colours or in different lights. Take, for instance, the plates of which I have to complain. In the case of the better-illuminated views the relative difference in sensitiveness was probably not more than two or three to one, whereas for the weaker light of the interiors the difference was at least twenty or thirty times as great. This was a trouble that cropped up long since with the Warnerke sensitometer, and it was often the case that of two plates the one that "read" the most rapid with the sensitometer might be much the slower in the camera. I do not think it would be a difficult matter for those who adopt the Hurter & Driffield method to add, in addition to the speed number, a diagram representing the characteristic curve of each batch of plates. For all I know, it may be done, but I have not met with it.

There is another subject on the *tapis* just now in which the "crank" element seems to be well represented, but the comical par of the arrangement is that all the cranks seem to be turning in different directions and not to particularly know or care what they or anybody else may be driving at. I refer to the depth-of-focus question, and if any one will read dispassionately all that appeared in last week's JOURNAL, to say nothing of other publications, and then tell me that the air is not full of contradictions, all I can say is, "He is another," as perhaps also is DOGBERRY.

FOREIGN NEWS AND NOTES.

The Acid Fixing Bath.—The *Deutsche Photographen-Zeitung* draws attention to the following formula recommended by Belitski:—

Sulphite of soda	50 grammes.
Water	800 c. c.

When completely dissolved, add—

Sulphuric acid	6 c. c.

and lastly—

Hyposulphite of soda	200 grammes.

Ethnographic Records by Photography.—The same periodical also informs its readers that the Dresden Amateur Photographic Association has united with the Ethnological Society of Saxony, and founded a National Association of Photography in Service of Saxon Ethnology. The object of the Association is to form a collection of photographs illustrating the culture by evolution of the Saxon people. The conditions of membership are the annual gift of two or more suitable photographs and residence in the kingdom of Saxony. The collection will be preserved in the Museum of the Ethnological Society of Saxony, and the prints must be sent in untrimmed, unmounted, and in duplicate. If possible, the process should be either platinum or carbon. The following programme of subjects is at present suggested: Typical landscapes, picturesque houses, characteristic interiors, family groups of characteristic type, national costumes, means of communication. English societies in search of useful work might well consider the adoption of a similar scheme.

Acetylene.—The *Zeitschrift für Calciumcarbid-Fabricat* mentions that the well-known firm of Jul. Pintsch, Berlin, have been making experiments to overcome the difficulties in burning acetylene by mixing it with the oil gas of their make. It has been found that an admixture of thirty parts of acetylene with seventy parts of oil gas increases the light given by the latter threefold, and that the combined gas is perfectly safe at any temperature below that at which the lamp chimney would melt. The possibility of explosion is therefore excluded. Other experiments are being made with hydrogen, carbonic acid, &c.

The Removal of Rust.—The *Central Zeitung für Optik und Mechanik* states that Dr. August Buecher, of Heidelberg, has patented a process for the removal of rust. Three grammes of gum tragacanth are dissolved in 100 c. c. of water, and to it are added 3½ grammes of tartaric acid dissolved in 50 grammes of water and ½ gramme of pure sulphuric acid. A certain amount of aurine, 100 grammes of sulphate of iron, and 5 grammes of potash alum dissolved in 100 c. c. of water are also added. The solution is brushed over the articles, and causes the rust to fall off without attacking the iron. The solution may also be used as a protection against rust.

Photographs in Two Colours.—The following simple method of printing views, &c., on post cards, in two colours, is given by Oscar Bolle in the *Photographisches Wochenblatt*. It is a combination of the Turnbull blue process and the gum bichromate. To obtain the blue print, the following solution is recommended: 15 grammes of green ammonic citrate of iron dissolved in 50 c. c. water, and 8 grains of ferricyanide of potassium dissolved in 40 c. c. water,

are separately filtered, and then mixed and kept in a deep yellow bottle. The card should be sensitised with this solution and dried in the dark. Print until the shadows are bronzed. Develop by washing until the high lights are clear. If the image is brushed over with lead vinegar before it is quite dry, the colour is changed to violet and becomes more intense. The colour is permanent. A coloured design for the border may then be added in the following manner: Take a spoilt plate or film and develop it to its utmost density. Copy a suitable design on tracing paper with a fatty ink, composed of chalk and grease. Transfer the design to the film by pressure, and engrave the lines on the film with a needle point. The brittleness of the film may be overcome by immersion for five minutes in a solution of 1 part of glycerine in 18 parts of water, between fixing and drying. For the second printing, the margin of the card is prepared by brushing on a thin, even coating of the following gum-bichromate solution: Forty grammes of gum arabic are dissolved in 100 c.c. of water, and to the requisite quantity of this solution sufficient burnt sienna, or other suitable colouring matter, is added. Sensitise with ten per cent. of a ten per cent. solution of bichromate of potash. As a substitute for the gum water, a two to three per cent. solution of starch may be used, as recommended by Dr. Mallmann. When the prepared margins are dry, they should be exposed under the engraved border negative, and developed in cold or lukewarm water.

Transparencies.—R. Schlatter, of Zürich, gives the following formula in an article on the preparation of transparencies, published in *Das Atelier des Photographen*. It will also be found an excellent developer for portraits and landscapes:—

Solution I.

Water	1 litre.
Sulphite of soda	50 grammes.
Hydroquinone	5 „
Metol	5 „
Yellow prussiate of potash	25 „

Solution II.

Carbonate of potash	50 grammes.
Water	100 „

For use take 100 parts of I. and 10 parts of II.

Photography in Colours.—A Munich photographer, Herr Reichel, claims to have discovered a physico-chemical method of producing coloured photographs. Some specimens were shown at the Polytechnic Association of Munich, and Dr. Miethe, accompanied by Herr Brandseph, Court Photographer at Munich, visited Herr Reichel to obtain further information and inspect specimens. The latter was unable to show any of the photographs in colours, and, although Dr. Miethe proposed to buy the process for a large sum of money, if Herr Reichel would make a negative or positive in colours in his presence, the offer met with no response. The claims of Herr Reichel have excited considerable interest in German photographic circles, and have at last given rise to a lawsuit between Herr Trant, a prominent member of the Munich Photographic Society, and Herr Reichel. The latter has written to the *Photographische Chronik*, through his solicitor, that he maintains having made the discovery, that it has nothing to do with any of the painting methods, and that Herr Trant has never had a specimen in his hands. Herr Reichel will obtain a good advertisement as an inventor or something else.

Magnesium Paper.—*Le National* gives the following particulars of a method of preparing a magnesium paper for the illumination of dark interiors. Two sheets of waterproof paper are coated with starch paste and covered with magnesium powder. The sheets are laid one upon the other, with the magnesium surfaces in contact, and allowed to dry. Two sheets of paper coated with chlorate of potash are then gummed to the outside surfaces of the double sheet of magnesium. The whole is covered with ordinary paper, to protect the chlorate of potash from moisture. A thick card is thus produced, which may be cut into narrow strips for use.

Print-washing.—As the albumenised print still retains an important position in the work of every professional photographer, a few remarks by Franz Ritter von Reisinger, and the editorial comment thereon in the *Photographische Correspondenz*, are worthy of note. Passing through Vienna in order to visit the Paris Exhibition of 1867, the writer took the opportunity to visit the studio of Ludwig Augerer, and was shown how the large pictures, for which that photographer was noted, were treated. The workroom was fitted on three sides with desk-like washing tables, and the sloping tops were covered with large sheets of plate glass. Beneath the glass there was a series of grooves to carry off the water. Above the glass plates were tubes fitted with sprays that threw a constant shower of water upon the prints. Girls were employed to transfer the prints from the first washing water to the tables, film downwards, and there to press them with indiarubber rollers at intervals, for two or three hours. In this manner the hyposulphite was completely removed from the fibres of the paper. Albumenised prints made in 1864, and thus treated, were recently shown at the Jubilee Exhibition at Vienna, and were in perfect condition.

Exposure.—The following is published in *Helios* and subscribed with the signature of R. Liesegang. "The following means will enable one to decide precisely if a negative has been correctly exposed or not. Examine the gelatine surface of the plate, and the back, at a certain angle, against a black background. If the gelatine surface shows a positive image, and the back none, the plate has been under-exposed. If the contrary is observed, that is to say, a positive image is visible through the glass, there has been great over-exposure. If there is no positive image, or if images of equal intensity are visible on both sides, the exposure was correct, especially in the latter case."

Photography and Woman's Work.—The *Wiener Freie Photographen-Zeitung* contains an interesting article by Fritz Hansen, of Berlin, on the employment of women in photographic establishments in Berlin. The statistics were compiled in 1894, and though there may be some inaccuracies, as the figures were obtained by voluntary effort, they may be taken as fairly indicating the circumstances at that time. Of 650 assistants employed, 300 were men and 350 women and girls. Of the latter 200 were receptionists and the remainder retouchers, &c. The salaries of the receptionists ranged from 2*l.* 10*s.* to 5*l.* per month, in the following proportions: 66 at 2*l.* 10*s.*; 90 at 3*l.*; 24 at 3*l.* 15*s.*; 16 at 4*l.* 10*s.*, and 4 at 5*l.* Average, 3*l.* 10*s.* per month. The retouchers, &c., received from 30*s.* to 3*l.* 10*s.* per month, viz., 27 at 30*s.* to 35*s.*; 65 at 2*l.*; 12 at 2*l.* 10*s.*; 43 at 3*l.*; 3 at 3*l.* 10*s.* Average, 2*l.* 10*s.* 6*d.* per month. The hours of work were ten to twelve hours daily for receptionists, and eight to ten hours for retouchers. On Sundays it was customary to work till twilight. There was rarely any payment for overtime, Christmas presents being considered an equivalent, although the latter have steadily diminished and are seldom in proportion to longer hours at that season of the year. Most of the women and girls employed are of middle-class families, and much work in retouching is given out to the wives and daughters of officials.

A. Lumière et ses Fils.—According to the *Revue Suisse* this firm employs 400 workmen and workwomen. Five steam engines are employed in driving six machines, and generate 300 horse power. Three dynamos generating 150 horse power drive thirty electromotors and supply the electric lamps. The monthly supplies represent about twenty railway truck loads with a total weight of 60,000 to 70,000 kilos. The plates produced daily represent a consumption of 600 kilos of emulsion, which at the rate of 25 grammes per square metre would cover a surface of 2½ hectares; 4000 metres of paper are coated daily. The number of orders executed in 1896 was 8,000,000, and the number of deliveries 38,000.

ON NEW OPTICAL SENSITISERS FOR SILVER BROMIDE.

In continuation of my previous note (see The British Journal of Photography, p. 245), I give here those sensitising formulæ which gave the best results with the oxamine dyes. In the previously mentioned dyes of the oxamine group, oxamine red B, oxamine scarlet B, and oxamine black B R are the most suitable. An alcoholic preliminary bath should be used, consisting of—

Water	800 c.c.
Alcohol	200 „
Ammonia	2 „

which should be allowed to act on the plates for two minutes, and they should then be placed in the dye bath, consisting of—

Water	700 c.c.
Alcohol	200 „
Ammonia	10 „

to which the following quantities of a 1:500 solution of the respective dyes should be added:—

	Oxamine red B	50 c. c.
or	Oxamine scarlet	150 ,,
	Oxamine black	80 ,,

The plate should remain in this bath for four minutes, and the dish be rocked all the time; it should then be taken out and rinsed in a second bath, and then placed to dry.

It is obvious that this work must be done in absolute darkness, the use of red light even being excluded, since with oxamine red B the sensitiveness extends to C, and the orange-red rays come into action.

Below I give a description of a further number of dyes of various kinds which I have tried, and which were kindly placed at the disposal of the K.K. Lehr und Versuchsanstalt by the firms mentioned. I will begin with two dyes which gave especially good results.

The first dye is diazo black B H N, obtained from the dye factory formerly Fr. Beyer, in Elberfeld.

This gives, when the above-mentioned preliminary ammonia bath was used and the following dye bath:—

Water	700 c. c.
Alcohol	200 ,,
Ammonia	10 ,,
Solution of dye (1:500)	50 ,,

in the above-mentioned way, a very vigorous band from B – D ¼ E, with a maximum lying at C ⅓ D.

A comparison with nigrosine B of the same firm, which has been proved to be such a good sensitiser, shows that diazo black B H N is four times as sensitive in the red.

Still greater sensitiveness, with greater colour sensitiveness, is obtained with benzo-nitrol brown made by the same firm. This dye, used in the same way as the above, gives a broad sensitising brand from C ½ D to beyond E, with a maximum at D ½ E. It does not reach quite so far with the red as with diazo black and nigrosine, but sufficiently far for copying paintings, as it is relatively very sensitive for the orange-red and yellow rays (six times as sensitive as nigrosine).

Dyes obtained from Dahl, Barmen.

Alkali dark brown: Band from C to D, with a maximum at C ½ D.

Alkali red brown G R: A band from C to E; vigorous maximum at D. The best concentration: 4 c. c. of a 1.500 solution to 100 c. c. of water and 2 c. c. ammonia.

Alkaligranat gives a vigorous band from B to E, with a maximum at D. The best concentration: 10 c. c. of a 1:500 solution to 100 c. c. water and 2 c. c. ammonia.

Alkali dark brown V shows two maxima at C ½ D and D ½ E, and gives a tolerably vigorous action between C and D.

Dyes from Meister, Lucius, and Brünning, of Hochst a/M.

Dianil black gives a vigorous band from C ¼ D to D ¾ E, with a maximum at D. The best concentration: 3 c. c. of a 1:500 to 100 c. c. of water and 2 c. c. of ammonia. A preliminary bath of ammonia should be used.

Dianil black R, with long exposures, gives a vigorous band from C to E, with two maxima, one at C ⅔ D, and a second, fainter, at D. By using the method described at the commencement of this paper, and using 5 c. c. of dye solution, plates were obtained which are four times more sensitive in the red than the nigrosine plates.

Dianil blue B: Two faint bands at C ⅔ D and D ⅓ E.

Dianil blue 2 R acts weak. Band from C ¾ D to C ¾ D. Maximum, C ½ D.

Dianil blue R gives a still narrower band.

The following dyes give very faint sensitising bands: Chromotrop S B, maximum D ⅔ E; Chromotrop, 6 B; Janus brown, E ¼ D – D ¼ E; Janus blue, B ¾ C – D; whilst Janus green causes fog.

Dyes from Kalle of Biebrich a/R.

The naphthylamine blue proved to be vigorous sensitisers for the red and orange-red rays from B to beyond D. Naphthylamine blue 2 B and B, a vigorous band from C to D. Naphthylamine 5 B a very vigorous band from B ½ C to C ⅘ D, with maximum at C ⅓ D, and another band from D ⅘ E to D ⅘ E, maximum D ½ E. Naphthylamine blue 3 R band from C to D, maximum C ½ D. The best concentration with this dye is 1·500 dye solution, 6 c. c. to 100 c. c. water, and 2 c. c. ammonia with a preliminary bath, 2 per cent. ammonia.

Tolan red sensitises from D ¼ C to D ¾ E, but the action is weak. This dye gives in aqueous solution even in tolerably strong dilution vigorous absorption bands. The absorption reaches from D into the violet, and it could thus be advantageously used for the preparation of colour filters.

Walk blue gives with greater concentration (5 to 10 c. c. of 1·500 dye solution to 100 c. c. water and 2 c. c. ammonia) a vigorous band from C ½ D to D maximum C ⅔ D, but tends to fog.

Dyes from the Clayton Aniline Company Limited.

Curcuphenine yellow, chlorophenin O R, rosophenin 4 B, and nitrophenin give faint sensitising bands and rosophenin acts the most vigorously and gives two bands, a vigorous one from D to E, maximum D½ E, and a fainter one, which only appears with long exposure from D to D⅓ C with the maximum at C.

Dyes from Leopold Casella of Frankfort a/M.

Dinamin pure blue gives a faint band from B ¾ C to D ¾ E.

Diamineral blue acts vigorously. Bands from C ⅕ D to D, and from D to D ½ E.

Diamin deep black Cr.* gives two bands from B ½ C to D and at D ½ E. the latter is faint and only appears with long exposure. Acts vigorously,

The dyes diamin yellow and diamin rose hardly act at all, also diamin orange gives only with long exposure an indication of the maximum at D.

Cyanol extra gives a narrow weak band at D, a broad weak band at B ½ C, and a band at D ⅓ E when used in a dilution of 1 c. c. (1·500) to 100 c. c. water, 2 c. c. ammonia, and 0·5 c. c. silver-nitrate solution (1 : 1000).

New phosphine G gives even in tolerably strong concentration only a weak band between D and E.

Lanacyl blue B B, and lanacyl violet give a narrow band at B, and a broader one at C (concentration 1–2 c. c. dye solution).

Dyes obtained from Badische Anilin and Sodafabrik.

Iris blue, according to Schultz, the ammonia salt of tetrabromoresorufin gives two narrow but vigorous bands at C and C ⅓ D.

Anthracine blue S W X gives in concentration of 2–4 per cent. dye solution with long exposure, faint continuous action reach to beyond B.

Wool blue (wolldruckblau) gives a narrow band from C to D ⅔ E with maximum at C ⅓ E.

Anthracine blue W G G in the form of a paste, 6 c. c. of a solution (2·5 to 500), and 2 c. c. ammonia gives a vigorous band from D ½ C to beyond D.

Naphthyl blue 2 B (product from O-amidophenic acid) gave a fain band between D and E, maximum D ⅓ E.

Alizarine black. Faint band between C and D, maximum C ½ D; the blue rays, with concentrations of 10 c. c. to 100 c. c. water, and 2 c. c. ammonia, are very strongly suppressed, greater concentration produces fog.

Cotton black B gives in weak concentration vigorous action; with 3 to 4 c. c. of dye solution a vigorous band from B to C ¾ D maximum C ⅓ D is obtained, a preliminary ammonia bath acts favourably.

Diazo black 3 B is a benzidine dye; it acts in concentration of 0·5 per cent. of dye solution as a vigorous sensitiser. The action extends from B to D ⅓ ¾ E with long exposure, maximum C ½ D.

Galatra black 4 B acts as a sensitiser for the red rays of the spectrum, it gives with long exposure a vigorous band from A to D maxima at A and B.

Dyes obtained from the Dye Factory, formerly Fr. Beyer, Elberfeld.

Azogrenadine; faint band from D ¼ E to D ¾ E, maximum D ½ E.

Doppelponceaus R, 2 R, and 3 R give very faint bands from C ¾ D to D ½ E, maximum at D ⅓ E.

Delphine blue—according to Schultz, a product of gallocyanine chlorhydrat, and aniline—acts as a very sensitiser, and gives a band from C to C ¾ D, maximum C ½ D.

Sulphonic acid blue gives two bands, one from D ¼ E to D ¾ F, and another very narrow with maximum at D ½ C.

The alizarine dyes, alizarine viridin, and alizarine cyanine, green E, sensitive for the red rays; the former dye sensitises vigorously from B to C ½ D, maximum at C; the latter gives faint bands at D ⅓ E, and at B towards D.

* This is a diazo dye of the dianin black group, of which group most dyes are sensitisers, concentration 2 c. c. dye solution 1.500, 2 c. c. ammonia, and 2 per cent. preliminary ammonia bath.

Oxamine blue, 3 R, is a vigorous sensitiser, and gives a well-defined band from C to D ½ E, maximum at C ⅔ D.

The different acid violets, namely, R, 2 R, 3 R, 4 B G, sensitise for the orange-red parts of the spectrum. Acid violet, RR and RRR, act best; the bands are very vigorous, and extend from C ¼ D to C ¾ D, with long exposure reaching to D ½ E, maximum C ⅔ D. Best strength 10 c. c. to 100 c. c. water, and 2 c. c. ammonia.

Benzo-nitrol dark brown acts very vigorously in the orange yellow, yellow, and yellow-green rays, the sensitising band reaches from C ½ D to beyond D ¾ E, with a maximum at D ½ E.

New toluylene brown, also acts favourably. The best action was obtained with the variety M. This gives a vigorous sensitising in the red and yellowish red. There is a vigorous band from B to D, with maximum at C ½ D, and a weak narrow band, with maximum at D ¼ E. The total sensitiveness of the plates is not lowered much.

Pluto black B is almost without action. Pluto black G, on the other hand, gives a vigorous band from B to D ¾ E, with two maxima at C ⅓ D and D ⅓ E.

Pluto black R also acts very vigorously, and, with the formula given at the commencement of this paper—five per cent. of dye solution—gives plates four times as sensitive as those with nigrosine B. The band appears sharp from B to D ¾ E, with the two maxima at C ½ D and D ⅓ E, and this dye should be of considerable practical value.

Phenol black gave less satisfactory results; with this dye a faint band appears from D ¼ E to D ¾ E, and a faint continuous action extending to beyond A is visible with long exposure. Those dyes of the above which do not show any vigorous, quickly rising maxima are useless.

E. Valenta.

BEFORE THE CONVENTION.

IV. Edinburgh—Three Princes Street Photographers.

The metropolis of Scotland is a haven of good things for the photographer, whatever branch of photography he makes his speciality. Here historical associations abound, and there will, we trow, be few at the Convention trip who will not carry away, with the assistance of the camera, some memento of the past. The task of enumerating these is outside the scope of these articles, and we leave the Conventioner, with all confidence, in the hands of Mr. Crooke, who has charge of the Edinburgh arrangements. Perhaps, however, we might be allowed to suggest that no Conventioner will regret providing himself, or herself, with a copy of *Galloway's Guide to the Forth*. It is specially written for tourists by the Galloway steamers, but it gives a good map of the route from Stirling to Edinburgh. Princes-street, the pride of Edinburgh and the envy of other cities with an ambition after beauty, contains many photographers, but space forbids us treating of more than three of them.

Approaching Princes-street from the west end, our first visit is made at the studio of Mr. Frank P. Moffatt, who is remembered by many of the younger generation as the winner of the Cadett 100*l.* prize, but the business is not of recent growth. It was founded in 1853 by the father of the present proprietor, and still bears the old name—John Moffat—as its business designation. Mr. Frank P. Moffat joined the business in 1875, and his father and he worked together until the death of the former, in 1894. The premises, 125 and 126, Princes-street, consist of two blocks. On the ground floor there is a suite of three large reception-rooms, on the walls of which is a goodly show of the work of the firm. They include large direct photographs (life-size heads), carbon enlargements, and paintings; the last are a speciality of Mr. A. E. Moffat, who studied art at the Academies of Edinburgh and London. Miniatures are a speciality with Mr. Moffat, and naturally he has some ideas of his own regarding these. For those on porcelain and paper he uses a photographic basis, but photography is barred with the ivory miniatures, Mr. Moffat having the idea, and it seems pretty nearly right too, that by placing a film on the ivory, much of peculiar transparency and "feeling" of the ivory is lost.

Two studios are used, and when business is brisk both are used; while the plates taken in one studio are being developed, a sitter is being photographed in the other. A very large proportion of Mr. Moffat's sitters are children, and naturally he has devoted considerable attention to them. His assistant focusses the camera, &c., while Mr. Moffat arranges the sitter and lighting, and generally makes himself as agreeable as possible. One of the studios is fitted with Adamson's incandescent electric lighting system, and this is found extremely useful and profitable for winter work. Study has overcome many of the difficulties of this artificial lighting, and by its aid many beautiful soft pictures have been obtained; some of them were exhibited at the recent Crystal Palace Exhibition. 'Tis but a step from one system of artificial lighting to another, and last winter, by the aid of the Todd-Forret lamp, Mr. Moffat did a good deal of work in flashlight photography. He uses two lamps, and prefers to place them a good deal higher than the camera, and behind it, and a little to one side. The workrooms are behind the studios, and here Mr. Moffat carries out his beliefs in specialism; each person is responsible for his or her own work. As might be expected, the stock of negatives is large, somewhat over a quarter of a million; they are all methodically arranged and indexed, so that any one can be got at a few minutes' notice. It is astonishing the number of orders received from negatives taken thirty and forty years ago. A number of negatives of public men are almost constantly printing; in regard to this, it is interesting to note that a negative of Spurgeon and his family, taken by the late Mr. Moffat, was never out of the printing frame for ten years. Mr. Moffat, unfortunately, does not exhibit very much, but we all remember that noble head—*My age is as a lusty winter; frosty, but kindly*—with which he took the 100*l.* Cadett prize; he has, however, a goodly show of gold, silver, and bronze medals. The first medal secured was in 1864, when medals were a scarce commodity, the subject being an untouched portrait of Sir George Harvey; to maintain a certain continuity, it might be mentioned that the last medal taken was in 1897 with *The Little Mother*.

At 103 Princes-street we come to the premises of Mr. William Crooke, truly a well-known name in photographic circles. Mr. Craig Annan, we mentioned as one of the two Scottish members of the Linked Ring, Mr. Crooke is the other half of Scotland's representative Salonists. His exhibited works are well known, if not in the originals at least in the reproductions, to us all, but it only needed one look at *A Symphony, Miss Macfarlane*, and others, to detect the vast difference between the reproductions and the actual work of the photographer; the reproduction may be called a half-tone, but it wants the beautiful gradation of tone and the transparency in the shadows that are evident in the originals.

The entry to Mr. Crooke's premises at once conveys to you the idea that you are entering a really artistic photographer's. The staircase is chastely decorated, and a handsome display of photographs, prominent amongst which are a number of specimens of his *Scottish Judges*, so much admired at the Glasgow International, adorns the walls. The reception-room, overlooking Princes-street, is a large spacious room, where one would fain linger and admire the portraiture on the walls. Mr. Crooke's forte is portraiture, at least we seldom see any other work from his camera, but so fresh, original, and withal pleasing in the completeness of its composition that we want nothing more. His portraiture has so grown upon us that we would almost regret any time bestowed on other subjects. Mr. Crooke in his portraits employs a lovely shade of carbon, greenish brown might almost describe it, which is effectively set off by the mounts of brown cardboard. We understand Mr. Crooke introduced these mounts, which are now extensively copied. The copying of these mounts calls to mind one photographer, who in copying the mounts neglected to note the prints, with the result that the brown-paper mounts appeared in his show case, with highly burnished silver prints adorning (?) them. The effect may be imagined.

Passing along a corridor we reach the studio, which is of large dimensions and almost square in shape. It also overlooks Princes-street, and the principal light is southerly. Between the outside windows and a range of windows inside is a selection of flowers and foliage. The inner windows are all of different patterns, and are made to open; these are often used by Mr. Crooke as settings for his portraits. There are also roof lights, so that any part of the studio can be used, and, as a matter of fact, every part of it has been used. Double blinds are used, so that the light can be admitted from any part, and thus Mr. Crooke is able to obtain the effective lighting we frequently see in his photographs. The studio might almost be said to be one of corners, and, unlike all other studios, it is a studio by itself, and its unique design immediately betrays the originality and freedom from conventionalities of the worker. Many of these "corners" we recognise. Here we have the piano of "a symphony," there an old doorway, and beside us an antique cabinet; it is a veritable store of antique furniture *in excelsis*. Not a background is visible, but a trapdoor in the floor conceals any backgrounds that may be necessary.

Adjoining the studio is a small dark room, the entrance being by an ancient carved wood doorway that forms part of the studio treasures. Our attention is attracted to a large direct photograph of Sheriff Comrie Thomson, a copy of which is in the Paris Salon. Mr. Crooke is a great believer in dark backgrounds, and employs them largely in his studio work. In all the specimens we saw we do not recollect observing one example of the modern vignette. Much of Mr. Crooke's studio work is children, in the portrayal of which he is singularly successful, and all his work is undoubtedly stamped with the personality of the master. Convenient dressing-rooms adjoin the studio and reception-room, and the whole premises are lighted with the electric light, sufficiently powerful for portraiture, so, if in any part of the premises Mr. Crooke is struck with a pose or an effective lighting, the camera is brought there and the photograph taken. Mr. Crooke is taking a great interest in the coming Convention, and his brother Conventioners have shown their faith in his powers of organization by leaving the arrangements for the visit to Edinburgh in his hands. We feel sure that their every want will be met.

Continuing our walk along Princes-street, we duly arrive at No. 60, the "howff" of Mr. R. D. Webster, almost opposite the famous Sir Walter Scott monument. Mr. Webster, who is one of the rising men in the profession, grumbled that business had sadly depleted his stock of specimens, and he had really nothing to show us. His work is, however, well

known at our more prominent exhibitions. Want of time prevents Mr. Webster exhibiting so often as he would like, but, on the four occasions when he has tempted fortune and the judges' decisions this year, he has been successful, viz., at Edinburgh, Dublin, London, and the Paris Salon. Every Scottish exhibition *habitué* will remember his *Rest in the Lord*, a beautifully conceived idea carried out with a spirit of "rest" that was thoroughly in keeping with, and, in fact, suggested of itself the title. Mr. Webster has long been a "strong" man in "old" figure studies, although he will hardly admit that, and in proof of his contention he showed us a lovely portrait of a girl's head, poetic in treatment and beautifully simple in its arrangement; still we cannot help invariably connecting Mr. Webster with the portrayal of the "auld folks." In 1895, it will be remembered, he took fourth prize in the Cadett competition with a strikingly lighted picture, *Light at Eve*, which depicted an old man reading a book by the last gleams of the dying day. Even as far back as 1890-91, at the Edinburgh Photographic Society's International Exhibition, he exhibited one of his "old" studies, to wit, *An old Cottar*. In connexion with his exhibition pictures Mr. Webster mentioned a rather interesting fact—he does not get special models, but relies on those coming to his studio in the ordinary way of business; but, when he does secure a suitable model, rest assured he makes the most of it. Mr. Webster's studio is a splendid winter studio, and he has a good light all the year through, a not unimportant matter in Auld Reekie. His work is very varied, and lately he has been copying a series of coloured woodcuts of animals; they were well copied, and, as the copies were coloured like the originals, it was difficult to distinguish between the copy and the original. In his reception-room, amongst the works displayed, we recognised many medal winners. The portrait of an old lady with a shawl round her head was a singularly graceful and simple study. Although still a young man, Mr. Webster is one of the veterans of the Edinburgh Photographic Society. He is enthusiastic in his work, and will certainly be even more prominently heard of in future. In regard to photography he has some very strong opinions, and it is hoped he may voice some of these at the Convention.

THE GUM-BICHROMATE PROCESS.

Before the members of the London and Provincial Photographic Association on June 16, Mr. Philip Everitt in the chair, Mr. G. H. James gave a demonstration of this branch of carbon printing, which has of late attracted such increasing attention amongst amateur photographers. He attended, he explained, to show the method of working a new commercial gum-bichromate paper, a paper due to his own experiments, and lately placed upon the market. To start absolutely at the beginning, he handed round specimens of the papers used for the process, both before and after coating. As in the carbon process, the paper is prepared with the coloured pigment which it is desired to use. Brown, red chalk, black, sepia, and Indian ink are supplied at present on various surfaced papers, and the coating on all presents a very uniform appearance. The smooth paper was exceptionally smooth, smoother, perhaps, than has yet been coated by those who make their own material, and about as smooth as can be got. There are also papers of medium, rough, and lined qualities, the size of the sheet coated being about 26×20 inches. The Indian ink paper is distinguishable from the black by a species of greasy surface which is present before the development of the image, after which, however, it disappears, and is due to the fine state of division of the pigment used. To expose, the paper is printed behind the negative in the usual way, and until such time as the image is denoted by the slightly darkened tint assumed by the portions forming the shadows of the picture. The use of the actinometer is entirely abolished in this process, and there appears to be no hard-and-fast rule governing exposure. The exposure should be full, this course allowing greater latitude in the subsequent development of the print. Mr. James prefers brush development, the exposure for which is therefore in excess of that for development, by merely soaking the print in plain water. There appears to be such great latitude in development, that exactness in exposure has little result upon the final picture. The more the grain on the paper the less does the effect of exposure show, and the greater the grain the longer should be the exposure. Why, he did not pretend to say. There appeared to be no definite relative proportion to be laid down. It was nothing like twice, but, whereas, against five minutes for one, another may take seven, at the same time an exposure of a quarter of an hour for the first might only require increasing by four minutes for the second. The development is effected by placing the print in cold water, and allowing it to soak until the image begins to appear, upon which brushing may be commenced. If it appears very rapidly, it is better to leave it alone to take its course, without brush work. For approximately correct exposures the operation is done by friction with a very soft brush, using but the point. The Artigue sawdust soup may be used, or a flow of water will answer the same purpose. The brush should be used in straight lines across the print, holding the latter under the water the while. Brush marks are not necessarily attendant on the use of the brush, and such effects which are sometimes seen are intentionally produced. With a good brush, and using the end, such marks need never appear. The process presents great possibilities for local development, as was shown by the several prints from a single negative which were passed round. The soaked print is supported upon a sheet of glass, and with a brush the required portions are touched up. Excessive exposure may be counterbalanced by tepid water replacing the cold, or by a long soaking in cold water, the results by the last-named being, however, superior. The paper is so good, indeed, that a week's soaking would not damage it, and, in the case of a very extreme case of over-exposure, such a soaking would produce a very good picture. Any continuing action which takes place is not noticeable, owing to the latitude in development. Fixing may be done by immersing the print in alum solution (1 : 20), and passing rapidly a few times through clean water, after which it is dried.

The following additional information was given during the discussion: It does not do to use the brush on the lights when the image appears very distinctly after the soaking. To use a spray of water, it would have to be fairly strong, and the result would be a coarse image. To demonstrate the scope of the process, a winter view was changed in another print to a spring scene, what should have been the snow being made to represent grass, the pigment being allowed to remain. The negatives used for the examples vary between the usual extremes, but a normal negative gave less trouble. An illustration of the use of the brush at too late a period was shown. Following a long soaking, the effect was to remove too much of the pigment from parts, with a hard result. The paper was of extreme rapidity, beating platinotype paper. This was one of its strong points. Demachy gets a paper which keeps three weeks, but it was slower than silver paper, and he kept it so long on account of its low sensitiveness. This paper, however, with its high speed, keeps well for a month under slight pressure. It was quite possible to obtain a dozen identical results from one negative. In the case of this paper, large sheets were coated uniformly and identically alike, and it was not to be compared with small single pieces coated for each print, which introduced the factor of irregular coating, which, of course, affected the similarity of the resulting prints.

PORTRAITURE FOR AMATEURS.

Before the Gospel Oak Photographic Society, on Tuesday, June 7, Mr. W. E. Debenham delivered a lecture on "Portraiture for Amateurs." Mr. Debenham in opening his discourse, stated that he had once before delivered a lecture on the subject before the Society, and that probably he would have very little or nothing fresh to tell them. The only real difficulty likely to be met with by an amateur who attempted portraiture was the difficulty of obtaining a suitable lighting, but, if care was taken, he could see no reason why as good portraits might not be made in an ordinary room or outdoors as could be obtained in a studio. He would divide his lecture into two parts, indoor portraiture and outdoor portraiture. Dealing with the latter class first, he showed the flat lighting that would be obtained on attempting to take a portrait in an open space such as on a heath. Here the lighting would be flat, but worse still would be the lighting when the sitter was opposite to a doorway in which the camera was placed, as owing to the presence of so much top light, dark and heavy shadows would be found under the nose and chin, and the eyes would appear to be sunken. But, supposing there was a fairly high wall behind the sitter, a great deal of this top light would be cut off and a somewhat better effect could be obtained; but a very great improvement on this would be the result, if things could be so arranged that, in addition to the wall at the back, there should be another at one side. Matters arranged in this way would enable satisfactory lighted negatives to be made out of doors.

Coming to indoor portraiture, he described the best means by which soft lighting could be obtained. The sitter should be placed fairly close to a window, and on the opposite side of the face should be placed a light-coloured screen, such as a clothes-horse covered with a sheet, so as to light up the dark side of the face. This screen or reflector should not be placed too close to the sitter, however. The best position for the camera was close to the wall on the same side as the window. If the light was too strong, so that the shadow side of the face was almost as bright as the side nearest the window, better relief could be obtained by removing the reflecting screen further away from the sitter.

In taking groups, it was well to remember not to include too wide an angle. The reason for this was the broadening effect on those figures nearest the edges of the plate. If these side figures were cut out and looked at as separate pictures, the effect would be absolutely false. Mr. Debenham's remarks were illustrated by various portraits taken by himself.

Replying to various members, Mr. Debenham said that a certain amount of direct light was wanted on the shadow side of the face. He did not think there was much advantage gained by the use of isochromatic plates without a screen, and this increased the exposure to too great an extent to be useful in portraiture.

Pyro ammonia was the developer he used himself, and it seemed to him to give satisfactory results. In his opinion, pyro ammonia would drag more detail out of the plate than pyro soda.

As regards lenses, the rapid rectilinear answers well for ordinary subjects, but for difficult work, such as an indoor group, the new

stigmatic lenses would be preferable. The price of these, however, was necessarily high. Portrait lenses could be used, but for large-sized or for groups they would have to be stopped down very considerably if depth of focus was required, and then the speed of the portrait lens was no greater than that of a rapid rectilinear stopped to the same aperture. The depth of focus of a lens depended upon the absolute size of the stop, and not upon its focal value.

Very few faces were sufficiently symmetrical to look best when taken from the front, and, as a guide to which side of the face should be taken, two rules might be laid down: The first was that the side of the face should be chosen in which there was the greatest distance between the eye and the corner of the mouth. The other was that as most noses were inclined more or less to one side of the face, the side to which the bridge of the nose inclined should be chosen to show against the farther cheek, or, in other words, the concave side of the nose should be the nearest to the lens.

PRESSURE PRINTS FROM METALLIC SURFACES WITHOUT ELECTRIC CURRENTS.

[A Communication to the Croydon Camera Club, June 15, 1898.]

Feeling that the first communication does not fully substantiate my contention that the so-called electrically formed prints of your lecturer are formed by the action of chemical force, I would like to add a few more points relating thereto.

This can perhaps the better be done by propounding one or two experiments. Practical results will prove more than any quantity of theoretical statements.

Example I.—Damp a piece of bromide paper with plain water, and press upon it, say, a silver coin. Develop with ordinary bromide developer.

Example II.—Write with a metal stylus—say a steel or iron point—upon a piece of ordinary writing paper damped with water, acidulated with hydrochloric acid, then develop with the separate iron and silver baths used by Mr. Friese-Greene (others will likewise answer).

Example III.—Take another piece of writing paper, damp it in the acid bath, and press upon it lead or metal type. Develope with the iron and silver baths.

Example IV.—Take a piece of bromide paper, damp it with weak ammoniated water, and press a copper coin upon it. In this trial if copper is used a developer is not required, neither is it in the remaining examples.

Example V.—Take a piece of P.O.P., damp it with plain water and press a type block or copper coin upon it. Fix with hypo. If a soft sample of gelatine is used in the P.O.P. emulsion, place a little formalin in the damping water. Specially prepared paper would not stick.

Example VI.—Coat a metal plate with fish glue, burn it in, then engrave or otherwise cut through the enamel to leave the metal bare; press upon this a piece of silver paper. In this trial as an alternative make a line or half-tone screen, print from a positive upon metal which is developed up to the point of etching, thus having a resist of enamel with bare metal in the lines.

Example VII.—A card or paper which has been printed upon in bronze powder, as the back of a gold-bronze printed photo mount, is taken and a piece of damped P.O.P. brought into contact with the printed matter.

The result in all these cases will be a print.

It is hoped these seven examples will show perfectly well that the use of the electric current is superfluous. I could go on adding to their number and with fuller particulars, but business calls prevent.

I trust, however, that the information here given, some of which has never been published before, will be acceptable to your Club, as enabling the members to steer clear of any erroneous theories likely to have been accepted after being present at Mr. Friese-Greene's demonstration.

It may perhaps be necessary to point out that patent rights are claimed for the commercial part of the method, wherein prints are made without development between metals and prepared paper, or other fabrics holding metal salts.

Henry Soar.

PICTURES FOR SCHOOLS.

The Art for Schools Association, which does a very useful work in providing at a low price reproductions of good pictures for the benefit of schools, held its annual meeting last week. The Committee state in their report that the demand for the pictures of the Association continues steady, and the field of work widens yearly. The number of pictures sold during the year was 3257. Many applications come from distant countries.

The Chairman (Canon Lyttelton) remarked that he had been asked to adopt a critical attitude towards the Society, for which he hardly felt equal. He could at any rate congratulate the Society on being engaged on a great educational work, which was at the same time uncontroversial, for it was extraordinary how controversial educational subjects were, seeing that the mass of the English public were but little interested in education. He believed that there was a demand—latent perhaps—in the English nation at large for education on the subject of pictures. He had seen many people in a state of weariness from different causes, but he had never seen such utter weariness expressed in the human countenance as might be seen among visitors to a picture gallery. He believed the reason was that they did not really look at them. If in a school the teachers were even once a year to take a picture on its walls, and thoroughly explain it to the children, they would then learn that a picture was worth a great deal of thought and attention.

Lord Balcarres, in moving the adoption of the report, regretted that the Society was not more widely known, and lamented the desolation and dreariness that prevailed in many of the Board schools.

Mr. Costelloe, in seconding the resolution, remarked that, though the London School Board had been a ready patron of the work, still the number of pictures in the schools was quite infinitesimal compared with an ideal standard; but they must remember that this matter was not entirely at the arbitrament of boards and such bodies, and, if they were to put pictures in the schools for the education of the children, they must first educate the public on the subject. The movement was not as conspicuous as it should be, and he was in favour of a rather more advertising policy if it were practicable. He was glad to see the work was not entirely confined to schools. The humanising influence of pictures could be much more widely used, and they could find a new field in the hospitals, workhouses, infirmaries, and industrial schools; he would not add prisons, though they were even being humanised too.

TATTERSALL'S PHOTOGRAPHIC SHUTTER.

This shutter is constructed on the roller-blind principle, and consists of a metal or other box, having an aperture at its centre to take the lens, and provided with a roller at each end, to which the ends of a flexible strip of an opaque material are secured. This blind is constructed with a central aperture similar to the blind in common use for this purpose. One of the rollers is provided with a motive spring, whilst the spindle of the other or winding roller is provided with two projecting arms which make contact with two stops fixed on opposite sides of an oscillating disc, which has a limited rotation on the releasing lever. Means are provided for winding and releasing the rollers as hereinafter described. Exposures are made by raising the releasing lever. The apparatus is adjustable either for "time" exposures or for "instantaneous" exposures.

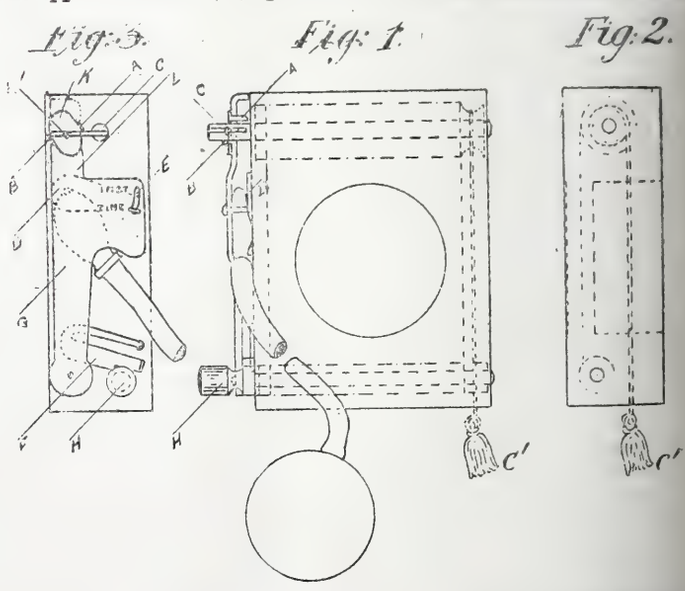
Fig. 1 shows a front elevation of the device.

Fig. 2 an end view of the same.

Fig. 3 another end view showing the releasing mechanism.

Fig. 4, 5, 6, and 7 show details of the said releasing mechanism.

The upper blind roller, C, upon which the blind is coiled when the said

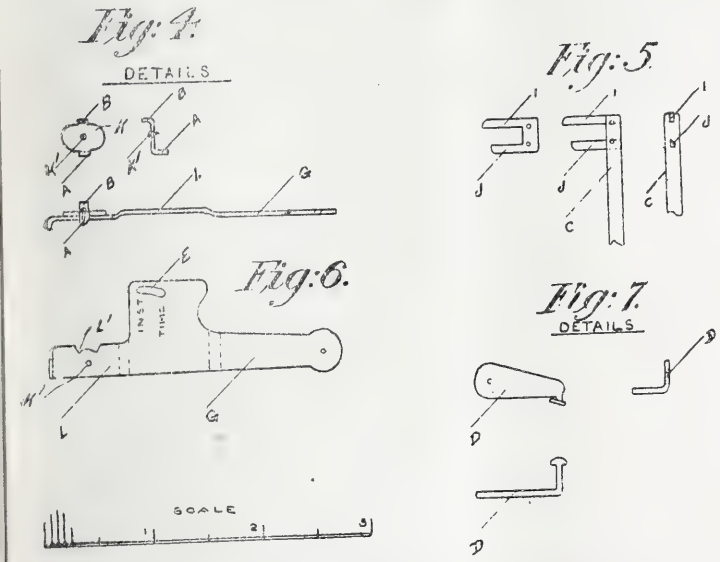


apparatus is set for action, is provided at the back with a pulley and cord, C^1, by means of which it can be actuated. The said roller has its spindle projecting to the outside at the front end of the case, which spindle carries the two arms, I and J. The releasing lever, G, carries at its end, L, an oscillating plate, K, having a limited motion around the pin, K^1, and bearing two projecting lugs, one on the under side marked A, the other on the upper side marked B (see figs. 3 and 4). These lugs are arranged to engage respectively with the projections, I and J, of the spindle, C, The lever, G, has its upper part, L, arranged as shown more particularly in fig. 6, and upon it is secured the pin, K^1, of the plate, K, whose motion is limited by the engaging of the projection, A, in the cut-out portion of the said lever, G, which is marked L^1. The said lever, G, has, moreover, a slot, E, through which passes the stud of the lever, D, whereby the mechanism can be set for instantaneous or "time" exposures, as explained later on. The roller, H, is provided with an

nternal coil spring, the tension of which is regulated by the knob at the end. The spindle, C, carries a roller of such a diameter that two complete revolutions wind up the blind to the full. F, is a spring stop controlling the revolution of the spindle, H. The operation of the device is as follows :—

The blind having been wound up to the full by pulling the cord, C^1, on the roller of the spindle, C, the same is held in position against the tension of the spring by the lug, A, on the oscillating piece, K, coming in contact with the inner projecting lug, J, of the spindle, C. If, however, the lever, G, be raised by means of the pneumatic device or otherwise, the said arm, J, is released from, A, and the blind rewinds on the spring roller, H, thus making the exposure.

For this operation the lever, D, must be adjusted to the part of the slot, E, for "instantaneous" exposures. If, however, the lever, D, be shifted



nto the position for "time" exposures, that is to say, towards the spindle, H, the lever, G, is moved inwards closer to the spindle, C, and the outer lug, B, on K, comes within reach of the outer lug, I, on the spindle, C. Consequently, when the mechanism is released, the said lug, I, on the spindle completing one revolution, will strike against the lug, B, on the upper side of the oscillating plate, K, thus preventing the blind from unwinding to the full, and leaving the aperture in the blind and the shutter respectively coincident.

The exposure will thus continue as long as may be desired until the lever, G, is again pressed out, when the arm, I, being released, the revolution of the spindle, C, is completed, and the shutter is closed. The lever, G, may be actuated by means of a pneumatic tube or otherwise ; a speed indicator may be affixed on the end of the spindle, H.

PORTABLE DARK ROOMS.

Mr. M. C. de Sane forms the portable dark room of a number of box-like sections adapted to slide into each other telescopically, so that when drawn out they afford sufficient space in their interior for the performance of the various manipulations required in developing negatives, light-proof sleeves being provided for the insertion of the arms of the operator. A suitable tank or vessel is provided for the supply of water, while, in the walls of one or other of the casings, windows of red glass or other suitable material are provided to enable the development to be watched.

The largest section of the dark room is provided with a hinged front or door, to admit of the camera and other accessories being packed therein.

Fig. 1 is a perspective view, and

Fig. 2 is a horizontal section on the line, *x x*, (fig. 1), showing the dark room extended ready for use.

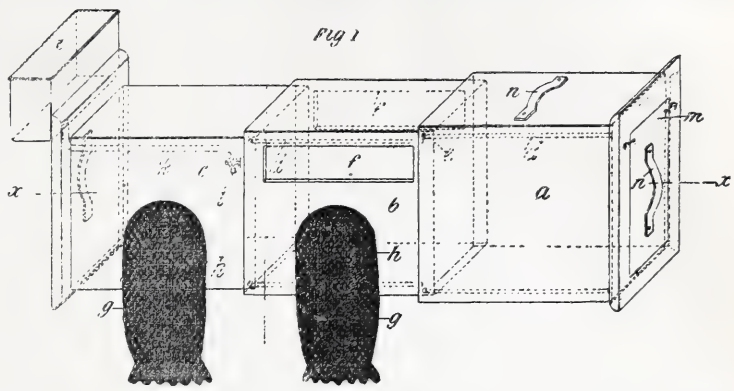
Fig. 3 shows the dark room in its closed state.

The dark room is formed of three sections, *a*, *b*, and *c*, each consisting of a square box or casing. These sections fit one inside the other, and are connected by slotted guides, *d*, and guide pins, *e*, which permit them to be pushed in and drawn out with a smooth and regular motion. When the sections are closed together, the dark room constitutes a square receptacle, in which is ample space to carry the camera, trays, and chemicals. The bottom of the sections may be provided with a covering of waterproof material to prevent them from getting soiled or damaged.

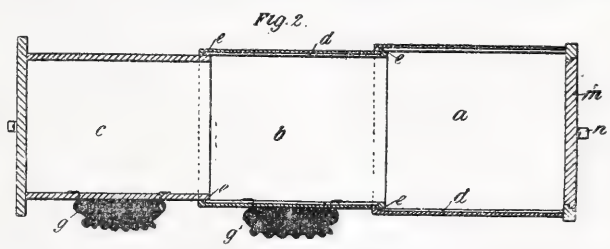
f are the windows of red glass, arranged opposite to each other in the sides of the middle section, *b*, so as to allow non-actinic light to enter and also to enable the operator to see into the interior of the dark room sufficiently to enable him to perform the necessary operations.

g are the sleeves for the insertion of the operator's arms. These sleeves are of dark light-proof fabric, and are fitted into apertures, *h*, in the sections, *b* and *c*. The two sleeves are both on the same side of the dark room, and have elastic bands or rings around their lower ends which grip the arms of the operator so as to prevent light from filtering through.

To prevent the sleeves interfering with the telescoping action when

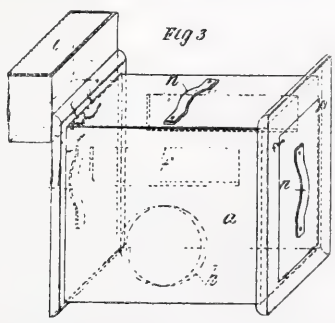


the dark room is being closed up, the left-hand sleeve is pushed through its aperture, *h*, into the section, *c*. The said section is then pushed into the section, *b*, thus bringing the apertures, *h*, opposite one another. The right-hand sleeve can then be pushed inward through both apertures so



as to be out of the way. The section, *b*, can then enter the section *a* freely.

i is the water tank which may consist of a small metal or canvas receptacle, and is adapted to be connected, say, to the third or smallest of the casings, so as to be supported at a higher level than the top of the same, as shown. A length of flexible tubing, *k*, leads from the tank or receptacle to the interior of the dark room, and is provided with a



suitable tap or other controlling device, *l*, to allow the water to be drawn off as required.

At the front of the large section, *a*, of the dark room is provided a hinged door, *m*, which serves to admit the camera and other accessories when the dark room is in its closed state. This door may be provided with any suitable means for fastening the same securely. The said section, *a*, is also provided with two handles or carrying straps, *n*, one of which is on the top and the other on the door thereof.

THE NEW POISONS BILL.

The following is the text of a Bill for regulating the sale of certain poisonous substances not at present scheduled under the Pharmacy Act 1868. The Bill was introduced into the House of Lords by the Duke of Devonshire, Lord President of the Council, on Monday, June 13, and read a first time.

1.—(1) No person shall sell any substance which is mentioned in the schedule to this Act, and which is not for the time being deemed to be a poison within the meaning of the Pharmacy Act 1868, unless the box, bottle, vessel, or package in which the substance is contained, and also any external wrapper or cover, are distinctly labelled with the name of the substance, and with the word "Poison," and with the name and address of the person selling the substance.

(2) Provided that, if the substance is supplied for internal use by a legally qualified medical practitioner, or by a pharmaceutical chemist or

chemist and druggist, and the ingredients of the substance and the name of the person by whom it is supplied are entered in a book kept by that person, the words "To be used with caution" may be substituted for the word "Poison."

(3) The Privy Council may make regulations as to the keeping and selling of substances mentioned in the said schedule, and all such regulations shall be laid, as soon as may be, before both Houses of Parliament.

(4) The Privy Council may from time to time, by order, amend the said schedule by adding any substance thereto, or removing any substance therefrom, and references in this Act to the said schedule shall apply to the schedule as so amended.

(5) If any person contravenes any of the provisions of this Act, or of any regulation made thereunder, he shall be liable on summary conviction to a fine not exceeding five pounds, or, in the case of a second or any subsequent conviction, not exceeding ten pounds.

(6) In the application of this section to Ireland, the Lord Lieutenant in Council shall be substituted for the Privy Council, and references to the Poisons (Ireland) Act 1870 shall be substituted for references to the Pharmacy Act 1868.

2.—The power exercisable under section one of the Pharmacy Act 1868 by the Council of the Pharmaceutical Society, with the consent of the Privy Council, of prescribing regulations as to the keeping, dispensing, and selling poisons, may be exercised also by the Privy Council, and that section shall have effect accordingly.

3.—(1) This Act shall come into operation on the first day of January, one thousand eight hundred and ninety-nine.

(2) This Act may be cited as the Poisonous Substances Act 1898.

SCHEDULE.

Butter of antimony.
Carbolic acid.
Chloride of zinc and its solutions.
Cresylic acid.
Hydrochloric acid, Nitric acid, Sulphuric acid } unless diluted in manner prescribed by the British Pharmacopœia for the time being in force.
Sugar of lead and other salts of lead.
Preparations of carbolic or cresylic acid or their homologues used as disinfectants and containing more than ten per cent. of any of them.
Substances sold for the purpose of poisoning insects or vermin.

PATENT STATISTICS IN 1897.

THE fifteenth report of the Comptroller of Patents, Designs, and Trade Marks, presented to Parliament by Mr. Ritchie, has been published. It states that the applications for patents in 1897 numbered 30,958, of which about 6000 were for inventions connected with cycling. This number represented an increase of 765, or 2·5 per cent., as compared with an increase in the year 1896 of 5131, or 20·5 per cent. But the growth in 1897, though less in quantity, was apparently of a more substantial quality than that of 1896; for, whereas in 1896 the increase was mainly in applications accompanied by provisional specifications, in 1897 it was mainly in applications accompanied by complete specifications, which rose by 677, or 14 per cent., while those accompanied by provisional specifications rose by only 88, or 0·3 per cent. Since 1893 the rate of increase in the number of the applications has been less constant than in preceding years. In 1894 the number remained almost stationary; it fell in 1895, rose with a sudden leap in 1896, and rose again, but only slightly, in 1897. In spite of these variations, however, the average increase of applications for the four years, taken together, was exactly the normal average, namely, 5·7 per cent. The total number of specifications received in 1897 showed an increase of 1862, or 4·9 per cent. upon those of 1893, and this was the normal rate of increase. When the Patents Act of 1883 first came into force, and the initial fees were reduced from 25*l.* to 4*l.*, it was thought probable that the average value of the patents granted would be diminished in a corresponding degree, as trivial inventions, upon which formerly it had not been worth while to pay high fees, would in future be made the subject of patents. The accuracy of this presumption could now, to some extent, be tested, and it appeared that the percentage of sealed patents which for 14 years had fallen from 6 to 4·5 per cent.; but, on the other hand, though the ratio was smaller, the actual number of patents continued, for their full term was considerably larger than before. Tables are appended to the report which show that England and Wales were less inventive in 1897 than in 1896, and that the additional applications came chiefly from Scotland, Ireland, Victoria, new Zealand, Tasmania, South Africa, France, Germany, Holland, Russia, Sweden, and the United States of America. Of foreign applications, the largest number came from Germany and the United States of America, which contributed 2459 and 3084, as against 2172 and 2725 respectively in 1896. Japan, from which no applications were received in 1896, sent 5 in 1897, the same number as in 1895; but China, from which 9 were received in 1896, sent only 3. The West Indies, from which 9, 16, 6, 8, and 12 applications were received in each of the five preceding years respectively, contributed only 5 in 1897. Under the provisions of the International Convention of 1883, 271 applications for patents in this country were received from inventors residing in other States of the Union. Women inventors contributed 702, or nearly 2·3 per cent. of the total number of applications, about 148 being for inventions connected with articles of dress, and 106 for inventions relating to cycling. The number of readers frequenting the Patent Office Library during 1897 was 111,439, or a decrease of 1956 as compared with the previous year, and 35,328 persons availed themselves of its use after four o'clock.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

GLASGOW MEETING, 1898.

Synopsis of proceedings:—

MONDAY, JULY 4.

Excursions:—Ayr and the Land of Burns; train leaving St. Enoch station at 12.30; Leave Ayr about 4 p.m.; arriving in Glasgow at 5 p.m.

Proceedings:—At the Fine Arts Institute at 7.30 p.m.: official opening of the Convention by the Right Hon. the Lord Provost; after which the new President (John Stuart, Esq.) will deliver his Presidential address.

This will be followed by an exhibition of specially selected lantern slides, illustrating the various applications of photography, and the present position of photography in natural colours.

TUESDAY, JULY 5.

Excursions:—Edinburgh and the Forth Bridge; special train leaves Queen-street (High Level) at 8 50 a.m.; arriving at Dalmeny (Forth Bridge) at 10.30 a.m.; leave Dalmeny at 11.15 a.m.; arrive in Edinburgh at 11 50 a.m.; leave Edinburgh at 4.45 p.m.; arrive in Glasgow at 5.55 p.m.

Proceedings:—At the Fine Arts Institute at 8 p.m.: a paper (subject to be announced). An exhibition of lantern slides solely by members of Scottish photographic societies. Colour photography, &c.

WEDNESDAY, JULY 6.

Excursions:—Afternoon visits to places of interest in and around Glasgow; The Cathedral, city chambers, harbour, shipbuilding yards, &c., will be arranged as required; carriages and guides leaving the Fine Arts Institute at 3 p.m.

Proceedings:—At the Fine Arts Institute at 10 a.m.: the Annual General Meeting and election of Council for the ensuing year. In Kelvingrove Park at 12 noon: the Convention Group and Animatograph Pictures will be taken. At the Windsor Hotel (*Headquarters*) at 7 p.m.: Annual Dinner and Smoking Concert.

THURSDAY, JULY 7.

Excursions:—Cruise on the Firth of Clyde; train leaves Queen-street (Low Level) at 9 a.m.; returning to Glasgow at 6 p.m.

Proceedings:—At the Fine Arts Institute at 8 p.m.: Paper, "Some Fundamental Points concerning Development," by Mr. C. H. Bothamley. An exhibition of lantern slides, colour photography, &c.

FRIDAY, JULY 8.

Excursions:—Loch Lomond; train leaves Queen-street, (Low Level) at 9 a.m.; Returning to Glasgow at 6 p.m.

Proceedings:—At the Fin Arts Institute at 8 p.m.; a paper on "American Photography and Photographers," by Mr. H. Snowden Ward. An Exhibition of lantern slides, colour photography, &c.

SATURDAY, JULY 9.

The Local Committee believe that the majority of the members will wish to spend this last day in Glasgow, and guides and carriages will be arranged for accordingly. Should any reasonable number, however, desire to have an excursion, the necessary arrangements will be made during the week, and particulars posted on the notice boards.

Our Editorial Table.

FITCH'S CELLULOID FILMS.

Manufactured by E. H. Fitch & Co., Seldon House, Fulwood's Rents, Holborn, E.C.

THE keeping properties of cut celluloid films have recently received striking recognition in our pages at the hands of Mr. W. J. Stillman, and additional evidence on the subject has lately been furnished us by Messrs. Fitch, whose experience in cut-film making is certainly unique, as it dates back to the year 1888. Some of their films, made in the year 1893, were recently put into practical trial, and, notwithstanding that all the time they had been stored in dark slides, they were found to give results which were all that could be desired. This is but one of many similar experiences. Negatives and prints obtained with the very latest make of the Fitch film have just been shown us. The subjects were outdoor portraiture, made with a very short exposure. Not only was the great rapidity of the film thus attested, but also its fine capacity for correctly rendering the gradation of the original. Indeed, we have not seen negatives having a bette-

scale from shadow to high light. The convenience attaching to the use of cut films is so great that the combination of keeping property with good quality is all that is needed to assure them increasing popularity. Fitch's films evidently possess these valuable features in a high degree.

PANORAMA OF EPSOM RACECOURSE.

By The London Stereoscopic Co, 54, Cheapside, E.C.

RACECOURSE photography has an undying attraction for large classes of the community other than those who make betting and similar concomitants of the turf a special study. You can view human nature on a racecourse in aspects that are not revealed in any other act of the comedy—or tragedy—of life. One of the best photographs of the kind we are discussing has just been exhibited to us by Mr. E. Miles, of the London Stereoscopic Company. It is in panoramic form, five feet long, and shows Epsom Racecourse on last Oaks Day. The scene is crowded and animated, the photograph is sharp and bright to the edges all over, and it entirely appeals to us as the finest example of this class of work that we have seen.

News and Notes.

WE are sorry to learn of the death, on June 14, of Mr. J. J. Atkinson, the well-known photographic dealer of 37, Manchester-street, Liverpool.

THE AUSTIN-EDWARDS MONTHLY FILM-NEGATIVE COMPETITION.—The prize camera for the current month has been awarded to Mrs. Blake, 38, High-street, Bedford, for her negative *Iris*.

ROYAL PHOTOGRAPHIC SOCIETY.—Technical Meeting Tuesday, June 28, to be held at No. 12, Hanover-square, at eight p.m. Mr. E Sanger Shepherd will read a paper on "The Scientific Translation of Colour into Monochrome."

A COURSE of seven lessons in practical photography will be given at the summer session of the Cripplegate Institute by Mr. C. W. Coe, of Messrs. E. G. Wood's. Particulars may be obtained of the Secretary, Mr. H. W. Capper.

MR. ALEX. LEE, of Portrush, writes: "Last week I took a group of fifty-five people in a studio, successfully, on a 10×8 plate, also 15×12 I should like to know if any of your subscribers have taken as large a group in a studio? There was not a single move."

WE are sorry to learn that, whilst playing cricket on the Central Ground, Hastings, on Monday evening last, a lad named Blomfield, son of Mr. Blomfield, photographer, of Hastings, was struck in the region of the heart, and died within a short time. He was batting in the nets of his club, that of the Grammar School, a schoolfellow bowling to him.

MESSRS. REYNOLDS & BRANSON announce that they have thought it desirable to register under the Companies Acts 1862 to 1893, thus forming themselves into a private limited liability company, under the style of Reynolds & Branson, Limited. The present partners take the whole of the share capital and retain the direction of the business as previously.

PHOTOGRAPHIC CLUB.—Wednesday evening, June 29, at eight o'clock, paper by Mr. E. W. Foxlee, subject to be announced. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. W. R. Stretton, 4, Queen-street-place, London, E.C.) will be pleased to forward on application.

Re GEORGE GUSTAVE GUGGENHEIM, photographer, 33, St. John's-square, Wolverhampton, lately carrying on business in co-partnership with Arthur Whitlock at 63, Darlington-street, Wolverhampton, and formerly carrying on business at 49, Snow-hill, Wolverhampton.—A receiving order was made against this debtor at the Wolverhampton Bankruptcy Court on the 15th inst. by the registrar, on the debtor's own application. The amount of assets and liabilities did not transpire. The public examination of the debtor was fixed for July 18 at 2.30.

A FACETIOUS correspondent writes: "The following is a dispatch lately come to hand: 'Sidcup.—Great capture by Dewey; whole town taken successfully; kept an incessant firing for ten hours; no details as to Dewey's losses; operations were delicately, but firmly, treated, owing to many of those taken being of tender age; great excitement amongst the inhabitants; it is estimated that at least 500 shots were made; no loss. The civil authorities sent their aid in case of a riot. Awaiting *developments*, further "proofs" of this great achievement on June 4.' Dewey claims this as a victory."

THE SALE OF PHOTOGRAPHIC POISONS.—At the South-West Police Court on Saturday, the 18th inst., George Frederick Handel Bartlett, a chemist, carrying on business at 38, Battersea-park-road, S.W., was summoned for selling a certain poison—to wit, cyanide of potassium—without recording the fact in a book kept for that purpose. It appeared that the prosecution was undertaken by the police at the instance of Mr. Frederick Davis, a photographer, of St. Phillip-street, Queen's-road, Battersea. The latter deposed that on Whit Monday he went to the defendant's shop in Battersea-park-road, and was served by the manager with half an ounce of cyanide of potassium, which he used for the purposes of his trade. The manager made no entry in his poison-book at the time of the sale, and he informed the police of the circumstances. Mr. Nicholl, who appeared for the defence, admitted the truth of the allegations made by the prosecution, and said he would address the Court in mitigation only. He stated that the business was left in the hands of a qualified assistant, Mr. Bartlett attending to his principal shop in High-street, Battersea, and the assistant, in the hurry of the moment, forgot to make the entry as required by the statute. He submitted that it was merely a technical offence, and hoped his Worship would only inflict a nominal penalty. Mr. Francis said the offence had been proved, and the defendant could not excuse himself on the ground that the offence was not committed by himself, but by his assistant; but, under the circumstances, he would fine the defendant 20*s.* and 2*s.* costs only.

X-RAY PHOTOGRAPHS IN COURT.—In the Queen's Bench Division of the High Court of Justice, before Mr. Justice Bruce, on Saturday last, an action came on for hearing in which a widow lady named Penny sued the Wimbledon Urban District Council, and certain contractors who were employed by them to make up a road in Wimbledon, to recover damages for personal injuries. It appeared that, in October last, the plaintiff, one dark night, fell over a heap of earth which the contractors had left without proper guards. The result of the fall was that plaintiff broke the wrist of her right arm, which was now disabled, and the disablement would probably be permanent. During the trial, photographs taken by means of the Röntgen rays, showing the injured bones, were handed to the jury for inspection. The District Council denied liability, on the ground that the work was done by independent contractors, over whom they had no control. The contractors also denied liability, but they paid 75*l.* into Court. The Council further contended that, if there was any negligence on their part, the 75*l* paid by the contractor was, at all events, sufficient to meet the plaintiff's claim. The jury found a verdict against both defendants, and assessed the damages at 50*l.* Upon this verdict the contractors claimed judgment with costs, as the amount paid into Court was in excess of the amount of damages awarded, and it was argued on behalf of the Council that, on the same ground, they ought also to have judgment entered in their favour with costs. Mr. Justice Bruce gave judgment for the contractors with costs, and, with regard to the Council, he held that they could not avail themselves of the payment into Court. Their defence was merely a denial of liability, and he consequently gave judgment for the plaintiff against them for 50*l.* and costs.

Patent News.

THE following applications for Patents were made between June 6 and June 11, 1898:—

CINEMATOGRAPHIC SHUTTERS.—No. 12,662. "Improvements in or relating to Shutters for Cinematographic or other Apparatus for Projecting Animated Pictures." J. DICKINSON.

SENSITISED POST CARDS.—No. 12,671. "Application of Sensitised Photographic Paper for Illustrated Post Cards, Envelopes, Letter Headings, and the Like." R. C. VON PIERRON.

APPARATUS.—No. 12,781. "A New or Improved Photographic Apparatus." B. CLARKE, JUN.

COATING MACHINE.—No. 12,836. "Improved Apparatus for Coating Paper and the Like with Photographic Emulsion or other Aqueous Medium." A. THILMANY.

BICHROMATE PRINTING.—No. 12,845. "Improved Method of Preparing or Preserving Sensitive Materials for the Production of Chromate or Bichromate Photographs." R. E. LIESEGANG.

LENS.—No. 12,859. "Improved Double Objective for Photographic and the like Purposes." Complete specification. C. P. GOERZ and E. VON HOEGH.

CINEMATOGRAPHIC APPARATUS.—No. 12,939. "Improvements in Cinematographic Apparatus." Complete specification. B. ACRES.

CASES FOR SENSITIVE MATERIAL.—No. 12 940. "Improvements in Cases for Containing Sensitive Photographic Material." B. ACRES.

RELIEF PHOTOGRAPHY.—No. 12,963. "Improvements in the Production of Relief Pictures with the Aid of Photography." Complete specification. C. PIETZNER.

CINEMATOGRAPHY.—No. 13,014. "Improvements in Apparatus for Taking and Projecting Photographs of Moving Objects." F. E. HOFFMAN.

APPARATI.—No. 13,036. "Improvements in or relating to Photographic Apparati." R. G. SANSON.

STEREOSCOPIC PHOTOGRAPHY.—No. 13,125. "Improvements in Coin-freed Apparatus for Exhibiting Stereoscopic and Other Views." C. E. BRUN and E. HUNGERBÜHLER.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

June.	Name of Society.	Subject.
27.....	North Middlesex	*The Relative Values of Printing Processes* Discussion to be Opened by J. McIntosh, F. W. Cox, and H. W. Bennett.
28.....	Birmingham Photo. Society ...	Exhibition of Pictures in Portraiture Competition.
28.....	Hackney	*Toning and After Work.* F. E. Roofe and J. J. Westcott.
28	Royal Photographic Society ...	*The Scientific Translation of Colour into Monochrome* E. Sanger Shepherd.
29.....	Croydon Camera Club	Conversational Meeting.—Prints from Negatives exposed at Penshurst to be brought up.
29	Oldham	Excursion: Lincoln. Leader, W. A. Nash.
29.....	Photographic Club	Paper by E. W. Foxlee.
30.....	London and Provincial	Annual Meeting.

ROYAL PHOTOGRAPHIC SOCIETY.

JUNE 21,—Ordinary Meeting,—The Right Hon. the Earl of Crawford, K.T., F.R.S. (President), in the chair.

NEW MEMBERS AND FELLOWS.

Twelve new candidates for membership were elected and four gentlemen were nominated for ballot at the next meeting.

The PRESIDENT announced that Messrs. Hargreaves and Redmond Barrett had been admitted as Fellows of the Society, causing some surprise by first giving the name of the latter gentleman as *Wilson* Barrett.

It was also announced that the Worcestershire Photographic Survey Society had been admitted to affiliation.

A BURNING QUESTON.—TO SMOKE OR NOT TO SMOKE?

At an early stage of the proceedings the attention of the President was directed to the fact that some of the members present were smoking, and he thereupon read a recent resolution of the Council to the effect that the question as to whether smoking was to be permitted at the meetings of the Society was to be subject to determination from time to time by the members attending. It should be explained that it has been the custom to permit smoking, without question, at the Technical and Photo-mechanical Meetings, but that, until recently, the contemplative pipe has been forbidden at the Ordinary Meeting held on the second Tuesday in each month. Of late, however, even on these occasions, it has generally happened that some member has moved that the ban be removed, and the motion has invariably been carried with practical unanimity. To-night, with the confidence born of previous success, and probably without a thought of the serious opposition, he was to encounter, the Rev. F. C. LAMBERT, who is not an an anti-tobacconist, but who, on the contrary, is the possessor of what he described as "the historic pipe," moved that smoking be permitted.

Captain ABNEY, who is known to be not ill-disposed to tobacco, to say the least of it, pointed out that smoking was not indulged in at the meetings of any other scientific society, and thought it would be a bad precedent to break through such a salutary precedent at Ordinary Meetings. The Technical and Photo-mechanical Meetings were of a less formal nature, and the same objection did not hold good on those occasions; but, although he felt the deprivation very keenly, the sense of duty impelled him to vote in opposition to the proposal to permit smoking at the ordinary meetings.

Mr. W. E. DEBENHAM strenuously opposed the motion, considering that the custom which had hitherto prevailed was a proper one, and constituted a fair compromise between the adherents of tobacco and those to whom smoking was objectionable. He was much inconvenienced by tobacco smoke, and had recently had to change his seat in consequence of the foulness of the pipe of a member sitting near him. He thought also that the practice was derogatory to the dignity of a Royal Society, and that, if its existence had been known in certain quarters, the Society would not have received the privilege of assuming the title "Royal."

The PRESIDENT expressed the opinion that not the slightest importance would have been attached to the fact.

Mr. T. BOLAS, who described himself as "a devotee of what is called the fragrant weed," urged his fellow-smokers to take the considerate course, and "not insist upon smoking up to the hilt," which strikes one as rather a mixture of metaphors. He thought that the Ordinary Meetings of the Society should be "kept free from the practice of this delightful habit."

Mr. JAMES CADETT supported the opposition to the motion, but protested against the question of dignity being introduced, for, if it was undignified to smoke, one ought not to smoke at all. He quoted the authority of Professor Huxley in favour of tobacco, to the effect that "the man who smokes thinks like a sage."

Mr. CHAPMAN JONES moved, as an amendment, that smoking be not permitted at Ordinary Meetings of the Society.

Mr. SEBASTIAN DAVIS seconded the amendment, which was subsequently carried without dissent, the PRESIDENT stating, in reply to Mr. LAMBERT, that the regulation would be enforced, even though it were known that all the members present at a meeting were desirous of smoking on that particular occasion.

THE FORTHCOMING EXHIBITION.

The result of the election of Judges and Committees, in connexion with the forthcoming Annual Exhibition, was announced as follows:—*Judges:* Art Section: Mr. Harold Baker, Lieut.-Col. J. Gale, Messrs. A. Horsley Hinton, J. B. B. Wellington, and W. L. Wyllie, A.R.A. Technical Section: Messrs. T. Bolas, J. Bulbeck, and Chapman Jones.—*Hanging Committee:* Messrs. F. P. Cembrano, J. A. Hodges, F. C. Lambert, A. Mackie, J. C. S. Mummery, J. A. Sinclair, and W. Thomas.—*Selecting Committee:* The Judges, the Hanging Committee, and Messrs. E. J. Wall and R. W. Craigie.

THE PROGRESS MEDAL.

The PRESIDENT stated that Mr. Driffield was unable to come to London to receive the progress medals which had been awarded to himself and to his lamented colleague, the late Dr. Hurter, and that it was proposed to forward the medals to him, and to request him to hand one of them to the representatives of Dr. Hurter. It was agreed that this course should be adopted.

THE CRYSTAL PALACE EXHIBITION.

The HON. SECRETARY (Colonel Waterhouse) presented the report of the Crystal Palace Exhibition Committee. The report commenced by a reference to the opening of the Exhibition by H.R.H. the Prince of Wales, and recommended that the thanks of the Society be given to him for the honour conferred upon photography and upon the Society thereby. The number of exhibitors was given as 374, including 47 Fellows of the Society and 43 members. The Committee felt some difficulty in stating definitely the number of persons who visited the Exhibition, on account of other attractions at the Palace on certain days; but it was estimated that from 70,000 to 80,000 persons visited the Palace for the special purpose of viewing the Exhibition. The report proceeded: "There was a strong desire on the part of many of the exhibitors that such an important Exhibition should have been kept open a week longer; but, unfortunately, it was not possible to make all the necessary arrangements with such short notice. Your Committee find that the time available for the issuing of a separate report upon the exhibits was not sufficient, and the idea had therefore to be abandoned. They hope, however, that the descriptive catalogue of the Exhibition will, to some extent, meet that want. The thanks of the Society are especially due to Messrs. Mackie and Thomas for their services during the hanging, and to Mr. F. A. Bridge for taking the direction of the Lantern Evenings upon himself, a course which necessitated his attendance at the Palace every day that the Exhibition was open. Your Committee desire to express their high appreciation of the services of the Assistant Secretary, Mr. R. Child Bayley, in carrying out the work of the Exhibition, preparing the catalogue, and describing the specimens of colour photography, and his strenuous exertions in every way to make the Exhibition a success. Your Committee also wish to place on record their hearty thanks to the Earl of Crawford, Colonel J. Waterhouse, and Mr. George Scamell, for their untiring and devoted services in the conduct of the Exhibition."

The report was approved and adopted.

PHOTOGRAPHIC IMAGES.

Captain W. DE W. ABNEY, C.B., D.C.L., F.R.S., read a paper, entitled "Photographic Images," in which he detailed the preliminary results of some researches in the microscopic examination of sections of exposed photographic films, and the character and distribution of the particles after development by various agents and treatment by different intensifiers. In the course of a very brief discussion,

Mr. CHAPMAN JONES expressed his gratification that Captain Abney had confirmed some results which he had himself arrived at by working upon somewhat different lines. With regard to the use of organic reducers, he remarked that Mr. Bothamley had suggested the employment of ortol without sodium sulphite, which would obviate the removal of the mercury, but he (Mr. Jones) found that the amount of stain was so great that, from a practical point of view, he could not but regard the method as entirely useless.

Mr. L. WARNERKE said it had been stated that the addition of bromide to the developer tended to the production of larger particles than when bromide was absent, and he asked whether Captain Abney used any bromide in the development of the films from which his sections were cut.

Captain ABNEY, replying, said he used the smallest possible quantity of sodium sulphite with ortol and some other developers, and in those cases the size of the particles was not what it should have been theoretically, perhaps owing to the removal of some of the mercury. He used bromide in some of the developers and not in others, but could not detect the slightest difference in the size of the grain, and he thought that Dr. Spitta had had the same result; a bromo-iodide film had, perhaps, a slightly coarser grain than a film of pure bromide, but the difference was very trifling.

PHOTOGRAPHIC CLUB.

JUNE 15,—Mr. H. P. Smith in the chair.

Messrs. E. A. NEWELL and HANS MÜLLER gave an entertaining description of their holiday experiences in the neighbourhood of the village of Burnham-on-Crouch and along the river, accompanied by a number of slides, amongst which were some conspicuous night and early morning effects, in addition to several very nice skies and clouds.

Subsequently there was a discussion upon the character of the country and the possibilities of work in and around Burnham. The relative advantages of films and plates likewise formed an inviting subject for discussion.

Mr. WELFORD found that the light at Burnham was very brilliant, and slow plates gave perfectly exposed negatives even when the sun was not shining.

Borough Polytechnic Photographic Society.—June 15, Mr. A. Bedding presiding.—A discussion on

THE IMPROVEMENT OF NEGATIVES

was opened by the Vice-Chairman, Mr. Albert T. Harris, who, however, confined his remarks chiefly to the precautions to be observed in the prevention of halation and pinhole spots, and the treatment of negatives by intensification and reduction. Whilst advocating the backing of plates as an almost certain remedy, his practice, when halation was suspected, was first of all to develop with a strong solution of rodinal and afterwards intensify. He strongly recommended the filtering of all developing solutions as a means of minimising the danger of pinholes caused either by some undissolved crystals or the formation of a deposit, and a gentle blowing on the plate rather than the use of a brush to remove dust. He had no faith in local reduction, and considered it one of the most difficult things to deal with.

Croydon Camera Club.—June 15.—A short paper was read by the PRESIDENT, on behalf of Mr. Henry Soar, which we reproduce on another page *in extenso*. A communication was next made by Mr. V. BENDER respecting a new print-out paper, to which he gave the name of "Heliogravure." The methods of handling the paper were briefly spoken of, from which it was judged that the composition of the visible image was mainly due to platinum. Examples of the results handed round indicated that the paper is capable of yielding pictures either platinum black or sepia-like in tone; the surface is matt, and the gradation ample in extent. In response to an appeal by the PRESIDENT, Mr. Bender promised to attend on Wednesday, July 13, and give a series of demonstrations of toning the paper. Mr. H. K. TAYLOR next gave a full and valuable account of his experiences in the taking of town scenery, illuminated by gas and electric light. He had spent many nights—and for this class of work wet nights are chosen—and hundreds of dry plates in his experiments, with the result that he had been able to get several charming examples of this fascinating class of pictures. His best result was judged to be an after-dusk view in Trafalgar-square. This was obtained on a Barnet ordinary plate, well backed, *f*-16, fifteen minutes' exposure, commencing just after sundown. A well-restrained developer was used. Mr. Taylor found that the backing usually put on ready-backed plates was neither

dense nor even enough, and had obtained most success with the following, which he himself applied: A thick coat of Indian red moist tube water colour mixed with methylated spirits; sponge off just before development. Some fine pictures, 20×14, and some lantern slides, shown by Mr. Taylor as examples of his results, were greatly admired. Hearty thanks having been accorded to Messrs Bender and Taylor, the PRESIDENT announced that twenty names had already been registered as going with him, on June 25, to Penshurst-place; any other member wishing to add his name to the list would be able to do so up to Tuesday morning. Mr. S. H. Wratten handed round interesting snap-shots of members of the Scientific Congress starting on their excursions. Mr. Irving displayed a dainty mountful of fine views near Otford and Eynsford, and the President showed portraits of himself taken by M. Paul Boyer, of Paris, by his new and improved flashlight portrait installation. Mr. V. BENDER and other experts expressed much admiration for the fine quality of the portraits which M. Boyer had been able to obtain with his new light. Mr. H. K. Taylor was elected a member.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEPTH OF FOCUS.

To the EDITORS.

GENTLEMEN,—It is true that the optician has always contended, on theoretical grounds, that there is no "depth of focus" in an aplanatic lens giving a "flat field." The photographer, on the other hand, has spoken to the optician of lenses as possessing "depth of focus" in a greater or less degree.

For a generation or more, opticians have understood photographers to mean by this term that the degree of definition given by a lens in the out-of-focus planes is sufficiently fine to lend to the picture a uniform *appearance* of sharpness at the ordinary reading distance.

On examining results that satisfied photographers as possessing the required "depth of focus," the optician ascertained that, if the finest possible definition appearing in any given plane of the picture gradually passed to less critical definition, the most imperfect being made up of circles of indistinctness measuring not greater than one-hundredth of an inch, the permissible degree of indistinctness had not been exceeded in order to satisfy the condition sought.

Taking this as a basis, opticians constructed tables for the use of photographers, to enable them to reproduce this degree of definition when required, and subsequently published the simple formulæ upon which the tables were constructed, the term "depth of focus" always having reference to an *absolute measurement* in the circles of indistinctness, and not a relative one.

[These formulæ apply to smaller-measured circles of indistinctness by substituting larger numerals for the numeral 100 if a smaller limit than one-hundredth of an inch is desired, such as 250 or 1000, for circles of one two-hundred-and-fiftieth or one one-thousandth of an inch respectively.]

As every individual has a (practically) definite reading distance, it is reasonable to expect that he will look at photographs at this distance, unless the photograph be a very large one, large relatively to the reading distance. Photographs of a subject taken by lenses of five and fifteen inches' focus respectively would, as a matter of fact, be viewed from the *same distance*, and not from five and fifteen inches respectively. Hence, if both were taken with an aperture of one inch, they would not have the same "depth of focus," either in appearance or the measurement of indistinctness of the out-of-focus planes.

Now, Mr. Debenham's repetition of a statement bearing on "depth of focus" is an obvious fact in theory, but it is unreasonable to expect it to be accepted or acted upon when applied to what we may term "discriminating" distances as regards vision, that is to say, in the examination of results near the reading distance. The truth of the statement, however, becomes evident in looking at high magnification or enlargement from either result, viewed at a distance considerably beyond the discriminating distance.

Your readers of to-day will be grateful to Mr. Bolton for his articles on a subject I hoped we had settled many years ago. If he thinks the statement that has at present taken the form of "Mr. Debenham's depth of focus" of sufficient value to keep as a "definition," I hope he will consent to call *it* by the *new* name and leave the old and perfectly intelligible "depth of focus" to remain as it is.—I am, yours, &c.,

THOMAS R. DALLMEYER.

25, *Newman-street, Oxford-street, W., June* 20, 1898.

To the EDITORS.

GENTLEMEN,—A last word, as far as I am concerned, regarding the question of "Depth of Focus," about which so much has been written of late, but more especially in answer to Mr. Bolton's latest contribution to this subject.

I should like, in the first place, to place before your readers two extracts taken from Mr. Bolton's efforts for comparison.

In your issue of June 10, 1898, and on page 372, Mr. Bolton says: "I am not sure that I quite understand exactly what his definition means, but it seems to me that Mr. Debenham claims that, with a given size of diaphragm, all lenses, regardless of focal length, give the same equality of definition to the same distance on either side of a given focal plane; or that, if the images be enlarged or reduced to the same dimensions, the departure from absolute sharpness will be the same in either case. If such be really Mr. Debenham's proposition, I must confess that I cannot, so far, by any process of calculation or of reasoning, arrive at anything like similarity of result."

The above gives us, I think, a clear understanding as to what conclusion Mr. Bolton had arrived at when he wrote the above.

Now, in your issue of June 17, 1898, and on page 398, he informs us that "the knowledge that all lenses, regardless of focal length, give the same depth of focus on the same definition with equal apertures when brought to the same scale, may be an interesting scientific fact, and one pretty well known to all who have dived at all below the surface in such matters; but it is useless without some means of arriving at actual figures and distances."

If we are to understand that Mr. Bolton is himself one of the "all" that *have* dived below the surface, then there must be some other way of explaining the above two extracts other than what my process of reasoning will produce. But it is surprising how much farther we *can* see after that "wall" has been pulled down.

Regarding the last portion of the last extract, as to this knowledge being useful or otherwise without some means of arriving at actual figures, I must beg to differ from Mr. Bolton, and I venture to think that, if one had the time or inclination to tackle the subject, it could be shown otherwise than as Mr. Bolton asserts. I for one have not the time.—I am, yours, &c. A. GREGSON.

2, *Windermere street, Bolton.*

To the EDITORS.

GENTLEMEN,—A word from an ordinary individual may contribute a little towards "stopping" the divergent, though plentiful, light thrown on the above by your learned correspondents.

To a very ordinary amateur like the writer the fuzziness seems to be in the anti-Debenham rays, Mr. Debenham's definition of depth being very "clear" and "sharp."

The dissentients come a cropper over the gratuitous introduction of the *infinite* factor, and laboriously prove, *not* that the infinite depth varies with the relative stop, but that "the distance from the lens to the *surface* of the infinite depth varies." This fact neither Mr. Debenham nor any one disputes, and it means simply that different lenses have different focal lengths—so much and no more.

I am no mathematician, but I know that $\infty = \infty$, and from this follows the addition of another "startler" to that of Mr. Debenham's, viz., "the infinite foci of all lenses are equal," and the figure given by Salomons' formula is the distance of the point where that "depth" begins, and *not* the measure of the depth itself, that being infinity in all cases, and therefore equal. Mr. Debenham, it may be noted, never touched the subject of infinite focus at all.—I am, yours, &c., R. B. HUGHES.

Min-y-don, Llanfairfechan.

[The discussion on this subject has reached a stage when it may conveniently be terminated, and we therefore apply the closure to it. We may remark that it is not by any means the first time that "depth of focus" has given rise to considerable controversy in our pages, in the course of which the most divergent views found expression. At a later period of the year the subject will probably again be treated in the JOURNAL; but for the present it must give way to other matters of more practical interest.—EDS.]

THE COOKE LENS.

To the EDITORS.

GENTLEMEN,—Messrs. Taylor, Taylor, & Hobson characterise Herr Klepp's communication to the *Deutsche Photographen-Zeitung* concerning the Cooke lens as at least absurd. If this is really the case, refutation should be easy; but, although Herr Klepp offers every facility by giving the number of the lens, and expressing numerically the careful analysis he has made, there has not been any attempt to prove that his figures are wrong.

Messrs. Taylor, Taylor, & Hobson refer to the reply by Dr. Kaempfer and Dr. Miethe in No. 19 of the *Deutsche Photographen-Zeitung*, but they omit to mention the editorial comments,* which prove that the photographs submitted fail in important particulars as comparative tests, and that Herr Klepp has based his estimate of the Cooke lens on sufficient grounds. In a final comment the editor replies: "The appellation, 'Surrogate Anastigmat,' should be more appropriate than ever, now that the former statements have been made complete by those which are before us."

We are getting accustomed to Messrs. Taylor, Taylor, & Hobson's exaggerated advertisements; but, if they wish photographers to believe them, they will make a serious attempt to disprove Herr Klepp's figures.

* This will appear in our next.—EDS.

Dr. Kaempfer and Dr. Miethe have not attempted to grapple with the latter, and they appear to admit the substantial correctness of Herr Klepp's statements concerning the roundness of field of the Cooke lens. They also admit unreservedly that the Satz anastigmat has a much larger area of definition than the Cooke lens. We are all agreed as to the high reputation of Messrs. Voigtländer as opticians; but, in face of these admissions, what must we think of Messrs. Taylor, Taylor, & Hobson's advertisement, "Absolutely equal to the best of the more expensive anastigmats?"

Take also the saw, toothpick, and hammer advertisement, which appeared in a contemporary, with the recommendation to get proper landscape lenses, if you want them. Is it possible to get a finer landscape lens than one of the Satz Anastigmat series, and have Messrs. Taylor, Taylor, & Hobson produced one as good? Yet it is implied that these are makeshifts, possibly to cover the confession of impotence which follows.

Messrs. Taylor, Taylor, & Hobson assert that the Cooke lens met with a storm of opposition when first introduced in England. This is a mistake. The storm arose over their advertisements, and the one just referred to may well be taken as a sample.—I am, yours, &c.,

PHOTOGRAPHER.

To the EDITORS.

GENTLEMEN, — I have to thank Messrs. Taylor, Taylor, & Hobson, and Mr. Dennis Taylor for their replies to my remarks on the Triple Anastigmat or Cooke lens; but I must remind them that they have overlooked the principal points which I raised. The one definite admission contained in both letters is that the Cooke lens was sent to Germany for commercial purposes—to be manufactured there in accordance with the native patent law. This is only interesting from a business, and not an optical, point of view.

Messrs. Taylor, Taylor, & Hobson entirely ignore the real position of matters. It is this: Messrs. Voigtländer take up the Cooke lens as a commercial speculation, and their scientific optician, Dr. Kaempfer, finds that it needs to be brought to "perfection." Dr. Kaempfer's estimate of the lens is next emphatically confirmed by Mr. Klepp, who gives the data of his measurements and every facility for the repetition of his tests; in short, Kaempfer and Klepp are substantially in agreement. Can it be possible that the only comment Messrs. Taylor and Hobson will allow themselves to make on the matter is that what Klepp says is "absurd?" Why don't they get the lens he measured and check his figures, or have it done by an impartial optician?

I am sorry that Mr. Dennis Taylor only confines himself to mere commercial information in his letter. It appeared to me that Mr. Klepp's condemnation of the Cooke lens was too serious a matter for the inventor of that instrument to pass over. However, Mr. Dennis Taylor is the best judge of his own business. By the way, he says he has not withdrawn any of the claims he made for the lens on its introduction. The original Cooke lens had, I believe, the centre element of compound form; but now I gather that it consists of a single glass, so that here we have a reversion to the form of triplet suggested forty years ago. Is Mr. Dennis Taylor aware of this, and can he reconcile this Voigtländer improvement—for such I presume it is—with his declaration that the curves and other data used for the Cooke lens made by Messrs. Voigtländer were those originally supplied by him? It seems to me that, if the Cooke lens now consists of only three single glasses (and Dr. Kaempfer says it does), Mr. Dennis Taylor's claims of four years ago fall to the ground, and we are face to face with the fact that the Cooke lens of to-day is an old and abandoned idea resuscitated. Will Mr. Dennis Taylor enlighten us on this point?

Messrs. Taylor, Taylor, & Hobson, say that the Cooke lens was received with a storm of opposition on its introduction. The pages of the photographic papers directly contradict this assertion. If I remember aright, it was not the lens itself that provoked opposition, but Messrs. Taylor's peculiar method of advertising it—a method which I am sorry to see that time does not appear to have improved.—I am, yours, &c.

London, W., June 19, 1898. R. E. CHESTERMAN, D.Sc.

ACETYLENE GAS.

To the EDITORS.

GENTLEMEN,—While thanking you for your notice of my book on Acetylene, I would call your attention to an error.

You say, "approved by the Executive of the Imperial *Executive*." My statement should read "the Executive of the Imperial *Institute*," and means the Executive who have organized the Exhibition of Acetylene Gas Apparatus now being held, and the sale of my book was not sanctioned until the work had been approved by Sir Frederick Abel, Sir Alfred Jephson, and others.

Would you oblige by inserting a short paragraph giving this explanation of what you print as an ambiguous phrase?—I am, yours, &c.,

G. F. THOMPSON.

Lombard Chambers, Bixteth-street, Liverpool, June 21, 1898.

[The second word "Executive" was, of course, a slip of the pen for "Institute."—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

W. G. Vickers, 313, Radford-road, Nottingham.—*Photograph of the Lord Mayor of Manchester.*

Mackintosh & Co., 27, Bridge-street, Kelso.—*Photograph of coronation of Gipsy King at Kirk Yetholm.*

E. S. Baker, 154, Bristol-street, Birmingham.—*Photograph of group of Aston Villa Football Club*, 1897–98.

Mary Leech, 28 and 30, Roe-street, Macclesfield.—*Photograph of the Right Hon. W. E. Gladstone, with autograph.*

E. A. BURCKHARDT.—In our next.

W. EDWARD WALLIS.—Thanks; we had already seen the photograph.

OPERATOR.—Send our publishers three prints from the negatives and 1*s.* 7*d.*, and they will effect registration for you.

W. V. MORRIS.—Many thanks for the cutting. Mr. Norton's letter, published last week, sufficiently explained the nature of the accident; hence we withhold further reference.

MOUNTANT.—GEORGE PARKER. A freshly made solution of pure gum arabic is an excellent mountant, *if* used freshly made. What is sold as "office gum" should be avoided.

R. COX.—We know of no such publication, but several firms advertise in the London daily papers that they will send a list of unclaimed moneys in Chancery. Better address one of these firms.

PHOTOGRAPHING PUBLIC BUILDINGS.—A. HEINTZ (Mulheim). No permission is required to take photographs of any of the public buildings in London or the provinces, nor is any necessary to take photographs, with a hand camera or otherwise, in the streets. We shall be pleased to see you if you will call at our office.

ORTHOSCOPIC LENS.—F. BIDGOOD. The orthoscopic is an aplanatic lens. At the time it was introduced it was claimed for it that it was free from distortion, but that was found not to be the case. The lines at the margin of the field were curved, but in the reversed direction to the curvature given by the single lens, and in a minor degree.

LENS.—NEMO says: "I am sorry for troubling you again, but I had forgotten which query I put first in last writing you *re* the optimus and euryscope question. Which would you recommend for studio portrait work, a 9×7 rapid euroscope or a whole-plate portrait lens?"—Both are good forms of lenses for studio work, but the portrait lens is the quicker of the two.

CAREFUL.—We presume you mean a partnership in a portrait and landscape business? Better advertise for what you want; make the most searching inquiries, and do not part with any money until you are satisfied as to the *bona fides* of the business. Your capital is rather small. We shall be pleased to advise on any specific point. You are entering upon an intricate path.

RESIDUES.—A. Z. writes: "I am just beginning to save my residues. The washings from prints are put into a cask which has no cover, and I notice that the silver thrown down by the salt quickly becomes dark by the action of light. Does this do any harm, or involve any loss of the silver?"—No. It does no harm whatever; indeed, it facilitates rather than retards the precipitation of the chloride.

SUNLIGHT FOR STUDIO.—PYRO asks: "Could you tell me what to do in the following matter? Certain parts of the day the sun shines on my studio windows. Is there some kind of thin material to make a blind of to pull up when the sun does not shine, or what would you suggest? I have only the light one side."—We would suggest that thin tracing linen be strained on one or more light wooden frames that may readily be put up as occasion may require. These, in practice, will be found more convenient than fixed blinds.

LIGHT FOG.—C. C. J. The negative is decidedly fogged, no doubt by light. You say your dark-room window was papered with a highly recommended medium last year and, upon severely testing it then, it was perfectly safe. That may be so, but the prolonged exposure to light it has had since may, and probably has, caused the colour to fade to such an extent that the light is no longer safe. The strong light we are now getting is very different from what we were getting a few months back. Replace the fabric with new and see the result.

STAINS; REGISTRATION.—REGISTERED asks: "1. Would you kindly inform me, through the medium of your valuable paper, the cause of marks on enclosed print? The print was sent home three weeks ago, perfect, and returned as it now appears. 2. Could you also state where to have negatives registered, and the charge for same?"—In reply: 1. We cannot say the cause of the marks, but they look very much as if they were brush marks of something in the mountant. There is also evidence of a general yellowing of the print in other parts. 2. At Stationers' Hall, Stationers'-hall-court, Ludgate-hill, E.C. The registration fee is 1*s.*

*** Owing to great pressure on our space, several articles, Editorial Table, correspondence, &c., have had to be held over till next week.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1991. Vol. XLV.—JULY 1, 1898.

Contents.

PAGE

Ex Cathedrâ 417

Stereoscopic Portraiture 419

Leaderettes:—
A New Use for the Cinematograph—Proof of the Layers of-Silver Theory in Lippmann's Colour Photographs—Disfiguring Advertisements—Performances of the Yerkes Telescope—A New Mode of Electric Illumination—Electrolytically Produced Mirrors—Two More New Elements in Air—What's in a Name?—The City Picture Exhibition—Polar Expedition 420

Spots on Negatives after Fixing. By W. B. Bolton 421

Before the Convention 422

The Triple Anastigmat 423

Is Diffusion of Focus Desirable? By Henry W. Bennett 425

"Sentiment of Art in Photography" 426

PAGE

Dark-room Signs 426

Portrait Statues in Egypt and America 426

Don'ts 427

Our Editorial Table:—
Portrait Velox Paper—The Cadett Spectrum Plates: "Ordinary" Brand, H. & D. Speed Number, 37—*Off Your Bikes—The Use of the Hand Camera*—"*Wolfe-Land:*" *A Handbook to Westerham and its Surroundings* 427

News and Notes 428

Meetings of Societies:—
Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—North Middlesex Photographic Society 428

Patent News 430

Correspondence:—
The Cooke Lens—"Kodax"—A Correction 430

Answers to Correspondents 431

EX CATHEDRA.

The Forty-third Annual Exhibition of the Royal Photographic Society will be held from September 26 to November 12, 1898, in the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall, East, London, S.W. The Exhibition will be inaugurated on Saturday, September 24, by a private view, followed in the evening by a *conversazione*, and will remain open daily (Sundays excepted) from Monday, September 26, until Saturday, November 12, from 10 a.m. till 5 p.m. It will also be open on Monday, Wednesday, and Saturday evenings, from 7 to 10 p.m., when lantern slides may be shown. The undermentioned gentlemen have been elected by the members of the Society to act as Judges, and have consented to serve:—In the Art Section: Messrs. Harold Baker, Lieutenant-Colonel J. Gale, A. Horsley Hinton, J. B. B. Wellington, and W. L. Wyllie, A.R.A. In the Technical Section: Messrs. T. Bolas, F.I.C., F.C.S., J. Bulbeck, Chapman Jones, F.I.C., F.C.S. The general regulations, which are of the usual kind, together with blank entry forms, and any further information respecting the Exhibition, can be obtained from the Secretary of the Society, 12 Hanover-square, London, W.

The death of Sir Edward Burne-Jones reminds us that it is only a few weeks since we inspected, in the studio of Mr. F. Hollyer, 8, and 9, Pembroke-square, W., a number of sketches and studies which the deceased artist made for several of the pictures that brought him his fame. To us as photographers, however, interest chiefly centered in Mr. Hollyer's photographic reproductions of nearly two hundred of Burne-Jones's pencil and other sketches, in which the master's touch had been preserved, or rather reproduced, with the most striking fidelity. Probably many of our readers will be glad to know that these photographic reproductions of the Burne-Jones sketches are obtainable from Mr. Hollyer.

* * *

One of the subjects that is engaging the attention of many members of the Royal Photographic Society is that of suitable quarters for the accommodation of the leading photographic society in the world. We are probably correct in saying that three years' experience of the Hanover-square rooms has proved their inadequacy to the needs of the Society, and it is felt that a larger and more suitable location is desirable. The subject is in the hands of a committee, and an attempt will be made to secure an entire house, affording separate office, library, meeting-room, and dark-room accommodation. There is said to be a suitable house available in Russell-square. The principal difficulty in the way of the proposed change will probably be financial.

* * *

We have for some days been confronted by the knotty problem as to which form of camera we shall take with us to Glasgow, hand or stand. In our dilemma, we have turned to the *Convention Handbook* for guidance, and we have found it. During the week there will probably be very few opportunities for stand-camera work, that is, for those who conscientiously go through the programme. The Edinburgh, Clyde, and Loch Lomond excursions seem to invite members to carry hand cameras; and at those times when there are no excursions it will need a fund of enthusiasm on the part of the photographer to find opportunities for comfortable stand work in so vast and busy a place as Glasgow. We shall be agreeably surprised if much work, other than that produced in hand cameras, is forthcoming as the result of the Convention meeting next week.

A CORRESPONDENT writes: "As illustrating the degree of versatility a modern operator is sometimes expected to possess, the enclosed reply (to an advertisement in your columns), received among others of an equally interesting nature, may possibly be of interest to many of your readers." The reply runs as follows: "I may say our place will be vacant in a fortnight or so. Can you do picture-framing, &c.? What wages do you require for a permanency? also, are you a Protestant, and a teetotaller? Send specimens of your work in posing, retouching, &c. Are you married? I may say our young man is leaving to go to take charge of his mother's business, owing to a death in the family. Do you play any brass instrument?" Such a wonderful operator as is here apparently required would be more suitable occupant for a glass case in a museum than a photographic studio.

* * *

THE Hon. Local Secretary of the Convention, Mr. William Goodwin, of 3 Lynedoch-street, Glasgow, informs us that the proprietor of the Windsor Hotel (Convention headquarters) is also the proprietor of Peebles Hydropathic, and he makes the following offer to members who may be there over either of the Sundays. He will take them to Peebles by train, leaving Glasgow at 8.30 p.m. on Saturday, provide them with board and lodging at the Hydropathic over Sunday, and bring them back by train, leaving at 7.45 on Monday morning. The entire cost, including railway fares, will be 16*s.* 6*d.* Peebles is beautifully situated on the river Tweed, and the scenery is quite different from any part of Scotland to be visited during the excursions. The Hydropathic is a magnificent establishment, with extensive private grounds. Members who intend joining the afternoon excursion to Ayr on Monday, July 4, will greatly oblige by sending Mr. Goodwin a post card to that effect, so that he may arrange railway accommodation if necessary.

* * *

THE war fever in America has attacked even the photographic journalists. One of them, the editor of the *Photo-American*, thus unburdens himself on the subject: "What opportunities are to be had in these war times! The photographers are out galore with every sort of camera, snapping at marching troops and the flag-bedecked town. Not perhaps in thirty-five years has the average town or city been so beautifully decked out with Old Glory, our beloved Stars and Stripes. Troops departing for the front add to the impressiveness of the scene, and, as might be expected, every one who can beg, buy, or borrow, a camera is out after records, which can be passed down to future generations. This is all history, and our camera-users can help no little in perpetuating some of it. It is important, I think, that all should. Camera clubs especially should take great pains to secure 'War of '98' views, and if the members of these clubs secure the honour of proceeding to the front, it would be wise and proper of them to tuck a small pocket camera in the knapsack, if there be room. Of course, I believe in the aforesaid knapsack containing things most useful in war first and foremost; but, if it can be done, our patriots, who know how to use a camera as well as a gun, should try and find room for one. Remember that the smallest pictures can be enlarged to goodly size, if well taken. Men who can photograph skilfully are wanted by newspapers for war duty. Our art will help journalists to make more vivid pen pictures, and will perpetuate, as nothing else can, the glorious triumphs of the simply unbeatable United States of America." We allow our *confrère* the familiar luxury of the tit-bit of spread-eagleism contained in the final sentence of this extract, in view of the excellent advice he gives those photographers who have been ordered to the front.

* * *

WE are glad to learn that the valued services of Mr. R. P. Drage to the Photographic Convention of the United Kingdom, of which for three years he was the esteemed and hard-working Honorary Secretary and Treasurer, have been suitably recognised by the Council of that body. An address signed on behalf of the Council by Mr. Cembrano, President 1897–98, and Mr. Bridge, Hon. Secretary and Treasurer, expressive of the Council's thanks for Mr. Drage's labours in the interests of the Convention, has been presented to him. The presentation was made within the last few days. We are sure that friend Drage will perceive in the address a reminder of the great appreciation in which his valuable services are held by the whole of the Convention members.

* * *

MR. BIRT ACRES, who was a witness of the terrible accident which occurred when the new warship *Albion* was launched on Monday week at Blackwall, supplied the following account of what he saw to the London daily papers: "By the courtesy of Mr. A. F. Hills I was permitted to take photographs both at the head stage and the dry dock end of the Thames Ironworks. As my assistants were at the two extremes of the works, it was necessary for me to pass to and fro several times—the first time I tried to pass over the fatal gangway I was stopped by the policeman in charge, but on my showing my authority he allowed me to pass. At that time the gangway was clear—the last time I crossed, about ten minutes or so before the accident, I found the gangway and planking placed for the convenience of the men when working on the new Japanese ship crowded. I spoke to the policeman at the end of the gangway, and he replied that he could not prevent them, as they had clambered over the staging and filled the place up. Either the policeman on duty or some one near—I am not now certain which—told me that they had cleared the gangway twice."

* * *

IT will be seen from some references in another part of this week's JOURNAL that Mr. Acres also has some remarks on the part which photography was made to play at the moment of the disaster. On Thursday, June 23, the following paragraph appeared in the paper, from which the foregoing extract was made: "There was a curious scene at the Royal Music Hall, Holborn, last night. Mr. A. D. Thomas is an expert with Edison's 'living picture' apparatus, and has for some time been giving 'a turn' at this hall. On the day of the fateful launch he chartered a boat in order to take photographs of a festival which degenerated into a tragedy. The machine was working beautifully when the accident occurred, and every thought was directed to saving life. This was successfully done, some twenty people being helped on board, but meantime the camera had been at work, with the result that no fewer than 1500 photographs were recorded. Mr. Brill, with his manager, Mr. Swanborough, decided to put them on the screen at the Royal, and the whole audience rose with bared heads as the drama of death passed before them. At the close, with the orchestra playing 'Rocked in the Cradle of the Deep,' there was scarcely

a dry eye amongst the silent audience." We cannot bring ourselves to think that the public exhibition of photographs having such a sombre interest is in the best of taste; and we are of opinion that the taking of the negatives, in the circumstances, was not the happiest possible inspiration. There is room, however, for very divergent views on the subject.

* * *

Mr. W. H. Stoneman, of 11, Endymion-road, Brixton Hill, S.W., writes us, with reference to our Ex Cathedrâ note on filtration in the issue of the 17th inst., that he has obtained the very efficient form of funnel therein referred to of Messrs. Brewster, Smith, & Co., 6, Cross-street, Finsbury Pavement, E.C. (late Orme & Co., of the Barbican); the sizes are $2\frac{3}{4}$, $3\frac{1}{2}$, $4\frac{1}{4}$, $t\frac{1}{4}$, 8, and $9\frac{1}{2}$ inches, and the prices run from 6*d.* to 2*s.* 6*d.*

* * *

We congratulate Mr. Percy Wood, of the Romney Studio, 122, Regent-street, W., on having secured a signal mark of Royal recognition. Two of his idealised studies, *Reflection* and *Speranza*—certainly among the most charming specimens of refined photography that we have seen—were last week purchased by His Royal Highness the Prince of Wales. To the Press Bazaar, opened on Tuesday last, Mr. Wood made many important contributions, notably a large portrait of Cardinal Vaughan.

* * *

The Sixty-sixth Annual Exhibition of the Royal Cornwall Polytechnic Society will open at Falmouth on Tuesday, August 23, 1898. Medals and prizes are as usual offered in several departments, including Photography: photographs by professionals and amateurs, and photographic apparatus. The Exhibition has been established over *sixty years*, and affords the best opportunity for making known the merits of inventions, &c., throughout the West of England. The Exhibition will be held in a spacious hall and adjoining rooms, and will continue open for five days. No charge will be made for space. The list of prizes and all further information may be obtained from the Secretary, Mr. Edward Kitto, the Observatory, Falmouth. The portion of the prize list relating to photography is as follows: In all cases state whether the work is professional or amateur, and name process of production. All work sent for competition must have been executed within eighteen months of the date of this Exhibition. *Carte-de-visite* portraits are excluded from exhibition, except when illustrating some special process or novelty. All enlargements for competition must be the work of the exhibitor. Regulation 5 does not apply to the Photographic Department for this year. Information respecting the Photographic Department may be obtained from Mr. W. Brooks, Laurel Villa, Wray Park, Reigate (member of the General Committee). Professional.—Medals are offered by the Society for meritorious productions in the following subjects: Outdoor Photography.—1. Landscape, not less than twenty by sixteen inches. 2. Landscape, twelve by ten inches, and under. 3. *Genre.* 4. Architectural (exterior). 5. Instantaneous, including Marine. 6. Animals. 7. Enlargements. Indoor Photography.—1. Portraits, not less than twenty by sixteen inches. 2. Portraits, fifteen by twelve inches, and under. 3. Home Portraiture. 4. Still Life, Flowers, &c. 5. Interiors, architectural or otherwise. 6. Enlargements. Amateur.—1. Landscapes. 2. Architectural, exterior or interior. 3. Alpine Scenery, including Caucasian. 4. Hand-camera work, not less than twelve examples. 5. Instantaneous, including Marine. 6. Still Life. 7. Enlargements. Photographic Apparatus.—With a view to offer facilities to manufacturers to bring their specialities prominently before the public in the West of England, the Society will apportion space for photographic apparatus generally, including the lantern and its appliances. A commission of five per cent. is charged on all photographs or apparatus sold from or through the Exhibition.

STEREOSCOPIC PORTRAITURE.

There is very little question that stereoscopic photography is advancing, though, we regret to say so, not so rapidly in England as it is doing on the Continent. This may possibly be due to the manufacturers of apparatus and dealers in this country not making the same prominent feature of stereoscopic apparatus and stereoscopes as do their foreign *confrères*. A friend, who has recently been travelling on the Continent, tells us that, in all the photographic apparatus shops he passed, stereoscopic cameras were to be seen as well as stereoscopes. So far as we are aware, no English dealers (with one or two exceptions, perhaps) really make a feature of stereoscopic apparatus, as is done on the Continent. Another proof that stereoscopic photography is advancing abroad is that we are told by the principal plate-makers here that by far the larger proportion of the stereoscopic-size plates they make are for export. This seems a little strange, considering that England is the birthplace of the stereoscope.

One reason, perhaps (as we have pointed out before), why stereoscopic photography is now so little taken up by amateurs is the idea that the apparatus must be both bulky and heavy, also that it must be used in connexion with a stand. These are fallacies that have been alluded to on former occasions. Some months back we pointed out that a stereoscopic hand camera need be but a trifle larger and but slightly more weighty than a quarter-plate hand camera carrying the same number of plates. The object of the present article, however, is not to go into the question of stereoscopic photography amongst amateurs, but to suggest that professional photographers would probably find it profitable to introduce stereoscopic portraiture in their businesses.

At one time, in the days of the Daguerreotype, a large and lucrative business was done in it by all the leading portraitists, and the pictures that were shown in the late historical exhibitions and elsewhere, produced by Claudet, Williams, Kilburn, Beard, and others, illustrated how charming they were. Some little while back we alluded to this subject, and mentioned that an experimental trial of stereoscopic portraiture would involve little, if any, outlay. Since then, several correspondents have written us on the subject, and all seem to have assumed that a bi-lens camera is an absolute necessity for the work—which apparatus many now do not possess.

Our chief object here is to show that not only is a bi-lens camera not a necessity, but that better results can be obtained with a single-lens one, and a repeating back camera, such as is to be found, nowadays, in every professional's studio. In the days of the Daguerreotype and the wet-collodion processes, when the exposure necessarily was often very long, a large proportion of the stereoscopic portraits were taken with a single lens and a repeating back camera, such as is now in general use for *carte* and cabinet portraits, the camera being moved laterally, or, by the Latimer-Clark arrangement, the re-

quisite distance between the two exposures. If successful stereoscopic portraits were taken when the exposure was frequently from a quarter to half a minute for each picture, how much easier is it now with gelatine plates, and their rapidity!

Some of the old stereoscopic portraits were faulty, and this is a matter we wish to call special attention to, by reason of the exaggerated relief in them, owing to the use of lenses of too short focus so that the camera had to be placed very close to the sitter; also from the two pictures being taken too far apart. With short-focus lenses the perspective becomes too violent to be pleasing, even in a single picture, and, when that is added to by the two pictures being taken too wide apart, the effect becomes offensive to a degree when seen in the stereoscope. The best and most pleasing perspective in portraiture of the stereoscopic or similar size, say the *carte de-visite*, is obtained when a lens of eight or eight and a half inches equivalent focus—six inches back, such as those made for cabinet portraits—is used.

In these lenses the glasses are usually about two and three-quarter inches in diameter. Now, it is obvious that a pair of such lenses cannot be fixed on a camera front with their centres the orthodox two and a half, or two and three-quarter inches apart. If we take shorter-focus *carte* lenses, and sacrifice the pleasing perspective, we shall find that the glasses in them are about two inches, and over, in diameter, and the brass setting, even when the flanges are cut down, renders it impossible to get their centres within the prescribed distance apart. Hence it will be seen that, if a bi-lens camera be used, short-focus lenses become imperative if the usual portrait combinations are employed.

We will now point out the advantages of single-lens cameras for the work. One of the first is that no outlay for additional apparatus is necessary as would often be the case if a bi-lens camera were used. The ordinary repeating back camera is all that is necessary, and the only thing to be done to secure the stereoscopic negative is to move the camera laterally on the stand two and half, or two and three-quarter inches, between the two exposures, whatever may be the diameter or focus of the lens. It is not well to exceed the former distance unless a lens of unduly long focus be used. In taking the two pictures the right-hand one should be taken on the left half of the plate by sliding the back in the reverse direction to that in which the camera is moved. This obviates the necessity of reversing the prints in the mounting of them; also the negatives can then be printed from in an ordinary printing frame without cutting or reversing the negative when transparencies are desired. It is as transparencies that we would recommend that stereoscopic portraiture be reintroduced rather than as paper pictures, as then the novelty will be the greater.

We commend the subject of stereoscopic portraiture to those professionals who are at the present time complaining that they are not overrun with business, as a means of increasing it, particularly as they have all the requisites at hand for carrying out the work. The more especially do we do this, as there is every prospect of the stereoscope once more becoming popular in this country, seeing what is being done abroad.

A New Use for the Cinematograph.—Rumours have been current of late with regard to the health of the Pope. In order to dispel these alarmist reports of his health, his Holiness, one day last week, walked through the gardens of the Vatican, and was cinematographed during his walk. This picture, when projected on the screen, should give a very good idea of the present physical strength of his Holiness, in a way that would be impossible in an ordinary photograph. This is the first time we have heard of animated photography being applied to any such purpose, and the idea is certainly a novel one.

Proof of the Layers-of-Silver Theory in Lippmann's Colour Photographs.—There are some who have held that the theory of the colour photographs by the Lippmann process is a theory only and an *ex post facto* one, but in a paper by R. Neuhauss, in a recent number of Wiedmann's *Annalen*, he shows that there are layers of metallic silver, to which, according to Zenker's theory, the colour effects are due really exist, and he claims that he has not only seen them, but made a photograph of them by the aid of the microscope. A power of 4000 was used upon a cross section of the film. It is stated, for example, that the distance between the layers when a red light is used is, as was theoretically held to be the case, equal to the wave-length of such light.

Disfiguring Advertisements.—A conference of members of Parliament and others on the subject of the abuses of public advertising was held in one of the committee rooms of the House one day last week, under the chairmanship of Mr. Bryce. Amongst those present were the Duke of Westminster, Lord Balcarres, Mr. H. Plunkett, Mr. Arnold Foster, Lord Stamford, Sir Charles Dilke, and many others. In the end a Parliamentary Committee, consisting of Mr. Brice, Lord Balcarres, Mr. Boulnois, Mr. Bond, and Mr. Paulton, was appointed, which are to confer with a number of societies interested in the question. It would certainly be a great boon to photographers if hideous advertisements could be suppressed when they are the most conspicuous objects in a charming landscape or other scene. This matter is really of more importance to photographers than it is to painters, as the latter can leave out the offending object in his painting, whereas the photographer must include it or forego the picture altogether. It is to be hoped that the movement will bear good fruit.

Performances of the Yerkes Telescope.—It is, of course, well known that the larger a telescope the fewer the nights when its powers can be made use of, a small five or six-inch refractor, for instance, often being able to be used when its larger brother has to be left covered up. But, apart from this, there is always the question, What are the actual working capabilities of a big telescope when it is obtained? It is no secret that there are very large telescopes whose size is in inverse proportion to their qualities. Any doubt, however, that might be felt with regard to the Yerkes telescope will be set at rest by a paper by Professor Barnard, recently published in the *Astronomical Journal*. Actual observation with the instrument was not possible till the best season was virtually over; but even then there were some favourable enough opportunities for testing. Professor Barnard was, on several occasions, able to use powers of several thousand diameters—once 3750—with good success. The object-glass is entirely free from any form of ghost, and he writes of it that "this, the last great work of Alvan Clark, is one of his noblest monuments." It is further stated that all the machinery for moving works with perfect steadiness, accuracy, and celerity. As an instance of the latter he moved it from the west in + 50 declination, to the other side, in the same declination, in 1 minute 50 seconds. It is evident that, when a fair opportunity is afforded it, we shall see photographs of unequalled accuracy, combined with ease of production.

A New Mode of Electric Illumination.—Up to the present, all electric lighting for photographic portraiture has been confined in this country to the use of arc and incandescent lights; but a new method is rapidly being brought to perfection which has fair promise of entirely revolutionising electric-lighting methods. It consists in the employment of large vacuum tubes, and the plan has got far beyond the merely theoretical stage. At the New York

Electric Exhibition the new light was shown in use on a large scale. There was erected a Gothic chapel of fair size, furnished with pews, pulpit, and full-sized organ, and entirely illuminated by Mr. D. Macfarlane Moore's ingenious system. The tubes, two inches in diameter, are bent to any required shape, to enable them to conform to the shape of the building, and are mounted in new specially devised fixtures. The light given was soft, and resembled daylight. As to the electric means, the tubes were connected in parallel, and the current used was the "kick" or extra current derived from coils without magnetic cores, and not from the secondary wires of an induction coil. The secret of success lies in the use of a contact-breaker making breaks 60,000 times a minute, and the entire circuit-breaking mechanism is placed in a vacuum tube, sparking being thus avoided. No perceptible heat is given out by the tubes, and the result is the closest approach to "light without heat" ever yet made. It is stated that instantaneous photographs have been made by the use of the new system, and it would seem obvious that the production of a light rivalling the electric incandescent for the portrait photographer's use is a mere matter of cost of installation.

Electrolytically Produced Mirrors. — Mirrors for photo-astronomical work and a variety of other uses are largely made and are very costly, though naturally not nearly so much so as refractors, and they can be made of much larger area. We recently described a new process for making them by the electrolytic backing of a silvery coating upon a glass surface till sufficient strength of shell was obtained to permit of its removal after being suitably backed. We may now call attention to a full what may be termed workshop account, given in last week's *English Mechanic* by the inventor, Mr. Sherard Cowper-Coles, M.I.E., Assoc. M.I.C.E. The mirror made by the means briefly described has a surface which will tarnish, a defect which Mr. Cowper-Coles remedies by electroplating it with palladium, which gives a surface of less reflecting power than silver, but quite untarnishable. Those of our readers who would wish to experiment for themselves are referred to the original paper.*

Two More New Elements in Air.—It is but a comparatively brief period since Lord Rayleigh and Professor Ramsay electrified the scientific world by the discovery of Argon, a gas existing in large quantity in atmospheric air. It is only three weeks since still another constituent of air was proved to exist and named Krypton, and now we have the latter chemist, in conjunction with Mr. Morris W. Travers, astonishing us with the announcement of the existence of two more hitherto unknown elementary gases in the air, which they have named Neon and Metargon. The measurements of the spectra given by the new elements have been mainly instrumental in determining the absolute novelty of the gases, which have been separated and examined in small quantities. We do not gather that spectrum photographs were taken, but, no doubt, we shall soon be in possession of them, if they are not already made.

What's in a Name?—Often a great deal, and sometimes what is misleading. In the report of the Croydon Club, in our last issue, it will be seen that prints on a print-out paper, to which the name of Heliogravure had been given, were shown. Now, however excellent the prints may be, we have no hesitation in saying that the name is very inappropriate, not to say a misleading one. Heliogravure is one of the names, if it was not the first, of photogravure. This name implies that the prints are made from an intaglio copper plate, in a copper-plate press. The term is as misleading as is that of photo-aquatint as attempted to be applied to the gum-bichromate process. "A rose will smell as sweet by any other name," and it is to be hoped that a more appropriate one will be found for the prints referred to.

The City Picture Exhibition.—This Exhibition continues to attract an unprecedented number of visitors. During the past fortnight it has been visited by upwards of 50,000 persons. This number gives an average of 420 visitors per hour on week days and 630 on Sundays, just fifty per cent. more per hour on Sundays than on week days. The Exhibition this year is confined to French art alone. As the pictures are loaned from private collections, and this is probably the only chance that the public will have of seeing them, it is an opportunity that should not be lost.

**English Mechanic*, June 24, p. 415.

WHILE on the subject of pictures, and their value, some exceedingly good prices were realised at Christie's sale rooms on Saturday last. A portrait of the Marchioness of Townsend, by G. Romney, made 5200 guineas; a portrait of Madame Susan Jouenne in white dress, by Rowney, was knocked down at 3000 guineas; portrait of Mrs. Inchbald, actress and dramatic writer, by J. Hoppner, was sold for 1000 guineas. As these were portraits, and of no very important personages, the prices the pictures fetched may be considered as very high indeed.

Polar Expedition.—On Friday last, the *Fram*, with Captain Sverdrup's Polar expedition on board, left Christiania. Dr. Nansen and a great crowd of people were present to witness the departure, and loud cheers were raised as the *Fram* left the harbour. This was the same day on which she left five years ago in the famous expedition under Dr. Nansen. In this expedition the *Fram* will take a widely different course from that of the previous one, but whether with any greater success in reaching the Pole, of course, remains to be seen. Every one, however, will heartily wish this and the other expeditions now on the way every success and a safe return. Possibly one or other of them may meet with traces of Andrée or his balloon, and, it is hoped, the intrepid Andrée himself.

SPOTS ON NEGATIVES AFTER FIXING.

THERE are, no doubt, very many photographers, both amateur and professional, who suffer seriously, like myself, in the matter of water supply from the not unmixed blessing of living in the country. Town life may have its disadvantages, but at least it can be said in its favour that the water supply is generally well looked after by the authorities, both as to quality and quantity. It is true that we very often hear of different kinds of living organisms, from eels to microbes, being found in "Company's" water, though there is very soon a sufficient outcry to bring about an instant improvement; but to the country dweller I am afraid this is not infrequently the constant and normal state of affairs, and such happy individuals think very little of pumping up a newt or young frog, to say nothing of innumerable smaller forms of life. It has been more than once a puzzle to me to explain how an adult newt has succeeded in passing up safely, and without apparent personal injury, through the valve of an ordinary suction pump, and on one occasion the house-supply pipe from a cistern served by a force-pump from a well some distance away, was found to be choked by the body of a half-grown frog that could have only got there after passing through the pump and some sixty feet of piping.

However, these forms of "organic matter" are of less importance from a photographic than from a sanitary point of view, though I have heard it seriously argued that, in the latter sense, the presence of a frog or newt in your water tank is a species of guarantee as to its quality. But it is rather the dead than the living forms of impurity that chiefly affect photographic operations, and these, I am sorry to say, are sufficiently frequent, and are not so easily detected or guarded against. I recently had an experience in this direction that is deserving of being placed on record, as, although it is not easy to dirctly explain it, at least it seems possible to point to a means of mitigating, or even totally suppressing, the evil.

I had four plates brought to me by a neighbour, with the request that I would develop them for him. He was a comparative novice, and these were his first attempts at "instantaneous" exposures, and he did not want to lose them. He gave me all particulars as to plate, subject, and exposure, and left them with me. The brand of plate is immaterial, though, without setting it down as an inherent defect

in the plate itself, it turned out to be an undoubted fact that the fault I am about to describe was more readily producible upon that particular make of plate than upon what I myself used.

As the plate was one that was entirely new to me, though not by many years a new one on the market, I developed and fixed the first negative before proceeding with the others in order to judge how much or how little I "came down" in fixing. As it happened, just as I had got it nearly fixed I was called away, so I left it in the fixing bath, a good old high-coloured sample, until I returned, nearly half an hour later. I then washed it or, rather, rinsed it and, after examining it, set it in a dish to soak. After developing the next plate I had another look at the first one, and was surprised to find it entirely covered with minute black spots, which I felt pretty certain were not there when it came out of the fixing bath; but, without giving the matter much thought, I set the result down to the long stay in the old hypo.

The second plate was therefore treated more carefully, that is to say, it was removed from the fixing bath when quite fixed, thoroughly rinsed, and carefully examined for similar spots, which were entirely absent. The remaining two plates were developed together in the same dish, as I found I had "got the range" of the exposure, and before fixing them it happened that I looked at the other two plates as I was changing the water. To my disgust they were both equally spotted, so my old hypo went into the waste tub, and a fresh bath was made from saturated solutions that I always keep at hand, clean and filtered. The last two plates were fixed in this fresh and perfectly clean solution, rinsed, and left to soak alongside the others, in the full confidence that they at least would be all right; but, on examining them a few minutes later, they, too, were found to be about as badly spotted as the others.

When my friend came for his negatives I pointed out the spots and described how they had made their appearance, and he not only did not seem surprised, but said "they always come more or less that way." I advised him, if that were the case, to change his plate, and finding that he had some more on stock, I got him to bring me half a dozen for purposes of experiment. One of these was exposed after being thoroughly dusted, developed, fixed, and washed as the previous ones had been, and like them proved to be entirely free from *visible* spots immediately after fixing, but to have developed them as badly as ever a few minutes afterwards. Then I thought I would would watch the process of their production, and so another plate was exposed under precisely similar conditions, developed and fixed in the same manner, and, after rinsing, *rocked* in a dish for some minutes and constantly examined in order to detect the first appearance of the spots. The process was continued for nearly half an hour, during which period the water in the dish was changed, I think, twice, but, strange to say, not a spot could be found, and though the plate was left to soak for some hours in the same water as before, not a sign of a spot came to light.

I now began to see a gleam of explanation; so, to verify my suspicion, another plate was cut into three pieces, exposed, developed, fixed, and rinsed. Then one portion was returned to the old discoloured fixing bath for two or three minutes, another simply laid in a stationary dish of water, the third in a rocking dish. The first portion, after a short immersion in the old hypo, was placed to soak in a separate rocking dish, and they were left for half an hour. At the end of that time the stationary plate was badly spotted, while the other two were entirely free.

There can, I think, be little doubt that the cause may be traced directly to the water in this manner. Minute particles of impurity of some kind, it is of little consequence what it is, were held in suspension, and in the case of the stationary plate these settled on to the film and decomposed the soluble silver salts *in situ*. By rocking the dish the particles of impurity are kept in motion and only act on the silver salt in solution, and, as the film becomes free from this soluble matter, the danger of the particles producing any action disappears, and after a certain time the dish may be allowed to remain stationary.

That this view of the case is the correct one seems to me beyond dispute, since under precisely similar conditions, but using carefully filtered water, not a trace of spots appeared, although the plate was removed direct from the fixing bath, and, without any rinsing, placed to soak for half an hour in a stationary dish.

But the curious point in the case is this, that, although as I have said, I do not set the spots down to inherent defects in the plate itself, there yet remains the unmistakable fact that that particular brand seems to be more prone to evil than others I have used, since, treated side by side, one film produces the spots, the others do not. It is possible the degree of permeability of the gelatine may have something to do with it on the comparative concentration of the soluble matter as it comes in contact with the reducing agent. At any rate it remains that one plate shows the fault, others do not.

But the remedy is sufficiently easy, namely, to either wash under the tap, or to keep the dish in motion for the first few minutes after removing from the fixing bath, so that the soluble silver salts are sufficiently removed or diluted to do away with the danger. This is a perfect remedy, not merely a partial one; but where it is not applicable, as perhaps in the case of large batches of prints—for here the same process, I imagine, would be followed out—filtration of the water proves equally effective if thoroughly performed. A cheap and efficient filter for this purpose can be made out of a large flower-pot, packed with alternate layers of sand and charcoal, with a piece of canvas top and bottom to prevent the filtering material washing away; and, at this time of the year, the porosity of the flower-pot will cause sufficient evaporation to very materially cool he water as well as purify it.

W. B. Bolton.

BEFORE THE CONVENTION.

V. Messrs. Wane, Ayton, & Patrick, Edinburgh.

Nineteen years ago Marshall Wane, at the request of many Edinburgh friends, who had sojourned in the Isle of Man, came from the Manx country and opened his present studio in George-street, Edinburgh. The first day he reserved for an exhibition of his work; this was a popular item, and the studio was thronged all day; since then, naturally business has fluctuated with the changing years; but still Marshall Wane, now grown grey in the service, is to be found at George-street. A crack with him, as he recalls his reminiscences, is an interesting glimpse into the evolution of photography. Not a few men who have now become noted in the world of photography have worked here, such as Messrs. Crooke, Webster, and Swan Watson.

The studio is a convenient and spacious one, and in it we see the influence of Mr. C. M. Wane, a name well known at photographic exhibitions; one or two corners in the studio are fitted up "at home" fashion, and, from the manner in which he (Mr. C. M.) showed the effects of different lightings on his set scenes, it was evident that the "corners" were the result of systematic arrangement and not chance groups. It seems that every studio must possess a big camera, and here we also find the inevitable "big 'un;" sometimes there will be quite a run on it for large direct work, at other times it is a mere ornament.

Adjacent to the studio is the dark room, which also shows the personality of the worker. The injurious influence of the ruby light on the eyes is a frequent source of "copy" to not a few of the writers to the photographic press; Mr. Wane has a remedy for this, simple and yet effective. An opaque shade is suspended at such an angle that the light is thrown down on the plate or print undergoing development, while it is shaded from the eyes, thus none of the direct ruby light reaches the eyes. The method is so simple that it is surprising that it is not more copied than it is.

The manner of arranging the exposed and unexposed plates prior to development or exposure betokens the presence of a very necessary factor in successful photography—"method." All the different processes of the business—copying, printing, retouching, &c.—are carried on on the premises, so that everything is under personal supervision.

Every firm seems to have some speciality, and it seems almost needless to mention Messrs. Wane's instantaneous work, especially in athletics. Mr. Wane and his son, C. M., are well-known figures at the athletic sports in the east of Scotland; in fact, no Scottish meet races would be complete without their camera near the finishing tape. Before us, as we write, are a few specimens of close bicycle finishes (fast work that), and some more recent ones, taken this year of horse races at Dunbar, &c. They are all beautifully clear and distinct, some of those of horses jumping being exceptionally well done. One snap-shot which secured a more than temporary fame is a splendid snap-shot of Fenwick, the Scottish champion jumper, clearing his record jump; this is one of these photographs which must be taken at the correct moment—no sooner, no later, and here we have that result exactly. This branch of the business, which has now become an important one, ensures that the workers need never lack work, as they are printing these from one year's end to another.

A few words must be spared for Mr. C. M. Wane; he is still a young man, but he is enthusiastic in the extreme, and has tempted the judge's verdict at many of our exhibitions. Four years ago he was successful in securing two medals at Southport for instantaneous work. In 1896 he was awarded four medals, and last year no less than ten medals fell to his prints. Already this year he has obtained four medals, besides being hung at the Paris Salon. Besides his instantaneous work, Mr. C. M. is developing marked ability in figure studies, and in this work he is much assisted by his sister, Miss Daisy Wane, and a lady friend, who have so often acted as models to him that "posing," naturally, not artificially as we too often see it, has now become second nature to them. He adheres pretty closely yet to the accepted canons of composition, and does not attempt anything startling; but he is young yet; he is really in earnest, so that it will not be a great surprise to his friends should he yet occupy an elevated rung on the photographic ladder.

At 43, Bruntsfield-place, facing the open expanse of Bruntsfield Links, one of Edinburgh's breathing places, is the Ayton studio. The business was founded by Alexander Ayton, continued by his son, Alexander Ayton, and since his death Mr. Robert Ayton has maintained the best traditions of the studio.

Entering the reception-room, we are confronted with a goodly array of good work. The first to attract our attention is the portrait of *T. Majoribanks Hay, Esq.*, which secured a gold medal at the Glasgow International Exhibition. It is a large direct photograph, printed in carbon and photographed in the ordinary way of business. It is unconventional in pose and striking in lighting, and shows in a marked degree the successful result gained by originality and ability. There is also a pretty photograph of a child and a dog lying together, "babes-in-the-wood" fashion; the whole picture breathes of the confiding trust of the child in his big protector; this has also, unless we are mistaken, been seen on some exhibition walls. A feature in the reception-room is the large number of "group" photographs; this seems to be the speciality of Mr. Ayton's business—groups, athletic and sedentary, learned and artisan, cluster around the walls; university groups are very much in evidence—in fact, Mr. Ayton seems to have a monopoly of that business. Mr. Ayton is also a radiographer, and, under the direction of two Edinburgh medicos, has secured quite a series of radiograms; a number of these, it may be remembered, were on exhibition at the Glasgow International. A very characteristic photograph of that ecclesiastical light, Principal Rainey, contrasted rather forcibly with an enlargement, finished in oils, of Scotland's great (!) patriot, Theodore Napier. The would-be chieftain was clothed in all the panoply of his Celtic garb, and, glory of glories, the heather was seen at his feet.

Behind the reception-room is the studio, simple and well lighted; both ends are used, and groups of somewhat large dimensions are photographed here. The dark-rooms and printing-rooms are adjacent. Upstairs are retouching, finishing, and store-rooms, and a room specially devoted to developing prints, separate sinks are kept for platinotype and carbon, and cleanliness is a virtue insisted on. We noticed here that Mr. Ayton does a large amount of work in copying old photographs and composite printing; in both departments good work is produced. In one particular Mr. Ayton seems to have been a little before the times; a study of electric lighting had convinced him of its usefulness, photographically, but at this time the electric light had not been introduced into Edinburgh. Nothing daunted, he laid down an electric plant, dynamo, &c., on his own behalf, and at the present time he has a system of electric lighting altogether independent of the public supply. The whole place seems up to date and prosperous.

A little beyond Morningside railway station, at 75, Comiston-road, we visited the studio of Messrs. John Patrick & Sons. From the outside it has the appearance of a comfortable dwelling-house, but a case of specimens betrays the photographic business. Mr. John Patrick is one of the old photographers, and from the fount of his experience draws many interesting reminiscences. When in business at Wemysfield, Kirkcaldy, one of his regular visitors was Thomas Carlyle, about whom he has quite a budget of anecdotes. In the old wet-plate days he was successful in securing a first-class photograph of the sage, who at that time was a schoolmaster in the town. In 1895 he published an enlargement of this as a centenary portrait, when there was, as there is still, quite a run on it. It is said to be the best photograph of Carlyle ever taken, and we can quite believe it, as it is one of those photographs that seem to portray the man, in opposition to many of the present-day photographs, which are merely a delineation of the mask of the face. Carlyle is shown in a characteristically meditative attitude; the strong powerful lines of the face betoken the strength of character, while the dreamy, far-away look of the eyes indicates the seer. It is a powerful memory of one of Scotland's greatest men. It is the only photograph of Carlyle ever taken by a Scotsman, and was photographed on one of Carlyle's "good days." Mr. John Patrick is a Carlyle enthusiast, and he has made a most interesting collection of photographs of the homes and haunts of Carlyle. He has also literary tendencies, and an article on Carlyle, illustrated by his own photographs, has been accepted by the *Century Magazine*.

Mr. James Patrick, who is his father's right-hand man, and takes much of the cares of management off his father's shoulders, studied his profession thoroughly. After being grounded in the technique of photography, he went through the art course at the Royal Scottish Academy; he spent sight years at this branch of study, including four years at the "life" school. As the father showed a partiality for photographing places associated with Carlyle, so the son, probably to prove the reality of heredity, has developed a similar *penchant;* but he worships at the shrine of that poetic master of English prose and romance, Robert Louis Stevenson. His views around Swanson were first taken as a matter of pleasure, apart altogether from any business connexion, but, as the collection grew in size and importance, the commercial value of it became apparent, and a portfolio of views from that picturesque corner of the Pentlands, published by the firm, has had quite a large sale. Besides the literary interest indelibly attached to the views, the pictorial possibilities were never lost sight of. Frequently a rough drawing was made beforehand of the effect to be aimed at, and the endeavour was made to make the photograph conform as nearly to the ideal set as possible.

Mr. Patrick has great faith in the possibilities of composition in the Swanson district, and, in arranging his pictures, he frequently uses sheep and horses to supply light and shade, or lines absent in the landscape, frequently, it must be admitted, with marked advantage. Not a few of his Swanson views have secured medals at our exhibitions. It is only about six or seven years since he started exhibiting, and already he is the possessor of fifteen medals. The studio is plain and unpretending, with an absence of any unnecessary "flunneries;" the work-rooms are perhaps a trifle cramped for space, but skilful arrangement has done much to overcome this evil. The firm does a large business in topographical views of Scotland, and during our visit we saw a large number of opalines being finished for the market.

Mr. James Patrick is President of the Edinburgh Photographic Society, and takes a great interest in its working. Lately he has appeared somewhat prominently as an advocate of the artistic in photography, although, judging from the prints and negatives we saw during our visit, he is no follower of the out-of-focus school.

THE TRIPLE ANASTIGMAT.

[Translated from the *Deutsche Photographen Zeitung.*]

Brunswick, April 20, 1898.

With reference to the communication in No. 16 of the *Deutsche Photographen-Zeitung*, permit us to make the following few remarks, by the publication of which you would greatly oblige us. We send you, for inspection, four test photographs, which have been made in the presence of our directors, and which are described more particularly at foot of each. The photographs were taken with four instruments—a Triple Anastigmat, a Goerz Double Anastigmat, a Zeiss Anastigmat, Series II., and an Anastigmat, Series VII., by the same firm, and they exemplify best the following remarks we desire to make. All the instruments are of about the same focal length.*

From these test photographs it is easy to judge that the curves of the picture plane are different for each objective, also that the curve of the Triple Anastigmat is more favourable for the field which has been selected than in the case of the other combinations. Not only middle and margin, but the entire field, is completely and evenly defined, whilst with the other anastigmats, although the middle and margin show perfect definition, there is in each case more or less depression, a slight unevenness, in the middle zone between centre and margin.

This is observable in the size we have selected (18 × 24 cm.), and, considering the care taken in making these tests, they should be unquestionable. The Zeiss-Satz Anastigmat defines considerably more than the size we have taken, and this we admit without question; but it should be remembered that the size, 18 × 24 cm., is superfluously large for 18½ cm. focus. The normal plate for this focal length is always 13 × 18 cm., consequently for practical use the new objective covers a sufficiently large plate, and even much more. It therefore practically includes a large angle. A plate measuring 18 × 24 cm. should be considered a wide angle for 18½ cm. focus. A larger angle is of no practical

* The notes at foot of the four test photographs are as follows:—
"Triple Anastigmat, III., F = 185 mm., stop *f*-7·7."
"Goerz Double Anastigmat, *f*-7·7."
"Zeiss Anastigmat II. No. 4 *f*-7·7."
"Zeiss-Satz Anastigmat, *f*-7·7."
But this is not sufficient for comparison. Regarding the Goerz Double Anastigmat, *f*-7·7, and the Zeiss-Satz Anastigmat *f*-7 7, it is only possible to conjecture the focus. Probably the lenses referred to are the Goerz, Series III., No. 2, F = 180 mm. *f*-7·7 full effective aperture, and Zeiss VII.A (not VII. as indicated by Voigtländer) No. 8 (?), F = 179 mm. *f*-7, full effective aperture. Zeiss II., No. 4, is 170 mm. focus and effective aperture *f*-6·3. These would be "the instruments of about the same focal length."
The actual size of the test object is also wanting in comparison with the ratio of reduction. But this can be ascertained indirectly. In No. 6 of the volume of this paper for the year 1895, a test photograph, with Collinear II., No. 3, F = 15 cm. *f*-6·3, is given, which object is the same as that represented in the test photographs now submitted, and the ratio of reduction is given as $\frac{1}{12\,4}$. With the aid of these data the actual size of a certain central portion of the test object was arrived at. But it is impossible for many persons to ascertain these particulars, which are necessary to a due estimate of the test photographs. Consequently it would have been better to supply them on the photographs.

use. For the normal plate, 13 × 18 cm., this objective has exceptional latitude for use of the cross fronts, as may be seen from the test photograph, 18 × 24 cm., which we submit. This will also make it evident to you that our prospectus has been drawn up with the utmost care, and that in fact the objective, which should cover 13 × 18 cm. according to the prospectus, covers considerably more than this size.*

It is next emphasised in Herr Klepp's notice that the curvature of the field of the Triple Anastigmat at an angle of 30° amounts to 1 mm. and to 1·5 mm. at 56°. From this the conclusion is drawn, that the new objective ranks in its characteristics midway between the anastigmats and the older lenses, uncorrected for astigmatism, being inferior to the former in the flatness of its field. We offer the following reply to these remarks, which are substantially correct so far as the figures are concerned. The field of the triple anastigmats, like that of every other objective, deviates from ideal flatness, and this deviation differs in many respects from that of the other anastigmats, but in no case is it greater than in the very best of them. Most anastigmats, and especially that type of anastigmat to which allusion appears to be made, are so constructed that the field has the following characteristics. If focussed for the centre, the image outside the axis, after deviating more and more from the ideal picture plane, again approaches it and cuts it at a certain point. Beyond this point of contact, therefore, outside the picture curve, to which we have referred, there is rapid and important deviation from the ideal picture plane.

It is an easy task for the practical optician to locate the point ouside the axis where the actual and the ideal picture planes shall again intersect, and the selection of this point is determined with due regard to the fact that, the further the point of intersection is from the axis, the deeper is the inevitable depression, and the more extensive its appearance in the picture. This unavoidable intermediate error attains different proportions in different instruments, as may be easily ascertained by test photographs or measurements, but in none of them is it so unimportant as to be imperceptible in practice if the said extra axial point of intersection subtends an angle of about 30° from the normal. Moreover, in most combinations, the curvature of field between the axis and this point of intersection is so great that a very apparent zone, wanting in definition, may be observed between the centre and point of intersection, at any rate with large apertures. If the point of intersection is brought nearer the axis, which may be easily done with every type of instrument, the intermediate error is diminished, but the available field is also enormously reduced, because there is always very rapid deterioration in the curve of the image beyond the point of intersection as compared with the ideal picture plane.

Since, however, it is not the end of a photographic instrument to fulfil definite theoretical optical conditions, but rather the substantial attainment of certain technical effects, the existence of such strict intersection of the curve of the image with the axis is of less importance for the action of the lens than bending out the curve of the picture to large angles on the ideal picture plane.

The triple anastigmats, like all other anastigmatic combinations, may also be constructed in such a manner that such an ideal point of intersection of the picture plane† and the plane of the focussing screen may be produced outside the axis; but, since the curvature of the field within the serviceable picture circle is quite exceptionally small, it is desirable to disregard this requirement and to place the image slightly otherwise, and to bend it out to the picture plane in a manner that has not hitherto been accomplished with like perfection.

We mention this to explain the effect of the measurements, which are correct in themselves, but the meaning of which is absolutely wanting in the notice in question, and which would only be convincing if a number of measurements of other instruments of a similar kind were made.*

We also wish to refer briefly to the name we have given to our instruments. It is pointed out in the notice that triple anastigmat may give rise to misconception by suggesting that the instrument consists of three anastigmats. This idea would be most unpleasant to us, because we consider the advantage of the new instrument to lie in the fact that the objective does not consist of several cemented parts, but of thin single lenses. The expression "triple anastigmat" only means that the anastigmat consists of three lenses, and not, like other anastigmats, of four, five, or eight lenses cemented in twos, threes, or fours. Up to the present the name has been understood on all sides in the sense we intended, since sufficient explanation is given in our prospectus, which is at the service of all. We think it is only necessary to draw attention to this to make the matter clear and to prevent misunderstanding.†

Concerning the concluding remarks of Herr Klepp, we beg to offer the following explanation: The question whether our triple anastigmats are more rapid than other anastigmatic combinations at the same relative aperture can only be settled by trial. We have made such trials, and, like many of our customers, have convinced ourselves that this is actually the case. As we can demonstrate at any time by comparative photographs that the instrument in its other optical qualities is *in no way* inferior to the best anastigmatic combinations within the angle utilised, and as we have been able to determine its higher rapidity, due to the absence of cemented surfaces and to the lower absorption of its thinner lenses, we think the statements in our prospectus, and which are wanting in Herr Klepp's article, fully justified.‡

In conclusion we would add that we do not for a moment hesitate to place the triple anastigmat by side of the best constructions as being at least optically equal to them in many respects, and we consider the name "subordinate anastigmat," as applied to these instruments has received, scarcely any justification.§

We have hitherto abstained from bringing our instruments into prominence by publishing comparative test pictures in comparison with those of other firms, and, as long as we have the opportunity of convincing the public by other means of the quality of our instruments, we shall remain true to this resolve. We are, however, willing at any time to afford to any one interested in the subject the opportunity of making comparative tests for his own satisfaction.

Respectfully yours,

VOIGTLÄNDER SOHN (A.G.).
Dr. KAEMPFER.
Dr. A. MIETHE.

* The table in No. 16, 1898, of the *Deutsche Photographen-Zeitung*, p. 216 (see THE BRITISH JOURNAL OF PHOTOGRAPHY, June 3, 1898, p. 362), was expressly stated to be for $b=f$; but, in the Voigtländer test photographs, b is not equal to f in any single instance; on the contrary, b is greater than f, as may be seen from the following table drawn up from the data we have ascertained. We have also included in the table the distance of the object, g.

Lens.	F.	G.	B.
	mm.	mm.	mm.
Zeiss-Anastigmat, Series II., No. 4, *f*·6·3	170	1252·6	196·4
Zeiss-Satz, Anastigmat, Series VIIa, No. 8 (??) *f*·7·7	179	1289·7	207·8
Goerz Double Anastigmat, Series III., No. 2 *f*·7·7	180	1326·3	208·2
Voigtländer Triple Anastigmat, III., *f*·7·7	185	1363·1	213·9

At these distances for object and image the objective would, of course, cover sharply a much larger area. If distance of image $b=f$, that is to say, 185 mm., when an angle of 41° covers a circle of serviceable definition of 14 cm. diameter, then the same angle would cover a circle of 16 cm. diameter if the distance of image, $b=213{,}9$ mm. Outside this circle the brightness of the image also falls off in the Voigtländer test photograph, and the corners of the small squares there represented begin to round off. This is less striking than when the distance of image, $b=F$, but still it is apparent. But it cannot be admitted that an especially large angle is utilised, or that the picture is of wide angle under the conditions selected for this photograph, since with the distance of image, $b=213{\cdot}9$ mm., only an angle of about 71½° is requisite to cover an 18×24 cm. plate. Consequently, the conclusions which Voigtländers have drawn from these photographs are *not correct*.

† The expression "picture plane" is absolutely to be condemned here. "Picture field" or "picture surface" are the proper designations.

* The whole explanation of the deviation of the actual from the ideal field is very interesting, but here rather superfluous; but, since it is given, we are compelled to go further into the subject.

In the ordinary aplanat of older construction, for instance Steinheil's, an almost perfect field is attained up to an angle of 10°, but beyond this, in consequence of rapidly increasing astigmatism, it is no longer possible to speak of an image. In the newer aplanats astigmatism is removed to a somewhat greater extent. The field is anastigmatic up to about 20°, but at 20° shows a strong curve. At 30° it is difficult to get an image, and 40° is the outside limit. In the anastigmats the field is good for flatness up to 20° generally. Beyond this a perceptible curvature begins, and in some of the older ones also perceptible astigmatism, but both deviations then again diminish, so that in the region of 60° an anastigmatic image is again formed in the ideal picture plane. In the triple anastigmats the field is primarily exactly the same as in the modern anastigmats. The flatness is good near the axis, but the curvature gradually increases in amount, and about in the same degree as in the "ordinary anastigmats;" whilst, however, in the "ordinary anastigmats" the curvature soon reaches its maximum and then again diminishes, in the triple anastigmats there is a constant increase of curvature. At 43° perceptible anastigmatism is apparent, and from that point the quality of the image deteriorates constantly in the same manner as in the aplanats, whilst in the "ordinary anastigmats" it improves. It is, therefore, impossible to understand in what manner the conclusion is wrong that the triple anastigmat "stands, according to its merits, midway between the anastigmats and the older lenses not corrected for astigmatism."

† With reference to this explanation, we would point out that the sentence seized upon (p. 216, No. 16, 1898, of the *Photographen-Zeitung*); (THE BRITISH JOURNAL OF PHOTOGRAPHY, June 3, 1898, p. 363) runs as follows: "triple anastigmat . . . . *may* . . . . suggest the idea," and the "*may*" simply indicates the *possibility*. But the firm of Voigtländer is also to blame that misunderstanding may attach to the name "triple anastigmat," since their symmetrical "collinear," each half of which they describe as spherically, chromatically, and anastigmatically corrected, is advertised in THE BRITISH JOURNAL OF PHOTOGRAPHY of March 26, 1897, under the name of "double anastigmat." People are thus led to a questionable false inference, and will easily believe that "triple anastigmat" is an analogous triple objective, in which the three components are similarly corrected, if double anastigmat means an objective in which each half is spherically, chromatically, and anastigmatically corrected.

‡ In reply to this, *it cannot be admitted* that the "tripie anastigmat in its other optical qualities *is in no way* inferior to the best anastigmatic combinations within the angle utilised," as shown by the statements in the article printed in No. 19, 1898, of the *Deutsche Photographen-Zeitung* (THE BRITISH JOURNAL OF PHOTOGRAPHY, June 3, 1898, p. 362), and which are here repeated and supplemented. With reference to Voigtländer's assertion that, in consequence of the absence of cemented surfaces, the rapidity is increased, *experiments* made in another quarter *have proved* actually that the triple anastigmat has *no advantage whatever* in comparison with other lenses of the same relative aperture. These experiments were carried out in such a manner that the lenses were mounted for comparison upon a stereoscopic camera, and gave a sharp image upon the same focussing screen. After the lenses were stopped to identical relative apertures (*f*·8 or *f*·12·5, &c.), the exposure was made with a focal plane shutter. If Messrs. Voigtländer have obtained results differing from these, let them be produced with exact description of the conditions under which they were taken, so that comparison may be made. We shall then see which results are the more reliable.

§ The name "subordinate anastigmat" seems more appropriate than ever, in view of these and our previous remarks.

IS DIFFUSION OF FOCUS DESIRABLE?

[Paper read before the North Middlesex Photographic Society.]

Is diffusion of focus desirable in pictorial photographs? should they be critically sharp, or more or less blurred?

Those who advocate "fuzziness" oppose sharp definition in pictorial photography only, admitting that in technical work critical sharpness is essential; it is therefore only necessary to discuss the question from the basis of pictorial work, although the question naturally arises, Why should a pictorial production in photography be of necessity technically defective? If this is so, then photography differs essentially from any other method of pictorial expression. It may also be permissible to allude in passing to the fact that, in an article that appeared a few months ago, a prominent pictorial photographer advocated that even architectural photographs, if their producer aimed at pictorial effect, should be more or less out of focus. Speaking as one who had made architectural drawings for many years before working with a camera, I would say most strongly that such an expression of opinion is absolutely indefensible.

In order to answer this question satisfactorily, it is necessary to know first the objects of diffusion of focus, or fuzziness, and the advantages that it is supposed to confer, and then ascertain if these objects could not equally well be attained without sacrificing definition or technical quality; in other words, if the worker were only a better photographer, if he were better acquainted with the capabilities of his tools and materials, whether he could not better attain his end by other means than by distorting his image by putting it out of focus, which is, in many instances, only a disguise to cover a multitude of defects that his work would show if it were sharp, defects that would indicate want of skill to a desired effect.

First, there is the supposed pictorial quality of fuzzy photographs as contrasted with those sharply defined; though, even from the arguments advanced by the advocates of fuzziness, it is difficult to understand how the fact of a photograph being out of focus should alone confer on it pictorial qualities that it could not otherwise possess.

Mr. J. A. Hodges, in the *Amateur Photographer*, a few months ago, illustrated an article advocating absence of sharp definition with two photographs in which point of view, lighting, and all else were identical, excepting that one was sharply defined throughout, and the other had no portion sharp, claiming that in consequence of this difference only one was a picture, while the other, that sharply defined, was not.

Why should poetry, sentiment, and all else that is involved in the word picture, be dependent on want of sharpness, which is only a form of distortion?

Pictorial quality depends on the sentiment, composition, breadth of effect and expression in a photograph equally as in any other picture; certainly not in taking it more or less blurred, a trick that any one can acquire with little or no practice, while the attainment of the art of pictorial expression is the work of many years, success being only arrived at after many failures.

This pictorial quality is said to be gained by the greater breadth of effect in an out-of-focus photograph, this breadth being due to—

1. Loss of harshness, or relief of one object against another.
2. The suppression of detail, and
3. The greater effect, or rendering of atmosphere.

Unquestionably, harshness or hardness, or aggressiveness of detail, or the absence of atmosphere, are all fatal to good pictorial effect; but does sharp definition necessarily involve these defects and does diffusion of focus secure their absence? I think not.

Why is detail aggressive or irritating by its myriad lights and shades? Why should one object stand out in hard relief against another? Why should there be absence of atmosphere? It resolves itself entirely into a question of the quality, and character, and direction of the lighting at the time of making the exposure. If the many lights and shades that make the detail aggressive did not exist at the time of exposing the plate, they would certainly not appear under any circumstances in the finished picture. Can any one reasonably expect that a negative taken when distant hills, trees, or buildings, stand out strongly with well-defined outlines against the sky, or harshly contrasted with each other, will show them softly defined and gradually disappearing into hazy distance? Mr. A. Horsley Hinton, one of the most prominent of pictorial photographers, stated in a recent article that, on a moderately hazy day, the employment of a small stop—*f*-32, for instance—would destroy the existing effect of atmosphere, while *f*-6 or *f*-8 would secure it. This is a view from which I most strongly dissent. If atmospheric haze exists, all the stopping down possible will never remove it; if it is not present, the use of a large aperture, or putting some planes of the picture out of focus can never produce it. Those who, for business, have to photograph buildings, &c., in large and smoky cities, know only too well the difficulty that they experience on dull or hazy days in obtaining clear negatives free from haziness; the task is frequently hopeless. This fact was very forcibly illustrated to me this morning, which was damp and hazy, on my way to business.

From the Temple Station, looking westwards along the Victoria Embankment, all the details of Somerset House, a few yards away, were plainly visible; every stone, every indentation could be seen, and the outlines well marked against the sky. A little beyond this stands the Hotel Cecil, in which only the principal lines could be seen, and the outline against the sky was very grey. Farther away still is the National Liberal Club, which appeared only a grey, hazy mass, in which no detail of any kind was visible, and the outline almost lost, although it was not more than half a mile from where I stood. The Houses of Parliament, about a quarter of a mile beyond this, were absolutely invisible; yet, on an ordinarily clear day, with the sun shining, not only is each of these buildings clearly visible, but the time can be read by the clock of the Houses of Parliament, the most distant of them all, by any one with fairly good sight. Now, the fact that I wish to emphasise is this: if the conditions of lighting or haziness existing at the time of exposing the plate are favourable to the absence of aggressive detail or harshness, or the rendering of atmosphere, then fine definition as given by the lens will not destroy this existing effect, and, if it does exist, then absence of definition cannot possibly render a true effect of atmospheric haze. Distortion of detail by blurring is not atmosphere, but only a poor imitation that is a tacit admission that its producer had either insufficient skill or patience to secure the effect that he has attempted to imitate. The lens shows detail less strongly marked than we see it: frequently, when all the details of a town building are plainly visible to the eye, it is practically impossible to obtain a negative that shall render them clearly, and this applies with equal force to the effects of foliage in a landscape.

In Mr. Horsley Hinton's article again I read: "With a sharply defined foreground the eye is attracted, and the interest so far arrested that it is difficult to travel further and enter into the poetry and sentiment of the scene beyond." This would be true if the lighting of the foreground were harsh and hard, but not if it were so soft that the detail, while present, was not apparent until looked for. In most discussions on this subject two entirely different points are confused with each other. It is not the fine definition that militates against the poetry of the scene, but the harshness or hard relief that results from defective lighting. The word sharpness is used by a painter to describe the hard relief of one part of a picture against another, and photographers often apply the legitimate objections against too sharp a picture in this sense to one in which the sharpness to which they object is fine definition—quite a different matter.

I have attempted to show that fine definition is not inconsistent with the softest atmospheric effects and absence of aggressive detail, but more than this is necessary. It should not be difficult to give reasons for stating that absence of definition is in itself a defect, and that the attempt to secure the effect of atmosphere or the suppression of detail by diffusion of focus is indefensible.

Absence of definition carries with it destruction of form and structure; certainly sufficient want of definition to destroy the effect of aggressive details must destroy their form, and only substitute for their well-defined lights and shades meaningless blurs and patches, irritating because of their want of form and character.

A skilful worker in any art, in producing pictures, will emphasise the character of the method by which his result is obtained, and make use of its special qualities to secure effects that could not be copied in any other method of working without sacrificing quality. Thus, a water-colour drawing is essentially different from an oil painting, while a line engraving or etching differs from both. For this reason a photographer should avail himself of the marvellous power of drawing possessed by the lens, unless it can be shown that there are other qualities that are thereby sacrificed, and, so far, it seems to me that no tenable argument has been advanced to prove that there is any real gain by loss of drawing or loss of definition.

Photographs are frequently compared with paintings and painters' methods of working, but the comparison is not a fair one. The scene-painter's methods cannot be applied to the work of the miniaturist, and the manner of producing a picture measuring four or five feet each way must differ materially from that of the photograph that is only a few inches. It is worth noticing that a photographic reproduction of one of a leading painter's works if reduced to eight or ten inches long appears as a well-defined photograph, and this should be a better guide than attempting to copy the method of working on a large canvas when producing a small photographic negative.

There is one point more, and one that has been a strong inducement to me to open this discussion, and that is to protest most emphatically against the position taken by so many pictorial photographers that, while admitting that originality is essential for pictorial work, and claiming for themselves absolute freedom to work as they please in order to carry out their ideas, and objecting to be governed by any recognised standard of technical work, they yet couple with this the contention that only the type of work that they produce has any claim to the title pictorial; and only just the degree of fuzziness that they advocate, no more and no less.

If, as I have contended, it is possible to obtain soft foregrounds and middle distance without self-assertive detail, and hazy distance in which the planes melt into one another and finally lose themselves imperceptibly in the sky, without sacrificing definition or technical quality, surely this method of working is more meritorious than attempting to imitate these effects when they do not exist by the mere trick of blurring the image. A photograph that combines pictorial effect with good technical quality is a far better production than one whose artistic value is marred by glaring technical defects.

HENRY W. BENNETT.

"SENTIMENT OF ART IN PHOTOGRAPHY."

We have received the prospectus, printed in amusing and nervous English, "of a publication of great riches," *Sentiment of Art in Photography.* Messrs. Camille Smits & Co., of 61, Rue de Cornet, Brussels, who send us the circular, say: "A simple examination will convince you of the interest and importance of our publication."

We quote the following, treating of Messrs. Smits' object:—

"Our object? Here it is:

"It is to make of the photographer, not an artisan, but an artist, it is to destroy the prejudice, according to which the amateur must be content with reproducing as truly as possible the reality shown by the object-glass, without occupying himself with the impression evolved by it

"The photography of all arts is certainly the most positive, and some people value it only by as much as it reproduces exactly until the smallest details, without caring how much this kind of minute interpretation is mean and little artistic.

"We therefore must get the better of the common opinion and vanquish equally the servility of the apparatus.

"The sculptor is not the slave of his boasting tool, neither the painter of his brush, nor the engraver of his graving tool, but the photographer is, to a considerable extent, slave of his apparatus.

"How to surmount such an obstacle? First by studying thoroughly the subject to be reproduced and by choosing judiciously the light—sun and shadow are they not principal agents for success?—and then by a work in the laboratory, where the photographer, having become again artisan, *will be his own master in choosing the proceedings.*

"To reach the highest possible degree of art in interpreting the nature by photography shall be our object.

"This object, shall we realise it?

"Yes.

"What we want to do before all, is to stimulate the amateurs, and the only way to that is the competition, which we shall therefore organize every month.

"The works having received a prize shall constitute the publication, the amateurs will have thus before their eyes models which will serve them as patterns teaching. The public will be judge, and will soon be able to judge by himself the obtained result.

"We appeal therefore to the good-will of all. This good-will, which the charm of research, inspiration and artistic work must rally naturally to our undertaking, for nothing will be more interesting than these competitions, as much for the amateur as for the public. High encouragements have already been given to us, a fact that will make our task an easy one.—We expect the support of all who are not indifferent to the questions of Art."

Those of our readers who are interested in this form of competition should apply at the address given for the rules. The following is a glance at the programme of the competitions:—

1. Competition of the Month of August.—*General competition:* Landscape. *Special competition:* Landscape in twilight. It is the exquisite hour, when the moon, like a golden galley, ascends the clear sky, where the stars are beginning to twinkle. The ploughman leaves the black furrow drown by the ploughshare. Solitude around.

2. Competition of the Month of September.—*General competition:* Interior with persons. *Special competition:* Interior with persons. Room of a rich or poor person.—The wife left by her young husband waits in the corner of the hearth. Study of a light effect, which, making the face conspicuous, shows its sorrowful expression.

3. Competition of the Month of October.—*General competition:* Summer landscape. *Special competition:* Summer landscape. Allegory. Flowers everywhere and over the roads young girls carrying arms full of corollas of many colours.

4. Competition of the Month of November.—*General competition:* Study of nudity. *Special competition:* Study of nudity. Personification of the youth.—Slender and graceful forms, whose outlines especially must be studied.—Accessories serving as frame for the young girl and as reason for the chosen attitude.

5. Competition of the Month of December.—*General competition:* Portrait of a woman. *Special competition:* Portrait of a woman. Standing or sitting, full-length portrait. Study of the outlines and the light.

DARK-ROOM SIGNS.

The Council of the Photographic Guild, 6, Farringdon-avenue, have prepared for the use of photographic dealers, hotel-keepers, and others who are willing to allow the use of a photographic dark room either free or at a small charge, a distinctive placard in the form of a blue printed Maltese cross six inches square, of which the annexed is a reduction. The Council believe that the use of a distinctive emblem which shall be seen at a glance by the photographic tourist will be of great use, not only to the photographers, but also to those who put the dark rooms at their disposal. They are preparing a list of photographic dark rooms, and will be pleased to send these cards to any one who is willing to display the same. They hope to publish a fairly complete list of dark rooms for the use of members of the Guild, and, in order that it may be made available for all photographers, they propose to communicate through our pages the additions to the list which may be obtained from time to time.

The Hon. Secretary of the Photographic Guild writes: "Those of your readers who are joining the Convention, and many others who will visit the Western Highlands this year, may be interested in the following list



of public dark rooms, which are at their service for plate-changing, either free or for a very small fee. Those marked with asterisks provide for developing also at a small charge. All are marked by the distinctive badge of the Photographic Guild. Similar lists are being prepared for the use of members of the Guild in other parts of the country, and we shall be pleased to receive the addresses of any with which we have not yet communicated":—

*John Cummings, 21, Mill-street, Alloa.
*P. Feathers, 6, Castle-street, Dundee.
*W. L. Ker, 56, High-street, Dunfermline.
*A. H. Baird, 39, Lothian-street, Edinburgh.
*A. Frazer, 32, Teviot-place, Edinburgh.
*A. D. McGuthrie, Bonnington, Leith, Edinburgh.
*Wm. Hume, 1, Lothian-street, Edinburgh.
*J. Lizars, 2, Maitland-street, Edinburgh.
J. M. Turnbull, 6, Rose-street, Edinburgh.
*Walls & Frazer, 47, Lothian-street, Edinburgh.
*R. Sinclair, 35, High-street, Falkirk.
*Albion Albumenising Company, 13, West Nile-street, Glasgow.
*T. Baird, 34, Queen-street, Glasgow.
*Bolton & Sons, 134, St. Vincent-street, Glasgow.
*J. Brown, 76, St. Vincent-street, Glasgow.
*J. Davie, 19, Gordon-street, Glasgow.
W. J. Hassard & Co., 209, Sauchiehall-street, Glasgow.
Lawson & Redpath, 18, Charing-cross Mansions, Glasgow.
*J. Lizars, 101, Buchanan-street, Glasgow.
*Geo. Mason & Co., 120, Buchanan-street, Glasgow.
*McGhie & Co., 75, St. Vincent-street, Glasgow.
*J. More, 77, Renfield-street, Glasgow.
*Rae Bros., 134, St. Vincent-street, Glasgow.
*W. A. C. Smith, 53, Dundas-street, Glasgow.
J. Trotter, 28, Gordon-street, Glasgow.
*Wm. Dow, The Apothecary Hall, Kinross.
R. Love & Co., Paisley.
*Smith & Govan, St. Andrews, N.B.

PORTRAIT STATUES IN EGYPT AND AMERICA.

It is a singular fact, says the *American Antiquarian,* that from the earliest time there were portraits which accurately represent the forms and faces of individuals. Some of them were kings, others noblemen, and a few private persons.

An unknown man of the fourth dynasty wrought out of a block of wood has been preserved. From this we learn the dress, the form, and the face of the men who lived in that time, 2000 B.C. The dress was a simple tunic with a cord about the waist, a rude sword suspended from the cord, and a knotted staff is held in the left hand. All of it is very plain and simple, just as we would expect to see at this time.

Later on there are portraits of the Hyksos kings. These have been described by Dr. A. H. Sayce. They are in great contrast to the statues just mentioned. They represent long, lank, lean faces, just such faces as we would expect to see in the Turanian or Mongolian races, with a long lock of hair falling on the shoulder, resembling the pigtail of the Chinese, but more resembling the scalp locks of the American Indians.

Still later there appears another set of portraits. They seem to belong to a superior race, and yet one which was allied or akin to the first race that reigned during the first four dynasties, who were the pyramid builders, but not the builders of the temples. The portraits of the Pharaohs are also given in most books on Egyptology. Among them the most interesting was that of Rameses II. These were tall and stately kings, but they also show something of the royal air. Later on, we find as great a change in the portraits as we do in costumes and in the art and agriculture of Egypt. The faces now resemble the Babylonian and Assyrian kings, as they have heavy beards and full faces, and wear crown or turbans. The hair falls in heavy folds below the crown. They seem

to be well fed and are very complacent, and are in contrast to the warrior kings such as Rameses and others.

The age of Ptolemy brought in more luxury and ease, which are exhibited in the portraits as much as in the surroundings of the kings.

All the way through the history of Egypt there was a line of nobility, notwithstanding the changes and revolutions which occurred. There was evidently a progress in civilisation, and this progress had much effect upon individuals, as upon the entire race, and marked its lines in their faces and forms as much as it did in their dress and equipage.

It is very interesting to trace this progress and study the history of Egypt and the East in the light of the portraits which have been preserved.

What shall we say about the early American history, that which preceded the advent of the white men and the date of the discovery? Can we learn anything from the portraits which have been preserved in the land?

We have in the preceding numbers spoken of the portrait columns at Uxmal Palenque, in Central America, and have maintained that they were the portraits of kings and queens. Some have thought differently, for they have held that they represent the divinities and culture, heroes and mere imaginary figures. A few, such as M. Le Plongeon, have held that they were portraits which resembled Egyptian faces, and have imagined from this fact and others a connexion between Egypt and America in prehistoric times.

A close study of the portrait columns will reveal the error, for there is no resemblance whatever. There is, however, a lesson to be learned. These portraits are in great contrast to the pictures of the North American Indians, of which Blackhawk was a specimen. They must have belonged to different races, and represent a different line of descent.

DONT'S.

Don't tell the photographer that you are the worst subject in the world to photograph and never had a successful picture. It is a stilted remark resulting from a species of egotism, which simply means that no camera has ever yet succeeded in producing the beauties that you see in yourself.

Don't imagine that it is necessary to assist the artist.

Don't practise expression, and so succeed in disguising yourself.

Don't have your hair cut or whiskers trimmed just before sitting for a picture. It will make you look stiff and unnatural.

Don't tell baby that birds and monkeys will jump out of the side of the gallery to amuse him. His disappointment will make him cross.

Don't bring the entire family along to keep the child in good humour. The artist can do that much more easily, and the baby is less likely to become nervous.

Don't bring a friend along to pose you. Trust to professional rather than amateur skill.

Don't antagonise the photographer because your wife or daughter has worried you into going to the studio.

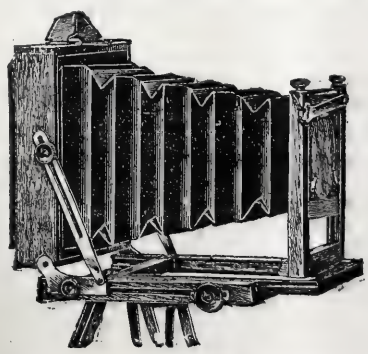
Don't, if you are an amateur, try to instruct an artist of thirty years' experience how to make a successful photograph.

Don't grow angry if you cannot break the business rules of the studio because you do not think they are good.

Don't forget that every good piece of art involves first, "essentially the evidence of human skill, and the formation of an actually beautiful thing by it.'—*Professional Photographer.*

Our Editorial Table.

Mr. Wilfred Emery of 3, Soho-street, W.C., draws attention to his half-plate set of photographic apparatus, which consists of a compact double-extension camera, with swing and reversing back, wide-angle movement, rising front, &c., double dark slide, and a three fold tripod.



There is also a R.R. lens of very good quality, fitted with iris diaphragms, which can be supplied to the above at at a small extra cost. The camera appears to be well and strongly made, and the set is undoubtedly good value at the price charged.

Portrait Velox Paper.

J. J. Griffin & Sons, 22, Garrick-street, W.C.

We have long been familiar with the pictorial supplements of some of our American photographic contemporaries, which have taken the form of prints on Velox paper. It is specially suitable for portrait work. Messrs. Griffin have just sent us a sample of the paper, together with the developer in powder form that merely requires dissolution in water to fit it for immediate use. Portrait Velox is treated in exactly the same way as the other papers of the Nepera Company that have recently been issued in Great Britain, that is to say, it may be developed and manipulated without regard to the entire exclusion of actinic light from the dark room. Softness of image, freedom from grain in the shadows, and an absence of hardness are the principal distinguishing characteristics claimed for Portrait Velox—claims which, upon trial, we find amply substantiated. The surface is half matt. We note that a feature is made of "Special Rough," and "Special Glossy" papers for soft effects from strong negatives. The Velox papers well deserve their popularity, for they give very charming results.

The Cadett Spectrum Plates: "Ordinary" Brand—H. & D. Speed Number, 37.

Cadett & Neall, Ashtead, Surrey.

In the manipulation of this new brand of the Cadett orthochromatic plates we experienced far less difficulty in avoiding fog than we had anticipated. Our slides, as suggested by the makers, were filled in total darkness; but, in transferring the plates to the dish, we stood with our backs to a source of red light some eight feet away, and this, while shielding the plate from the direct rays, enabled us to see sufficiently to be sure of what we were doing. Our negatives subsequently showed no trace of fog, and thus we might say that, given a little care, total darkness is not wholly essential at the development stage. We employed a dilute solution of diphenal for development, and, arriving at a rough calculation that a quarter of an hour would be required, we, at the end of that time, were rewarded with clear, bright, dense, and fog-free negatives. Our test subject was a specially prepared three-colour picture, printed with selected inks, and a comparison of print with original shows that the Spectrum Ordinary plate possesses an almost perfect power of correctly translating colour values. The plate is specially put out for general studio and landscape work, and, judging by the exposures we ourselves made and the unmistakable good qualities of the results, we have no hesitation in saying that the Cadett Spectrum Ordinary plate accomplishes everything that is claimed for it. Certainly we were very pleased with the trials we made.

Off Your Bikes.

By Walker Miles. Published by R. E. Taylor & Son, 19, Old-street, E.C. 136 pp. Price 1s.

"Off Your Bikes" is the fanciful title of Mr. Walker Miles's latest addition to his series of little books treating of field-path rambles. The author, as is well known, is an enthusiast in the pastime described as "padding the hoof," and he has a keen love of the country. Monmouth and Raglan, Warlingham and the South Downs, have been the scenes of his latest visits, and he gives the intending tourist in those districts much useful information to guide him. The other contents of the book include some spirited references to the subject of footpath protection, several poor reproductions of photographs by Mr. Alfred Bedding, and a humorous rhymed legend of Leith Hill Tower, "Rummy Dick's Ghost." The little book, which, *inter alia*, makes a friendly tilt at the cycling mania, is decidedly worth a place in the library of every nature-lover.

The Use of the Hand Camera.

By Clive Holland. 198 pp., price 2s. 6d. Westminster: Archibald Constable & Co.

Judging by the twenty or more half-tone reproductions in this volume, Mr. Clive Holland takes very good photographs; but he scarcely shines as an author of photographic books, if his present effort is to be taken as a fair specimen of his knowledge and powers. In Chapter I. several well-known cameras are recommended; but the descriptions (and prices) given are obviously of the merest catalogue kind, and the reader is left in absolute ignorance of the essential points of those instruments. To speak of a rapid rectilinear lens working at the "comparatively large" aperture of *f*-8 is an indication of a very scanty knowledge of photographic optics. The advice to expose at least two plates on all subjects of importance is scarcely sound. If two, why not twenty? Besides, if this plan of working has anything to recommend it, why, on earth, does the author go to the trouble of printing exposure tables? The book would have gained immensely had the proof sheets been subjected to competent revision. For instance (page 120), the author includes "ammonia bromide" in a formula. He means "ammonium bromide," and should have said so, especially as he has it right in other places. Mercuric chloride is also called mercury perchloride and bichloride of mercury. Again: "clean hypo bath, 6 ounces;" what strength is meant? The book as a whole does not rise above the level of amateurish platitudes, although it is fair

o add that the class to which it is addressed may not notice this. A good volume on the use of the hand camera has yet to be written, and Mr. Clive Holland may easily accomplish this, if, to his undoubted ability as a taker of photographs, he will join a determination to master the *minutiæ* of photography sufficiently to qualify him for the position of a teacher of others—a position he has by no means yet secured. Mr. Horsley Hinton contributes an introduction to the book, which gains as little from such a "send off" as Mr. Hinton does from his association with a volume which is distinctly below the level of the photographic pabulum that comes out of Creed-lane every week.

"Wolfe-Land:" A Handbook to Westerham and its Surroundings.

By Gibson Thompson. 158 pp. Price 6*d*. London: Beechings, 174, Strand, W.C.

Of the many books that we have recently noticed few have given us such real pleasure as Mr. Thompson's agreeable contribution to the literature of the country side. Taking Westerham as his centre, Mr. Thompson gives a history and guide to one of the most charming districts near London. We have gone over nearly the whole of the ground covered by Mr. Thompson, and some of our most recent cycle and camera excursions have been into the matchless Kent country which he describes. There is a useful map and seventy-two illustrations in the book, which we can heartily recommend. General Wolfe lived at Westerham, hence the title chosen for Mr. Thompson's volume, which is issued under the auspices of the Homeland Association. There is a chapter on Fly Fishing on the Darenth by Mr. J. Paul Taylor, and an introduction by Colonel C. A. M. Warde. Altogether a charming production, reminding us of many happy hours passed amid the scenes therein described.

The Hurter & Driffield Photographer's Note-book, published by Sidney Smith, 26, Albert-street, Manchester, should be of great use to all those who take practical advantage of the H. & D. system of plate-speed marking. It is intended to be employed with the actinograph, and it affords spaces for recording all the data of exposures. We can cordially recommend it as a valuable aid to accuracy in exposure and development

News and Notes.

Photographic Club.—Wednesday evening, July 6, at eight o'clock, Open Meeting, it being Convention week. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards, which the Hon. Secretary (Mr. W. R. Stretton, 4, Queen-street-place, London, E.C.) will be pleased to forward on application.

The Artists' Guild.—Princess Christian offers prizes for embroidery at the Artists' Guild Tenth Amateur Art Exhibition, to be held at the Imperial Institute in November next. The Exhibition is open to all amateurs. Prizes are offered for painting, carving, photography, work in leather and metals, &c. Full particulars from Lieut.-Colonel Bacon, Secretary Artists' Guild, Exhibition-road, S.W.

Romney Studio, Limited.—The above named Company has been registered by J. E. Green, of 41, Threadneedle-street, E.C., with a capital of 3000*l*. in 2000 preferred and 1000 deferred shares of 1*l*. each. The objects of the Company are to carry on the business of photographers and dealers in works of art, sculpture, &c. Table A mainly applies. The registered office is at 122, Regent-street, W.

A deed of assignment for the benefit of creditors has been executed by James Mellor Butler, of 1, Baldwin-street, Bristol, and 28, Regent-street, New Swindon, and residing at Mount Pleasant, Lillymeade-avenue, Totterdown, Bristol, photographer under which Mr. E. T. Collins, chartered accountant, 39, Broad-street, Bristol, is trustee. The unsecured liabilities are returned at 1399*l*., and the assets, after deducting claims of preferential creditors payable in full, are estimated at 400*l*. The deed provides for the assignment of the estate upon trust to realise in case of default by the trustee, but no steps to be taken to realise the estate if the debtor pays a composition of 5*s*. in the £ within three months.

How Willesden Paper is Made.—A concentrated solution of cuprammonium hydroxide is formed by dissolving cupric hydroxide in ammonia to saturation; the paper, wound on a drum, is drawn through the solution, and then over heated hollow iron drums, by which means it is dried and rewound. In passing through the solution, the cellulose on the outside of the paper becomes partly dissolved, and on drying is reprecipitated in an amorphous form, so that the pores of the paper are entirely filled with it. At the same time the copper salt is decomposed, and a compound of that metal remains in the paper, acting as a preservative. Thicker sheets (or two-ply) are obtained by running two sheets of paper simultaneously through the solution, and they become welded together on the hot drums; four-ply paper is made by running two sheets of two-ply paper together again through the solution, and so on for thicker material.

The Action of Electric Discharges on Photographic Plates.—"I do not know whether others have observed the fact that, when strong sparks from an induction coil or influence machine are allowed to traverse the sensitive surface of an ordinary photographic dry plate, a dark line, delineating the path of the spark, is immediately produced, and can clearly be seen without any necessity for photographic development. Further, that such lines, though faint to commence with, darken appreciably after a few minutes' lapse of time, and still more so in the course of a few hours. This appears to indicate that, whatever the precise action of the spark on the film, this action continues after it has once been started. Further, it is a curious fact that these lines, if examined with a magnifying glass, are always found to consist of two dark lines with a light space between them. This is specially noticeable immediately after the spark has passed, the space apparently filling up with lapse of time."—A. A. C. Swinton in *Nature*.

Concerning Lord Crawford's collection of manuscripts at the Grafton Galleries, a well-known art critic writes: "We hope the Earl of Crawford has been persuaded to prolong the exhibition of his manuscripts and mediæval bindings beyond the few days at first announced. It is a most amazing collection, full of very rare and beautiful examples of an art now lost to us. Many periods and many countries are represented. There is Greek and Latin work of the early centuries of Christianity; French and English, Spanish and Italian, Celtic and Icelandic MSS. have a place. More curious are the old Egyptian rolls on papyrus, the Singhalese, Tamil, and other sacred books on palm-leaves, and, indeed, all the Oriental specimens. It is amusing to find in the Egyptian Book of the Dead, dating back to B.C. 300–100, an arrangement of text and vignettes that even the purist to-day would admit is distinctly decorative, so well balanced are the proportions and so harmonious the relations of drawing and writing. Really the artist has as much to learn from these old MSS. as the archæologist or the historian. The illustrator and the printer can consult them with advantage. In writing of the French books of the eighteenth century at the Fine Art Society's, we pointed out that a book could be beautiful even if it did not in all particulars conform to an earlier convention founded upon the mechanical restrictions of the age in which it flourished. With these European manuscripts you go back to a still earlier period, before the invention of printing, and, when you see the freedom with which the illustrator who was independent of the reproductive arts worked in those days, you realise more than ever that the characteristic style of the first wood-engravers, now so extolled, was not the result of the artist's scheme of book decoration, but of the engraver's primitive tools. The manuscripts are decorated with conventional scrolls, and curves, and lines, but they are illustrated too. The little pictures let in the text are as realistic in their way as the illustrations of the *Century* and *Harper's*. Of course, the conditions under which illustrators then worked were not the same as those that afterwards ruled Dürer and Holbein. But, then, since the time of Dürer and Holbein, conditions have again altered entirely, and there is no more reason why we should be compelled not to develop their method than that they should have been expected to show the same freedom as their predecessors working in other and then more pliant materials."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

July.	Name of Society.	Subject.
2	Leytonstone	Excursion: Wanstead Park. Leader, Mr. Bailey.
4	South London	Open Night
5	Gospel Oak	Ten-minute Papers: *My Favourite Developer*.
5	Hackney	Discussion on Enlarging Camera for Society.
5	Rotherham	*Gentle Art of Making Failures*. Paper lent by P. E. Newstead.
6	Borough Polytechnic	Lecture: *Carb n Printing*.
6	Photographic Club	Open Meeting.
6	Southsea	Excursion: Arundel.
7	Gospel Oak	Excursion: Zoological Gardens.
9	Borough Polytechnic	Excursion: Orohamhurst.
9	Hackney	Excursion: Broxbourne. Leader, The President.
9	Liverpool Amateur	Excursion: Ellesmere. Leader, F. Anyon.
9	Oldham	Excursion: Haddon Hall. Leader, T. W. Hilton.
9	South London	Excursion: Leatherhead. Leader, F. Jarvis.

ROYAL PHOTOGRAPHIC SOCIETY.

June 28,—Technical Meeting,—The Right Hon. the Earl of Crawford, K.T., F.R.S. (President), in the chair.

A New Flash-lamp.

Mr. R. Thiele exhibited and described a new flashlight apparatus, the invention of Mr. Weiss, of Strassburg. It consisted of a brass telescopic stand (a unipod, with a clamp for attachment to a table or other support), at the top of which was placed the igniting arrangement, the pressure of a trigger causing an ordinary Swedish match to ignite by contact with a friction block, and thus to discharge a flashlight powder. The latter was a mixture called "argentorat," and was said to possess in the highest degree the actinic qualities necessary to ensure fully exposed negatives with exposures of one-thirtieth of a second or less; it would not ignite by friction or concussion, each charge was entirely consumed, no sparks or dust resulted from the discharge, and it would keep for an indefinite period. The apparatus as a whole was described as possessing every possible advantage, and some excellent photographs taken by its aid were exhibited, including one of a portion of Strassburg Cathedral, extending for a length of 103 metres from the camera, with a height of thirty-five metres, this having been taken by the aid of only one lamp and an exposure of one-twentieth of a second. During the reading of the paper referred to below, the lamp was used to obtain a photograph of the meeting. There was a tolerably loud report, followed by a great deal of

smoke, which, however, ascended and escaped by way of the open skylights. The exposure was very brief, and the surprise of the audience at the sudden and unexpected "bang" will probably not be evident in the photograph.

Orthochromatic Photography.

Mr. E. Sanger Shepherd read a paper on "The Scientific Translation of Colour into Monochrome." The object of orthochromatic photography, he said, was to secure in a monochromatic print from a negative of a coloured object as accurate values as could be obtained by ordinary photography when copying from a black-and-white original. The visual luminosity of the spectrum was shown by means of a chart, and the effect on a photographic plate was similarly demonstrated, the maximum action being in the blue instead of in the yellow. The aim of orthochromatic photography was to shift that maximum, and get it in the yellow, where the eye saw the greatest luminosity, bringing the visual and photographic effects into harmony. This could be achieved either by the use of a light filter in the camera, cutting down the action of the blue and violet so as to aliow the red, green, and orange to act, or by taking advantage of Professor Vogel's discovery of the properties of certain dyes when applied to photographic emulsions. The first method, using an ordinary plate and suitable screens, was capable of rendering good results, but necessitated long exposures, and was consequently very little utilised, especially as very good plates prepared by the second method were commercially obtainable. The spectrum sensitiveness of the various brands of commercial colour-sensitive plates was shown on the lantern screen, and it was pointed out that the maximum of action was still in the blue, and that the use of a colour filter was still necessary, its function being to cut out the invisible violet rays and to reduce the action of the blue, and also, depending upon the nature of the plate, and in a lesser degree, the green and red. The extent to which this correction should be carried was not always fully understood; in photographs of paintings or flowers the most perfect correction was necessary, but with many subjects a more truthful result could be obtained with less perfect correction. Much of the light of a landscape was reflected white light, and, with the exception of highly coloured objects in the immediate foreground, a landscape would be as well translated by an ordinary as by an orthochromatic plate; a light screen of brilliant yellow dye would produce results satisfactory to the most critical, and would add very little to the duration of exposure. The question of the range of gradation in the negative was next considered, and examples of the scale of various commercial plates were shown, certain brands being conspicuous for their advantage in this respect. Several methods were described of measuring the density of the deposit in the negative, and of measuring the luminosity of colours, and the paper concluded with a consideration of the qualities necessary in light filters for developing lamps and the luminosities of various media for the same. In connexion with this point, Mr. Sanger Shepherd referred to the fact that Messrs. Cadett & Neall stated that their new Spectrum plate must be manipulated in absolute darkness, a requirement which he thought was not essential. Combined films of naphthol yellow, aurantia, and brilliant green would cut out all the light of the spectrum, except a very narrow band of red beyond the sensitiveness of the "spectrum" plate; but the light was not sufficient to work by. A screen allowing plenty of light to pass, and quite safe if ordinary precautions were adopted, could be made by fixing an unexposed gelatine plate and soaking it in a solution of aurantia, treating another plate with naphthol yellow, flowing over the first a solution of methyl-violet 5 B and combining the two.

At the conclusion of the paper, Messrs. Lovibond, Ives, Sebastian Davis, and others made a few remarks, and the meeting closed with the usual compliment to the author of the paper.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 23,—Mr. W. D. Welford in the chair.

The nomination of officers for the ensuing year took place, the following being the names of the nominees:—*Trustees:* Messrs. A. Haddon and J. B. B. Wellington.—*Committee:* Messrs. E. H. Bayston, R. Beckett, R. P. Drage, S. H. Fry, J. E. Hodd, J. W. Hodges, A. Mackie, H. C. Rapson, J. S. Teape, E. J. Wall, H. Snowden Ward, and W. D. Welford.—*Curator:* Mr. J. W. Hodges.—*Recorder:* A. W. W. Bartlett.—*Librarians:* Messrs. F. W. Mundy and E. T. Wright.—*Hon. Secretary* and *Treasurer:* Mr. T. E. Freshwater.—*Affiliation Delegates:* Messrs. E. H. Bayston, S. H. Fry and J. S. Teape. Messrs. S. H. Fry and E. T. Wright were appointed the auditors of accounts.

Mr. P. Everitt said the Committee of the Traill Taylor Memorial Fund had made arrangements for Mr. T. R. Dallmeyer to deliver the first lecture under the scheme, the subject being an optical one, and that application had been made to the Council of the Royal Photographic Society for permission to use the Exhibition Gallery. The date of the lecture would probably be November 8, the anniversary of Traill Taylor's death, and it was the desire of the Committee to make this lectureship an important feature in the photographic world, and one which it would be deemed an honour for the person invited to fill. He trusted that those present would use their endeavours to ensure the success of this the first lecture given under the auspices of the fund.

Mr. S. Herbert Fry, referring to the demonstration of the gum-bichromate process of last week, said he had been fired with enthusiasm by the results shown and the apparent ease with which they were obtained. He now showed several prints he had made, and for comparison one upon matted gelatino-chloride paper, all from the same negative, to show the effect in his hands. The pictures were shown without any intention of lauding or running down the process, but simply as his first attempts. He might add that, having no brush, he used a piece of cotton-wool for the development. They were told, he continued, that the sensitiveness was very high, but his calculation proved entirely in excess of its real speed, and he found it no faster than Ilford P.O.P.; in short, he got the best results by more exposure than such paper would require. The prints had between twenty-five and thirty minutes' exposure, face upwards to the sky, in a bright north light, while the P.O.P print was completed in about twenty minutes. The first exposure, five minutes, proved a failure, there was not nearly the same depth in the shadows seen in the prints shown, nor would it stand much development. The others stood it well, and the longer soaking removed much of the yellowness which was very obvious in the prints soaked only for a short time. The process was absolutely easy to work.

The Chairman detailed his first attempts. In these, however, he had picked at random negatives of all kinds, colours, and densities for the printing, and had developed some with the brush, some by soaking alone, and others with his fingers. He showed every piece of paper exposed. He differed from Mr. Fry as regards speed, which was some two and a half or three times that of printing-out paper.

Mr. J. S. Teape saw one fault in the process, which was its apparent inability to differentiate sufficiently between the deepest tones and the next deepest tones. They all seemed to merge one into the other, and he had noticed the same defect in Mr. James's own prints, a general levelling-up of the low tones.

Mr. Everitt thought that the process required a specially suitable negative—thin, with plenty of detail in the shadows. Of course, all matt surfaces showed a loss of detail in the shadows.

Mr. Teape thought that Mr. Henderson's suggestion of printing from the back for the improvement of detail was good. It would tend to hold more strongly the deeper tones and improve the gradation.

Mr. W. Thomas did not find in his trials with home-made paper that this clogging of shadows occurred to a noticeable extent. The negatives used were suited to platinum printing, and were of all sizes. He understood Demachy considerably over-exposed, taking down with long soaking and additional friction.

Mr. James explained that the use of cotton-wool was not anticipated by the makers of the paper. It was neither so delicate a tool as the brush or plain soaking in water. He agreed that at one's first trial over-exposure was more likely to give a good result, better than would be obtained by what might be called an exact exposure for the method of development to be used. The question of speed, then, was not called into question, as the method of development used by Mr. Fry necessitated a longer exposure to counterbalance the greater friction of the cotton-wool. The paper, in fact, was faster than platinum paper. For brush development, over-exposure yielded better half-tones than would follow a normal exposure, but with plain-water development the half-tones would be properly rendered by the normal exposure. However, he congratulated both experimenters on their maiden efforts, which were very encouraging. The Chairman's results seemed to show a general washing away of the half-tones, and in cases very hard negatives appeared to be used. With such negatives one should be careful of his lighter tones, and it was perhaps better to develop the heavy shadows first and then the half-tones in the way he had demonstrated before. It was also a convenience to have an alternative method of developing, and he described a variation by which only the shadows were developed, the print dried, and the high tones lightened by strokes of a hard hog's-hair brush.

A discussion ensued as to the effect on the sensitiveness of the different colours of pigment, and it was said that the red chalk printed quicker than the blue. It was suggested that some of the prints would have been improved had the paper been more deeply coated with pigment. The latitude in exposure allowed, and the range of gradation possible were topics of some conversational discussion.

Mr. Snowden Ward, referring to Dr. Russell's experiments as to the action produced upon photographic plates by certain substances in a darkened room, said that the work of Hunt should be remembered in this direction. He had examined the influences of various substances on polished copper, by which images had been developed with the vapour of mercury, and sometimes the breath itself, which seemed to be quite permanent, and which, thinking them due to heat action, he termed thermographs. Reproductions of newspaper printing had been obtained, and the method had been suggested for the copying of engravings and such things.

Mr. Henderson showed a plate bearing an image of printed matter showing both positive and negative effects. It was printed on a slow lantern plate, extreme density being required for projection purposes, and was developed with an old hydroquinone solution, mixed with a little fresh, and diluted down with bromide and water. The lettering was of a brilliant ruby colour by transmitted light.

PHOTOGRAPHIC CLUB.

June 22,—Mr. Thomas Bedding in the chair.

Mr. Philip Everitt (the Hon. Secretary of the Traill Taylor Memorial Fund) thought it might interest the members to know that arrangements had been made with Mr. T. R. Dallmeyer to give the first lecture under the scheme, and that probably November 8, the anniversary of Traill Taylor's death, would be the date fixed. The lecture would, no doubt, be given at the Pall Mall Exhibition Gallery, and he hoped that by their presence at these lectures the members would make them an important feature in photographic life.

The Chairman stated that the business of the evening was to receive a large number of slides which had been got together for display at the Convention meeting at Glasgow. It had been thought that the unsuitability of many of the slides shown on former occasions called for attention, and a committee of three had been charged with the duty of collecting slides, the main idea being that photography should be worthily shown on the screen for the benefit of outside visitors to the meetings. Messrs. Hinton, Wall, and Ward had done their duty in collecting together the slides, and it became that of Messrs. Bridge, Bridgman, and Cembrano to perform the office of selection.

The slides were then passed through the lantern and the selection made.

Croydon Camera Club.—An excursion to Penshurst Place was held on June 25, when the President (Mr. Hector Maclean) conducted a party

numbering between twenty and thirty to the former home of the Sidneys. A special saloon was put on to the 9.55 train, arriving at Penshurst station about 11.15. The park was first visited, and yielded several lake scenes. A peculiar breed of black horned sheep afforded exciting sport in stalking and snap-shotting. The mansion was reached about 12.30, and occupied the party for most of the day. Several of the interiors were exceedingly picturesque, and many of the objects were of surpassing interest, of which the sapphire velvet stool upon which the Queen knelt when crowned, although perhaps the most recent, is certainly not the least attractive. The gardens, which exhibit a pleasant mixture of formalism and irregularity, gave abundant subjects, as also did the various frontages of the main building. The somewhat uncommon, and not less striking, entrance to the quaint churchyard, by means of a passage under an ancient and picturesque range of old timbered cottages, one of which was designed as a church house, received considerable attention. Penshurst village, which can boast of being surrounded by scenery both dignified and characteristic, provided a number of tempting subjects, several of which were attempted, particularly delightful being some of the shady lanes, and the pleasant reaches of the River Eden, which here joins with the Medway, both being, however, rather brooks than rivers. At six o'clock the party sat down to a high tea, provided by the hostess of the Leicester Arms in a manner which gave complete satisfaction. During the day over 240 exposures were made in sizes ranging between quarter-plate and 10×8. A considerable proportion of these were upon Sandell double-filmed plates. Backed plates were less used than expected, said to be due to the fact that they are not largely stocked by dealers. Except in one instance, home-backed plates do not seem to have been used.

North Middlesex Photographic Society.—On Monday, June 20, the course of instruction lectures for beginners arranged by the Council was continued, Mr. H. STUART having for his subject

PREPARATION OF THE NEGATIVE FOR PRINTING.

The lecturer, in pointing out the necessity of preparing the negative, claimed that intensification and reduction could not properly be called "faking," neither could simple spotting, and that retouching was only another name for "dodging." He said that there is always a certain amount of guess work in photography, that the worker is in each successive operation endeavouring to correct the errors of the previous one, and, finally, that in addition to blemishes caused by errors in manipulation, the ordinary photographic plate being blind to many of the most prominent colours in nature, after treatment in most cases became imperative. Mr. Stuart advised the novice to make himself familiar with the characteristics of all printing processes, and to abstain from intensification and reduction until he was quite certain he could not do without it. After all possible chemical treatment had been applied the negative was often capable of still further improvement by working upon both the film and the glass with pencil and stump. Pinholes were usually bare glass, and should never be dealt with until the negative had been varnished. If done before, the gelatine either absorbed the colour, leaving the glass still bare, but with an opaque circle surrounding it, or an opaque spot was introduced, producing in turn a white spot on the print. The lecturer further emphasised the necessity of varnishing all negatives that were to be preserved.

Patent News.

THE following applications for Patents were made between June 13 and June 18, 1898:—

CINEMATOGRAPHY.—No. 13,162. "Improvements in the Film Operating Mechanism of Apparatus for Taking, Printing and Exhibiting Series of Photographs." C. WRAY and H. J. OULTON.

DEVELOPER.—No. 13,195. "Improved Photographic Developer." J. HAUFF.

CAMERAS.—No. 13,242. "Improvements in or in connexion with Photographic Cameras." J. E. THORNTON.

FILM-DEVELOPING AND PRINTING.—No. 13,315. "Improvements in or relating to the Printing and Development of Photographic Film." C. M. HEPWORTH and C. URBAN.

EXHIBITING PHOTOGRAPHS.—No. 13,401. "A Winding and Automatic Machine for Exhibiting Photographic Advertisements, Show Cards," &c. H. R. SUTTON.

WASHING APPARATUS.—No. 13,427. "Improvements in Photographic Washing Apparatus." A. LEHMANN.

STEREOSCOPIC EFFECTS.—No. 13,644. "Improvements in Obtaining Stereoscopic Effects." C. RALEIGH.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE COOKE LENS.

To the EDITORS.

GENTLEMEN,—I perceived from your issue of the 17th inst. that Messrs. Taylor, Taylor, & Hobson have tried weakening my searching scrutiny of the triple anastigmat by writing you: "But to opticians familiar with the characteristics of the Cooke lens and its corrections, the communication of Mr. Klepp to the *Deutsche Photographen-Zeitung* is, to say the least of it, absurd."

Upon this the writers continue: "A reply to this, signed by Dr. Kaempfer and Dr. Miethe, is published in the May issue of the same journal, and they there give details of their comparative tests of the Cooke and other anastigmats."

I send you with the same mail a copy of our No. 19, with the reply of Drs. Kaempfer and Miethe, and you will see that I have made some remarks to this reply which Messrs. Taylor, Taylor, & Hobson do not mention. These remarks have till now remained without any reply by Drs. Kaempfer and Miethe, or by Messrs. Taylor, Taylor, & Hobson. For that reason I hope to have the claim of sending back the sentence of Messrs. Taylor, Taylor, & Hobson over my communication as long as a reply to my late remarks does not follow.

I should be very glad if you would take notice of this in your JOURNAL.—I am, yours, &c., HANS KLEPP.

Weimar, June 21, 1898.

[We are obliged to Herr Klepp for his letter. A translation of the article to which he refers was in type last week, but had to be held over for want of space. It appears elsewhere in the present number of the JOURNAL.—EDS.]

To the EDITORS.

GENTLEMEN,—I see that there has been some correspondence in your last few issues about the Cooke lens. It appears to me that, if any one wishes for information about an objective, it is unnecessary to ask for it publicly in your Correspondence columns. The long-suffering makers would, no doubt, have enlightened your correspondents on the several trivial points they raise.

I fail to see in any one of the letters objecting to this lens any objection arising from practical knowledge of a defect of the lens in question, or, what is more important (as "practical" defects may be due to faulty manipulation), from any definite theoretical fault which is insurmountable by careful construction. These, I should imagine, are the only excuses for a public attack.

I believe the surest way of settling questions would be a systematic series of tests made with modern lenses, such as I briefly sketched in the ALMANAC of 1898; but, until this, we must, I regret to say, expect foolish "challenges" to lens-makers to continue to burden the much-abused Correspondence columns of the JOURNAL and its contemporaries.

These "challenges" can do no possible good, and, to quote Mr. Dallmeyer, had much better be dropped. This, I think, is also the opinion of other scientific men, whether lens-makers or not.—I am, yours, &c., PHILIP E. B. JOURDAIN.

Ashbourne, Derbyshire, June 24, 1898.

To the EDITORS.

GENTLEMEN,—In your issue of the 17th inst. Mr. Dennis Taylor was indignant at the idea of the Cooke lens having been improved by Messrs. Voigtländer & Sohn.

In Eder's *Jahrbuch* for 1898, p. 205, appears the following passage in an article by Dr. A. Miethe, who is, I believe, one of the technical advisers to the above-named firm of opticians: "Während auf dem Continent die weitere Verfeinerung der Instrumente unter Zuhilfenahme von einer immer wachsenden Anzahl von Linsen mit Erfolg erstrebt wurde, und während die ersten Anastigmate 4 bis 5, die dann folgenden Constructionen 6 bis 8 Linsen enthielten, hat der durch seine optischen Constructionen bereits vortheilhaft bekannt gewordene englische Physiker H. D. Taylor einen ganz neuen Weg eingeschlagen, der anastigmatische Linsen von äusserst einfachen Formen gezeitigt hat, als deren Typus die zuerst von Taylor, Taylor, & Hobson in England eingeführte und *dann von der Firma Voigtländer & Sohn mit Erfolg verbesserte Cooke-Linse* oder der Triple-Anastigmat angesehen werden kann."

Doubtless, many of your readers can understand this passage, but I append a translation.

"Whilst on the Continent the further improvement of the instrument was successfully sought after by the help of an always increasing number of lenses, and whilst the first anastigmats contained from four to five, the subsequent constructions contained from six to eight lenses, the English physicist, H. D. Taylor, who had already become favourably known by his optical constructions, had struck out an absolutely new way and had matured anastigmatic lenses of extremely simple form, as a type of which the Cooke lens, or the triple anastigmat, introduced in England by Taylor, Taylor, & Hobson, and *then improved by the firm of Voigtländer & Sohn* may be looked upon as the first."

Now, who is right and who is wrong?

Dr. Miethe further on states, after giving the ratio aperture of the lenses, "Da aber die Linsen sehr dünn sind und der lichtabsorbirende Kitt vermieden ist, arbeiten diese Objective verhältnissmässig viel schneller als andere Anastigmate von gleicher Lichtstärke." *Anglice* "Since, however, these lenses are very thin and the light-absorbing cement is avoided, these objectives work proportionately much quicker than other anastigmats of equal rapidity."

It may possibly be of interest to recall in connexion with this point he researches of Drs. Eder and Valenta, "Absorptionsspectren von arblosen und gefarbten Gläsern mit Berücksichtigung des Ultraviolett" Eder's *Jahrbuch*, 1895, pp. 310–327). According to Miethe the front ens of the Cooke lens is constructed of baryta crown glass, which, in bsorptive power is practically equal to ordinary crown glass, the ifference being only 15 $\mu\mu$ when the thickness of the glass is only mm., and this is from λ 285 to λ 300 $\mu\mu$ at about P (Frauenhoferline) in he ultra-violet.

With regard to the "licht absorbirende Kitt," which is, of course, anada balsam, the following passage from the same paper may not be ut of order: "Since the lenses used for photographic objectives are, as rule, cemented with Canada balsam, and Hartley has already com-nented on the absorptive action of this body, we also brought Canada alsam into the sphere of our researches on the absorption of light. For his purpose we cemented two rock crystal plates with Canada balsam, nd photographed the spark spectrum of the said metal alloy in precisely he same way as in the estimation of the absorptive power of the lasses. The result was that the strongest absorption of the ultra-violet egins about λ 298 that is to say, behind Frauenhofer's line U. The bsorption for the most strongly refracted rays is less than the best lasses in 1 cm. thickness, and somewhat greater than with crown glass lates 1 mm. thick; on the other hand, somewhat smaller than with flint lass 1 mm. thica. From this it is obvious that Canada balsam, as gards the absorption of the ultra-violet, is an absolutely harmless ement for glass lenses, because its absorptive power is such that it only as an effect on those ultra-violet rays which would be absorbed by the lasses themselves without it."—I am, yours, &c.,

OPTICAL GLASS.

To the EDITORS.

GENTLEMEN,—I was little prepared for Dr. R. E. Chesterman repeating, his letter published in your issue of the 24th inst., his groundless sinuations about the Cooke lens being sent to Germany to be improved. he will take the trouble to procure from the Patent Office a copy of my tent specification, No. 15,107, 1895, he will find full descriptions, rves, and drawings of three triplets, each of three simple lenses; and is from the specifications given there, and also in my patent specifi-tion, No. 22,607, 1893, that all Messrs. Taylor, Taylor, & Hobson's nses, as well as Voigtlander's, have been made.

I would like to state here that I do not consider myself called upon to vote time and trouble to trying to make converts of people who think versely of the Cooke lens.

Possibly some will arise who will express opinions about it far more verse than any yet published, and fortified with elaborate tables of rthless figures, but I would not waste time in arguing with them.

Those behind the scenes know the meaning of these things. We are ite content to abide by the opinion of the majority of intelligent itics, under the influence of which the sale of Cooke lenses is rapidly d steadily increasing.—I am, yours, &c., H. DENNIS TAYLOR.

To the EDITORS.

GENTLEMEN,—It is because we believe that all our published state-nts regarding the Cooke lens are true, because many of the thousands users of Cooke lenses have testified directly that our claims are stified by the facts, and because anybody is at liberty to test Cooke ses against others and form his own opinion on the point, that we do not ach to Mr. Klepps's remarks the importance which they occupy in Dr. esterman's view; nor do we see any more need for appointing a entific commission to prove those remarks misleading than there is to ove to children that sunshine is warm, for in either case a little perience is quite sufficient to make the facts clear, and there is no er way of acquiring certain knowledge than by direct experience.

It seems to us a very curious point that Dr. Chesterman should adopt h a partisan attitude in regard to the Cooke lens, while he is so little quainted with the instrument as to say: "The original Cooke lens d, I believe, the centre element of compound form; but now I gather t it consists of a single glass, so that here we have a reversion to the m of triplet suggested forty years ago." If Dr. Chesterman were quainted with any descriptions of the Cooke lens, or if he possessed a s, or had even handled one with any scientific interest, he could not sibly be in doubt on so elementary a point as the form of its con-ction.

We cannot impute to him that he is a dissembler, and as the only rnative is that he is ignorant, we cannot take his letters seriously.

His recognition of the Cooke lens, as of "a form suggested forty years ," reminds us of a boy we knew who said he "*well remembered lying in the doctor's drawer before he was born*" (!), for, when the Cooke lens put on the market in 1895, the late Mr. J. Traill Taylor, the dis-guished authority on the history of photographic optics, who had met t bogey of the old triplet lens (it has been trotted out before), he said: "nglishmen are justified in feeling proud of a lens of the excellence and oubted originality of this one."

If Dr. Chesterman really wishes to know what experienced men have to say about the Cooke lens, he can find it in the Cooke booklet, which we should be happy to send him if he will favour us with his address.

As to his reference to our advertisements, and as to the insulting remarks of your other correspondent, who seems very properly ashamed to associate his own name with them, we may remind these gentlemen that no attempt was ever made to show wherein the statement referred to was (as alleged) misleading; and we may inform them that our proofs of the accuracy of our statement, in the form of carefully prepared diagrams showing the characteristics of Cooke and the other lenses, were left unpublished by a certain section of the photographic press, which then found it convenient to close the discussion.

The attempt which was made at that time to discredit and boycott the Cooke lens is another story, which the public has not heard, and which we are quite content to withhold, because the reputation of Cooke lenses rests on too strong a foundation, and is too firmly established to derive anything but greater strength from such adverse criticism.—We are, yours, &c., TAYLOR, TAYLOR, & HOBSON.

Leicester, June 27, 1898.

"KODAX."

To the EDITORS.

GENTLEMEN,—We have pleasure in sending you enclosed copy of judgment delivered by the Master Cutler and the Cutlers' Company in respect of an application made to register the word "Kodax" as applied to metal goods. We opposed this application, and you will see that our opposition has been allowed and upheld.

We shall be glad if you will kindly notify the result of this case in your valuable JOURNAL.—We are, yours, &c.,

THE EASTMAN PHOTOGRAPHIC MATERIALS COMPANY, LIMITED.

43, *Clerkenwell-road, London, E.C., June* 25, 1898.

The following is the Master Cutler's judgment:—

"APPLICATION TO REGISTER TRADE MARK 'KODAX.'

"*Judgment of the Master Cutler and Cutlers' Company.*

"It was decided—

"1. That for trade-mark purposes the word 'Kodax' is practically identical with the word 'Kodak,' and—

"2. Having regard to the identification of the word 'Kodak' with the Eastman Photographic Materials Company, Limited, by reason of their extensive use and advertisement thereof, and by reason of the existence of the Kodak Company, Limited as a joint-stock company, of which the shares are held by the Eastman Photographic Materials Company, that purchasers of silver and electro-plated goods marked with the word 'Kodax' would be liable to be deceived into the belief that the goods they were purchasing were manufactured or sold by the Eastman Photographic Materials Company or the Kodak Company."

A CORRECTION.

To the EDITORS.

GENTLEMEN,—May I be allowed, without entering into a discussion of the subject, to correct two little inaccuracies that occur in your report of the last meeting of the Royal Photographic Society?

I did not say I was "much inconvenienced by tobacco smoke." On the other hand, I said that personally I did not object to cigars or cigarettes, but that the fumes from a foul pipe at close quarters were disagreeable to me.

I did not complain of having had to change my seat in consequence of the foulness of the pipe of a member sitting near me. I pointed out that at the Technical and Photo-mechanical meetings the seats were so arranged that a change of place could be effected, but that this was not so practicable at the Ordinary meetings, and on the occasion of Mr. Haddon's paper being read (at an Ordinary meeting) I found my throat affected by my being seated next to the possessor of what I see is claimed as "the historic pipe," and so left before the conclusion of a paper which I should have liked to hear.

It is possible that in condensation, part of the speech of a member, whose name I do not see mentioned in your report, and who said that smoking was very objectionable to him, and that, if it were continued at the Ordinary meetings, he would have to resign, has been by mistake included in my remarks.—I am, yours, &c., W. E. DEBENHAM.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPH REGISTERED:—

C. H. Hayman, Church-street, Launceston.—*Photograph of the late W. E. Gladstone addressing a large number of people on the Castle Green, Launceston.*

RECEIVED.—T. W. BARBER; H. O. DRAKE; J. E. PALMER. These, with others, in our next.

E. BANKS.—Simply treat the image with a solution of iodine.

ALFRED UNDERHILL.—The address, we believe, is Queen-square, Bloomsbury, W.C.

STUDIO.—Sorry to say we have no recollection of the book mentioned. Give us an approximate date, and we will search.

H. WALTERS.—Yours is one of many similar complaints. A threat of legal proceedings will, doubtless, have the required effect.

BURNISHER.—We do not know the makers. Since the publication in question we have not seen any reference to the burnisher being on the market.

H. HARDS.—The process would in all probability answer. An analogous method was suggested some years ago; the advantage, however, is not obvious.

E. A. BURCHARDT.—The calculations appear to be correct. We have for the present suspended the correspondence, but may again refer to the matter, and will endeavour to include your suggested rule in our next ALMANAC.

STUDIO.—ROGO says: "Please say to what height should a studio be built, so that some houses eighteen feet distant from side light should not interfere with the light, and greatly oblige?"—This is a question we cannot answer, as all depends upon the height of the houses. The higher they are, the greater must be the height the studio is built from the ground.

UNRULY APPRENTICE.—TROUBLED. If the lad is idle, impudent, and will neither work nor obey your lawful orders, he may be taken before a magistrate, who has power to deal severely with unruly apprentices. But is the lad legally an apprentice? If the indentures are not stamped, he is not, and you can discharge him as you could any other servant.

AGREEMENT.—W. H. As we read the agreement we cannot see that it is binding for a year. It seems to us that you can at any time be discharged at a week's notice; also that you can leave on giving a week's notice. If the agreement for the year's service is only verbal, it is of no value whatever. As the agreement is not stamped, it is not binding on either side.

GUM-BICHROMATE.—T. SIMS. The "gum-bichromate" process is undoubtedly a carbon process, indeed it was *the* original carbon process. Gum is the colloid used in it instead of gelatine, as in the usual carbon process. The manipulations in the two are, however, different. Both are based upon the same principle, the action of light on the bichromated colloid. Your friend is in error.

METHYLATED SPIRIT.—McK. You can still obtain methylated spirit of the old kind (that is, free from the mineral spirit), for manufacturing or experimental purposes, but you will have to obtain a licence from the Excise and purchase not less than five gallons at a time. The licence will cost you nothing, but you will have to enter into a bond. Call on the Excise Officer of your district for details.

PHOTOGRAPHING CONSERVATORIES.—W. BINNS. The trouble you mention is very common in photographing conservatories and greenhouses. It is due to moisture condensing on the lenses, and thus dimming them, in the same way that moisture condenses on cold glasses when brought into a warm room. The remedy is simple. make the lens a little warmer than the atmosphere of the conservatory, and then no moisture will condense upon them.

STUDIO LIGHT.—J. WARD. As the sun only troubles you when it is at its zenith—about midsummer—we should say that the simplest way of stopping it out will be by light wooden frames covered with thin tracing cloth or tissue paper which can be fixed in position when the sun is troublesome, and removed when it is off the studio. This will be better than painting over the glass in the roof, which is not easily cleaned off when it is no longer required.

H. G. MASSEY.—Here are a few: Victoria, $5\times3\frac{1}{4}$; Imperial, $9\frac{7}{8}\times7\frac{7}{8}$; Boudoir, $8\frac{1}{2}\times5\frac{1}{4}$; Panel, $8\frac{1}{4}\times4$; Promenade, $7\frac{1}{8}\times4\frac{1}{8}$. These refer to the sizes of the mounts. The names mentioned are approximate to the sizes indicated. Generally speaking, there is no settled agreement among photographers as to the nomenclature of sizes; many individuals are laws unto themselves in the matter. We should think Messrs. Marion are in the best position for giving you information on the matter.

CHEAP LENSES.—SMALL PURSE asks if the cheap lenses of foreign make (presumably French) can be relied upon as regards the ratio of the stops, so that they can be trusted to with regard to the various exposure tables?—We are sorry to say they cannot always be relied upon, either as regards the size of the diaphragm or their focal length. The former are often smaller than they purport to be, and the latter larger. Better measure them up for yourself to be sure. Any known difference can then be compensated for in the exposure.

STUDIO.—INQUIRER writes: "You kindly answered a query of mine a week or two back; I am afraid I did not give sufficient details. I now enclose sketch plan of studio. 1. Aspect is west. Should the glass be ground glass? also, would an outside blind be good, and, if so, what material should it be made of? 2. The interior of the room is 22 feet 6 inches × 15 feet. You will notice in plan of studio that two beams have to be taken out, which makes the height 12 feet. 4. You will also notice the height of glass on roof in the 'section through shop and studio;' is that sufficient? 5. Any suggestion will be thankfully received as to curtains," &c.—1. Ground glass is unnecessary, unless there is some unsightly outlook to be hidden. With a west aspect an outside blind is not required. 2. Four or five feet longer would be an advantage. 3 and 4. A little higher would be advantageous. 5. Light green or dark blue curtains will be suitable.

FINISHING BROMIDE ENLARGEMENTS.—P. S. MCGUINNESS says: "Would you kindly answer the following questions:—1. What (if any) solution is placed over bromide enlargements before rubbing on crayon? 2. What is best to mix with crayon to go over the heavy shadows, so as to make them stand out?—1. It is not usual to apply any solution, but to rub the surface over with an ink-eraser or cuttle-fish powder, to get the paper to take the crayon. 2. It is not necessary to mix anything; simply apply the crayon strongly.

REPRODUCTIONS.—A. R. T.—We have it from a reliable source that the reproductions referred to from the pictures in the National Gallery, and those in the Queen's collection, were not made on gelatine plates, but by a collodion process, which is said to yield better colour rendering than can be obtained by the gelatine process. We are told that the facilities were granted on the condition that a special cheap edition of the copies was to be issued, so that the public could obtain copies of the national pictures at a merely nominal price.

FAULTY CAMERA OR LENS.—NEW CAMERA writes: "Kindly give me your opinion, at your earliest convenience, on the two negatives (herewith). They were taken with a —— fixed-focus camera and a ——'s lens, and you will see they are wofully out of focus. Do you think it is the fault of the lens, which was worked at *f*-11 (its full aperture is *f*-8)?"—One of two things is certain: either the lens does not work to focus, or the camera is not rightly adjusted—we opine the latter; for we have little doubt the lens has its optical and chemical foci coincident. Return the apparatus to the dealer for adjustment.

COLOGNE.—E. A. W. No permit is required to photograph in the streets of Cologne; but you must keep clear of any of the fortifications. To photograph in the cathedral a permit is necessary, and that, we believe, may readily be obtained for a small fee, as in the case of some English cathedrals. You need to be provided with a wide-angle lens, as the streets in the old, and most picturesque, parts of the city are very narrow. As for the cathedral itself. we doubt if any lens is made with a sufficiently large angle to include the top of the towers when taking the front entrance from the ground level.

STEREOSCOPIC WORK.—BEGINNER. For portraiture the lenses should not be more than two and a half inches apart. For landscapes the case is different; they may then be three or more inches apart, depending upon the character of the subject. If there are near objects in the foreground, they must not be separated so wide as if there were not. In some of the well-known transparencies of Ferrier the lenses, and, of course, the cameras, were many feet from each other. The effect of this great separation, however, was to represent the subject rather as a model than as seen by the eyes when looking at it in nature.

COPYRIGHT.—G. W. GIBSON says: "A is engaged by B to photograph C. B wanted A to assign copyright to B. A would not, and was allowed to take the copyright in his own name. E (a newspaper) reproduced the photograph without A's permission, and now refuses to pay a fee, as he says the copyright is B's. As B employed A to take the photograph, is A justified in prosecuting E for infringement?"—Certainly not. As A was employed by B to take the photograph, presumably for a "valuable consideration," he cannot sue E, as, so far as we can see, he is not entitled to the copyright any more than he would be in taking any portrait for which he is paid.

ENLARGING.—G. W. Y. writes: "Thanks for information to my letter on May 27, 1898, referring to enlarging, &c., and should be pleased with the following questions answered: 1. Would a room nearly west answer better than the room south? 2. Will the cabinet-portrait lens make enlargement on bromide paper the size of 12×10 or 15×12, with stop? 3. Should any ground glass be used for the light to fall through before the negative, as I think the ground glass might give softer effects? 4. Would not the $8\frac{1}{2}\times6\frac{1}{2}$ camera be best, as the half-plate camera is too small for the large portrait lens?"—1. Yes. 2. Yes, if the negative is no larger than the cabinet lens is capable of covering. 3. Yes, by all means. 4. Certainly; indeed, it seems to be a necessity.

LENS.—B. S. P. C. says: "I have bought recently a whole-plate portrait lens, Lerebours & Secretan, Paris, and there is only one stop, *f*-8, and that fits into a cap front of lens. I should be pleased to know whether I could get a set of Waterhouse diaphragms fitted in the barrel or not, it has pinion adjustment; also, whether it is a standard lens or not, and whether it would be better remounted, and, if so, who would be the firm to send it to?"—Any photographic lens maker will fit Waterhouse diaphragms to the instrument. There is no necessity to have the lenses remounted. The firm whose name the lens bears turned out very good instruments, and at one time they were in repute. The instrument you have is evidently of ancient date, but may be none the worse for that.

PHOTOGRAPHING FLOWERS; ENLARGING.—B. B. puts the following queries: "1. I have a number of flower beds to photograph, and produce lantern slides. Should I get better detail by taking half-plate negative and reducing to lantern size, or best to take exact size and make transparency by contact? 2. If I photograph a group on a whole plate with a 10 in. Euryscope lens, and want to make a 15×12 enlargement from it on bromide paper by daylight, would a quarter-plate portrait lens be suitable to use, or should I use the Euryscope? and, if so, is it necessary to use the same stop that was used in taking the negatives? 3. In photographing flower beds, would the isochromatic plate, be any advantage over the ordinary plate, as I have not got a yellow screen?"—In reply: 1. It will be less trouble, and the result will be as good, to take the negatives the same size as the slides are to be. 2. A quarter-plate lens will not do at all. Use the Euryscope and a stop sufficiently small to give even definition all over the enlargement. 3. Not much advantage unless a colour screen be used.

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Contents.

PAGE

EX CATHEDRÂ 433

METHYLATED SPIRIT FOR QUICKLY DRYING PHOTOGRAPHS 434

PADERETTES:—
Drying Carbon Tissue Without a Dark Room — The Contractility of Gelatine — X-ray Troubles — Antarctic Exploration — Passports to Switzerland 435

PERSULPHATE OF AMMONIA FOR REDUCING DENSITY. By G. Watnough Webster, F.C.S., F.R.P.S. 436

THE NEW POISONS BILL 436

THE GUM-BICHROMATE PROCESS 437

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM 438

THE PICTORIAL EXHIBITION 438

THE CONVERSAZIONE 439

PRESIDENT'S ADDRESS 439

THE SCIENTIFIC SLIDES 442

PAGE

PHOTOGRAPHIC GAUGES. By John A. Randall 443

REVERSING MIRRORS. By A. C. Austen 444

HARRIS'S VIEW-FINDER COVER 444

PHOTOGRAPHIC IMAGES IN DYES 445

AN AUSTRALIAN CONVENTION 445

OUR EDITORIAL TABLE:—
Tourist's Guide to the Continent—Catalogue Received 445

NEWS AND NOTES 445

PATENT NEWS 446

MEETINGS OF SOCIETIES:—
London and Provincial Photographic Association — Photographic Club — Hackney Photographic Society 446

CORRESPONDENCE:—
The Cooke Lens — Stereoscopic Lantern Projection 447

ANSWERS TO CORRESPONDENTS 448

EX CATHEDRÂ.

Two of the Sydney (N.S.W.) photographers, to whose very low prices and curiously striking methods of advertising we some months ago referred, have fallen out rather badly, for, according to the *Australian Photographic Journal*, a lawsuit of unusual interest is just now before the Court. Mr. M. Blow, of the Crown Studio, has sued Mr. Eden George for alleged libel, on account of an advertisement published in the *Sydney Morning Herald* and the *Australian Star*. Mr. Blow sues each of the three parties for the sum of 2000*l*., and prays for an order of injunction against Mr. Eden to abstain from supplying the public with "Rococo Portraits"—a trade mark which has been legally registered to him for certain styles of photographs, and which he has largely advertised. It is said that the case will be one of general interest to photographers, as the often-mentilated question of the permanency of bromide prints will once more be brought into the field. The precise bearing of the permanency of bromide prints on a libel case is not quite plain to us from the foregoing, but we note some references to the permanency question in the pages of our Australian contemporaries. Somebody appears to have rashly cast doubt on the permanency of platinum prints, and has provoked several retorts; another person asks for a definition of permanence, and so on. It all sounds to us like the echoes of two or three controversies on the subject that lie buried in our pages twelve years and more ago.

* * *

In connexion with the reported find of old Talbotype negatives in America, referred to in our issue of June 17, it must have occurred to a great many of our readers how few, or comparatively few, specimens of old and obsolete photographic processes are known, although there must be very many in existence if their whereabouts could only be discovered. If we take the Royal Photographic Society's Historical Collection at the recent Crystal Palace Exhibition as a sample of what can be done in getting together what was intended to be a representative show of photographic results from the earliest times, it must be admitted that the result was not encouraging when it is taken into account that practical photography is barely half a century old. If we could dive into the future—say, a thousand years hence—if things go on in the same way, photographs of the latter half of the nineteenth century, even those of the "permanent" classes, would probably be found to be a mere tradition, for the reality stands a good chance of being entirely lost to posterity for want of a little care and thought at the present time.

* * *

There are undoubtedly still in existence abundance of examples of probably every photographic process ever published, if they could only be unearthed, and we of to-day, for our own sakes, owe it to posterity that they should not be lost. We remember a case that occurred a year or two back; the death was recorded in our pages of one of the early amateurs or amateurs in the truest sense, who, in the pre-society days, were scattered over the country in large numbers, but never heard of outside a narrow circle of congenial friends. In this particular instance the deceased gentleman had been a worker of the collotype and waxed-paper processes, from which he had gradually passed on to albumen, and subsequently to collodion dry plates, and possessed, we are ourselves aware, a very large collection of specimens by each; but, on inquiring of one of the few remaining intimate friends of his later years, we were surprised to learn that no trace could be found of these early productions. The deceased gentleman was a bachelor, and had out

lived nearly all the friends and companions of his earlier days, and for the last twenty years or more had lived a nomadic life, travelling from place to place, partly in search of health, but chiefly for the sake of change and amusement; and, although his end came amongst friends, all trace of his scientific belongings was lost with him.

* * *

This is a case that may occur again and again, or, worse still, because even more likely to happen, valuable scientific property—valuable only in that sense, and not intrinsically—may fall into the hands of uninterested or unsympathetic relatives, and be even more irretrievably lost by being destroyed as rubbish. This we have actually known to happen, interesting and valuable old photographs being destroyed simply because they fell into the possession of those who were familiar enough with them to consider them as worthless lumber on which they set no value. Even if a bundle of old photographs is fortunate enough to find its way into the print shops, or better still, to "Stevens's," or some of the other sale rooms, it stands a poor chance of getting fair recognition, for, unless former owners have been methodical enough to affix the necessary data, all interesting particulars as to date and circumstances of production will be lost, and these lend half the value.

* * *

This is not as it should be, and, ere it is too late, we should like to see the matter taken up by some authoritative body, and surely none is more suitable or more competent than the Royal, with a view of forming a permanent collection of specimens of not only early but successive stages of photography. We are well aware that something of the kind has been proposed and attempted before, but we do not wish to see such a collection "housed" in a corner at South Kensington, to be swept ignominiously into the cellar, as they do at the National Gallery, when room is wanted for something else of merely passing or purely personal interest, nor do we mean that the things should be carefully stored away and as carefully catalogued in the "archives" of the "Parent" Society or the Photographic Club, where no one can get a glimpse of them without stirring those august bodies literally to their foundations. We would have the collection under proper photographic management, in a house of its own, and, if not on view constantly, we would have it open to the public, say, one day a week, and, to those more specially interested, at any time upon making application in the proper quarter. Now, friends and fellow-Conventioners, see if you cannot spare time between the picnics to do something in this direction, if it be only to locate some of the hidden treasures of the past, with a view of preventing their passage into oblivion.

* * *

Writing on the subject of our recent article on "Methylated Spirit as a Dehydrater," Mr. W. B. Bolton points out that the "milk fog" can be produced under the conditions referred to with pure spirit and more easily still with pure absolute alcohol, and he attributes the result to the presence of soluble hyposulphites left in the film which when completely desiccated crystallise in the opaque form. He says, "Any one may satisfy himself on this point by simply rinsing a negative after its removal from the fixing bath and then passing it through successive baths of spirit to completely remove the water, and, if necessary, finishing off the apparently dry film by warming it. The less washing applied to the plate before placing it in the alcohol, and the stronger the latter, the more marked will be the effect. The alcohol throws down the crystals of the double hyposulphite instead of removing them, and, though these may remain transparent and invisible so long as moisture remains in the film, they become opaque and painfully visible when the film is completely desiccated, as it may be either by heat or by using strong enough alcohol."

* * *

Mr. Bolton goes on to say that this form of "stain" if such it can be called, that is to say, produced by non-mineralised or pure spirit, differs from that produced by the mineralised spirit in that it disappears instantly, or within a few seconds, when the film is wetted in plain water, while the other requires pure or non-mineralised alcohol for its removal. He also calls to mind that several years ago this method was proposed at a meeting of the Photographic Society of France for the rapid removal of the hypo from a negative, that is to say, instead of prolonged washing, immersion in alcohol was said to force the hypo out of the gelatine film; but it was pointed out in these pages at the time that, instead of removing the hypo, the use of alcohol would simply tend to fix it there, and recurrence of this milk fog was mentioned in proof.

* * *

As closely allied to this subject, Mr. Bolton further says that indirectly a method for the thorough elimination of hypo from films or prints is here indicated, though not in a particularly rapid manner. Mr. John Stuart, of Glasgow, mentioned to him in the early days of gelatine that a negative washed in the ordinary way, no matter how long or carefully, if examined with the microscope after drying, invariably showed traces of minute crystals, which he supposed to be the hyposulphites unremoved, but that, if the negative were immersed in water for a short time and redried, the crystals entirely disappeared. In the same manner, he says, if the negative be dried by means of alcohol after removal from the hypo, it is probable that, on rewetting it, the precipitated salts will quickly diffuse out of the film, and so ensure their removal, though not with much ultimate saving of time.

* * *

The business of Mr. L. Langfier, the well-known photographer, of 158, Sauchiehall-street, Glasgow, has recently been converted into a limited liability company with a capital of 30,000*l.*, which we are informed was considerably oversubscribed. Evidently the business must be very successful to account for the shares of the Company being in such excellent demand. In December next, Messrs. Langfier are opening a new studio in Old Bond-street, London. We are told that it is to be on a scale of sumptuousness never hitherto attempted.

METHYLATED SPIRIT FOR QUICKLY DRYING PHOTOGRAPHS.

Before dwelling further, as previously promised by us, on some of the practical aspects of this subject, we may refer to an objection which has been raised to our air theory, as a cause of the milk fog so annoyingly frequent in hastily drying negatives with the aid of methylated spirit. The objection raised is that, if our theory were correct, the same effect would be observed when drying a carbon transparency on glass by

similar means, but that "milk fog" is not produced under such circumstances. But the parallel, to be complete, requires the condition of that portion of the gelatine next to the glass to be the same in both cases. In a carbon print on glass the gelatine is insoluble where next to the glass, and the insolubility is far greater than the slight insolubility conferred by a pyrogallic developer.

It will be seen by these remarks that methylated spirit is useful not alone for negatives that are to be quickly dried. Further, we may point out that it is a most valuable aid to the quick drying of bromide prints. There are many occasions where this is required, and if heat alone be depended upon for the purpose time is lost, and there is always a risk to the print from the application of too much heat. With the aid of spirit it is quite easy to have a print mounted upon cardboard, and perfectly dry, within less than an hour after a plate has been exposed. When a number of prints are so needed, they should be placed evenly in a heap, and then squeegeed—with a very even roller squeegee—on a piece of plate glass, and afterwards immersed in the methylated spirit with continued turning over and changing of position to ensure the access of the spirit to each print. Again, they should be squeegeed on the glass, and once more put into perfectly fresh spirit. As soon as the water is all expelled the paper will assume a semi-transparent or greasy appearance, at which stage the prints can be hung up to dry. A good heat may now, without fear, be used to expedite matters.

In treating negatives, this plan, it need not be said, is inapplicable. The plan to adopt is, first, to wipe the back of the negative dry, to remove the surface moisture, by placing the negative on a piece of hard blotting-paper. Then a small quantity of the spirit is to be poured on one corner of the plate, and allowed to gradually spread in a continuous wave from there over the whole plate. The difference in the superficial tension of the two liquids is so great that the bulk of the surface water is, as it were, pushed forward by the spirit, and can be driven off the opposite corner. This may be repeated a second time (three-quarters of an ounce will amply suffice for a 12×10 plate), and finally the plate may be placed in a porcelain or ebonite dish, with sufficient spirit to cover it to the depth of about an eighth or a quarter of an inch, and the dish gently moved to and fro for a space of about ten minutes, after which the negative may be reared up to dry. Where there is urgent haste, it is well to repeat this operation with a fresh batch of unused spirit. It is here where the supposed expense comes in; but, if the precaution be taken to store the once-used spirit in a special bottle, to be used for a first dehydrating bath on a future occasion, there will be little occasion to complain of waste or cost.

Wherever possible, it will be well to bear in mind Mr. W. B. Bolton's remarks, and to obtain, if possible, the old kind of methylated spirit. And a further caution may be given at this stage to those who are not familiar with methylated spirit. Most chemists have a licence to sell pure methylated spirit, but it is not all who have obtained the privilege, and, when buying from the latter or from a drysalter, there is always a probability that methylated "finish" may be supplied. This would be very inconvenient, for the moment it is mixed with water the finish becomes milky, owing to the deposition of the contained resin, "finish" being spirit in which shellac or other resin has been dissolved to the extent of one ounce in a gallon. There are no restrictions placed on the sale of "finish." In case, however, of there being nothing but this latter available, the difficulty may be surmounted by adding about a quarter of an ounce of strong ammonia solution to a gallon of "finish;" no precipitation will then take place—a peculiar property of spirituous solutions of shellac many years ago pointed out by Mr. Watmough Webster.

It may here be noted by those who require to use methylated spirit largely for this or other purposes that one gallon is the largest quantity even the wholesale houses are permitted to sell at a time to any one unprovided with a special licence to store methylated spirit, though this, as we have before pointed out, is easy to obtain (no fee being required), not only for ordinary, but for the old kind of methylated spirit, which term truly described the liquid sold under the name. The present kind is more correctly termed denaturised spirit, as no methyl alcohol is used in making it.

With this sometimes useful information we leave the matter in our readers' hands, with the hope on our part that our still unfinished experiments may enable us to solve the enigma of what we have termed "milk fog."

Drying Carbon Tissue Without a Dark Room.—Amateurs, and small consumers, are often deterred from working the carbon process, or sensitising their own tissue, on account of not having a suitable room in which to dry the tissue. There is no question that upon the drying of the tissue a great deal depends; but that applies more to drying it in large quantities than it does when dealing with in amateur quantities. In the latter case it may be dried almost anywhere, and in almost any light, if a few precautions are taken. Some few years back, a special "daylight tissue" was introduced that could be sensitised and dried anywhere, but whether it is made now, or not, we are unaware. Be that as it may, all ordinary carbon tissues are, practically, "daylight tissues." The only difference, it may be explained, between the daylight tissue and the ordinary is, or was, that in the former the pigmented coating is applied on yellow paper instead of white, so that, when it is sensitised, it may be dried in any light, provided it be squeegeed on any opaque material, such as a ferrotype, an ebonite, or a zinc, or tin plate. The plate protects the front of the tissue from light, and on the yellow paper the back, so that it may really be dried in strong sunlight if desired. Now, ordinary tissue may be dealt with in exactly the same way, provided it is not exposed to more than the light of an ordinary room. The paper, after sensitising, is sufficiently coloured by the bichromate to protect the tissue, even from the action of tolerably strong light. Hence, all that is necessary is to squeegee it upon an opaque material, and stand it up to dry in any convenient situation, out of the way of any strong direct light.

The Contractility of Gelatine.—Few photographers seem to be aware of the immense force exerted by gelatine in its contraction. The thing is, however, well known to collotypists, often to their cost. If a collotype plate be over-dried, the power of the gelatine, in its contraction, is so great that it tears away the surface of the glass itself, breaking it up in a peculiar fern-like pattern. The surface of the collotype plate is always ground, and it is that which gives so firm a hold to the gelatine that the glass is torn away. It is a curious fact in connexion with the matter that different characters of gelatine produce a different pattern fracture. A brittle kind of gelatine produces a different pattern from that yielded by a tough and horny one. This property has been taken advantage of, commercially, for many years past in the manufacture of that kind of ornamental glass known as "crystalline glass," so general for decorative purposes.

X-ray Troubles.—Those who have had much to do, continuously, with the Röntgen rays have, at times, suffered considerable inconvenience from their action on the skin. Sometimes the

rays produce very unpleasant eruptions, of a more or less dangerous character, and the preventives hitherto devised seem to be inadequate, hence the necessity for something better, particularly with those, like some medical men and experimentalists, who do much with Röntgen's discovery. It is said that German dermatologists are now recommending that a gelatinous mixture of zinc, cinnabar, and a salt of bismuth be spread over the parts that are exposed to the action of the ray. The preventive is certainly very simple, if it is efficacious.

Antarctic Exploration.—For some years past the Royal Geographical Soocicty, in conjunction with the Royal Society, have been trying to induce the Government to equip an expedition for the exploration of the Antarctic, the greatest unknown area on the face of the earth. Some time back the President of the Royal Geographical Society wrote to the Prime Minister on the subject; the reply received was sympathetic and gave some hope that a final reply would be favourable to the project. The final reply has recently been received to the effect that "his Lordship expresses his regret that he is unable, under existing circumstances, to hold out any hope of Her Majesty's Government embarking upon an undertaking of such magnitude." Under these circumstances, it is said, the Council of the Royal Geographical Society have decided to try and raise funds for an Antarctic Expedition to be sent out under the Society's auspices. If the project is successful, we may some day see photographs of the least-known parts of the globe. While there are so many expeditions to the Arctic regions, it seems a little strange that the Antarctic are so much neglected.

Passports to Switzerland. — There seems to have been some misapprehension as to passports being required by tourists in Switzerland. It now appears, from a communication from the Minister-Resident for Switzerland, that none are necessary for persons going there as mere travellers or tourists, or those staying at hotels or boarding-houses, for health, or recreation. Passports are, however, required by such persons who have the intention of taking up their residence in Switzerland for longer periods; they will have to obtain a *permis de séjour*, or permission to reside, which may be had from the Cantonal authorities. It is well that this should be known to photographers who intend to make a lengthened stay at any one place. Although passports are not necessary for tourists in Switzerland, we should strongly advise all going there to be provided with one. This is advice we have before given to all photographic tourists on the Continent. A passport will not keep a photographer out of trouble, but it will be a great assistance in helping him out of it, if he unsuspectingly gets into it, say, by being seen taking photographs in the neighbourhood of fortifications. A passport is easy to obtain, lasts for all time, and the cost is but nominal.

PERSULPHATE OF AMMONIA FOR REDUCING DENSITY.

A COMMUNICATION (of which I have only learnt from a newspaper paragraph) made to the Paris Academy of Sciences by MM. Lumière and Seyewetz upon the use of persulphate of ammonia for reducing excessive density in negatives forces my hand rather, the subject being one upon which I had been experimenting for some time. That the salt will produce the reduction, to any extent, even to the total clearing away of every visible trace of image, is an undoubted fact. Moreover, and this is the most valuable property of the new agent, the reduction appears to take place without altering the ratios of the deposit. It is well known that, if a slightly under-exposed, and consequently hard, negative be reduced by Farmer's, or, indeed, any known reducer, the tendency is for the lighter tones to be eaten away at a more rapid rate than the thicker deposits, with the consequent tendency to increase the "hardness" of the negative. With the persulphate this does not take place; the image may be reduced to less than half its original density, or even to a greater degree, and yet, if there be a difference, it will be towards increased softness rarther than hardness. My readers will naturally be inclined to rush to the nearest chemist and buy some of this new preparation (which, by the bye, I may say is not a salt of persulphuric acid, but an acid sulphate of ammonia); but, in the first place, it is a preparation rarely kept, and, in the next, there are practical objections to its use which, unless surmounted, and, so far, I have been unsuccessful in attempting to surmount them, nullify all the great advantages it appears to possess. The paragraph which first brought to my notice the fact that M. Lumière, whose contributions to our knowledge of developers and developing are invaluable, had been working on the same lines as myself, stated that he recommended a five per cent. solution. My experience is that a one per cent. solution is amply sufficient, and does not accentuate the evil effects to anything like the same extent as a five per cent. I will briefly describe these defects, as disappointing as serious. My first experiment was with a series of negatives treated with various strengths, all below five per cent. The effect was admirable, one uselessly dense negative was made into a clean, useful-looking one of correct printing depth.

I left it with an assistant with instructions to place it in the washing trough, so as to entirely free it from the acid salt, and then to place it in the drying rack. To my intense annoyance the negative, when I came to examine it next day, was completely ruined with stains and finger marks. Upon complaining of this careless treatment, I was assured that the usual care had been bestowed upon it, and that it had not been handled with chemically dirty fingers.

I proceeded to experiment with a number of waste plates, and found the reduction to take place most beautifully—but the nature of the silver deposit forming the image was so changed that the mere placing of the finger, quite clean, at the edge of the plate caused a stain or smear to extend to a considerable distance towards the centre of the plate, and the mere act of washing caused a completely rotten and stained appearance over the whole plate. A five per cent. solution so weakened the texture of the film itself, that the heat of the fingers sufficed to cause it to melt.

Concurrently with the reduction of the image there was produced a white, milky-looking deposit on the surface of the film, and any attempt to remove this in the usual way, by gently rubbing with the fingers, caused stains to appear. The addition of an alkaline sulphocyanide solution aided in the prevention of the deposit, but in no way lessened the tendency to staining. Hypo was inapplicable, as decomposition as I expected at once took place upon mixing together solutions of the two salts, and sulphur was abundantly precipitated. I apprehend that the action of the persulphate upon the negative is, first, to convert the image into sulphate, which possibly dissolves, and is reprecipitated to form the white deposit alluded to. There is then a further action of disintegration, or, possibly, partial solution of the gelatine itself, for I believe Liesegang has recently pointed out that this salt dissolves the gelatine of the film.

Other experiments I made need not be described, for they were one and all unsuccessful in the endeavour to nullify the staining tendency of the reduced image. I am, however, still in hopes of being able to discover a practical working means of utilising the properties of this salt, for, so far as the mere reduction of intensity is concerned, it is immeasurably superior to any reducer yet brought forward. Its action in this regard alone is simply beautifully perfect.

G. WATMOUGH WEBSTER, F.C.S., F.R.P.S.

THE NEW POISONS BILL.

THE new Bill relating to the sale of poisonous substances, which was introduced in the House of Lords on the 13th ult. by the Lord President of the Council, the text of which we printed the other week, passed through Committee on Monday week. The Duke of Devonshire, in moving the second reading of the Bill, referred to the present Pharmacy Act, by which the sale of the poisons scheduled was limited to persons registered by the Pharmaceutical Society. The articles mentioned in the schedule of the present Bill the Privy Council had always declined to include in the schedule of the Pharmacy Act, on two grounds—first, the inconvenience to which the public would be put by additional difficulties being put in their way in obtaining these extremely necessary articles; and, secondly, the dislocation of trade that would be caused if the very extensive sale of these articles were placed in the hands of what is virtually a great monopoly.

For years past the Pharmaceutical Society has been trying to get the monopoly of selling carbolic acid in their hands, but the Privy Council have always refused to add that to the schedule, as it has done other substances the Society has tried to get the monopoly in the sale of. The enforcement of the law relating to the sale of poisons has hitherto

rested with the Pharmaceutical Society, and we all know how it has done it, and not done it. If a photographic dealer has sold to any of its informers a little cyanide of potassium or bichloride of mercury for photographic purposes, or an oilman has sold "fly papers" containing a small proportion of one of the scheduled articles, or maybe a "patent medicine" bearing the Government stamp, containing a trace of one, he is forthwith proceeded against in the County Court for the five-pound penalty which, with costs, when they are given, go into the Society's pocket. The Pharmaceutical Society secured their Act, ostensibly to safeguard the public, and this they take advantage of only in recovering their five-pound penalty from grocers, oilmen, and others who may have supplied a bottle of patent medicine or a few fly papers or other articles, the composition of which the ordinary pharmaceutical chemist, who can legally sell it, knows no more of than the former does. It is a well-known fact that the greatest infringers of the Pharmacy Act are the pharmaceutical chemists themselves. But have we heard of the Society taking action against a member of their own trades union, either as regards the conforming to the Act in the sale of poisons, or in the quality of the things they sell, although flagrant cases have been brought under its notice? These duties, when carried out, have hitherto fallen on the police or the sanitary inspectors, who look after the purity of our coffee, milk, butter, and the like.

When this proposed new Act was first mentioned, we suggested that it would probably take the administration of the law out of the hands of the Pharmaceutical Society, and we now see that the Privy Council are to have the same powers as it has, so that we may expect that the law will be more rigorously enforced against pharmaceutical infringers of it than has been the case hitherto. When we made the above suggestion, we also mentioned that photographic dealers, drysalters, oilmen, grocers, and others would do well to look forward to this Bill in their own interests. By the new Bill they will be able to still vend the substances named in the schedule if they duly label the parcel or bottle containing it "poison," with their name and address. They can also sell, under the same conditions, substances sold for the purpose of poisoning insects and vermin. In the schedule of the Pharmacy Act are several substances used for industrial purposes that there is little doubt would be included in the schedule of the present Bill if the matter were brought before the Privy Council by those interested—oxalic acid, bichloride of mercury, cyanide of potassium, and chloroform, to wit. The sale of these might as well be intrusted to the hands of others as well as to pharmaceutical chemists under the conditions of the new Bill. So might all patent medicines bearing the Government stamp. Those most interested in this matter will do well to prominently bring it before the Privy Council while the Bill is before Parliament.

THE GUM-BICHROMATE PROCESS.

The following *précis* of a work * on the subject by J. Gaedicke that has just been published by Schmidt, of Berlin, will be of interest.

As regards the paper, the author recommends for the reproduction of the finest details single transfer paper as used in the carbon process; for coarse tones, ordinary cardboard and drawing paper; the latter, in order to obtain pure whites, must be coated with a two per cent. solution of gelatine.

The gum solution is—

Gum arabic	40	parts.
Sugar	20	,,
Water	100	,,

This solution will keep well.

The sensitising solution he recommends is a ten per cent. solution of ammonium bichromate, which, he states, is much to be preferred to the potash salt.

Several foreign firms are mentioned, but he also commends Winsor & Newton's colours in the form of powder.

For black—vegetable black, lamp black, ivory black, and Chinese ink (dissolved to a syrup).

For brown—sienna, umber, bistre brown, Kasseler brown, and Vandyke.

For red—burnt sienna, Indian red, English red, burnt ochre, caput mortuum, iron oxide, Munich lake, and carmine lake.

For yellow—bright ochre, chrome yellow, cadmium yellow, gamboge, yellow lake, and stil de grain.

For blue—Prussian or Paris blue, indigo, and ultramarine.

The best black is obtained by a mixture of ten parts of ivory black and three parts of lamp black, a small addition of Prussian blue or burnt sienna making it cold or warm.

He uses a two to three-inch broad brush for sizing the paper, and two broad hog's-hair brushes for laying on the colour, and two round badger's-hair softeners for softening out the marks.

A sensitometer or actinometer should be used to gauge the depth of printing. Zinc dishes are recommended, so that they may be heated frequently, the temperature of the water has to be 50° C.

All papers, with the exception of the transfer paper, must be sized with—

Gelatine	2	parts,
Water	100	,,
Alcohol	10	,,

the gelatine being dissolved by heat and the alcohol added, the whole well stirred and allowed to set, and then remelted for use.

The paper should be fastened by two upper corners to a board, and a broad brush dipped in the solution passed across the top, and then the brush dipped in again and passed again across the paper so as just to touch the lower edge of the first streak. When the paper has been covered completely, it is hung up to dry.

Gaedicke has adopted a modification of Packham's method of preparing this paper, and fastens a sheet of paper on a board gelatine side up, and underneath it a piece of blotting-paper; a Blanchard's brush is now dipped in the bichromate solution, and passed over the surface in streaks till the whole is evenly covered; and this must be continued for two minutes, and then it should be covered with clean blotting-paper, and this rubbed down, the blotting paper lifted up and again placed on and rubbed down again, and then removed, and the paper hung up to dry in the dark.

The vehicle for the colour is—

Gum solution (as above)	50	parts by weight,
Fish glue	50	,, ,,

which must be well stirred together. The solution will keep.

For black the following is the actual mixture here used:

Gum and fish-glue solution	40	parts.
Ivory black	10	,,
Lamp black	3	,,
Water	20	,,

The dry colours should be rubbed up on a piece of ground glass with a glass muller or a spatula till quite even and smooth, and then the rest of the gum and water added, and the mixture placed in a wide-mouthed bottle and kept well corked. Of this stock solution one volume should be mixed with seven volumes of water for dark pictures with deep tones, but with ten parts of water for light, delicate tones. The mixture must be stirred before use.

For brown:—

Gum and fish-glue solution	20	parts.
Sienna	10	,,
Water	20	,,

This stock solution should be mixed with an equal quantity of water.

Blue colours are generally used for shading other colours. Sepia is made by mixing burnt sienna with a small quantity of black till the desired tint is obtained. Olive-green is made from burnt sienna, Berlin blue, and a little black.

To coat the paper with the colour, it should be fastened by the four corners to a board with the chromated gelatine side up, and then the colour laid on with a hog's-hair brush from side to side, and then up and down, and then the marks evened out with a badger's-hair brush, rubbing first of all hard, and then softly, in all directions, in circular strokes. This smoothing process must be continued till the coating is so thickened that no marks are caused, and then the paper is hung up in the dark to dry. It must not be exposed till it is thoroughly bone-dry.

Development may be effected by floating face downwards in water repeatedly changed till all the yellow colour is removed, and then placed in clean water face downwards for from six to twenty-four hours till developed. A spray diffuser, or fine sawdust, or a brush, may also be used.

When sufficiently developed, the picture is then fixed by immersion in dilute sulphurous acid or a solution of sodium sulphite acidulated with sulphuric acid, and should then be washed and dried.

Gaedicke's book has as a frontispiece an illustration in collotype, which is a facsimile of print prepared by him, by what he calls a monochrome combination print, which is excellent and gives exceedingly fine details, delicate half-tones, and rich, deep shadows. The original was prepared as follows: The first coat of colour was laid on very thin and

* *Der Gummidruck.* Published by Gustav Schmidt, Berlin. Price 3s. 6d.

printed very deep, so that on development all the details were there, but the print was flat. This picture was then given another coating of colour, and printed for a somewhat shorter time and then developed. On development this film washed completely away in the lights and the lighter half-tones, but the darker tones remained behind, and the result was an excellently modelled picture.

This method of combination printing may be used for two colours, which are near one another in tones, and therefore a new field is opened up for artistic work.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

GLASGOW MEETING, JULY 4–9, 1898.

MONDAY.

GLASGOW this week receives a visit from the Photographic Convention of the United Kingdom for the second time. It is ten years since the first meeting was held there, and in the interval not only have many new chapters been added to the history of photography, but the hand of change has also been busy with the Convention itself. The comparatively small institution of 1888 has steadily increased in numbers, usefulness, and public esteem. It has been reserved, we anticipate, for the second Glasgow meeting to mark a distinct span of progress in all three respects. At the moment of writing the signs point to a large membership, and we perceive distinct indications that the work which will be accomplished this year will make a material contribution to photographic knowledge, and that the compliments paid to the Convention by the civic authorities will have an appreciable effect in raising the public status of that body as well as of the beautiful art for the advancement of which the Convention chiefly exists.

We were the other day looking at the group of members of the Convention taken at Tarbert in 1888. Of the sixty odd persons there shown, probably not more than half a dozen are present this year. The most conspicuous absentee is none other than the esteemed President himself, Mr. John Stuart, who, we are sorry to say, has been exceedingly ill for some weeks past. Keen as the President's disappointment is at having been denied the long-looked-for pleasure of placing himself at the head of the gathering towards the success of which he has been for months ungrudgingly contributing unstinted time and trouble, it is not exceeded in intensity by the feeling of poignant regret evinced by the whole of the Convention members in being robbed of the presence of their genial chief. We hope that, in the course of the week, it will be found possible for Mr. Stuart to appear at least at some of the meetings; but, in his much-deplored absence, he will have the entire sympathy of the Convention with him, and to that feeling will be joined the hope of a speedy recovery.

The long journey from London to Glasgow on Saturday last, by the 10 30 a.m. train from St. Pancras, was rendered delightfully smooth and pleasant for a small party, of which we were members, by the kindness of Mr. and Mrs. J. B. B. Wellington, and Mr. and Mrs. Ward, who had reserved a saloon carriage for their guests. They also hospitably entertained them on the way down, and the agreeable discovery was made that the "Royal Sovereign" strawberry, as grown at Elstree, has a delicacy and piquancy which extorts the applause of very critical connoisseurs.

The weather on Monday morning broke clear and bright. At the headquarters about seventy members were in residence by midday, a similar number being traced to the Waverley Hotel in Sauchiehall-street. The doors of the Institute of Fine Arts, where the meetings are being held, had not been open many minutes before the galleries were thronged by crowds of eager Conventioners full of anticipations of a busy and pleasant week. We missed some of the old faces—A. Haddon, H. P. Robinson, Andrew Pringle, F. P. Cembrano, F. W. Hindley, R. P. Drage, and many other time-honoured Conventioners, being absent. On the other hand, there were many notable new comers to fill up the gaps. The Institute of Fine Arts consists of a suite of five large galleries, the most spacious of which is reserved for the meetings. It was here that the famous Glasgow International Photographic Exhibition of last September was held.

The members of the Local Committee are :—

Chairman—John Stuart.

MEMBERS APPOINTED BY PHOTOGRAPHIC SOCIETIES:—*Glasgow Photographic Association*, A. Lindsay Miller, Fred Mackenzie. *Glasgow and West of Scotland Amateur Photographic Association*, Thomas Steventon, Cameron Todd. *Glasgow "Evening Times" Camera Club*, A. H. Duncan, T. S. Muir. *Glasgow Photographic Trades Society*, William Hampton, P. M. Stevenson. *Glasgow Eastern Phot graphic Society*, G. H. Laird, Thomas Hughes. *Paisley Photographic Society*, Thomas Rastall, Robert Milne, David B. Jack. *Greenock Camera Club*, William Blair, George Dunlop. *Monklands Camera Club*, John W. Eadie, W. Dixon Gray. *Hamilton Photographic Society*, William Barrie, John Dick. *Motherwell Photographic Society*, James Hamilton, Dugald Taylor. *Kilmarnock and Ayrshire Photographic Society*, Thomas Ferguson, Thomas H. Milloy. *Leith Photographic Society*, Alexander Pitkeithley. William Crooke, *Edinburgh*, William Robertson, *Gourock*, R. C. Platt, *Airdrie*, J. Craig Annan, T. N. Armstrong, Matthew Ballantine, Robert Ballantine, George Bell, R Doig, William Elsmore, Patrick Falconer, William J. B. Halley, William Lang, Charles MacDonald, John H. A. McIntyre, William Brown, *Lanark*, James Norval, *Dunfermline*, William J. McIlwrick, *Paisley*, George Mason, John Morison, junr., J. C. Oliver, William Ralston, Andrew Riddell, R. W. Sharp, W. A. Verel, W. M. Warneuke, Archibald Watson, and James Whyte.

The Hon. Local Secretary is William Goodwin, 3, Lynedoch-street, Glasgow.

SUB-COMMITTEES:—*Galleries*, J. Craig Annan, Convener, A. Lindsay Miller, W. M. Warneuke. *Lantern-slide Selection*, A. Lindsay Miller, Convener, J. C. Oliver, Archibald Watson. *Hotels*, Matthew Ballantine, Convener, P. M. Stevenson, George Bell. *Excursions*, Archibald Watson, Convener, Cameron Todd, W. Ralston. *Advertising*, William J. B. Halley, Convener, John Morison, junr., J. H. A. McIntyre, P. M. Stevenson, Charles Macdonald. *Introduction*, George Mason, Convener, J. Craig Annan, W. M. Warneuke, William Crooke.

The Glasgow men are hard workers, as we know by experience, and we have had ocular demonstration of the firm grip which Mr. W. Goodwin, the local Honorary Secretary, has had upon the business in hand. Between him and Mr. F. A. Bridge, the general Honorary Secretary, it has been a friendly competition in the perfection of the week's arrangements, and we are fairly sure that, when all is over, both gentlemen will have deserved well of those for whom they have been working so hard and unselfishly.

On Monday morning there was a largely attended excursion to Ayr. Other parties patronised the Clyde, and found much opportunity for camera work among the shipping and the busy life of the quay side. Hand cameras were greatly in evidence, and a considerable amount of work was done.

THE PICTORIAL EXHIBITION.

THE Second Glasgow Convention will live in history as having produced an Exhibition of photographs by the best men, illustrating very effectively the present position of photography in its pictorial aspects. For the first time the Convention Exhibition is really good and representative, and, moreover, the photographs have been properly hung, while a very successful attempt has been made to secure the assistance of artistic decoration in three of the galleries. For the former branch of the work, Mr. J. Craig Annan and Mr. W. M. Warneuke were mainly responsible, while, as regards the decoration, the skilful craftsmanship of Mr. George Walton, which produced such striking effects at the New Gallery and the Dudley Gallery last year, once more put itself in evidence for the admiration and instruction of visitors. Messrs. Elliott & Son, Messrs. Wellington & Ward, and the Eastman Company take advantage of Mr. Walton's assistance in this respect, and, as the two latter firms each occupied a gallery, one might easily imagine that three or four separate little exhibitions were being held.

In Messrs Elliott & Son's exhibit we noticed several of the pictures hung at the last Pall Mall and Crystal Palace Exhibitions—notably the carbon head studies, one of which was medalled at the former, and the more than life-sized portrait of a lady which was such a conspicuous centre piece of the firm's display at Sydenham. In carbon work Messrs. Elliott are certainly not second to any other house. We are also charmed by the engraving-like quality shown in the firm's bromide papers, prints on which, from negatives by Balbeck, Green of Keswick, and others, are hung.

Messrs. Langfier, of Sauchiehall-street, show a large number of portrait studies in carbon, &c. Since we last had an opportunity of examining a collection of Langfier's work it seems to us that a very distinct improvement has taken place in it. Here, in the examples before us, we have as good a display of portraiture as any professional photographer at present produces—the poses are striking and unconventional, the likenesses have been well caught; and the total effect in each case is bold and artistic.

Three walls are covered with many examples of gum-bichromate printing, contributed by Mr. R. Demachy. These photographs lay bare,

as it were, the whole of the possibilities of this kind of printing, and show the variety as well as the extent of control which the worker has over his result. What Mr. Demachy here practically demonstrates is that *he* can "do what he likes" with his picture, so soon as light has done its work through his negative, and produce results of undeniable power and charm; but—the Demachy's of the British photographic world can be counted on the fingers of one hand, and we are tolerably confident that the recently formed Gum-bichromate Club is not likely to increase the number.

Let us turn from one kind of "control" to another, to that illustrated by the Eastman Company in their magnificent exhibit here, practically the New Gallery Exhibition over again. Here is an appeal to the photographer who can use a pair of scales and weights, a measuring glass, and a little Opie's medium. What the Eastman technical exhibits—which include prints and enlargements on all the Company's papers, examples of variety of result got by systematic methods of toning, development variations in paper prints and many other illustrations of the immense number of effects which may be got in pure photography—what all this teaches the photographer is that control over his result may be reduced down to a certainty by the employment of a little arithmetic and the intelligent use of his organs of vision. And this, we take it, is the kind of "control" which the "bread-and-butter" photographer most needs—not the picturesque but utterly illusive and unmanageable "control which M. Demachy and one or two other gentlemen are constantly harping upon. All this *apropos* of the Eastman exhibit. The Company's many specialities are well set forth in Mr. Walton's beautifully draped and stencilled "Kodak room" at Glasgow.

We ought here to say that the loan collection embraces works by Harold Baker, Horsley Hinton, H. P. Robinson, Annan, and many others, who are very old friends of ours in picture galleries, so that we are not called upon to make detailed reference.

A word of congratulation to the President, Mr. Stuart, here seen at his best. He has a wall space all to himself, and the versatility of his talent is shown in a series of exquisite little architectural studies, and some portraits treated in a spirit of mingled dignity and simplicity. We think the head of a young girl, which Mr. Stuart has here, and which, if we remember aright, was at Pall Mall last year, one of the most pleasing and natural photographs in the galleries. Mr. Stuart's prints are chiefly in carbon, and they have a delicacy and beauty of colour—the Stuart brown, if we may so call it, which make them very attractive to the eye. It will be seen in his address that the President is a very good preacher; take our word for it, that he also practises what he preaches, as his work here shows. We regard John Stuart, of Glasgow, as the finest type of professional photographers to hold up for the imitation of our readers.

The Velox stall is presided over by Mr. W. J. Belton, of Aberdeen, who skilfully shows the ease with which these papers may be manipulated, and the novel and beautiful effects which may be had upon them. The great run which Velox paper is having is in no small degree due to Mr. Belton's facile and persuasive powers as a demonstrator.

Pass we now to the Wellington room at Glasgow. Herein Messrs. Wellington & Ward have given Mr. Walton *carte blanche*, and the result is a cool, tastefully schemed and decorated little gallery, forming a perfect background for the many specimens of the "W. & W." printing processes shown. There are examples in Sylvio, platino-bromide (two large portraits of the Prince and Princess of Wales we note, in passing, to be of striking excellence—the depth and richness of the bromide enlargements are very noticeable). The Sylvio prints are also very fine. The Wellington room at Glasgow, like the firm's "cool retreat" at Sydenham, is a distinct success.

THE CONVERSAZIONE.

In the evening members and visitors to the number of about 400 gathered in the galleries for the opening *conversazione*. In the unavoidable absence of the Lord Provost, his place was taken by Bailie Dick, who welcomed the Convention to Glasgow. Mr. George Mason (Past President) occupied the chair, and gave expression to the general regret felt at the inability of Mr. John Stuart (the President) to be present at the opening of the Convention. Mr. Bridge (Hon. Secretary) then called upon Mr. Thomas Bedding to read the President's address, a task undertaken at the request of Mr. Stuart himself.

PRESIDENT'S ADDRESS.

My first duty this evening is the extremely pleasant one of returning thanks in the name of the Photographic Convention of the United Kingdom for the very cordial welcome we have received to Glasgow. Nothing could be more gratifying to the members of an institution, gathered as we are to-night from every corner of the kingdom, than to know that they have been collectively presented, in the wider meaning of the term, with the Freedom of the City in which they are met. I feel certain I echo your sentiments when I assure the Lord Provost and the magistrates that the compliment is one we individually esteem. May I add that I am more proud to preside in my native city over such a representative assembly of ladies and gentlemen interested in the welfare of photography, not so much from commercial motives as from an altruistic desire to contribute to its advancement as a science and elevation as an art.

Many of you are aware that the Convention was instituted to bring isolated workers together at least once a year, so that, by comparing notes, discussing new departures, communicating the results of original research and the ripened fruit of daily experience—in a word, by the attrition of mind on mind—photography might be enlarged as a science and perfected as an art. We remember to-night that the late Mr. Traill Taylor was the Father of the Convention, and that he had the satisfaction of seeing his offspring leap at once into favour with the craft. Successful from the first, the Convention has steadily progressed, increasing alike in numbers and efficiency, until I feel safe in hazarding the statement that at no distant date the photographer who is not a member will be a person of no standing in the photographic world.

A Retrospect.

On the verge of the twentieth century, and looking back over the past fifty years, one feels astonished at the immense progress and development which have taken place in photography. Reviewing the departments of science and commerce, in which it at present plays an important part, it would be an easier task to name the few which are not indebted to it more or less directly than to number those in which it is a valuable auxiliary. One can hardly take up an illustrated paper which has not its pages filled with half-tone photographs. The perfection reached in this process is marvellous, and thousands are to-day earning their daily bread by its means alone. The art of the million to-day has a photographic basis, although we are told by some that photography is ruining art. Whether that indictment be true or false, and many would dispute it, photography has this advantage, that it brings down to the masses of the people those every-day occurrences which make the whole world kin, and makes the humblest in the land acquainted with the personages of note who move across the "stage of Time."

Nothing would have given me greater pleasure, had time permitted, than to enter with some detail into the processes now most in vogue, and the numerous changes the older workers have witnessed in their lifetime, but these tempting byways must be left for others to tread. I must be more general and discursive in the remarks I make.

It has been tersely said by one who is a master in photography, "The tools are nothing." I do not stay to accept the dictum or deny it, but this I must confess, that I have seen much very good work done by the very crudest apparatus. Cameras and lenses have undergone great changes—changes for the better. For a time the Germans were our benefactors in the matter of high-grade lenses, but their enterprise and skill made our English opticians "sit up," and to-day we have home-ground lenses made of Jena glass which, in every respect, are equal, if not superior, to those of foreign manufacture.

Fifty years ago, cameras were made by the dozen; at present they are being turned out by the thousand, and every week almost sees the advent of a new claimant for public patronage. Many of them are marvels of ingenuity, yet the most complete require a minimum of "brains" if worthy results are to be achieved. In the early days we were proud, some of us, to own a cigar-box with a spectacle lens and a makeshift plate-holder. To-day the camera is a thing of beauty—a work of art and skill, as far removed from its progenitor as the armed cruisers are from the wooden walls of Nelson's fleet. I verily believe the variety of cameras for amateur and professional purposes is so numerous, that the types would individually pave Sauchiehall-street from Renfield-street to Charing Cross; and in that calculation I do not include cameras above half-plate size.

I had a strong desire in this connexion to give you some idea of the difference in the consumption of chemicals and cameras within the last fifty years, but I soon found it to be a hopeless task. I believe I am on safe ground, however, when I say that, whereas fifty years ago, nitrate of silver, one of the principal ingredients for photographic purposes, was consumed by the pound, it is now consumed by the ton, and the consumption of the other chemicals in daily use has increased in the same ratio. Fifty years ago the photographer had to make his own collodion, also his albumenised and sensitised papers; now the manufacture of sensi-

tised paper alone forms a very large and important industry. Not more than twenty years ago, as a reference to time-stained accounts will show, photographers had to pay 30*s.* per gross for the glass used for cabinet portraits; to-day they can purchase the same size of plate, ready for exposure, for 18*s.* per gross. As an industry, nothing speaks more eloquently of its importance, and not merely of its *de-luxe* character, than the recent flotation of the Britannia Works Company with a capital of 380,000*l.*

The Services Photography Renders to Science.

But I must pass on to glance briefly at the service photography has rendered, and is daily rendering, with increased effectiveness and power of science, in nearly all its branches. It has made the astronomer more than ever master of the heavens. By its aid he has mapped out the starry firmament, and been apprised of the existence of stars the most powerful telescopes had failed to show. In the investigations into the composition of the sun and its corona photography has been an invaluable agent. In the registration of storms in the body of the sun it plays a very important part. In the registration also of the barometric and thermometric variations it is in daily use.

From the infinitely great to the infinitely little is often but a step, and photography in this instance enables us to cross the dividing line. Its utility in microscopic work has been abundantly proved of late. bacterial science has made rapid strides by its assistance, and every day seems to produce a more startling discovery than the day before. The word "bacteria" causes a shudder to run through many, but wholly without reason. The bacteria or microbe is one of God's best gifts to the human race, for, without its destructive work, we would now be living amongst the dead bodies of the countless millions of animals which have inhabited the earth throughout the countless ages. The slides which are to be shown upon the screen to-night will throw additional light upon this subject.

In the medical profession photography promises to become one of the most beneficent agents science has as yet placed at the service of the healing art. The X rays, or radiography, are now an indispensable adjunct in every well-equipped medical school. A flourishing society has been started to specialise in this hopeful field, and already developments are daily taking place almost beyond our conception. Most of you would observe in the report of a discussion in the House of Commons lately, that the Foreign War Secretary stated that a number of X-ray apparatus had been sent out to Egypt for the purpose of locating the bullets in the wounded. None but those who have undergone the torture of the surgeon's probe can rightly appreciate the painlessness of the X-ray method.

Although still in its infancy, scientists are eagerly following up the discovery that pictures can be reproduced over vast distances by the conjoint aid of photography and electricity. The feat has been accomplished, and it is within the bounds of possibility that, before long, telephonic or telegraphic messages will be reproduced by photography.

I must not forget to mention that delightful instrument, the cinematograph, which has taken so firm a hold on popular favour, The interest taken in it was strikingly testified by the thousands who nightly crowded into this very hall during the last photographic Exhibition. Already it has proved of great value in graphically reproducing scenes which would otherwise have remained but a memory with a few who saw them. Together with the magic lantern, the cinematograph seems destined to become a power for educational purposes. It may be abused, but let us hope that native good taste will always characterise the cinematographic exhibitions in this country. We are fortunate in having Mr. Prestwich with us, as he has kindly consented to cinematograph the Conventioners after the official group has been taken in Kelvingrove Park on Wednesday.

Photography in Colours.

Turning now to several of the more recent advances in photography, I would allude first of all to that which has fascinated the popular mind—photography in natural colours. This has long been the dream of photographic scientists, and the progress made towards its realisation during the last few years has been considerable. Lippmann, of Paris, has been a leading worker, securing the gold medal of the Royal Photographic Society for his invention. Joly, of Dublin, and Ives, of New York, have also been working steadily at the problem. By way of proving that the problem has been partially solved, our friend, Mr. E. J. Wall, will show us some photographs in natural colours, not painted photographs, remember, but coloured photographs produced by purely photographic means. I think I see some of our lady friends pricking up their ears and saying, "How nice it would be if all our fine coloured bonnets and dresses could be produced in their natural colours." Do not mistake me, however; some time must elapse, I fear, ere the difficulties in the way of such a revolution in the art are overcome. But one never knows. The solution of the problem may come much earlier than we anticipate. Perhaps the inventor of some simple process which will yield such startling results may be seated in this audience.

I dare say many of you are aware that, up till a few years ago, dark blue came up white and light red came up dark, and so with the different colours according to their position in the spectrum, so that reproduced pictures never truly represented the true chromatic scale. These drawbacks are now easily obviated. In the orthochromatic series we have plates which, in conjunction with a coloured screen, render these colours more or less directly in their true relation to the picture reproduced. By their means coloured photographs have been reproduced, but such results must not be confused with those aimed at in natural-colour photography. The process consists simply in the use of different kinds of plates and different screens in copying the picture, so that three half-tone blocks are printed in the primary colours, one on the top of the other, to produce the finished result, the combination presenting a picture approximately near to the colours of the original. When travelling in England lately, I saw some coloured reproductions of scenery in the railway carriage which, I believe, were produced by this process, a proof that photographers are ever on the alert to place the new and useful at the service of the public. In this class of work a great deal depends, of course, on the skill of the operator and the amount of practice he has had.

In dealing with reproduction processes, I must not forget the very beautiful process known as photogravure, which has been making marvellous strides in recent years. By its aid we have pictures reproduced which come up very close to the old mezzotint or line engraving. It is not of equal excellence, but it has been brought to such a pitch of perfection, that it is being utilised to a great extent in the reproduction of our best pictures, to the exclusion of the old engraving process. Indeed, it has so completely ousted hand engraving that scarcely any one devotes attention to that process now. Much of the credit for the advance in this country, of which I have been speaking, is due to the late Mr. Thomas Annan, of Messrs. T. & R. Annan & Sons, of this City, Mr. Annan having been one of the earliest workers in photogravure.

One other advance I must touch upon before I pass to other topics. The daily press has lately given us an account of one of the most wonderful applications of photography, in the photo-mechanical process for the Jacquard weaving loom, whereby all the puncturing of the cards is entirely obviated. If the process accomplishes all that is claimed for it at this stage, it will effect quite a revolution in the art of weaving.

A Professional to Amateurs.

I stated at the outset of my address that the Convention embraced both amateur and professional photographers. Permit me now to devote a few remarks to each. The amateur photographer represents a very important class. I believe I am within the mark when I state that amateurs constitute seventy-five per cent. of all those engaged in the practice of photography. Since the introduction of dry plates, the amateur has become ubiquitous, there is scarcely a home now which does not harbour an amateur photographer. Nor is it surprising. I know of no hobby which has a more enlightening and refining influence, or one which has a stronger tendency to replace the love of frivolous enjoyment with settled interests of an elevating character, not the least of these being a love for the good, the beautiful, and the true, alike in nature and in art. But the hobby must be intelligently pursued if it is to yield its devotees the greatest good, and, in venturing to present the amateurs in my audience with a few words of advice, I hope they will be taken in the spirit in which they are given, seeing they summarise the experience of one who can look back over nearly fifty years of studio work. When out for a ramble with your camera, do not snap at everything. Look carefully round the subject. Study it from several points of view and select the best. A very good way of discovering the best point of view is, I find, to close one eye and look steadily at the scene you wish to photograph with the other. You will then see it as the camera sees it. In looking at it with both eyes open you have a stereoscopic effect, which you eliminate on viewing it with a single eye. Beware of introducing extraneous and unpictorial elements. The other day a lady friend showed me her collection. Among the number was a photograph of a picturesque bridge. On looking at it, I asked, "What is this in the

very centre of the bridge?" "Oh, that's Tom," she replied; "he went up there to be photographed;" and the unthinking "Tom" had marred what would otherwise have been a very pretty picture. To become an adept with the camera, you must exercise restraint and caution. It will never do to run here and there, and, when a friend murmurs, casually, "Oh, what a pretty view!" immediately expose a plate. That style of amateur earns dividends for the plate-makers, but he makes no progress towards artistic work. Better have two or three really creditable views than nine or ten moderately good or just on the border-line of failure. Your plates will keep, for there is no profit in exposing them until you find something really charming or of special interest. Do not be satisfied, my amateur friends, with the "press-the-button-we-do-the-rest" style of photography, for there is no pleasure half so delightful as to stand over your developing dish and see the details of your picture building up minute after minute. Picture-making in the field affords great pleasure; but, in my opinion, the greatest of all is that of posing your friends in their rooms, in the midst of their every-day surroundings; and this, with a little care and management, can be done very successfully without other lighting than that obtained from the window of an ordinary room. I have seen pictures turned out by amateurs under such conditions possessing greater artistic feeling and excellence than half the results produced in some professional studios. One often hears the patronising statement, "*It* is only an amateur's work!" when your attention is drawn to a picture; but, even at the risk of unduly puffing up the amateurs now before me, I must confess that I have had specimens many a time of amateur photography put into my hands which made me feel that I had something yet to learn. We professionals owe a heavy debt to our amateur brethren for many of the advances and improvements in photography. There is no jealousy between us. We can cordially join in wishing them all success, and the road to that success, whether their aim be to fill their albums with little gems of places they have visited, or with portraits of friends and acquaintances, lies along the beaten tracks I have indicated. Opie told a friend, who sought to fathom the secret of his skill, that he "mixed his paints with brains." If there is intelligence behind the camera, and diligence to boot, success is certain.

Flashlight photography is a branch well within the scope of the average amateur. Of special service in illuminating caves, the interior of pyramids and mines, and other dark and subterranean interiors, it is daily being pressed into service in other departments. I had the satisfaction recently of seeing a dancing party, while whirling round to the lively strains of a waltz, photographed by the aid of magnesium light. A small hand camera and a box, no larger than a match box, to hold the flashlight apparatus are all that are necessary to equip the amateur for this branch of work. And now a word in favour of the stereoscope. Twenty years ago this optical instrument was a great favourite, and justly so, for it gave the solid atmospheric effect required to render photographic views more lifelike. Unfortunately, it has been neglected for a long time past, but at present, I am glad to note, there is an inclination to take it up again. Amateurs especially are taking it up with enthusiasm, and we may confidently hope for a revival of the taste for the charming effects the stereoscope alone can give, no possession being more delightful for the home circle than a stereoscope and a good collection of slides.

I have probably exhausted the patience of the amateurs, and my professional friends are still to come; but, by way of switching myself from the amateur to the professional track, I would like to say a brief word on the framing of photographs. The subject has attracted considerable attention lately, and those who have watched the progress of events in theory and in practice must have noticed a laudable improvement. In every case the frame should be secondary to the photograph which it encloses. What is more disagreeable than to overhear any one say, when looking at a picture, "What a pretty frame!" The frame should never draw away the attention from the photograph. A well-chosen frame should be like a well-dressed lady—one should see only the shapely form or the beautiful face, so that, when questioned as to what she wore, you would be unable to say, except that she was most becomingly attired, and simply "looked lovely!"

Advice to Professionals.

I feel rather diffident in proceeding now to speak more particularly to professionals, for I see many present to-night at whose feet I ought to sit. Still, I should like to embrace this opportunity by adverting to a few topics which seem to me to be of general interest. We are never permitted to forget the wholesome fact that the professional photographer has always to look to his "bread and butter" in the first place; but, while he does so, there is no reason why he should not make "Excelsior" his motto, and daily strive to aim at something higher than the conventional and mediocre. It is a much-disputed point whether photography is an art or not, but I make bold to say that, whatever the answer be, photography has the art of pleasing ninety per cent. of the community. True, the photographer can never hope to come up to the genuine artist's standard of idealism. Take the human face. How kaleidoscopic! Every nerve and every muscle is instinct with motion as you look at it, so that you never see one distinct expression. A hundred different expressions pass over it in a second, and no photographer could hope to reproduce them, any more than an artist could reproduce the wheel of a carriage in motion. Ask a photographer to take a moving carriage, and he must do it so smartly that the spokes of the wheel show as if the vehicle had been stationary. An artist, on the other hand, would strive to convey the sense of motion, to give an idea of the rate at which the carriage moved by the confusion of the spokes.

Still, in portrait work, much can be done by making your subject feel at ease, meanwhile studying which of the fleeting and recurring expressions would be the best. While doing so the operator must avoid staring at his subjects as if they were statues, and, above all, he must be tactful. An illustration occurs to me in this connexion. Some time ago I was photographing an old and rather crusty gentleman. I kept up what I thought was a pleasant conversation and was flattering myself that I was doing nicely, when he suddenly stared me very hard in the face, and growled, "Get on with your photographing."

Strive also while making your pictures artistic to avoid the use of any of the so-called accessories. If furniture is necessary, let it be appropriate to your subject. Theatrical fittings always seem to me objectionable in a photograph, as they tend to make it simply a reproduction of an ornamental fireplace, say, with a figure in the middle.

As regards the further stages, I am very pleased to find that retouching, which was carried to such excess in bygone days, is now falling into disuse. The skilled photographer tries instead to so light his subject that there may be no need for retouching the plate except in very special cases. On that account retouchers who formerly commanded six guineas a week are now offering their services for a third of that amount.

For the Young Man.

I might continue these discursive remarks much longer, but time forbids. Before I conclude, however, I have an appeal to make to the younger members of the profession. I often feel down-hearted when I come into contact with them. Question them about lenses or the chemistry of their art, and you find that many of them know literally nothing of the scientific principles on which all their work is based. Ask them if they have read such-and-such an article in such-and-such a journal, they shake their heads, they never see a journal. Such a state of matters does not present a very bright outlook for the rising generation of photographers. The rising generation, those who are now in the "sere and yellow leaf" have waded through difficulties up to the neck, and have spent many a sleepless night thinking out the preparation of their chemicals. In these days everything is so cut and dry that the younger photographer is too apt to think he has nothing more to do than put the plate into the slide, take it to the gallery, expose and develop it, and the thing is done.

Young men, do not be content with such a mechanical career. To rise and succeed in the profession, you must master photographic chemistry thoroughly and the science of optics. Could anything be more disappointing than to meet a young operator, who fancies he knows everything, and who is yet unable to tell what *f*-6 or *f*-7 means in relation to a lens, who is also ignorant of the elementary fact that a lens of four inches focus has a greater depth than a lens of twenty inches focus with the same size of stop?

Visit regularly the picture galleries, and take a hint from the late Dr. Taylor, Professor of Philosophy in the Andersonian University. Dr. Taylor had a first-rate system of training his students, who were studying photography and its kindred branches. He took them to the exhibitions, and asked them to take notes of all the pictures without referring to the catalogue for the artists' names. Not knowing who the painters were, whether celebrated or obscure, the students criticised the pictures with intelligence and a knowledge of the principles which govern all true art, and thus became self-reliant and discriminating.

Seeing the Lord Provost is with us to-night, I should like to say that I think we require a technical school specially devoted to photography and its allied branches, a school supported by endowment and subscrip-

tion. There would then be a strong case for the proposal that photographers should only employ those who have attended a course of study and practical training, and who are able to pass a thorough examination in all that pertains to photography as a science and an art.

And now I have done. We have a heavy, and, I sincerely trust, a pleasant and profitable week before us; therefore, in language familiar to those who attend Parliament on the opening day, I commend you to your labours.

On the proposition of Mr. C. H. Bothamley, seconded by Mr. Mason, a cordial vote of thanks was passed to Mr. Stuart for his address.

Refreshments, music, and an inspection of the pictures filled up an interval of half an hour. A list of those present would involve the repetition of a long string of names very familiar to the readers of photographic journals. The Convention *conversazione* is one of those functions to which, as the phase runs, "everybody who is anybody" goes, and on Monday night it may be said that the reputation of the gathering for affording the opportunity of a pleasant reunion for the whole of the Convention was thoroughly well maintained.

THE SCIENTIFIC SLIDES.

Mr. E. J. Wall prefaced the display of scientific slides which he had been instrumental in getting together with the following remarks:—

"The Council of the Photographic Convention decided this year to make a distinct change in the character of the slides shown on the opening night of our Annual Meeting, and they decided to show you slides illustrative of some applications of photography. It having fallen to my lot to show these technical slides, I feel rather inclined to quarrel with the President for having to a great extent cut the ground from under my feet. He has said several things that I wanted to say, and in some cases, curiously enough, has actually used expressions that I wanted to use. There are many that time will not permit us to show, but it is to be hoped that the few that you do see will give you some better idea of the almost universal application of photography to other arts and sciences.

"The first science to which I shall allude is astronomy, and it is here that our science scores over the human observer, who, when he sits down at the eyepiece of a telescope, does so in many cases with his mind unconsciously filled with what others have written and described. Now he sees most keenly at the first moment of observation, but gradually his retina gets tired, and he actually sees less, but imagines he sees more, and sees some of those wonders which are so often reported, and which too often do not exist. With the photographic plate it is just the reverse; it has no memory, and the longer it looks the more it sees and stores up for us a permanent record of the objects presented to it, which, in many cases—certainly in the case of stars—have never been seen by any human eye, and, so far as we know, never will be seen, because their light is so faint."

[Slides illustrative of solar, lunar, and stellar photography were then shown, and the method of determining the rate of motion of the stars by the movement of the spectral lines then referred to.]

"From large objects at enormous distances to very minute objects which are only rendered visible by the aid of the microscope seems a big step—so it is; but here, again, photography is the recording angel; and examples of photo-micrographs of an insect's multiple-faceted eye were shown, and the numerous images to be obtained by aid of the lenses of these eyes, and also the one image to be obtained by excision of the eye and photographing the aerial image, as was done by Professor Exner, of Vienna.

"Photo-micrography naturally suggested its application for detection of bacteria, and examples of this and other medical work were shown.

"To the botanist it was useful, not only by enabling him to obtain pictures of the internal structure of plants and leaves, but also their external forms; and slides of a fern frond, the skeleton of a leaf, and flower studies were shown in illustration.

"To the agriculturist it is an advantage as showing in permanent form the effect of specific manures and the ravages of particular wood-boring insects.

"The geologist can use it for the determination of strata, of the effects of erosion, and by the aid of photo-micrography the ultimate structure of any particular stone or deposit he may come across.

"The meteorologist for determining the duration of sunshine, the rise and fall of the barometer, the recurrence of earthquakes by the seismograph, for lightning and cloud studies.

"For bee culture it is used to explain the correct methods of cultivating bees, showing the queen, the worker, and drone, foul brood, the well-known disease, &c.

"For fish culture it is used in like manner, with the advantage that the results can be studied at leisure, whereas the actual fish cannot, because it will not keep.

"For the study of birds, bird life and animal life, it is far superior to ordinary visual observation; and slides showing birds on nests, flying, and rabbits and deer were shown.

"Justice uses it for the detection of crime—forgery, murder, &c.—and identification of criminals."

[Radiography, instantaneous work, archæology, military photography, and many other applications were shown, including a large number of pictorial slides.]

After these, a very fine display of pictorial slides, and slides in colours by Ives's method, were shown by the lantern kromskop, lent by the Photo-chromoscope Syndicate, and also by the process of Dr. Joly, which had been lent by the Natural-colour Photograph Company, of Dublin, both of which were warmly received by those present.

The proceedings were brought to a conclusion by the exhibition of about fifty specially chosen slides illustrative of pictorial photography.

Among the other exhibitors are the Aerograph Company, Mr. Burdick, as of yore, producing capital work with a deftness which excites th envy of those whe watch his skilful manipulation. Mr. Romney, of the Albany Studio, Charing-cross, Glasgow, has a very good selection of portrait work; and Messrs. Brinckley & Co. are also very strongly represented by some sound work.

The capabilities of the Sandell plate for obviating halation are shown in a selection of Mr. Sandell's admirable architectural views—a line of work in which Mr. Sandell unmistakably shines.

The Apparatus Section is not large, but it contains exhibits by Messrs. Messrs. George Mason & Co., of 120, Buchanan-street, who give prominence among the contents of their stand to the optical productions of Ross and Dallmeyer. We learn that the firm's new premises, which are situated in the most prominent part of the city, have been found extremely convenient for the growing requirements of the business. Messrs. R. & J. Beck, Bolton & Sons, the Thornton-Pickard Manufacturing Company, and others are represented in the section. Apparatus, however, at Conventions shows a tendency to dwindle away. *Per contra*, the pictorial and scientific features of the gatherings attract more attention than hitherto, and it is to be hoped that future executives will take the hint and develop these features to the utmost, for they are certainly popular with Convention visitors.

Tuesday.

The weather, unfortunately, changed for the worse, and Glasgow, which on the Monday had been favoured with bright sunshine, reverted to its characteristic climatic conditions, and tendered the Convention a dull and wet day. Notwithstanding these meteorological discouragements, most of the members took the excursion to Edinburgh, under the leadership of Mr. W. Crooke.

At the modern Athens, which was reached *viâ* the Forth Bridge, where a halt was to be made, the large party split up into smaller batches, and were so conducted over the town. Mr. A. Eddington had kindly written a capital little guide for the information of Conventioners, and this was much appreciated, as it gave a great many useful hints on the photographic opportunities afforded by a brief visit to the most beautiful city in Britain.

Other parties chose the Clyde for their journey, and we ourselves, in the afternoon, also took to the river by the well-known steamer *Iona*, plenty of scope for camera work being found on the famous waterway.

The President's health had so far improved that it was fully expected he would be present at the meetings on Wednesday.

For the proceedings on Tuesday evening a discussion on plate speeds, to be opened by Mr. T. N. Armstrong, was set down. Exhibitions of lantern slides, which are greatly enjoyed in Glasgow, concluded the meeting.

Wednesday.

At the General Meeting held on Wednesday morning, the invitation of the Gloucester Corporation to hold the Convention at Gloucester next year was cordially accepted.

PHOTOGRAPHIC GAUGES.

The value of all exact science may be determined by its capacity of enabling us to fix upon a standard of measurement for technical application, so introducing the definite in place of the vague, certainty for guesswork, and allowing correct information to be imparted from one to another. The progress of science is thus marked by the establishment of a succession of standard units of time, space, mass, &c., the simple units, as the inch, yard, second, hour, ounce, pound being the recognised divisions of the fundamental qualities.

With the creation of new sciences and the growth of the arts these primary units cannot meet all requirements, hence it becomes imperative to devise other standards. Thus, we do not speak of inches or ounces of electricity, but of ohms, volts, and ampères, words expressing definite values of the electric force not measurable by the existing standards.

Photography, being amongst the recent discoveries in new regions, also calls for the invention of units, by which its relations can be measured and compared; furthermore, without such aids it will not expand nor advance from the empirical, traditional, intuitive, or rule-of-thumb stage.

The Royal Photographic Society, in advising a uniform system of numbering the diaphragms of photographic lenses, began the work of founding standard units, the practical outcome being that different lenses are readily compared for rapidity by merely stating the *f* number. This facilitates photographic operations, supplies a system, and results in a commercial economy. A uniform system of numbering diaphragms is an obvious and essential part of photographic technical units, yet, though it was the first to be laid down, it is not the principal nor the basic photographic standard. In practice we are only concerned with the size of the diaphragm and rapidity of the lens as a factor in the production of a correct exposure leading to the perfect negative. Our goal is always the negative, with its converse the print, that is, deposits more or less dense of reduced silver salts; therefore what we desire chiefly to measure is the product of energy of light upon the sensitive salt. The main photographic standard is thus referred to actinometry, and must be expressed either as transparency, opacity, or density of the layer resulting from the exposure of a sensitive compound to a given light, all other units being simply factors modifying this final result.

Now, it is an axiom of science that "every kind of magnitude requires for its measurement some unit of the same nature as itself;" consequently, if we are to measure photographic action by a standard, it must consist of unit thicknesses of density, in other words, a standard scale of gradations or photographic gauge.

Accepting this view, it is at once evident that we shall have to decide what the unit thickness is to be, and the manner in which it or its multiples can be reproduced with certainty. It also follows that what is called sensitiveness, or the speed of a plate, has first to be considered, defining precisely the meaning of speed; secondly, that a standard light must be chosen; thirdly, that the developer and development be uniform.

Some photographers assert that the speed of a plate is an undefinable quantity, since, if a slow and a rapid plate are given the same exposure, the former developed in the so-called strong developers and the latter in the weak developers, the one plate will seem as rapid as the other. This opinion cannot be accepted until we know upon what basis the speed is estimated. Speed can be regarded under two aspects: one, as in the Warnerke method, upon the visibility of the action of a faint amount of light; another, as with Hurter & Driffield, on the densities of deposits caused by a series of light intensities. The powerful developers like rodinal or amidol give the detail in negatives very quickly, but have no corresponding powers of building up the image, whilst the ferrous, oxalate developer inclines to yield maximum density before the fainter detail is visible. A test for speed by Warnerke's method can only be rightly made with similar developers, since, when different, there is no common basis of comparison. So, too, if visible colouration is made the test of speed, and a variety of developers employed, the Hurter & Driffield method will result in speed being a question of developer rather than plate. Hurter & Driffield, however, made density of deposit the measure of speed, and in this, as in all their photographic investigations, clearly indicated that the science of photography must be founded upon, and its standard units consist of, opacities as the product of actinic action. Following them, I regard speed as the greater or less opacity caused on sensitive films under equal conditions of light intensity, time of action, and circumstances of development.

After a definition of speed, our next requirement is a standard light. Many standards have been proposed, and against all of them serious objections can be urged. Sources of illumination are every one variable, and so inherent is this defect that it seems but an abandonment of all researches to wait for the discovery of an ideal standard light. Hurter & Driffield faced this difficulty, and boldly decided to adopt the standard candle, with all its shortcomings, as a unit. Their unit is one second's exposure, at a metre distant from the candle, denoted as one candle-meter second, or one C.M.S. The work they have accomplished justifies their choice of the standard candle. Faulty as it is, many problems of scientific photography can be solved by its aid, and it would therefore be absurd to reject it for applications to technical photography. From my own experiments, I am convinced that a candle may be used without fear of errors great enough to mar practical work. A point generally overlooked is that of the known error. Supposing we know that our results with a standard candle are reliable to within ten, twenty, or thirty per cent., we are at once in a postion to employ it with precision.

Taking the standard candle, we have finally a mode of development to adopt. For our purpose the ferrous oxalate is unapproached and would meet all demands.

Having come so far, I am now in a position to describe what I mean by a "photographic gauge," and its practical value, with some hopes of making my meaning clear to the reader.

The first proceeding is to take a plate of known rapidity, say, 60 Hurter & Driffield, and impress upon it C.M.S. exposures, equal to the scale of light intensities met with in photographic work. Authorities differ concerning the extent of this range, some putting it as about 1:30, and others as 1:80, or 1:200. Leaving the solution of this matter aside, we will take light intensities of 1:64 as covering the majority of subjects. This means exposures of 1 C.M.S. to 64 C.M.S. The difference between single C.M.S. exposures is hardly appreciable, and it will only be necessary to expose the plate at 1, 2, 4, 8, 16, 32, 64 C.M.S. Exposing the length of a cabinet plate for each of these times, and then cutting it into eight parts across the width, we shall obtain as many scales. These are numbered and placed together in the standard developer, removing one at the end of two minutes after the first appearance of the 64 C.M.S., and the remaining seven at intervals of two minutes. When fixed and dry, on arranging them in their order according to length of development, we have a series of fifty-six densities, each produced by a known light, time of development, and by observing the same conditions reproducible at will. These should be numbered at the side with the respective 1 to 64 C.M.S, and along the top with the increasing time of development, that is, from two to sixteen minutes. The individual squares are finally measured for transparency by a photometer to find the density. Taking the density as the logarithm of the opacity, each can be given a numerical value; writing this on the density to which it corresponds will complete the gauge.

Taking such deposits as a standard, we are immediately in a position to ascertain by comparative tests the relative speed of plates, the value of all kinds of developers, the range of gradation given by various brands of plates, and the latitude of exposure simply by preparing a duplicate gauge under the same conditions of light, exposure, and development Added to this, it can be used as experimental data for calculating the time of exposure for camera work, and as a means towards a method of systematic development. These things may not appeal to the practical man; so, leaving them aside, I will descend to the commercial and workshop level, though not without delivering myself of the opinion that all profitable commerce can only be founded on sound principles of science.

Assuming I require some plates developed to a variety of known opacities, and request another person to do them, there exists at present no means beyond the terms "thin," "dense," of indicating to him what the opacities are to be. With a standard gauge once established the matter is simplified. A scale similar to the one described above would have numerical values extending from about ·204 to 2·500; hence, by stating these, or intermediate numbers, I convey exactly the required opacities. When once familiar with the densities any number signified, the photographer could reproduce by inspection during development. Using the same numbers, the scale of gradation of any negative could be readily stated.

Plate-manufacturers and their customers would derive some advantage by adopting scales of this nature in their commercial transactions. When we desire to try a new brand of plates, the usual custom is to apply to the maker, and be supplied with a sample box; these we expose on a subject, and judge of the quality of the plates by results. The test is of little value, for six operators will give as many different opinions. With a test made as above explained this could scarcely happen, for every quality of a plate is brought out, and we obtain a faithful record of its capabilities, and for what class of negative and subject it is best suited. That plate-makers have not yet supplied a guide of this kind to purchasers of their plates is a matter of surprise, but I expect we shall wait until the time when the stress of competition forces them to recognise the growing importance of systematic exposure and development. Nothing is more evident than the fact that photography is growing largely mechanical, and independent of the personal equation; the plate-maker who sees this, and keeps up with the times, will outstrip his rivals.

By setting up a standard scale of densities, we create a situation from which arises a matter of practical importance. With the majority of plates it is quite easy to reach a density of 2·500; for most photographic purposes, where only thin negatives are wanted, a maximum density of 1·500 is ample. This being so, we purchase plates at a loss, they containing useless silver that dissolves out in the hypo. Plate-makers, in my opinion, would therefore serve their customers' interest by issuing plates of different qualities, specifying what is the maximum density obtainable on each.

Here I leave the "photographic gauge," an instrument which may on a superficial examination be thought unattainable. I would, however, commend the subject to every thoughtful worker, for I am persuaded that

photography has reached a point where it will stop unless some attempt is made to co-ordinate and embody in a system the vast collection of isolated photographic phenomena now in existence. This object cannot be attained until units of measurement are available.

JOHN A. RANDALL.

REVERSING MIRRORS.

[*Process Review and Journal of Electrotyping.*]

THE following method for making optical mirrors is one that was given to me by a well-known optician of Albany, N.Y., Mr. Ernest Fasoldt, and from personal observation I know it to be excellent, and quite sure and simple if correctly worked. To be sure, the making of an optical mirror is not child's play, but it can be done by any one of common sense if they will be careful in all things, and be accurate.

Mr. Fasoldt has made several mirrors for me, and his device for holding the mirror in front of the lens is neat and practical.

Optical mirrors are best produced by depositing metallic silver on polished plate glass. The light reflected from a mirror made thus has very slight yellow colour, but not in a harmful degree, for experiment has demonstrated that fully twenty-five per cent. more light is reflected from a mirror of this kind than from the old mercurial mirrors.

A perfect piece of glass is the first requisite, and, in small sizes, this can usually be found in the quarter-inch German polished plate. The surface to be silvered must be very carefully cleaned with strong lye, followed by strong nitric acid, after which it should be well washed, rinsed with distilled water, and laid in a dish of distilled water until wanted.

Before beginning operations it will be in order to arrange for supporting the glass, face downward, in depositing dish, so that the surface to be silvered shall be quite horizontal, and just below the level of the fluid, which should be at least half an inch or more in depth. Mr. Fasoldt says:—

"I make four brass angles, and screw them to two pieces of pine wood of sufficient length to extend beyond the edges of the silvering dish a couple of inches on each side. The brass angles are coated with asphaltum varnish and then dipped in hot wax, to protect them against the action of the silver.

"It will be readily understood now that, by inverting the pine-wood supporters, and resting the ends on blocks built up on each side of the dish, the plate to be silvered will be supported face down in the solution at the required depth.

"Compound the following formulæ in the order given:—

No. 1.

Nitrate of silver	1 ounce.
Distilled water	10 ounces.

No. 2.

Caustic potash	1 ounce.
Distilled water	10 ounces.

No. 3.

Glucose	½ ounce.
Distilled water	10 ounces.

"The above quantities are suitable for 250 square inches, consequently an ordinary copy mirror 8 × 6 would require rather more than two ounces of solution, and other sizes in proportion.

"The caustic potash and distilled water must be quite pure. Ordinary caustic potash will not answer at all. The best to use is known as 'pure by alcohol.'

"A sufficient quantity of silver solution (No. 1), say two ounces, is put into a perfectly clean glass tumbler or graduate. To this is now added, drop by drop, concentrated liquid ammonia, until the precipitate first formed is just redissolved. The same quantity (two ounces) of the potash solution (No. 2) is now mixed in, and the precipitate again dissolved with ammonia, after which more of the silver solution is added, a little at a time, until distinct turbidity is produced. To all is now added sufficient distilled water to fill the bath dish to a proper depth, about half an inch. Filter the solution closely. Now add to this two ounces of the filtered solution of glucose (No. 3), and pour the whole into the bath or depositing dish, which is, preferably, a glass previously cleaned as carefully and efficiently as was the glass to be coated. Remove the glass plate from the distilled water, where it has been kept since cleaning, and lay it face downwards in the silvering solution, it being supported by the device already described, so that the face is just below the surface and the silver does not touch the back, and taking great care that the face shall be equally below the surface at all points. Great care should be taken that no air bubbles remain on the surface of the solution, or between it and the surface to be silvered.

"Now set the vessel in the sun for a few minutes, if the weather be warm, or by the fire if it be cold, as a temperature of 45° to 50° C. (113° to 122° F.) is most conducive to the rapid deposition of a brilliant, firm, and even film of silver. The fluid in the sunlight soon becomes inky black, gradually clearing as the silver is reduced, until when exhausted it is perfectly clear. The mirror should be removed before this point is reached, as a process of bleaching sets up if left after the fluid is exhausted. From twenty to eighty minutes, according to the weather, purity of chemicals, &c., is required for the entire process.

"When the mirror is removed from the bath, it should be carefully rinsed with distilled water from the wash bottle, and laid on its edge on blotting-paper to dry spontaneously.

"To polish the mirror it should be perfectly dry, and should be slightly warmed. Rub very gently in small circles with a tuft of very soft and dry absorbent cotton, and, after going over the surface in this manner, finish by using a little jeweller's rouge."

A. C. AUSTEN.

HARRIS'S VIEW-FINDER COVER.

MR. W. G. HARRIS provides a view-finder cover or shade for photographic cameras, by means of which extraneous light is shaded off from the ground-glass screen upon which the view is reflected, and the admission of light from above is readily regulated or completely shut off.

Figs. 1 and 2 are respectively a side view and a central longitudinal section.

Fig. 3 is a plan view of the same.

Fig. 4 a view showing the device in the half-turned-down position.

Figs. 5 and 6 respectively a side view and a central longitudinal section of the device completely closed.

a is an open frame plate, to the under side of which two cross pins or wires, *b*, are fixed by soldering or brazing. *c*, *d*, are two cover parts

FIG. 1.

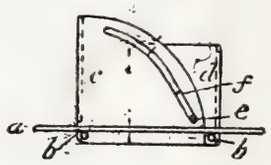
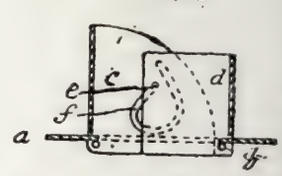


FIG. 2.



mounted to turn on said pins, one within the other, either inwards or downwards, from the open to the closed position, or inversely. This movement, with the relative position of the two parts, is controlled by means of guide pins, *e*, fixed one in each side of the inner cover part, *d*, and engaging in slots, *f*, provided one on each side of the outer cover part, *c*, and of different curvatures, the pins, *e*, being each fixed at such a point in the part, *d*, as to correspond with the curve in the outer part, *c*, through which it has to move. The slots may be covered over on the ouside by any suitable means to prevent the entrance of light.

The device is attached to the outside of the camera box so as to enclose, with its frame-plate and cover or shade parts, the usual ground-

FIG. 3.

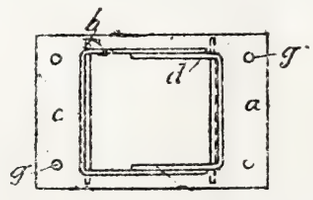
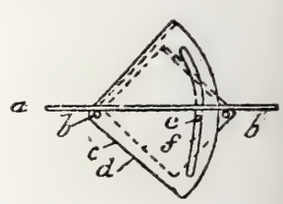


FIG. 4.



glass screen of ordinary cameras. For this purpose screw holes, *g*, ar provided in the frame plate.

In operation the two cover parts, *c*, *d*, being linked together by the pins, *e*, and slots, *f*, may be opened out upwards, or turned down simultaneously, by pulling or pressing one of the said parts. When in the turned-down position, the back of the outer cover part is flush or nearly so with the outside of the camera box. To ensure a perfectly flush horizontal position, the cross pin or wire, *b*, of the inner cover part should be placed slightly lower than the opposite cross pin. Suitable slots must be provided in the camera box for the passage of the sides of the cover parts.

The device is preferably made of thin sheet metal, say, one-thirty

FIG. 6.

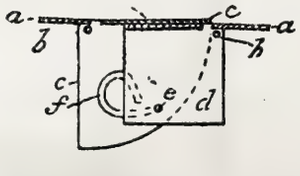
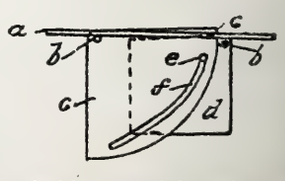


FIG. 5.



second of an inch thick, but any other suitable material, such as mica or celluloid, may be used instead. In the drawing, the thickness of the metal is exaggerated for the sake of clearness.

Instead of the movement of the two cover parts, *c*, *d*, being controlled in the manner described, the said parts may be unconnected and operated independently of one another. In this case the guide pins and slots are dispensed with, and the cover parts constructed to be held in any set position by friction, to obtain which they are constructed of spring metal, the outer one having a tendency to spring inwards at the sides, and the inner one to spring outwards.

PHOTOGRAPHIC IMAGES IN DYES.

Numerous attempts have been made to utilise the vast array of organic dye stuffs as the bases of photographic images. Such dyes are used to some extent in the carbon process, but, otherwise, the only two processes which have met with any measure of success are the Feertype (named after the inventor) and the primuline process, the invention of Messrs. Green, Cross, and Bevan. In both of these processes a diazo compound is exposed to light, whereby it is converted into the corresponding azo compound. The original d azo compound, when treated with an amine or a phenol, gives rise to various coloured bodies, whereas the product of the action of light on the diazo compound forms no such coloured combination. In the Feertype process the amine or phenol is contained in in the paper or fabric, which is developed with water or weak acid, whilst in the primuline process it is subsequently applied as a developer to the exposed fabric.

A new method of obtaining prints in dyes on fabrics has recently been published by Stewart F. Carter in a contribution to the New York Section of the Society of Chemical Industry. Mr. Carter does not employ light-sensitive bodies capable of giving rise to dyes as in the processes just cited, but, taking advantage of a most ancient and familiar photo-chemical reaction, he deposits the dye at a later stage of the operations. Adjective dyes only are available for use, that is, dyes which require a mordant to fix them to the fabric, as distinguished from substantive dyes, which require no such aid. The outline of Mr. Carter's process is as follows: The fabric is coated with the usual ferro-prussiate sensitising mixture of ferric ammonium citrate and ferricyanide of potassium, and, after exposure to light and development in water, is treated with caustic soda; the ferrocyanide formed is removed by washing, leaving the ferric hydroxide in the fabric. After a bath of phosphate of soda and further washing, it is ready to receive the dye.

The practical details of the process are thus given by Mr. Carter. The fabric is sensitised on a somewhat strong solution consisting of equal parts of—

1.

Ferric ammonium citrate	75 grammes.
Water	200 c. c.

2.

Potassium ferricyanide	75 grammes.
Water	200 c. c.

After exposure under an ordinary negative and ample washing in cold water the print is treated with a solution of caustic soda, made by diluting 2·5 c. c. of soda solution (sp. gr., 1·350) to one litre, until the blue is completely decomposed. This operation is followed by washing in hot water, after which the fabric is immersed for three minutes in a hot solution (170° F.) of phosphate of soda. The object of this phosphate bath is to give the dyed shade a good bloom, its omission producing a more or less flat result. After washing for a short time in cold water, rinsing in hot (160 F.), and again in cold, it is ready for transference to the dyeing bath. For general and striking work a dye bath of resorcin green is recommended. This contains—

Resorcin green	3–5 grammes.
Water	1 litre.
Glue size	5 c. c.

The object of the glue in the bath is to preserve the purity of the whites. The water is heated to about 160° F., the glue size added and the print moved about in the solution for two or three minutes. The dye is then added and the temperature gradually raised to 180° F. Dyeing proceeds rapidly, and when a dark enough shade has been reached the fabric is removed and well washed in boiling water to remove superfluous dye. It is next passed through a bath of neutral soap (to clear up the whites) used at 160° F., then rinsed in hot water, finally in cold, and then dried and ironed. Other dyes can be used; gallocyanine gives a violet and blue shade; alizarine gives purple; alizarine brown, pleasant sepia tones, whilst natural dyes, such as logwood, etc., may also be employed.

AN AUSTRALIAN CONVENTION.

According to our Australian contemporaries, the subject of a Convention of Australasian photographers has been mooted. The Secretary of the Bendigo Amateur Photographic Association, in a circular, points out that for some time past the advisability of holding a general conference of all the photographic societies of Australia has exercised the attention of many members of the Victorian photographic societies. In order to give effect to these ideas, the Bendigo Amateur Photographic Association has determined to endeavour to hold a Photographic Convention in Bendigo about October of this year. The Convention would consist of representatives of the various amateur societies of Australia, and it is hoped that the fixture would become an annual one, to be held in turn in the principal cities of Australia. The Bendigo Association would then (should a sufficient number of favourable replies be received) make all local arrangements for meetings and outings, concessions with steamships, railways, hotels, &c., and issue a leaflet embodying the same. The Convention would be conducted on lines similar to those of the Photographic Convention of the United Kingdom. The business of the Convention would include the election of a representative committee to arrange for the annual continuance of the meetings, and the drawing up of the necessary rules for exhibitions and competitions. In addition to this business there would be a conference on photographic subjects, reading of papers, lantern exhibitions, &c., but we do not, on this occasion, propose to hold a photographic competition. The Convention would be held in the large hall of the Bendigo School of Mines. Facilities would also be afforded to visitors for taking photographs at the principal mines, both above and below, together with the various places of interest in the district. If our friends down under really mean to conduct their organization on lines similar to those of the British Convention, they would do well to bear in mind that the latter is not merely confined to amateur photographers. Professionals have ever been its most ardent and unswerving supporters, and we hope will always remain so. Without that support we should be dubious of the Convention's future. We wish the Australian Convention all success.

Our Editorial Table.

Tourist's Guide to the Continent.

Edited by Percy Lindley. 158 pp., 6*d*. Published at 30, Fleet-street, E.C.

A new edition of this useful and chatty guide, which has many illustrations and maps, has just been published. The tourist to Holland, Germany, Belgium, and Switzerland will find it of great service. Among its fresh features are particulars of the new express service to Norway, Denmark, and Sweden, *viâ* the Royal Mail Harwich—Hook of Holland route; a series of Continental maps, a chapter upon cycling routes in Holland, Belgium, and Germany, and a page or two of "Dull useful Information," giving particulars as to the cost of Continental travel.

Catalogue Received.

H. O. Drake, 35, Heath-street, Hampstead, N.W.

A recent entrant into the business of photographic dealing, Mr. Drake, has sent us a copy of his first catalogue. It extends to over 150 pages, and is a well-compiled production with many illustrations, calculated to be found useful for reference by photographers. The principal makes of apparatus, &c., are listed and described.

In our report of the last Technical Meeting of the Royal Photographic Society (p. 428, July 1), we briefly described a new flashlight apparatus (the invention of M. Weiss of Strassburg), with which a photograph was taken of the meeting. Messrs. Reinhold Thiele, & Co., of 66, Chancery-lane, W.C., have been good enough to send us a print from the negative. It is one of the best examples of flashlight photography that we have seen, being sharp, remarkably well exposed and evenly illuminated over the whole field of the picture.

News and Notes.

Photographic Club.—Wednesday evening, July 13, at eight o'clock, Members' Open Night.

Messrs. Cadett & Neall write: "You were good enough to report on our new Spectrum plates in your issue of July 1. You mention that the development with diphenal took a quarter of an hour to give you a good negative. We have not up to the present tried diphenal as a developer, but we may say that, with ordinary developers, such as pyro ammonia, ferrous oxalate, &c., the time of development is usually from one and a half to two minutes. We merely mention this in case the idea would be given that our new brand of Spectrum plates is one which takes a long time to develop; this is quite the reverse for the ordinary developers in use."

Leeds Camera Club.—The Committee desire to draw particular attention to the following items. Club meetings during the ensuing summer session will be on Wednesday evenings, July 20, August 10 and 24, September 7 and 21. The syllabus for winter session 1898–9 will be a most useful and attractive one. The Committee have pleasure in stating that the following gentlemen have already been secured for lectures and demonstrations, viz., Mr. Harold Baker, Rev. J. Beanland, B. A. Burrell, F.I.C., S. Coulhurst, E. R. Dickson, A.P.S., A. Horsley Hinton, A. Keighley, F.R.P.S., W. Thomas (Chairman of Affiliation of Photographic Societies), W. E. Tindall, R.B.A., W. J. Warren, W. T. Wilkinson. Other important arrangements are pending.

Patent News.

The following applications for Patents were made between June 20 and June 25, 1898:—

Cameras.—No. 13,657. "An Improvement in Photographic Cameras and Kindred Apparatus." H. D. Herring.

Printing.—No. 13,863 "Improvements in or relating to Photographic Printing, applicable more especially to Purposes of Amusement." L. H Barnard and E. D. Walrond.

Optical Projectign.—No. 13,893. "Improvements in or connected with Optical Projection Apparatus." Communicated by the Northern Advertising Company, Nordisk Reklame Kompagni (Aktieselskab), Denmark. J. G. Lorrain.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

July.	Name of Society.	Subject.
9	Birmingham Photo. Society	Excursion: Hewell Grange Leaders, J. P. Croft and F. E. Slater.
9	Croydon Microscopical	Excursion: Oxted and Titsey. Leader, Dr. H. Franklin Parsons.
12	Birmingham Photo. Society	Social Evening.
12	Hackney	*Some Minor Matters in connexion with Architectural Photography.* J. H. Avery.
13	Photographic Club	Members' Open Night.
16	Leytonstone	Excursion: Epping. Leader, Mr. Cox.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 30,—Annual Meeting,—Mr. W. D. Welford in the chair.

Messrs. T. E. H. Bullen and G. H. James were elected scrutineers of the ballot.

The Hon. Secretary read the annual report of the Committee as follows:—

I have much pleasure in again presenting the annual report of the Committee to the members of the Association. We have had a very good year as far as papers and interesting discussions are concerned, for, of the fifty nights that we have met in these rooms in the past year, scarcely one has been what can be called flat, and we think there has been no lack of interest shown by the members in the subjects under discussion and the papers that have been read.

The Committee regret to say there have been several deaths and a few resignations. On the other side, there has been a goodish few new members elected, which make up the vacancies caused thereby. The Committee would be glad if some of the younger members would volunteer to read papers or open discussions on such subjects that are of interest to them, so by that means impart knowledge to others.

A list of the more interesting papers and discussions that have been read before the Association are as follows: "Cloud Negatives and Double Printing by a Stripping Print-out Paper," Mr. W. D. Welford. "Bromide of Copper Development," Mr. E. Banks. "Photographs of the Jubilee Procession." "Novitas Paper for Negative-making," Mr. J. E. Hodd. "Faher's Ras-relief Process." "Some Little-known Developers," Mr. E. Banks. "A Good Negative," Mr. E. J. Wall. "Relative Values of Printing Paper," discussion. "How to Test the Speed and Quality of Plates," Mr. T. E. H. Bullen. "Pall Mall *versus* The Salon," discussion. "Sulphide Toning," by Mr. E. Banks. "Optical Projection," Mr. T. E Freshwater. "The Photo-chromoscope," Mr. T. E. Freshwater. "Colour Photography," Mr. E. J. Wall. "Exhibition Management," discussion. "Paper Negatives," Mr. W. T. Wilkinson. "Velox Paper," Mr. Ibbetson. "Treatment of Lantern Plates," Mr. T. E. H. Bullen. "Hand-camera Criticisms," Mr. J. E. Hodd. "Photo-micrography," Dr. E. Spitta. "Colour Filters," Mr. E. J. Wall. "Comparisons of some Developers," Mr. J. S. Teape. "Polarised Light," Mr. J. J. Briginshaw. "Notes on Mr. Teape's Paper—Comparisons of some Developers," Mr. A. Haddon. "Photo-lithography," Mr. A. E. Smith. "Some Flippant Remarks on a Serious Subject," Mr. T. H. Fry. "The Gum-bichromate Paper," Mr. G. H. James.

The Lantern Evenings have been very popular, notably Convention slides by Messrs. A. L. Henderson, W. D. Welford, and Drage; "Cowes Regatta," Mr. T. E. H. Bullen; "The Queen of the Riviera," Mr. A. L. Henderson; "Fruit Culture," Mr. T. E. Freshwater; "Two Men in a Boat;" "Thames Life," Mr. W. D. Welford; "Cycling, Zoological Studies, and Fair Life," Mr. L. Medland; "Pompeii," Mr. R. Beckett; and many other slides have been shown by Messrs. Rapson, J. Coles, P. Everitt, E. J. Hill, Mundy, Kellow, and others, besides novelties in apparatus.

Mr. A. L. Henderson moved the adoption of the report, Mr. G. W. Atkins seconded the motion, and the report, as read, was adopted without comment.

The Hon. Secretary then read the balance-sheet of accounts for the past session, showing an amount to the credit of the Association of over 27*l*.

Mr. J. E. Hodd thought the statement was satisfactory from all points of view. He had pleasure in proposing the adoption of the balance-sheet.

Mr. Kellow seconded the motion, and the same was carried unanimously.

The following were elected officers for the ensuing session:—*Trustees:* Messrs. A. Haddon and J. B. B. Wellington.—*Committee:* Messrs. E. H. Bayston, R. Beckett, R. P. Drage, S. H. Fry, J. E. Hood, A. Mackie, J. S. Teape, and W. D. Welford.—*Delegates to the Affiliation:* Messrs. E. H. Bayston and S. H. Fry.—*Curator:* Mr. J. W. Hodges.—*Recorder:* Mr. A. W. W. Bartlett.—*Librarian:* Mr. E. T. Wright.—*Hon. Secretary and Treasurer:* Mr. T. E. Freshwater.

Votes of thanks for services rendered during the past session were then passed severally to Mr. Freshwater (Hon. Secretary), Mr. Rapson (Librarian), the Trustees, the retiring Committee, the Secretaries, and the Recorder.

Professor Stebbing, of Paris, showed a large number of interesting examples of his professional work, including cabinets and others of tasteful, slender, elongated shape, full-length figures of actresses in various poses and fancy costumes forming the subjects of most of the prints These long narrow prints were coloured in a very soft and charming manner by a means which the Professo proceeded to describe. They were coloured after a method introduced by him into France some seven years ago, when he opened his establishment in Paris, and specimens of the process were shown by him in England at about the same time. He had hopes of arranging for the following up of the new method, which involved the use of certain chosen aniline dyes, and was made practicable by his discovery of a means of rendering the albumen of the print suitably absorbent of the dye stuffs used. However, for certain reasons he did not disclose the method or arrange for its development, but about a couple of years ago this same process of dyeing upon photographic prints was proposed under the name of the Dansac-Chassagne process, and the public were informed that, when the prints were made, they were simply subjected to the action of certain solutions, when, by a selective absorption process, they assumed the colours of nature. Unfortunately the names of certain gentlemen in England had come to be used as assuring the genuineness of this method of colouring, and he greatly regretted that the name of Captain Abney, who, with his work, was so well known in France and looked up to as an authority, had been used in exploiting the process. Much money, on the basis of the universally accepted belief that Captain Abney had recognised the value of the process, had been spent in bringing it before the Parisian public, but this had all been lost, the scheme had failed, and nobody would have the prints. Reverting to his own work by this method, he said that an artist was intrusted with the colouring of the prints with the dyes supplied, but only actresses and public characters were so treated, as the process was not considered to be permanent, indeed it was fugitive.

Mr. Henderson maintained that the idea was certainly forty years old, and remembered such things well. He had had photographs coloured in this way shown him as permanent, but they were extremely fugitive.

Mr. A. Haddon thought that, as Captain Abney's name had been mentioned, it was but fair to say that, so far as he was personally aware, Captain Abney had never lent his name to the Dansac-Chassagne process. As a scientific man, he would not express his opinion one way or the other until he had been able to fully experiment with the process and examine the solutions, and Mr. Haddon thought that such an impression as Professor Stebbing stated to exist in France was absolutely unfounded.

Professor Stebbing was surprised at this, as the method had undoubtedly received so much attention solely by the use of these names, with which it had been boomed.

PHOTOGRAPHIC CLUB.

June 29,—Mr. R. Child Bayley in the chair.

Mr. J. A. Harrison exhibited an ingenious form of adapter for attaching lenses of different sizes to the camera front. It was something on the principle of the three-jaw chuck, and was actuated by a locking lever device, the lens being very firmly gripped.

Mr. E. W. Foxlee thought it would be interesting to the members if he were to show a few things, "made in Germany," which he had picked up during a recent visit to that country. He handed round two portraits of himself, taken in Germany, and asked the opinion of the meeting as to the retouching. In England, the idea of the retoucher seemed to be to eliminate all suggestion of likeness from the photograph; but in Germany he had not found this so. Retouching seemed to be little resorted to. The operator depended on his own work, and did not leave it to the retoucher to make his negatives. The prints and negatives showed little sign of the retoucher's art, nor, indeed, much need of his assistance. The next item was to illustrate that things made in Germany for sale in Germany were widely different to the things made in Germany for sale in England. It took the form of a little album of views, such as are largely retailed in our seaside towns, of Munich, but was much superior to the views of our country supplied by our German competitors. Its chief point was in the extreme minuteness of detail in the prints, and, generally, its get up was better. Mr. Foxlee had paid a visit to an Exhibition of Machinery in Munich and was struck by the variety and quality of the machinery produced. He could not but think that England would need to exert all its energy to compete with Germany in the near future. Book-binding and printing machinery, unequalled anywhere, was made, and for some time the best collotype machines had been produced by German works, which for finish and efficiency were not to be beaten. Mr. Foxlee also showed a catalogue of a picture show, notable by reason of the fact that the whole work of reproducing some sixty pictures, and making the blocks, and printing 20,000 copies was done within forty-eight hours. To give an idea of the present stage of collotype printing by machine many fine examples were passed round. Until recently there existed a strong prejudice against machine collotypes, but the speaker thought that the machine work was surperior. The examples were by F. Hanfstangel, and were excellent in every respect. England seemed to be behind Germany in reproduction work and portraiture, although we held our own in process work, and were superior in landscape work. Mr. Foxlee observed very few hand cameras in Munich, but stereoscopic apparatus was to be found in every dealer's window. Reverting to his own portraits, he said they were taken in a studio of very large area in which practically no blinds were used. The lighting was done entirely by means of muslin screens running on wheels, and the sitter was mounted on a similarly moving platform, and was not asked to move at all, but was simply moved with the platform.

The plates used were English, as was the lens. This latter was a 10×8 portrait lens, and it seemed to be a prevailing and commendable custom to use lenses of a very much larger capacity and longer focus than was the case in England. Gelatine papers were not much favoured, albumen, carbon, and platinum being those chiefly employed; and there seemed to be a general adoption of the ferrous-oxalate developer all over the Continent. Mr. Foxlee's remarks were received with much interest, and some discussion took place regarding developers, printing papers, and other points touched upon by the speaker during the evening.

Hackney Photographic Society.—June 28, Mr. E. Farmer presiding.—Mr. Guest showed and explained his photo duplicator for use with the stand camera. He said that, in order to obtain best results, it was necessary that the duplicator attachment should be some distance away from the lens, otherwise overlapping of the different sections of the photograph would result. Mr. Otto Schölzig gave a demonstration of

"Novitas" Stripping Film P.O.P.

He explained that this was a collodio-chloride printing-out paper, and required, up to a certain stage, exactly the same treatment as other collodio-chloride printing-out papers. The difference between this and others was that the film was attached to a temporary paper support by a soluble substratum, so that it could be removed and transferred to glass, opal, paper, or other suitable material. The print is made in the usual way, except that, for transparencies, the printing must be carried on until the shadows are quite bronzed. After toning, fixing, and washing, the print is put face downwards on to a piece of vegetable parchment, and the whole placed in a dish of water at 120° Fahr. When the substratum is sufficiently soft, which soon takes place, the paper backing is removed from the film, leaving it on the piece of vegetable parchment, which is then removed from the water and placed with the film downwards on to the final support, which has been painted with a solution of gum arabic (one drachm to one and a half ozs. of water) and rubbed into contact. The temporary support is then removed and the film allowed to dry. Mr. Schölzig transferred several prints at the meeting and the results were much admired, both on account of their beauty and the ease with which they were produced. The transparencies were particularly fine. It was claimed that the Novitas film was of great value as a means of producing positive transparencies for enlarged negative-making. It was especially suitable by reason of the fine gradation of the collodion film. In such a case it is necessary to print somewhat lightly and fix without toning. In reply to questions, Mr. Schölzig advised the use of the separate sulphocyanide toning bath for collodio-chloride paper. Toning took place best at a temperature of between 70° and 83° Fahr.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE COOKE LENS.

To the Editors.

Gentlemen,—What would be the effect on the minds of a jury if the defendants went into the witness-box to reply to certain charges and simply said: It is because we believe that all our published statements are true that we do not attach to these remarks the importance which they occupy in the view of the plaintiffs? Yet this is all Messrs. Taylor, Taylor, & Hobson have to say in reply to Herr Klepp's criticism as enforced by Dr. Chesterman. If we are to accept Messrs. Taylor, Taylor, & Hobson's advertisements, Herr Klepp's statements must be disproved. These may be placed side by side as follows:—

Messrs. Taylor, Taylor, & Hobson.	*Herr Hans Klepp.*
"With full apertures, Cooke lenses give critically fine definition right up to the margins of their plates." "They are free from astigmatism and curved field."	"Circle of critical definition at *f*-7·7, 18°. Circle of serviceable definition at *f*-7·7, 41°. Curvature of field about 1 mm. at a=30°; and 1·5 mm. at a=56°. At 43° perceptible astigmatism is apparent, and from that point the quality of the image deteriorates constantly."

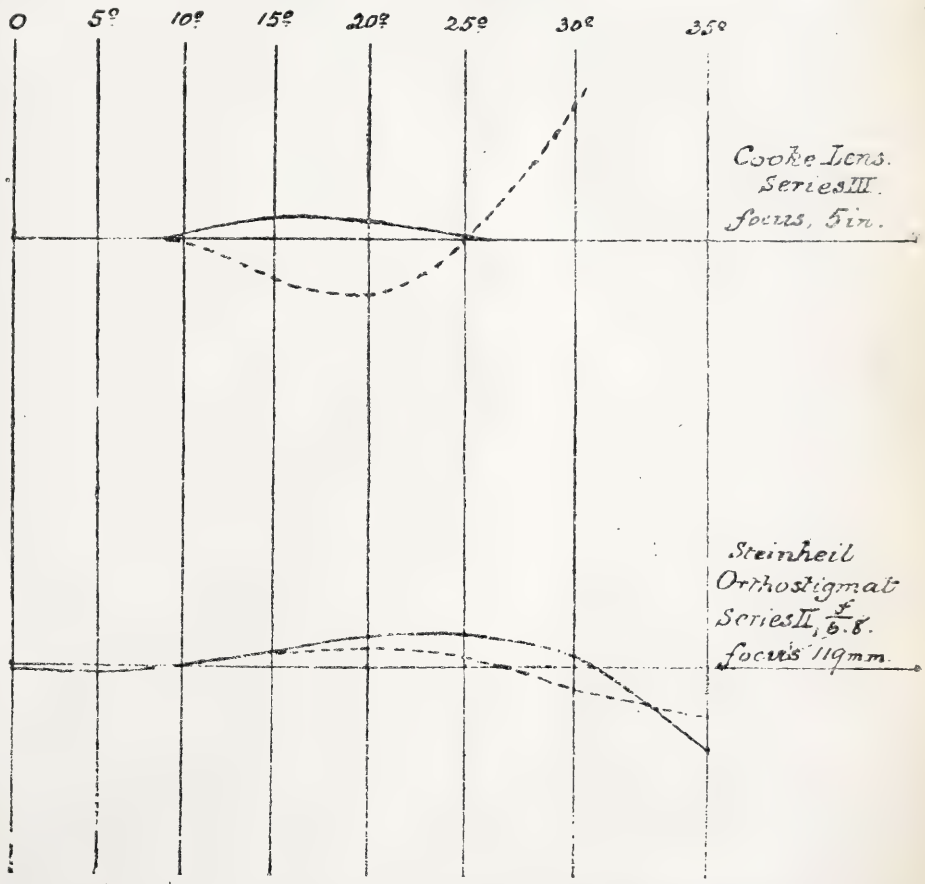
The lens examined by Herr Klepp was listed for a plate 13×18 c., which is equal to an angle of 61½°. Moreover, Dr. Kaempfer admits the substantial accuracy of Herr Klepp's figures and has not attempted to reply to the comments published in No. 19 of the *Deutsche Photographen-Zeitung*. "Optical Glass" has given the extract from Dr. Miethe's article in the *Jahrbuch* for 1898, in which it is claimed that Messrs. Voigtländer have improved the Cooke lens, and he has also referred to the tolerably well-known researches of Eder and Valenta concerning the absorption spectra of optical glasses and Canada balsam. Will Messrs. Taylor, Taylor, & Hobson reply?

Mr. H. Dennis Taylor evidently retires from the discussion, but what are we to think of the attitude of mind that rejects as worthless that which is unpublished and unknown? Clearly Mr. H. Dennis Taylor has reached scientific finality. Messrs. Taylor, Taylor, & Hobson attack my anonymousness. I am superciliously indifferent to their reproaches, and it was not without a purpose that I suppressed my name. Messrs. Taylor, Taylor, & Hobson have criticised, by advertisement, other lenses, and have omitted the makers' names. I see no difference in the two offences, and, when Messrs. Taylor, Taylor, & Hobson observe the golden rule, they will be justified in asking for the names of their critics.—I am, yours, &c.,

Photographer.

To the Editors.

Gentlemen,—I send you herewith a diagram showing the curves of the



Cooke Lens, Series III., and Steinheil's Orthostigmat, Series II. *The error in both cases is increased fivefold*, to facilitate comparison and to assist the printer. The straight horizontal lines represent the true plane of the plate. The full lines represent the focus for radial, and the dotted lines the focus for tangential, lines. The difference between the two lines represents the astigmatism multiplied by five. The diagram of the Cooke lens is constructed after that in Messrs. Taylor, Taylor, and Hobson's letter to the *Amateur Photographer*, vol. xxii. p. 340, that of the Orthostigmat from Eder's *Jarhbuch*, 1897, p. 207. "Photographer" has drawn attention to the advertisement in which Messrs. Taylor, Taylor, and Hobson claim that the Cooke lens is "absolutely equal to the more expensive anastigmats;" but it is evident from these curves that there is much less astigmatism in the Orthostigmat than in the Cooke, and that the former should cover a larger angle with good definition. I have assumed that the curves of the Cooke lens were taken at full aperture, but this may not be the case. It is probable the lens was stopped down to *f*-8, as the diagram was used by Messrs. Taylor, Taylor, and Hobson, for comparison with the curves of rectilinears at *f*-8, and it is stated that the conditions were exactly the same.

These diagrams confirm Herr Klepp's deductions in many respects. If we also remember that there are limits to the rectilinearity of the Cooke lens, Messrs. Taylor, Taylor and Hobson's advertisement appears to be pure assumption.—I am, yours, &c.,

P. Everitt.

88, *Evering-road, N.*

STEREOSCOPIC LANTERN PROJECTION.

To the EDITORS.

GENTLEMEN,—I have seen recently several notes regarding various methods for producing stereoscopic effects in lantern pictures, all the apparatus described being more or less clumsy and impossible in practice.

At the recent demonstration of the Electrorama at Niagara Hall, which has been so well described by Mr. G. R. Baker in your issue of June 3, the stereoscopic effects were so remarkably prominent that I think some explanation of them from the point of view of the photographic expert is wanted. This Exhibition was the first time that panoramic projection has ever been attempted by lantern, the views being 40 feet high and 400 feet in circumference, the object being to reproduce by photography the appearance of nature as closely as possible. There was nothing in the optical systems employed to account for the stereoscopic effects. Buildings, trees, &c., in the foreground appeared solid and real, and stood out from the general background of the distances with wonderful effect, without the use of any optical device by the spectators.

Distances also were singularly correct in their apparent rendering. I may mention that the screen was sixty-four feet from the lantern, and that in some pictures, in order to secure the entire horizon, buildings, &c., were included that were not more than twenty feet from the camera, with grave misgivings as to the effect these would produce on the screen. But there was neither distortion nor exaggeration apparent in these near objects, which appeared as though only a few feet from the spectator, while other and more distant parts appeared as at their correct distances.

This stereoscopic effect is particularly fine in the case of mountain scenery having prominent objects in the foreground; these latter stand out with wonderful realism, while the mountains appear to be miles distant, and quite free from the flatness so apparent in ordinary photographs and lantern slides.

The question is, Are these effects merely due to the cylindric projection of the picture? If so, the sooner cylindric projection is adopted, instead of plane, the better; but is it conceivable that merely curving the lantern screen will produce stereoscopic vision? I think not.

I have been told repeatedly that, by taking my panoramic views in flat segments, I should obtain on the screen merely a series of flats in all straight, horizontal, or inclined lines, and that I ought to use the modern revolving swing camera to obtain true perspective. A little reflection, however, will show, I think, that this is incorrect, for it will be seen that such cylindrical pictures would have to be inserted in the lantern as curved plates; otherwise, if printed as flat transparencies, the effects of distortion above described would be apparent. As a matter of fact, this is the case in practice. Views taken on flat plates, printed as flat transparencies, and projected on a cylindrical screen, show no distortion unless the camera front has been raised. Many of my views were taken on a bridge or pier having long lines of railing extending right across the panorama. All such lines are projected perfectly straight, as seen from the platform round the lantern.

Colonel Stewart and others have written on this matter of cylindric plane projection. As photographers, we are perforce tied down to the latter by our flat plates, but it is clear that, in doing so, we lose a good deal of the realism of the subject. On the other hand, cylindric projection by panoramic cameras is spoiled by the difficulty of seeeing the photograph from its optical centre.

The ideal form of a screen or picture is, of course, spherical, every part of the screen or picture being then equidistant from the eye. To this ideal the cylindrical screen is the nearest approach practicable, but produces slight distortion in horizontal lines at the top or bottom of the picture, but these are not very observable. A spherical screen, unless in plaster, is almost an impossibility. At Niagara Hall, unfortunately, a canvas screen was obliged to be used, and it took a decidedly convex form, as all curved screens do if strained, causing considerable curvature of vertical lines. At the next Exhibition I propose using a plaster screen nearly approaching the spherical form.

I am inclined to think that the optical effects I have described are the result of other causes besides the curvature of the screen, notably the graduated toning of the slides and the correct rendering of relative distances and proportions.

It has always seemed to me that the ordinary monochrome slides are grossly unnatural, coloured, as they often are, blue, red-brown, or black, to the fancy of the operator, and that there is a fine opening for artistic photographers to produce slides having a nearer approach to natural tone and colour.—I am, yours, &c.,

T. W. BARBER.

"*St. Helen's*," *Park-road, Hastings, June* 28, 1898.

[We are much interested in Mr. Barber's experiments; but he is in error in attributing "stereoscopic" effects to the projected pictures at Niagara Hall. The relief apparent is not greater than that seen in ordinary lantern transparencies on the screen. Again, it is hardly correct to describe existing methods for producing stereoscopic effect on the screen as "clumsy and impossible." By the Anderton and Freshwater systems very fine results are easily obtained.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

A. W. Sargent, 184, Castle-road, Cardiff.—*Two photographs of Lance-Corporal Vickery, V.C.*

A. A. Jane, Mountfolly, Bodmin, Cornwall.—*Photograph of a casket, known as "The Bodmin Casket."*

RECEIVED.—R. E. CHESTERMAN, D.Sc.—In our next.

SILVER.—The address is Cross-street, Finsbury, E.C.

J. E. PALMER.—Probably half-tone etching on copper is meant. If so, *The Half-tone Process*, published by Percy Lund & Co., Bradford, will give you the necessary information. Write again if further information is required.

CRYSTALLINE APPEARANCE ON NEGATIVES.—R. TURNER. The cause of the appearance is the imperfect washing of the negatives, notwithstanding your man's assurance to the contrary. Touch the negatives with the tongue and you will taste the hyposulphite of soda.

ENLARGING.—J. COTES. If you refer to the table of enlargements in the ALMANAC, you will see what length to build the camera for the different lenses you intend to employ. The same camera will also do for reductions if a dark slide be fitted to the smaller end.

MOUNTANT.—S. MINNS asks if starch is a reliable mountant, and the best that can be used? Starch, if of good quality, *and is used freshly made*, is one of the best mountants that can be employed. The only better we know is *neutral* gelatine, but that, too, should be used fresh.

PLATINOTYPE.—S. WILLIAMS. The prints enclosed in your note bear evidence of the paper having been exposed to moisture before it was printed, and that is confirmed by your saying that the lid of the tin was loose when you received it. It is of no use trying to get good results on the paper.

LENS.—N. J. S. We do not recognise the lens by the initials upon it. But you may depend upon it that the makers of it did not put in such a small fixed stop unless they knew it was necessary. Almost any lens becomes a good one if a sufficiently small diaphragm be used to make it one.

COLLOTYPE.—J. A. J. The surface of the plates should be ground. It is not absolutely necessary that it should be, however; but the ground surface gives a better hold to the gelatine, and has other advantages in addition. Unless worked on a machine, it is not necessary that the edges of the plates be bevelled.

ACETATE TONING BATH.—T. MICHELL. This bath is perhaps more generally used for albumen prints than any other. It is usually made by dissolving thirty grains of acetate of soda in about eight ounces of water and adding one grain of chloride of gold. The bath should be made at least twenty-four hours before it is used. You will not find it answer with all kinds of gelatine papers.

LENS.—O. P. E. The instrument is certainly not a photographic lens, even of the earliest form. The sketch seems to show that it is an eyepiece of an astronomical telescope. If you send us the instrument itself, we shall then be able to tell you what it is for. It is decidedly not an early form of photographic lens, of that there is no question.

MECHANICAL WORK CATALOGUE.—As regards cost, if the edition is a large one, then process blocks will be the cheapest; but, if it is only of limited numbers, the collotype will be the less expensive. It will cost more to make process blocks 13×11 than collotype plates, but the printing of the latter is more expensive than the former.

BEGONIA.—1. Practically the same, we believe, although we ourselves have no actual experience there. 2. No; you are not in the least likely to be interfered with. 3. Yes; there is dark-room accommodation. As to the kind of work to be done there, call upon us by appointment when you are in town, and we may possibly be of assistance to you.

GUM BICHROMATE.—C. RICHARDS. As the pigmented gum refuses to dissolve, even when warm water is used, it is evident that the coating has, from some cause or other, become insoluble. Long keeping will bring that about, so will too acid a bichromate. Insolubility will also be induced, in some instances, by the use of an unsuitable paper—one containing alum in the sizing, for example.

YELLOW WHITES IN PRINTS.—T. MCDOUGAL. The cause of the yellowness is, doubtless, due to the use of the "combined bath" when it had no gold left in it, the toning being due to sulphur. Under these conditions yellowness in the whites may be expected after a few months' keeping. Tone and fix separately, and then the risk of yellowing, with proper care in the manipulations, will be avoided.

*** Owing to our absence at the Glasgow Convention this week, many communications are necessarily held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1993. Vol. XLV.—JULY 15, 1898.

Contents.

	PAGE
x Cathedrâ	449
ound *versus* Flat-field Lenses	450
eaderettes:— Invisible Physical Images—Incandescent Gas Mantles - Iron Vapour — Thermometer-testing	451
Cosmos" at the Convention. By Cosmos	451
hotographic Convention of the United Kingdom	453
On a Standard Speed for Dry Plates and Films. By T. N. Armstrong	453
Some Fundamental Points concerning Development. By C. H. Bothamley	457
American Photography and Photographers. By H. Snowden Ward	458
e Convention. By a Scotsman	458
Photo-lithographic Half-tone Process without a Screen. By A. Albert	459
Ball-bearing Squeegees	459
Aids to Business	460
A Novel Toning and Fixing Process	460
Broughton's Postal Wrapper	460
The Britannia Works Company	460
Our Editorial Table:— *Photography—Ausführliches Handbuch der Photographie*	461
News and Notes	461
Patent News	462
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club	462
Correspondence:— Acetylene for Portraiture — *Re* "Effect of Printed Matter upon Plates"—Old Wet-plate Days—Photographing at the Paris Exhibition of 1900—The Triple Anastigmat	462
Answers to Correspondents	464

EX CATHEDRA.

rom different parts of the country complaints have been opping in of troubles with gelatine films arising from the hot eather; such, at least, is the cause generally set down, ough, from the nature of the effects produced, as well as e fact that, so far as we are aware, there has been no abrmally hot weather to produce them, we fancy they are to traced to something beyond mere heat. It is noteworthy at, except in one instance, no mention is made of the old ouble, "frilling," and even in that particular case the conions were somewhat out of the common, so that we may asonably conclude that plate-makers are now able to successlly cope with what was once the great bugbear of gelatine ates.

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One correspondent speaks of his films becoming extremely ft and tender, and apparently absorbing far more water than ordinary times, which led to very slow drying, more than e negative having taken upwards of forty-eight hours to dry, ring which period the film acquired a peculiar glossy appearce that was not natural to the brand of plate, but rather ggested decomposition of some sort. The alum bath was apparently entirely without effect, or, if it had any influence at all, it was to make matters slightly worse. Another complains of a similar softening of the gelatine, accompanied by the formation of pits or holes in the film varying in size from a small pin's head to, in very bad cases, the dimensions of a threepenny piece These made their appearance either during washing (after fixing) or during drying, for, if the plates were removed quickly from the washing tank, the action seemed to proceed just as steadily afterwards.

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This correspondent writes: "The plates are of the brand I regularly use, and are part of a batch I have been working for some time, and, I think, in weather actually hotter than we have had lately, but it is only within the last ten days I have had any trouble of this kind. As a remedy I have tried soaking the plate in alcohol; simply pouring it on and off was no use at all, so I tried soaking in a dish for several minutes, and then "dabbing" off the surplus with a linen cloth. But even then small pits formed during drying, leaving a hole in each case as if a bubble had burst in the gelatine film. I may mention another circumstance that bears out your remarks in last week's issue with regard to drying with spirit. I used rectified spirits of wine, as I am unable to obtain the non-mineralised methylated spirit, and one negative that I wanted to use I finished off by heating it, with the result that, round the edges of three slides where it dried first, the "milk fog" you speak of made its appearance. After trying a print I placed the plate in water again to get rid of the milky fog, when, to my disgust, the film left the plate altogether on those parts where the opacity had been, but stuck tenaciously where the film had retained its transparency."

* * *

If we may make a suggestion in explanation of these phenomena, it will be to remind our readers that we are just now in the season of thunderstorms; indeed, storms have already been reported from various parts of the country, and that when "thunder is about" gelatine is apt to play curious pranks. In fact, we have, in previous years, ourselves called attention to very similar troubles. Our own experience coincides with that of one of the correspondents quoted, in that we have found the ordinary alum bath to rather intensify the evil, though chrome alum behaved in a rather better manner. But the best remedy we have for this—and, indeed, for all forms of softening of the

film—is formalin, for besides its hardening action, its antiseptic influence helps to arrest any tendency to putrefactive decomposition, which seems to be the nature of the change set up by thunderstorms. We can recommend no particular strength; we keep a ten per cent. solution of the commercial formalin for general disinfecting purposes, and of this we add sufficient to the water in which the negatives are soaked, after the bulk of the hypo is removed, to make its presence *felt* rather than *smelt* when a strong inhalation is taken.

* * *

Apropos of this form of decomposition we received a communication two or three weeks back, calling attention to some remarks of Professor W. K. Burton with regard to insect attacks upon gelatine films, and suggesting that possibly the effects attributed to insects were in reality the decomposition set up by electrical disturbance of the atmosphere. It is possible such may be the case, for we have ourselves seen these minute perforations take the form of vermicular lines resembling the track of an insect, but under conditions that entirely precluded the possibility of their being the work of insects.

* * *

Amongst the correspondence we were compelled to leave unattended to before leaving for the Convention was a letter with reference to Mr. Henry Soar's communication to the Croydon Camera Club, published at page 410. The purport of that communication is that the electric current is not necessary to set up a developable impression, as demonstrated by Mr. Friese-Greene; but our correspondent points out, and we cordially agree with him, that Mr. Friese-Greene's results differ entirely, or rather the method of their production, from the cases quoted in Mr. Soar's communication. At least six out of the seven cases there quoted are palpably the result of chemical action that it would be difficult to arrest; but in Mr. Friese-Greene's demonstration an *unprepared* paper was used, not one containing a silver salt, brought into contact with another metal and not damped with acidulated water for the purpose of setting up chemical action.

* * *

The discussion on the gum-bichromate process before the London and Provincial Photographic Association seems to have elicited, writes a friend, "two facts not hitherto noticed by any of the workers of that process, namely, that there is a difficulty in differentiating between the different tones and also that the gradation is improved by printing from the back of the paper." "But," he continues, "is not this 'going back' on what was first claimed for the resuscitated process?" To which we reply, "Yes, certainly; but 'magna est veritas, et prævalebit.'"

ROUND *VERSUS* FLAT-FIELD LENSES.

Photographers of the present day enjoy facilities in working that were unknown to those of a couple of decades or so back; indeed, in the matter of lenses, we may say considerably less than a single decade ago. The Jena glass has enabled lenses to be constructed that were an impossibility before. From the earliest period of the Petzval lens there has been a yearning for a lens with a perfectly flat field and, at the same time, free from astigmatism, and until the advent of the Jena glass that was an impossibility. Now we have it, and, as every one is aware, anastigmatic lenses, of different forms, have been in the market for some years, and with them results have been obtained that were unattainable without them. But are they the best for every purpose?

During the last few months the question has been raised as to whether the anastigmatic lenses are really so good for some purposes as some of the older forms that possess a moderately round field. This subject was touched upon a few weeks back by a correspondent when taking part in the late discussion on the "depth of focus" question. There are no two opinions that the new lenses are a great achievement in photographic optics. It does not follow, however, that the most perfect optical instrument is, necessarily, at all times and under all circumstances, the best "photographic tool," for tool the lens is to the photographer. For reproduction work generally the new form has no rival—the field is flat, evenly illuminated, and free from astigmatism, and in these respects is a great contrast to the best of the older forms, even though they were specially constructed for that class of work. This, of course, applies also to enlarging. For general landscape work, and for architecture, where it is fairly in one plane, it is also excellent. There are, however, some subjects for which the older forms, that have a moderately round field, are preferable, inasmuch as they may often be worked with a much larger aperture than is possible with the newer forms of lenses, if sharp definition in different planes is required over the whole field. This is by no means an unimportant point when exposure is a consideration, as, for instance, in hand-camera work or street scenes with objects in motion.

This subject is by no means a novel one, as it was duly treated upon in these columns some four or five years ago, when anastigmatic lenses were then in their infancy. Let us take an example of where the old form of lens is preferable to the new. Let us suppose a street scene, an every-day subject, where the sides are nearer the camera than the distance and it is desired to have all parts of the picture sharply defined. Now, such a subject lends itself particularly to a lens with a round field, whereas it does not do so to the flat-field one. Suppose, with the latter, the middle distance be focussed upon with the full aperture of the lens, say, *f*-8, all before and behind, according to their distance, will be more or less out of focus, and the lens will have to be stopped down considerably before good definition all over the field can be secured; but, if a lens with a moderately round field, such as the rapid rectilinear or symmetrical, be used, and the same object be focussed upon, we shall find, by reason of the roundness of the field, with the same aperture, *f*-8, that both the distance and the nearest points are much sharper than they were with the other lens at its full aperture, and also that far less stopping down will be required to get all portions of the view sharply defined. In many cases, where the subject is suitable, the older forms of lenses may frequently be worked with double the aperture, definition for definition, that the newer forms can be, an advantage not to be despised when rapidity of exposure is a desideratum.

A more striking proof of the advantage of a round field will be seen in the case of taking the interior of, say, a cathedral, where the subject lends itself more markedly to the curved field of the lens. If the lens be focussed, even with its full aperture it will be seen that it is almost possible to get all portions—sides, distance, and foreground—in nearly sharp focus at the same time, and a very little stopping down will be necessary to

obtain crisp definition all over the field. Not so, however, with the flat-field lens: that will require a much smaller diaphragm to bring all planes into crisp focus.

In connexion with this subject it may be mentioned that, in practice, when focussing with the older forms of lenses, to get the best results they should be focussed with a medium stop inserted, or, preferably, the one with which the picture is taken; and for this reason, although lenses of the R.R., and similar types are said to be aplanatic, there is usually some little spherical aberration present, when, if the instrument be focussed with its full opening, stopping down afterwards would make a slight alteration in the focus. That is not the case, however, with the newer instruments.

From the above it will be seen that the faults and imperfections of the older forms of lenses, under some conditions, render them better photographic tools than the more perfect flat-field instruments. While the anastigmats are the more perfect optical instruments, and the most generally useful lenses, the old rectilinears and symmetricals are not to be despised to the extent they now are by many who do not recognise their value.

Invisible Physical Images.—There are many ways in which depositions of various substances, by developing solutions and otherwise, may be produced on surfaces which to the eye are perfectly even. The mere passing a glass stirring rod along the sides of a glass measure containing "iron developer" and nitrate of silver suffices to determine the first precipitation upon the invisibly scratched spots. If the so-called "French-chalk" pencils be used to write upon a clean surface of glass, and the marks then removed by vigorous friction with a cloth, the presence of some influence is shown upon breathing on the newly polished surface—every line that had been traced with the pencil becomes visible. A toy on a similar principle was sold in Paris streets a little time ago. You bought a plate of glass, apparently perfectly plain, and in a leather case. On breathing upon it, a portrait of the Czar was seen. This condition of the glass resulting in this image-production was brought about, not by French chalk, but by printing from an indiarubber block with an ink composed of hydrofluoric acid, to which substance had been given by fluoride of ammonium. No trace of this printing could be perceived till the film was breathed upon.

Incandescent Gas Mantles.—For a long time it was supposed that these were mainly composed of zirconium, but, according to an article in *Inventions*, the Auer light, of the Berlin Auer Company, is the best mantle made, and is composed mainly of thorium oxide to the extent of ninety-nine per cent., the remaining one per cent. being cerium oxide. It appears that, when the mantles first began to be popular, a great demand arose for thorium, and its price went up immensely. It was found in certain minerals in Norway, and so keen did the search for thorium become that women even sold the stone weights of their mangles for large sums, stones were prised out of the walls of buildings, and nothing was talked about but thorite. Gradually, however, the true sources of thorium were discovered, and eventually it was obtained from various parts of the globe. At one time thorium brought over twelve sovereigns for a pound, but now the price is little over two sovereigns for that quantity.

Iron Vapour.—As bearing on Dr. Russell's recently published experiments, we may quote a paper read at the Paris Academy of Sciences by M. H. Pellatt. He laid a small iron ring directly on the surface of a bromo-gelatine plate; at its side another ring was placed, but separated from the sensitive surface by a very thin sheet of microscopic cover glass; the latter was covered by a bell jar, fastened to the plate with paraffin, as in M. Becquerel's experiment. The whole was left in the dark from last December 24 to April 27. The plate was then developed, when it was found that the iron ring under the jar had made no impression, but the ring placed directly on the sensitive film had produced an image of a slightly larger size than the ring itself, and therefore extending beyond the line of contact. The experiment is said to show that the phenomenon is not due to radiations, but to a volatile body produced by the iron.

Thermometer-testing. — In this country philosophical-instrument makers mainly send thermometers to Kew to be tested and obtain certificates; but Mr. A. W. Warrington had an article in the *Chemical News* describing the accuracy and the cheap rate at which such certificates were obtainable at Charlottenburg. He tested some of the instruments so certificated, and found that they were correct to the one-hundredth part of a degree of precision, which is not found on the Kew certificates.

"COSMOS" AT THE CONVENTION.

It was a Top-Hat Convention. Hitherto the gentleman who is to preside at the Gloucester meeting has been the distinguished exception to the unwritten rule that any kind of head gear but the stove pipe should be worn during "the week," but this year quite a crowd of members followed his courageous example. Probably the fact that Glasgow is a very commercial city, and that therefore it was incumbent upon one to "line up" to one's surroundings, had something to do with this sartorial outbreak; perhaps it was only the sincerest form of flattery, or, maybe, a yearning to raise the status of the Convention and of photography in the eyes of the world; probably merely the very human anxiety to look one's best on State occasions. Howsumdever, as the old ladies say, there were the top hats for the first time in Convention history. I wonder if, after all, the appearance of these highly polished cylinders is to be interpreted as an indication that the Convention is on the way to becoming an institution of superior persons?

Well, it was a grand week. It began grandly, it ended grandly. The weather was wet at Edinburgh on Tuesday and dull in Glasgow on Wednesday; but on the other days the city of St. Mungo basked in quite Italian sunshine. Our Scottish brethren's prayers prevailed, and the Thursday and Friday excursions to the Firth of Clyde and Loch Lomond will long be remembered for the magnificent meteorological conditions under which they were made. Of course, it was a record Convention — in membership, enjoyment, weather, excellence of work done, number of plates exposed, and so forth. Are not these things said of every Convention? But to that at Glasgow the word "record" may be applied, in some respects, with far more truth than in other cases that I know of. The lantern slides were the best so far shown; the exhibition of photographs was also the best, not even excepting Leeds, yet held in connexion with a Convention; and Glasgow certainly holds the record for being the noisiest town in which I have attended a Convention. The hoarse roar of the traffic in this iron-bound city has given me a headache, from which I have not yet recovered.

The very saddest man in all Scotland on the opening day of the Convention must have been the President, John Stuart. Illness had stepped in to rob him of the cup of pleasure when it was nearing his lips; and the old ambition to place himself at the head of the association of photographers on whose behalf he had so freely worked, to step into the position which had so long been prepared for him, and which he had so thoroughly won, was not to be realised. Such was the gloomy prospect with which the week began: Monday, with its opening ceremonies; Tuesday, with its excursion and meetings, passed without the President being seen; and we were beginning to assign to Glasgow the character of being unlucky when, hey, presto! Wednesday brought us better news—and the man himself! The doctor had been floored, for there, at the civic tea party, was the Helensburgh giant; the dinner, too, found him at the head of the table; and at the Clyde and Loch Lomond excursions, the happiest

and proudest man of all was the downcast invalid of a few hours before. It would have been hard to say who derived the greater pleasure from the transformation, the President or the members.

I mean no disrespect to Glasgow, or the many warm friends I have made there, when I say that I hope I may not have to live in it until wood paving and asphalt take the place of the granite cubes with which it is carpeted. Also the urban reaches of the Clyde might be a little more pleasant from the olfactory point of view. The stern Glaswegian architecture, too, has no charm for me, but the great Clyde—minus its odour—has for ever spoilt me for the river Thames from its mouth to its source. You would think as you steam down the Scotch river that enough ships are in process of construction to supply the mercantile and war navies of the rest of the world. Away down to Rothesay, with its charming bay and the sharp peaks of Arran striking the sky beyond it, the broad Firth winds in and out between two chains of lofty hills, past charming little waterside towns, at any one of which the tired town-dweller could find rest and peace. Miles separate shore from shore. The steamers are swifter, better found, better provisioned than the southern boats; fares are cheap, and "the life of the water," the constant panorama of moving craft against the background of hills, with their ever-changing gleams of colour, fills and delights the eye. And how invigorating are the breezes that sweep up here right across from the Atlantic. It has been said that the Convention always gives the district in which it meets a good advertisement, and I have no doubt that the West of Scotland will greatly profit in this respect. Who that was there last week does not long to go back?

The papers, good though they were, seemed to excite little interest and did not raise much discussion. It might be worth while considering whether, for the solid part of the Convention programme, some new and novel departure could not in future be made. There is no getting away from the fact that papers, except of the very highest theoretical or practical interest, do not hold a mixed general audience, such as we have at Conventions. People, after a day's hard pleasuring, are too tired to listen to them. Would it not be possible to arrange for one or two first-rate practical demonstrations of processes of current interest? The gum-bichromate process, as worked by Mr. Packham, would, I think, have "gone down" hugely at Glasgow; so, probably, would the production of a half-tone block; platinum and velox printing; carbon; and other processes that must occur to the mind of the reader, if worked by expert hands. What is needed is something to maintain the interest of the majority of members after the pleasure is over and the work begins; and this was hardly done at Glasgow. As I wrote last year, I believe in the play part of a Convention, but I also want to see it do its work; otherwise it has no reason to be.

This year, however, the eye, if not the ear, was successfully appealed to, and Mr. Wall's scientific and colour slides were voted the best and most instructive ever shown at a Convention. Of the votes of thanks that were distributed, there was no more worthy recipient than Mr. Wall, for he worked uncommonly hard, before and during the Convention, to make the lantern-slide department the great success it was. I think, too, he deserves the V.C. for a bit of wonderful coolness in an emergency, which he showed by the side of the lantern on the Thursday night. A large sheet of flame suddenly rose from the jet; there was a movement of alarm among the audience; but three or four quickly but calmly spoken words of reassurance came from Mr. Wall; the people kept their seats, and what might have been an ugly rush was averted by his swift readiness to meet the situation.

On second thoughts, it is not entirely Glasgow City that is to blame for my headache. There was a piper at the dinner—a very pleasing festivity—and I suppose that at some time during my life I must have spoken disrespectfully of his interesting musical instrument, for during the meal Mr. Piper piped *at* me and behind me (I sat on the edge of his line of walk) and flung "the Cock of the North" at me with a defiant energy which I challenge the renowned Findlater to beat. I bore my martyrdom with all the fortitude I could muster, for I felt that even at the price of a headache it was my duty to my Scottish hosts to *try* and like the bagpipes. I presume it was by way of showing keen appreciation of the piper's musical efforts at the dinner that on the Friday excursion to Loch Lomond some Conventioners suddenly appeared on board the steamer in burlesqued kilt costumes and disported themselves in a fashion which excited the ridicule of the southern visitors and the contempt of our Scotch hosts. The melancholy incident was an exhibition of bad taste which those most concerned in will, it is to be hoped, have no opportunity of repeating at future gatherings of the Convention.

What a very photographic place Glasgow appears as you pass through it! In the heart of the city photographers and dealers seem to occupy the best positions in the main streets; and there are so many of both that I should not be surprised to find that, relative to its population, Glasgow has more photographers and dealers than even London. The facilities for plate-changing last week were exceptionally good, most of the dealers freely placing their dark rooms at the disposal of Conventioners. The Thornton-Pickard mammoth shutter dark room was taken on the Thursday and Friday excursions, and was very much used. On the first-named day, as we steamed side by side with the *Bona*, which was competing against the *Ailsa* in the regatta, you could hear the click click of released shutters sounding like a fall of hail-stones on glass. A photo-yachting acquaintance of mine, who was a sardonic spectator of the scene, told me that most of the plates so exposed were wasted.

Let us hope not. May a good crop of results come out of a grand week's work and find place on the walls of the autumn exhibitions. No previous Convention could have had such magnificent opportunities for varied photography. The Clyde and the lochs make up a paradise for the hand-camera man, who had it all his own way last week. The stand cameras used were mostly carried by professional photographers, who, I was pleased to note, turned up to support President Stuart in large numbers. The exchange of ideas by those interested in the bread-and-butter side of photography should alone be sufficient reward for a visit to the Convention. I hope that, as the years pass on, professional photographers will visit the Convention in increasing numbers, for there is much to learn there by the "attrition of mind on mind," as Mr. Stuart happily phrased it.

The Glasgow and West of Scotland Amateur Photographic Association, headed by Mr. Steventon, Mr. Halley, Mr. Morrison, Mr. Chalmers, and other good friends, heartily joined in the welcome extended to the southern visitors, and it was a source of regret to the Association that the plethoric state of the programme denied it the opportunity of specially entertaining the Convention, which thereby missed something uncommonly good, for the Association has the deserved reputation of doing things well. My own acknowledgments are also due to—— Alas! were I to write down the names of all those from whom I received a kindly welcome and greeting during Convention week, I would fill more lines than a stern printer allows for this number of the JOURNAL. So to you all, good men and true of the North, I send back my heart's thanks; and here's to our next merry meeting!

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Saturday morning! The last grains of sand have run through the glass, and the Convention of 1898 has been added to the things that were. From the palpitating city on the Clyde some two or three hundred tired photographers speed away north, south, east, and west. The few that stay behind listen wistfully to the echoes of the past six days' enjoyment. Ah, yes, it is truer than ever that half the pleasure of life consists of anticipation, the other half of re-

trospection. It is only misery that is realised at the time. Thus the little group of new and old friends who have clung together throughout the week, alone linger to give each other a strong, firm, silent grip of the hand; and, when the half-choking good-byes have been said, the curtain drops as the last remaining *dramatis personæ* of the Convention drama glide off the stage and mingle with the world once more.

COSMOS.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

GLASGOW MEETING, 1898.

TUESDAY, JULY 5.

WE resume our report of the Convention proceedings at the evening meeting at the galleries of the Fine Arts Institute. Mr. George Mason (Past President) occupied the Chair, and the following paper was read:—

ON A STANDARD SPEED FOR DRY PLATES AND FILMS.

By T. N. ARMSTRONG.

I ESTIMATE that at the present time there are nearly forty-five firms in the United Kingdom engaged in the manufacture of gelatino-bromide-of-silver dry plates, very few of whom adopt one and the same system of indicating to the public the speed of the sensitive materials they are producing.

Fifteen years ago, the dry-plate industry of this country had not assumed anything like its present proportions; yet, so far back as 1883, it was recognised there existed a pressing need for the adoption by plate-makers at that time of some standard for measuring the sensitiveness of the plates that were then being placed upon the market, and, even at that early period in the history of the dry plate, a special committee was formed, known at the time as the Sensitometer Committee, and which met and fully considered the subject. The outcome of their deliberations, briefly stated, was, that, after mature consideration, they could suggest no better method of measuring the sensitiveness of a dry plate than by means of the Warnerke sensitometer, and for a long time this method was largely adopted both by professionals and amateur plate-makers and workers; in fact, with one exception, a firm who from the very first adopted wet collodion as their standard of speed, the Warnerke sensitometer system was almost universally employed.

In course of time the number of plate-makers increased, and, instead of a packet of dry plates bearing the Warnerke sensitometer number as a guide to their sensitiveness, some of the makers simply labelled their plates by such terms as ordinary, rapid, extra-rapid, studio, snap-shot, instantaneous, medium, special express, universal, meteor, and many other similar expressions, while in some instances plates gave no indication whatever beyond the maker's name.

Then, again, to complicate matters still further in the plate-making industry, a rivalry set in between several manufacturers as to who could produce a plate of the most exalted sensitiveness, the result being the elevation of plates which are still termed ordinary, rapid, extra-rapid, &c., to more than the twice the degree of sensitiveness that previously existed, without any indication of such increase being recorded by means of sensitometer tests, and not only did the Warnerke system of measuring the sensitiveness of emulsions fall into disuse, but another method, known as the Hurter & Driffield system, was brought prominently forward and selected by several makers in preference to the older Warnerke sensitometer system.

The outcome of all this is seen in the almost chaotic confusion that exists in the methods employed by makers at the present time for indicating to the public the speed of the plates they place upon the market.

First, there are those bearing the Warnerke sensitometer number.

Then, those indicating so many times the speed of wet collodion, by crosses.

Then, a very fast plate, that bears nothing but the maker's name.

Then, those plates marked with a variety of speed numbers after the H & D system.

Then, those of a firm who mark their plates with a special actinograph number, intended to apply to the use of an exceedingly clever instrument, used as a mechanical aid to exposure.

Then, no end of other indications by numerous makers, who merely use such expressions as ordinary, rapid, &c.

Briefly stated, a slow emulsion in the early history of the dry plate was indicated by a 12 or 15 Warnerke sensitometer number, the former of these being equal to about twice, and the latter four times, the sensitiveness of wet collodion, and these were the plates recommended for landscapes, pure and simple.

A medium or fairly rapid emulsion, working out at about a 19 Warnerke sensitometer test, would indicate a plate about twelve times more sensitive than wet collodion, and such were largely employed for studio and rapid shutter exposures where no great amount of movement in the object was present.

A fast emulsion showing a 25 Warnerke test number was a very fast plate indeed, and was looked upon as about sixty-three to sixty-five times more sensitive than wet collodion, and so long as one or other of these speeds and methods was employed to guide a photographer in forming an estimation of the plates they were using there was little liability for a novice getting far astray in his estimate of the speed of his plates.

To any one regularly in practice, and who is almost daily exposing plates of one and the same maker, there is no difficulty in estimating the rapidity of such plates, and so apportioning to the same an approximately correct exposure; but there are, apart from professional workers and such amateurs as regularly keep in touch with photography, a large number of ladies and gentlemen who but seldom find an opportunity for exposing a few plates, and to whom the difficulty of forming a correct estimation of the speed of their plates is very great indeed.

Then, again, take the case of any one out of practice for a few years, and whose experience in the past has been confined to plates the speed of which was indicated by means of the Warnerke sensitometer. At the present moment any such individual entering a dealer's store and being supplied with a box of plates, say, of 300 H. & D., how can such be expected to form anything like a correct estimate of the enormously increased rapidity of such plates when compared with, say, a 19 sensitometer plate of years ago? No doubt, any dealer's assistant might be able to say that the 300 H. & D. plate is a very fast plate indeed, but few, however, could be found, at least in the West of Scotland, who would care to venture or hazard an opinion as to how much less exposure the same plate would require compared with that of the 19 sensitometer plate.

This difficulty has over and over again been brought before my notice by pupils and others even well versed in matters photographic, and has arisen solely from the fact that all our plate-makers do not adopt one and the same system or standard of estimating the speed of their emulsions and indicating such sensitiveness in the same manner on the plate boxes.

Several years ago, a somewhat similar difficulty was experienced in connexion with the various grinders of lenses, who adopted different standards of apertures in the instruments they produced. This led to endless confusion for many years, but, on the suggestion of the Photographic Society of Great Britain a standard for the apertures or rapidities of lenses has been established, and now we find all opticians working to this standard, viz. an aperture of one quarter the focal length of the lens being taken as the unit. By this means a serious difficulty in the estimation of exposures was at once overcome, much being made simple that was previously fraught with difficulty.

Now, ladies and gentlemen, if the production of a perfect negative is absolutely dependent upon a correct exposure of the sensitive plate, it naturally follows that, without a fairly correct indication of the sensitiveness of the plates we employ, the obtaining of not merely perfect, but even negatives that may be classed as of fairly good character, must be a matter of difficulty, if indeed not frequently a matter of chance. And it has occurred to me that such a subject as "a standard" for indicating the speed of dry plates and films is one specially suitable for discussion by the members of the Photographic Convention at this time.

In bringing this subject before your notice, I am well aware I am introducing one that is fraught with considerable difficulty, but there is no doubt a pressing need exists for the formation of a reliable standard in the comparison of the speed of plates, and, if this meeting of our Convention, by means of discussion and practical suggestions, can assist in bringing about the adoption of such a standard, the Glasgow Convention of 1898 will have been fruitful in establishing a distinct advance in photography.

The want of a standard for measuring the sensitiveness of dry plates has from the very first been fully recognised, and many years ago, as previously stated, so far back as 1882-1883. The Committee referred to sat for months with the view of establishing a reliable "standard." At that time, if I remember rightly, the outcome of their deliberations was that the Warnerke sensitometer was the nearest approach to a standard for measuring the sensitiveness of a dry plate.

Exception, however, has been taken to this method of solving the problem, on the ground that it was practically impossible to produce

absolute uniformity in the screens, as well as the liability of the light to vary considerably, hardly two instruments being found capable of recording similar results.

Exception has likewise been taken to the more recently introduced method of Messrs. Hurter & Driffield. It is only fair, however, to state that these scientists claim to have actually solved the problem, and that all that remains now to be effected is that every maker of dry plates be required to label their boxes after the system invented by them.

It is not, however, my desire to dogmatise or to offer any decided opinion as to whether the simple Warnerke system is an efficient system to adopt, or whether the more intricate H. & D. method is the better. What I wish to strive for is to show you that there is a pressing need for something being done that would put an end to the confused condition of things as they stand at present, whereby a casual worker may be able easily to ascertain the speed of any batch of plates he purchases.

From among the large number of manufacturers now engaged in plate-making, I only know one firm who seem to have thoroughly grasped the situation in so far as the marking of their plate boxes with speed numbers is effected to meet the requirements of the public, and so enable them to form an approximately correct exposure, and in my opinion it is to that firm's credit that they indicate no less than four distinct systems of speed estimations.

First, they give the Warnerke sensitometer number. Then the H. & D. number. Then comes the Watkins exposure meter figure, and finally the Wynne diaphragm *f* number.

Perhaps a description of these might prove of interest:—

The Warnerke is given as 25.
,, H. & D. ,, ,, 100.
,, Watkins ,, ,, 100.
,, Wynne ,, ,, 78.

Now, ladies and gentlemen, there being no single standard to work up to, it appears to me the next best thing to do is to indicate each of the various methods that contains something like a definite statement of the speed of their plates, and, were all our makers even to follow such an example, it would be a step in the right direction.

I know quite well that, within recent years, some extremely clever and useful mechanical aids to exposure have been invented, and that, in connexion with such instruments, there exist special lists showing the speed of different plates; but, somehow or other, there has always been more or less prejudice existing (among professionals especially) against the use of these mechanical aids, all of which are absolutely dependent upon a correct estimation of the actinic power of the light that prevails at the moment of exposure, and the equally important factor of a knowledge of the correct speed of the plate being used, for without these factors all such mechanical aids are simply worthless.

Many say, however, "Oh, why should these speed indications be wrong?" Well, Mr. Chairman, when I find gentlemen publicly asserting in open print such statements as the following:—

"A recent trial by the writer of two such plates by a well-known maker showed (although these plates were indicated by the same H. & D. speed number); in the camera one was nearly three times as rapid as the other."

Then, again, if further proof be asked regarding the misleading indications that plate-makers give of the rapidities of their plates, let me refer you to a paragraph contained in one of H. & D.'s pamphlets; they say:—

"We had been using for our experiments a certain brand of commercial plates of ordinary rapidity. We liked the plates; they were clean and fairly coated. Wanting some plates, however, of greater rapidity, we procured some 'extra rapid' ones by the same maker. We immediately made a determination of their speed, and found, to our astonishment, that they were of identically the same rapidity as the ordinary plates, and the only distinguishing feature between the two brands was that the extra rapid plates possessed a considerable veil of inherent fog, for which we paid sixpence extra per quarter-plate packet. Now we had no difficulty in deciding the speed of these plates, but the photographer, relying upon the camera test, and judging by appearances in the developing dish, and being further misled by the term 'extra rapid,' would have been in considerable difficulty, and would probably have condemned the plates as altogether useless."

Another maker recently supplied us with a gross of plates, which we found to be no less than three times as slow as the last batch we had, although they were nominally the same plates. Such instances might be multiplied to any extent.

I say, Mr. Chairman, when we find gentlemen, whose veracity is unquestionable, giving public utterance to such statements as I have read, I think there is little doubt that the speed indications at present in common circulation are liable to lead to considerable error.

I am far from wishing it to be understood that I deride the utility of any of these little clever mechanical aids to exposure, but, until we are able to place absolute reliance upon the speed of the plates that are placed in our hands, and upon which all our various calculations are founded, such must of necessity be liable to mislead those using the same.

Take, for instance, the following example, which is no mere surmise, but is given from actually comparing the two comparisons I quote:—On the box of plates previously referred to, a 25 Warnerke sensitometer plate is indicated as equal to a 78 Wynne and 100 H. & D.; but, on the special list supplied by the makers of the Wynne instrument as a guide to those using their mechanical aid to exposure, I find that a H. & D. 100 plate is given as equal to 90 on their system, or, in other words, a plate given as 78 by their system is only a 75 H. & D., and not 100, as stated by the makers of the plate.

Now, in the face of such widely different statements as I have referred to, I ask what confidence can any one have in using these mechanical aids when such misleading figures are given, in this case the difference being as 78 is to 90?

In the early days of the dry plate it was by no means an uncommon practice with enthusiastic workers not only to make their own plates, but likewise to test their own as well as those of other makers by means of the Warnerke sensitometer. This operation, in point of fact, was a very simple one, and, upon the whole, fairly correct estimates were procured when any one subjected his tests to a developer constant in respect of temperature and composition; and there are those who still maintain that the exceptions taken against the Warnerke system are based quite as much upon errors introduced by the operator in using the instrument as upon any shortcoming in the system itself.

Such, ladies and gentlemen, is, I believe, the position into which the method of indicating the speed of the plates we use has been allowed to drift during the last ten or twelve years, and it is to be hoped that something may be done to improve the existing state of affairs by discussing this matter at the present time, and, if possible, devising some plan for establishing a simple standard of speed which shall be recognised by all plate-makers, and an endeavour made to work up to such.

Some years ago there was invented by Messrs. Hurter & Driffield an exceedingly clever little instrument termed an actinograph, by means of which any one can, in conjunction with known exposures on any brand of plates, correctly estimate the speed of such, and apportion to the same a speed number as a standard upon which to base all future exposures on different subjects. Somehow or other this clever invention never seems to have elicited the attention it deserves; at least, this is so in Glasgow and the West of Scotland, where the instrument is almost unheard of.

Its value to those workers who desire to test the speed of plates that are unknown is very great indeed, as well as being of the greatest assistance in guiding any one to a correct exposure of a plate, the speed of which is known, and, if in the future our plate-makers should continue in the course that has been followed during the last ten or twelve years, it appears to me that in this little instrument lies the germ of a system whereby the public can easily estimate for themselves the speed of any plate they may be working with.

Let me give you an example of how this little slide rule is capable of providing the speed number for a plate after the Hurter & Driffield system.

This little instrument is provided with a light scale for each of the various latitudes of our globe. The one you see here is intended for use in Great Britain. This light scale consists of a number of curves indicating the mean value of the light at any hour of the day throughout the year, the mean light being estimated at that brightness when the sun just casts a shadow. On the top sliding scale are given the various apertures of all lenses, singles, doublets, and triplets, from the most open stop to *f*·64. On the bottom sliding scale are found the speed numbers applicable to the plates being used.

Let it be supposed that we have received a packet of plates without any guide whatever to the rapidity of the emulsion with which the same has been coated.

It stands to reason that, without being provided with any special apparatus for measuring the sensitiveness of emulsions, such as are used in laboratory tests, the next best and most practical thing for a photographer to do is to proceed and make a test exposure by means of his camera and lens. A plate is therefore exposed, say, on any familiar subject, care being exercised in noting the exact time of exposure, the

stop used, as well as the quality of the light prevailing at the time. In making this exposure the shutter of the slide is drawn at three varying distances, and a similar period of time given to each of the three portions of the plate. By this means, if the last portion receives one second, the first will have received three seconds, and the middle portion two seconds. The plate is then developed, when it is almost certain one of the three exposures will be found correct. We have now data upon which to base our calculations.

Taking this little instrument in our hands, we first set the light scale to the day of the year, and the hour of the day, upon which the exposure has been made.

We then slide the lens aperture scale along till it meets the light curve indicated on the light scale; for example, say the date was February 20, and the hour of the day two p.m., an aperture of *f*-45 being employed in the lens, the subject being an ordinary landscape, lighted by means of bright sunlight.

Our development has shown us that the correct exposure was two seconds, sliding the speed index to that point opposite two seconds on the exposure scale. The pointer indicates immediately that we were using a 40 H. & D. plate, a plate largely in use for landscape work at the present time.

With these data we are now enabled to apply such plates to every other species of subjects.

Had the plate taken only one second, the index would have shown the speed number as 80 H. & D.

To some this simple method of arriving at a reliable standard of speed may be deemed unscientific, but to my mind it meets the requirements of the public satisfactorily enough. I have always been a believer more or less in practically testing the speed of a plate by means of the camera and lens and daylight. The source for which in general all plates are required to be provided, and if it be true that, with the more recent introduction of the custom of backing plates with an anti-halation medium, the application of such backing tends to lower their rapidity in some instances to the extent of fifty per cent. when such are used in the camera, this simple method seems to me to be preferable to any elaborate laboratory tests that can be applied to a stock of emulsion before the same is handed over to the public in a backed-plate form as an anti-halation plate.

Then, again, do our makers, who are now making a practice of applying these anti-halation mediums to their plates, make any allowance for the lowering of their speed, or, what is practically the same thing, the plates requiring often as much as fifty per cent. more exposure, ever so indicate on their boxes that such an estimation of their speed is necessary, And do any of our mechanical aids to exposure take such factors into account when guiding the users of such plates? Quite recently a clear case of failure, attributable to this source, came under my notice, and it is another proof, were such wanting, of the unsatisfactory position into which matters have been allowed to drift in connexion with speed indications of the plates at the present moment.

Through the kindness of Messrs. Marion & Co., of London, who have sent me one of these little calculating machines—for I could not get one in Glasgow—I have recently been making some tests with it, and am surprised at the unerring precision with which it points out the correct exposure for any day or hour of the year, in any quality of light, from very bright to very dull, and this without having recourse to any photometer for testing the actinic power of the light that exists at the moment of exposure. As I have said, it is also capable of indicating the speed of plates, when used in conjunction with camera tests, or by comparison with negatives that have been correctly exposed, the particulars of which are known.

Being anxious to ascertain, if possible, the opinion of a few of our leading photo-chemists, who are at the same time practical plate-makers, I took occasion to address myself to one firm whose experience is of considerable value in forming an opinion on the subject we are considering. I received a most courteous reply, from which I may quote the following remarks:—

"We use a modification of the Warnerke system for commercially marking our films. We, however, use, for our own information, the Hurter & Driffield system, and find it of great value from a manufacturing point of view. No system has yet been devised for commercially making plates and films which is sufficiently mechanical and uninfluenced by the personality of the operator to be of any value.

"The Hurter & Driffield system, when worked by a skilled man who has no bias in favour of, or against, the plates or films under examination, can arrive at a truthful and comparative result; but the results of its use by one or two makers at the present time would seem to show that it is difficult to eliminate the personal equation."

Now, Mr. Chairman, it appears to me that there does exist a means whereby a reliable standard of speed for plates can be formed provided an existing prejudice among makers can be removed, and I think I cannot conclude this paper with a more fitting expression of opinion than that contained in a little pamphlet of Messrs. Hurter & Driffield's, in which they say:—

"It certainly will be a happy day for photographers when plate-makers stamp every packet with their speed, ascertained by some accurate and really scientific method. This will, however, only be done when the photographic public insist upon it. We flatter ourselves that we have, at any rate, rendered it possible."

The Chairman said: My experience of dry-plate making is not very great, and it is now some years since I took an active interest in the works at Helensburgh. I remember, however, that for a long time we never could understand how it came about that the same batch of plates when tested by the same instrument, the Warnerke sensitometer, showed different results when such were examined a few days or months after the plates were coated. Eventually, however, the cause of this difference in the speed of the plates was found to arise from the fact that the plates were tested first before they were dried, at which time they always showed a much greater degree of sensitiveness than they ever could be made to show when dry, the difference in some instances being as much as fifty per cent. These plates were what was known as ammonia plates, and frequently registered, previous to drying, as high as twenty-eight on the Warnerke sensitometer. There is no doubt Mr. Armstrong has introduced a subject of great importance to all photographers, and I shall be glad to have the opinion of any present that are able to throw light upon this subject.

Mr. Bothamley said: I congratulate Mr. Armstrong on the excellent paper he has just read. The subject he has chosen is most useful, and eminently suitable for discussion by the members of this Convention. The great difficulty, in my opinion, lies in the want of a satisfactory unit of light; hitherto, all attempts that have been made to arrive at a satisfactory solution of this difficulty have resulted in failure. My experiments have chiefly been conducted with the aid of the Warnerke sensitometer, and any shortcomings that have arisen I have generally found to lay in the graduated squares that formed the index to the sensitometer, three successive squares, at times, showing the same depth of opacity. Of course, when this happened, such had to be left out of all calculation. The Warnerke system, however, has been of great practical value, and is still largely in use. I think Mr. Armstrong struck a very important key-note when he drew our attention to the lowering of the sensitiveness of dry plates by applying to the same an anti-halation backing, a practice that, no doubt, might explain many instances where plates appear to be of much less speed than the makers indicate. It is now well authenticated that the action of light upon a backed plate does not tend to lower the shadows as much as would be evident upon an unbacked one. The subject under discussion is, no doubt, surrounded with much difficulty, and until such time as we may hope to get all plate-makers to come to some mutual understanding regarding the testing of plates, and indicating the speed of same in a similar manner, it will be difficult to prevent the errors that Mr. Armstrong has alluded to.

Mr. Henderson said that had he been called upon to discuss this subject at the last Glasgow Convention, he would have been more in touch with the question. He had not made many experiments lately, but agreed in the main with what Mr. Armstrong had said, but it seemed that the lecturer and Mr. Bothamley had both missed the mark, they forgot how much depended on the composition of the emulsion. He had made many thousands of experiments with compounds of silver and other metals with curious results. Captain Abney stated some years ago that a bromide iodide of silver emulsion gave more sensitiveness than a pure silver bromide. He agreed with him somewhat, but very much depends on the proportions used, and whether the compounds were made separately or together. A very high-speed emulsion of pure bromide and made by the ammonia method resembles a bromo-iodide emulsion and has frequently been mistaken for such by experts. In his early experimental days, Professor W. K. Burton frequently brought plates for comparison, invariably in the afternoon. When the light was on the wane, the ammonia-made plates lost less of their sensitiveness, as the light yellowed, than the boiled emulsion plates. An ammonia-prepared emulsion will give a much higher camera register than a boiled emulsion, *i.e.*, when tested by a Warnerke sensitometer; this

can only be accounted for by the colour of the light employed. The Warnerke and Hurter & Driffield sensitometers are of little or no use to the ordinary users of plates when the character of the light is changing. The Chairman had said that he had found some plates more sensitive when wet than dry. This was easily explained. The gelatine was, doubtless, of a hard quality, and it took much longer for the developer to permeate the film, and before full reduction had taken place the plates were slowed. When large batches of emulsion have to be coated, the last-coated plates vary very much in speed and quality, so that the marking of the speed of the first and last would be very misleading. That a soft gelatine will give a more rapid plate is a well-known fact, and experimenters when making comparisons should soak the plates before development, and keep the solutions at one temperature. Taking all these matters into consideration, speed markings and meters were of very little use to the ordinary workers. He was not going to deny that they were not useful to makers of plates, but to ordinary users he would say practice is the best meter."

Professor Stebbing said: My experience, Mr. Chairman, has always been with the Warnerke system, but I had to discard the tablets used with the same, and adopt, in place thereof, a standard wax candle, easily procured in my country. I never found these wax candles to vary to any material extent. I always waited for several minutes until the candle was yielding its maximum degree of light, and I am quite satisfied that, as a standard for light, a wax candle of known quality cannot be improved upon, for they are always regular. I quite agree that this subject is one of great importance to photographers, and it would be a good thing if all plate-makers could agree to adopt the same method of testing their plates and indicating the same.

Professor Sexton, of Glasgow College, said: I have listened with great pleasure to the admirable paper that Mr. Armstrong has just given us. The question of the public being informed of the proper sensitiveness of the plates they purchase is one of great importance, and there is no doubt that very misleading indications are to be found on many packets of plates; in fact, my experience has proved these indications to be absolutely unreliable. I quite agree with Mr. Armstrong that daylight, in conjunction with camera and lens tests, is the most reliable method of ascertaining the speed of plates, and it is one that all photographers can employ themselves. I was rather surprised to hear Mr. Armstrong say that Hurter & Driffield's actinograph was almost unknown in Glasgow. I have used it myself for very many years, the difficulty in using it being that a dull light might be a yellow dull light, the same being different to a greyish dull light. The importance of this subject can hardly be over-rated, and, to my mind, the best way to deal with it is to embrace dry plates under the Adulteration Act, and so ensure their uniform quality and for which the public pay.

The meeting concluded with a display of lantern slides.

Wednesday, July 6.

The Annual General Meeting was held on Wednesday morning in the galleries, Mr. George Mason in the chair. There was a fair attendance of members.

The Hon. Secretary (Mr. F. A. Bridge) stated that, so far, 325 members had paid their subscriptions, a number believed to be the largest on record.

Mr. W. Crooke moved a resolution, the effect of which was to appoint a gentleman as Vice President, whose duty it should be to take the chair in the absence of the President. In seconding, Mr. Snowden Ward observed that, had the contingency referred to by Mr. Crooke been provided for in the rules, they would have elected Mr. Mason to the position by acclamation.

Mr. C. H. Bothamley thought no case had been made out for the change. It would be decidedly dangerous to have a Vice-President in training for the Presidency. He was in favour of the old plan, which allowed of Past Presidents deputising in the absence of the President.

Mr. A. Tate (Belfast) thought that they had a sufficient number of Past Presidents to make it tolerably certain that somebody qualified to take the chair would always turn up.

Eventually, after other discussion, it was decided that those Past Presidents who remain members should be Vice-Presidents.

The election of Council was then proceeded with. It resulted in the selection of the following: J. Craig Annan, Glasgow; E. R. Ashton, Tunbridge Wells; Harold Baker, Birmingham; Thomas Bedding, London; Godfrey Bingley, Leeds (*ex-officio*); C. H. Bothamley, Weston-super-Mare; A. Bridgman, Watford; J. J. Briginshaw, London; Alexander Cowan, London; William Crooke, Edinburgh; H. Harvey George, Great Yarmouth (*ex-officio*); William Goodwin, Glasgow (*Local Hon. Secretary*); Sir Howard Grubb, Dublin; Herbert Denison, Leeds; A. Haddon, London; Martin J. Harding, Shrewsbury (*ex-officio*); H. M. Hastings, London; A. Horsley Hinton, London; Sydney Keith, London; Paul Lange, Liverpool; C. Phipps Lucas, London; Percy Lund, Bradford; J. L. Lyell, London; Major Lysaght, London; George Mason, Glasgow; A. Lindsay Miller, Glasgow; A. F. Mowll, Liverpool; W. W. Naunton, Shrewsbury; J. Porritt, Leicester; Andrew Pringle, London; H. P. Robinson, Tunbridge Wells; W. Ralston, Glasgow; J. C. Ruthven, Dublin; A. Seaman, Chesterfield; Henry Sturmey, Coventry; W. Taylor, Leicester; Alexander Tate, Belfast; E. J. Wall, London; J. H. Walker, Leeds; H. Snowden Ward, London; W. M. Warneuke, Glasgow; G. Watmough Webster, Chester; S. B. Webber, London; W. D. Welford, London; J. B. B. Wellington, Elstree; A. Werner, Dublin.

The question of next year's meeting place was then discussed, and it appeared, from a statement made by Mr. Bridge, that four invitations had been received—viz., Antwerp, on whose behalf the "Photo-Circle" wrote stating they would have great pleasure in welcoming the Convention in 1899. It was also said that the proposal was well received in Brussels. The Société Française de Photographie, through Professor Stebbing, sent an invitation on behalf of Paris, and Newcastle-on-Tyne and Gloucester had also expressed a wish to have the Convention next year.

Mr. Bridge personally favoured a visit to Belgium.

Professor Stebbing said that the Municipal Council of Paris would give the Convention a cordial welcome, and no doubt the British Ambassador would interest himself in the matter. He (Professor Stebbing) would personally do all in his power to promote the success of the meeting, for which he suggested 1900 as a suitable date.

Mr. J. Pattison Gibson briefly advocated the claims of Newcastle-on-Tyne.

Mr. Bothamley, in supporting Gloucester, said that no better district could be desired for the meeting. The local Society, as well as the Corporation, were eager to have the Convention, and he thought that, inasmuch as Scotland and the East of England had recently been visited, it was time the West country had a turn. He moved that the invitation of Gloucester be accepted, and Mr. Harold Baker seconded.

The proposition was enthusiastically carried, and it was also decided to send the thanks of the Convention to the other cities which had sent invitations.

The thanks of the Convention were voted to those ladies and gentlemen who had lent slides for exhibition. In seconding the proposition, Mr. J. L. Lyell said the slides shown at the evening meetings were a credit to the Convention, and he particularly complimented Mr. E. J. Wall on the interesting lecture which he gave descriptive of the scientific slides.

The only other business before the meeting was the re-election of Messrs. John Howson and Thomas Fall as Auditors, which was carried unanimously.

An adjournment was then made to Kelvingrove Park, where the group of members was taken by Mr. George Bell, of Sauchiehall-street. In the afternoon a reception of members of the Convention was held by the Lord Provost in the Municipal Buildings.

The Annual Dinner.

The annual dinner, which is always an important function at Conventions, was held on the Wednesday evening at headquarters, the Windsor Hotel. Mr. John Stuart (the President) occupied the chair and was supported by about 140 members. Instrumental music was provided, and a piper, who, among other items, gave "The Cock of the North," added what may be termed local colour to the entertainment. As a souvenir of the dinner, Messrs. T. & R. Annan & Sons had prepared a charming *menu* and toast list, embellished with a very artistic photogravure portrait of the President and half-tone views of the Glasgow Cathedral and University. The principal toasts were: "The Convention," "The Local Secretary," "Absent Members," "The Photographic Press," "The President," and "The Ladies." A smoking concert concluded a very enjoyable evening.

Thursday, July 7.

The day's excursion was carried out in superb weather. The party proceeded by train to Craigendoran, where the special steamer, *The Lady Rowena*, was boarded. Music was provided, and the time passed rapidly, cruising over the waters of the Firth of Clyde until the racing ground of the Mudhook Yacht Club was reached. In Rothesay Bay the steamer ran broadside on with two of the competing yachts, the *Bona* and the

Ailsa, and it is safe to say that many hundreds of plates were exposed on those elegant vessels by the delighted Conventioners, who had turned out in great force. It was a grand opportunity for this kind of work, and the day's outing was enjoyed to the full.

In the evening Mr. C. H. Bothamley delivered a paper on

SOME FUNDAMENTAL POINTS CONCERNING DEVELOPMENT.

I APPEAR before this meeting with some qualms, because I believe there is an expectation that I am about to report the results of some original work carried on with the aid of the grant from the Research Fund that was kindly made to me by the Council. I regret that I have very little, if anything, that is original to bring before you; the grant was made only a few months ago, and since that time my official work has left me no leisure for scientific investigations of any kind.

In these circumstances, it seems best to review, very briefly, the present position of our knowledge concerning some of the fundamental points of the process of development, and to discuss, incidentally, whether some of these points should not be regarded in a manner somewhat different from that in which we have been accustomed to regard them.

The object of development is to produce a perfect negative, and we must, therefore, at the outset, try whether we can define such a negative. Hurter & Driffield, in their memorable paper, state that a negative is perfect "when the amount of light transmitted through its various gradations is in inverse ratio to that which the corresponding parts of the original subject sent out." This can be stated in a different form: "The negative is mathematically the true inverse of the original when the opacities of its gradations are proportional to the light reflected by those parts of the original which they represent." The term "density," as used in the paper, was defined as the logarithm of the opacity, and subsequently the conclusion was drawn that "in a theoretically perfect negative the amounts of silver deposited in the various parts are proportional to the logarithms of the intensities of light proceeding from the corresponding parts of the object."

Now, a little consideration will show that, if we regard a negative not as an end in itself, but as a means to an end, which is a print—and from a practical point of view we must so regard it—this definition cannot be accepted without considerable qualification. It involves the assumption that in the production of the positive print the effect produced is directly proportional to the quantity of light that acts on the sensitive surface. But, even if this be true through a limited range, it is not true in the case of print-out processes, when the amount of pigment formed by the action of light becomes considerable. Further, it is a matter of common knowledge amongst practical photographers that the same negative yields prints of different character, according to the particular process that is used. If a negative be made in the usual way, so that it consists of a series of strips, each of uniform opacity, and if strips of different printing papers, such as albumenised paper, gelatino-chloride paper, and celloidin paper, are printed behind this negative at the same time, care being taken to print a particular strip to the same intensity in every case, there will be very perceptible differences in the gradations of the three prints.

In a word the Hurter & Driffield definition will hold good when the negative is used for making diapositives on plates, the speed of which has been determined in the same way as the speed of the plate on which the negative was made (*i.e.*, by the Hurter & Driffield method); it probably holds good, with less exactitude, in the case of bromide and platinotype paper; but it does not hold good in the case of many print-out papers.

In the same paper by Hurter & Driffield it was shown that pyrogallol above a certain limit retards development, that ammonia accelerates it, and that soluble bromides tend to prevent the production of fog, and in this there was nothing particularly new, but as a result of the experiments described the very important conclusions were drawn that, although changes in the composition of the developer may affect the time required for development, "the ratio of the densities is given by light alone. . . . This ratio is altogether unalterable. No modifications we have made in developers or development have ever seriously disturbed this ratio of the densities." This conclusion, diametrically opposed to the prevalent belief amongst photographers that the gradations of a negative for practical purposes can be materially altered by modifications in development, met with much criticism. Some confusion at the outset was caused by the use of the word "density" in a sense different from that in which it is used by photographers. Mr. Chapman Jones made a number of experiments which he considered demonstrated the inaccuracy of Hurter & Driffield's conclusions, but Hurter & Driffield were far from accepting this view. Mr. James Cadett, who is thoroughly familiar with the Hurter & Driffield methods, has also made a large number of experiments, which to me, at any rate, seem to show that Hurter & Driffield's conclusions require considerable modification. Cadett's experiments are described in "Dry Plates," and they show that large modifications in the speed of plates, or, in other words, in the gradations of negatives, can be made by alterations in the mode of development, *provided that the composition of the developer is modified before it is poured on the plate*, and not during the process of development. This important limitation is intelligible if we consider the part played by diffusion in the process. Similar results were obtained both with pyro ammonia and pyro soda, and it was found that differences in gradation were also obtained according to the chemical nature of the reducer employed, *e.g.*, pyrogallol, ortol, or ferrous oxalate. Cadett also found that the temperature of the developer has an important influence on the gradations.

In a recent paper, which we must all greatly regret must be their last conjoint paper, Hurter & Driffield describe experiments and results which, unless I misunderstood them altogether, go far to demonstrate that some of the conclusions in their earlier paper are untenable. They show, for example, that by alterations in the composition of the developer it is possible to make the inertia or speed of a plate, which depends on the gradations of the resulting negative, vary more than fifty per cent. The variations are not so great as those obtained by Mr. Cadett, but they point to the same conclusion, and it would seem that we are again back to our old position, that a photographer can alter the gradations of the negative by the way in which he develops it, though the extent of alteration possible may not be so great, especially with very rapid plates, as used to be supposed.

A careful examination of the prints exhibited during this Convention from negatives made on Sandell plates with a very wide range of exposures must, I think, impress every one with the fact that the nature of the sensitive film, physical as well as chemical, is an exceedingly important factor in determining the character of the negative, or, perhaps one ought to say (what from the *practical* point of view is the same thing), in determining the character of the prints obtained from the negative.

In a recent paper on the "Comparison of Developers," Monsieur Houdaille states that he can obtain negatives of practically indistinguishable printing quality from plates that have received exposures in the ratio of one to twenty.

One of the most elaborate and interesting papers on the subject of development that has yet been published was contributed last year to the *Photographische Rundschau* by Von Hubl, whose work and ability are so well known that any statements that he makes are worthy of serious consideration. Von Hubl states that, by making various modifications in the composition of the glycin developer, and in some cases varying its temperature also, it is possible to obtain negatives of practically the same printing quality from plates that have received exposures, not only in the ratio of one to twenty-five, but even in the ratio of one to five hundred. In the course of this paper, which time will not permit me to summarise (for it is a very long one), Von Hubl draws a very important distinction between the development of the surface and development deeper down in the film, and points out that in case of under-exposure the surface development must be accelerated and deep development retarded, whilst in cases of over-exposure the reverse is, of course, the case.

It appears, therefore, that at present we have to decide between conflicting statements made by investigators of acknowledged ability, and there are many points that require further investigation. I trust that at the next Convention I may have some definite results to report, but it is obvious that the question is one of such extreme complexity and difficulty that an investigator may perhaps be forgiven if he approaches it in a frame of mind that cannot be described as exuberant.

After some brief remarks by Mr. T. N. Armstrong and Professor Sexton a vote of thanks was passed to Mr. Bothamley.

THE COUNCIL MEETING.

This was held after the Ordinary Meeting. Votes of thanks were passed to the readers of papers; to Mr. Mason for presiding; and to the Glasgow Executive for their labours on behalf of the Convention. To the latter vote Mr. W. Goodwin, the local Honorary Secretary, replied. He remarked that his office had been a somewhat difficult one, inasmuch as he was not acquainted with the requirements of the Convention from practical experience, but he was pleased that the meeting had so far proved successful.

On the proposition of Mr. Harold Baker, seconded by Mr. Percy Lund,

Mr. Wm. Crooke (Edinburgh) was elected President of the Convention for the year 1898-9.

FRIDAY, JULY 8.

Fortunate once more in the weather, which was remarkably bright and warm, the Convention again turned out in undiminished strength for the excursion to Loch Lomond. Train was taken to Ardlui, whence a special steamer conveyed the members down the Loch. From Luss, boat parties journeyed to the islands in the Loch. There were between 1700 and 2000 plates exposed on this excursion, which sent the members home to Glasgow both delighted and tired to the fullest extent.

In the evening a paper on "The Gum-Bichromate Process" by Mr. W. B. Bolton was read. This will appear in our next.

AMERICAN PHOTOGRAPHY AND PHOTOGRAPHERS.

MR. H. SNOWDEN WARD read a paper on this subject, in the course of which he said that the subject was so large that he could only touch, and that very briefly, upon some important points. It was very difficult to make useful comparisons between British and American work, since the conditions in the two countries were so different, and, to a certain extent, the ideals and aims were different also.

In amateur work the fundamental difference lay in the fact that the United States had comparatively few real hobby-riders, because there was no great "leisure class" such as existed in the older countries. Hence amateur photography was not on such a thorough and systematic basis in the States as in Britain, though there were numberless "button-pressers." Still, there were large numbers of very able amateurs, including many whose work had not been seen at all in Britain, but who could materially add to the interest and value of our exhibitions.

A disadvantage of the American workers lay in the fact that they had no thoroughly representative exhibitions comparable to the Exhibition of the Royal Photographic Society and to the Salon; and, though they had many good local exhibitions, they needed wider scope for the comparison of their work with the best examples, and also needed more thorough Press criticism.

The society life in the States was stronger than in Britain; and, though the number of societies was perhaps smaller, and the average number of members was fewer, the societies were better housed, and the interest taken in their work and the percentages of members in regular attendance at the meetings were greater than in Britain. The subscriptions were much higher, but, as a result, every society of standing provided good conveniences in the way of rooms open every day and all day, good laboratories (with the necessary apparatus and fittings), often a studio, and in several cases the further advantages of a good middle-class club, with comfortable reception and smoke rooms, or even with a billiard room. The societies' business was conducted more formally and with more business-like precision than in Britain, and in some of the societies the meetings were followed by informal club suppers, which tended to produce useful discussion and exchange of experiences. The criticism evenings, on which the members' lantern slides were criticised by a painter or by the members generally, were very successful and useful, and might well be copied in Britain.

Professional photography in the States was a larger craft, with more varied aims, and with greater profits, the speaker feared, than were now current in Britain. Unfortunately for the artistic side of portraiture, the professionals there, as well as here, were obliged to study, first, the cash question, which meant that the general ideal—not a very high one—was the pleasing of the sitter. Still, there were many factors in the American methods which made for progress, and Mr. Ward here described at some length the influence of the Annual Convention and Exhibition of the Photographers' Association of America, and the excellent organization of travelling demonstrators for the plate and paper-makers. Mention was made of the comparative rapidity with which a new style of portraiture was taken up throughout the country, and the members of the Convention were referred to a small collection of portraits by Hollinger and by Falk, of New York, by Strauss, of St. Louis, by the Albany Art Union, and by W. H. Hale, of Geneva, N.Y., which were hung in an djoining room.

One of the chief factors in the success and progress of British workers in the past had been a strong and unfettered photographic press, while America had suffered greatly from the fact that there were many "stock-house" journals, owned by individual manufacturing firms, which had fettered and hampered general journalism. Of late, the American press had been steadily improving in this respect, the old independent journals increasing their influence and the stock-house journals becoming more independent.

THE CONVENTION.

BY A SCOTSMAN.

"O, WAD some power the giftie gie's
To see oorsels as ithers see us"

must have been in possession of the mind of the Editor of these pages, when at last week's pow-wow of the photographers of these islands he asked the writer, who is even as the least of one of the prophets, to place on paper his impressions of the Convention.

Impressions is the proper word, for no one with the slight acquaintance that a few days at the Convention gives would have the audacity to give any more authoritative statement. The knowledge necessary to lay down the law and the testament with authority, "not as the scribes," is not acquired in a hurried visit nor a chance acquaintance, although some of our writers would fain make us believe the opposite. The critical reader will therefore understand that the following is a brief sketch of the Convention as seen through a pair of spectacles decidedly Scottish.

The first thing that struck the writer was the preponderance of the Sassenach, compared with the native Scot; this was all the more noticeable that the Scot is usually considered anything but a "stay-at-home," but probably the Convention frivolities did not appeal to his more staid desires. One consolation we had was that the native samples were mostly first-class specimens, and from the President—a richt guid chap—downwards to the merest Convention novice did no disgrace to their country.

'Tis often said that the Scot, at least in public, or until he dies and leaves a bequest to some University or other, is in a persistent state of hard-up-ness; we might almost say that this received additional proof at the Convention. The average Scot, with the exception of those resident in Glasgow, whether from the above reason or from a desire to limit his luggage, had only the one suit with him, consequently he stayed away from the "full-dress" *conversazione* and attended meetings, reception, dinner, and excursions, in the same one suit. The Sassenach, on the other hand, seemed to have brought his wardrobe with him; he had the regulation frock-coat and tile for meetings; at dinner, &c., he appeared in all the glory of his dress coat and large expanse of linen; while at the excursions he boasted the regulation "knickers" and Norfolk jacket, the check was sometimes large and the legs displayed were sometimes a little after the nature of the man who was so ethereal that it was said his "calves were away at the grass." The Scots had, however, one champion who, although a little late in joining the party, completely overshadowed all, during the life on the ocean wave, so much so that when he came up with his little lot to take a photograph of the ladies' group, was hailed, I think by a Southern, who had "Dun-more" than enough to keep the party lively, with "Hello, make way for the Commodore."

We were greatly tickled to hear the southern attempts at applause, even the best of them appeared to lack the ability to trill out the hearty "hear, hear" that shows to the orator the approval of his audience, that word so hearty and encouraging to our ears when given with all its breadth and fervour was abbreviated into an insipid "he-a, he-a." We also noticed that the "h" and the "r" still puzzle the Englishman we had thought that the march of education had uprooted this, but even in the well-educated ranks of the Conventioners this was evident to northerners, who had "an idea" it was "hout" of date.

That some, at least, appreciated the greatness of Scotland was evident and when the lady orator, and a first-class one too, proudly claimed remote Scottish ancestry, we excused her "*Old* Langsyne;" we admired Mr Bothamley's honesty and exquisite judgment when he stated, in spite of the sneering criticism recently voiced by a writer, that the Glasgow Municipal Buildings were the finest in the world; and every southern voice, without exception, was lavish in his or her praises of the scenery on Thursday and Friday. On Thursday one Scot was ravenously devouring the praise poured on the scenery of the Gairloch; the speaker, an Englishman was contrasting the grandeur of the hills, when compared with the flat and monotonous banks of the Thames; the Scot, with a self-congratulatory air, said, "Ay, we want that monotony." The Englishman looked up in astonishment, "Want it! I don't see what you'd want monotony for when you have this wealth of variety." Then Scottie saw that the native idiom was confusing, and explained, "Perhaps (you will notice he would not quite admit error) I should have said, The monotony is a-wanting here we do not want it, in the sense you mean." (He-a, he-a.)

An Englishman, when he goes to be amused or to enjoy himself, makes sure that, whatever the circumstances, he *is* amused, and he does enjoy himself, not a bad plan either; the Scotsman, on the other hand, pr

bably from his sterner up-bringing, is quite ready to be amused and also to enjoy himself, but he must have a reason for it; his southern compatriot is more happy-go-lucky, and enjoys himself "whether or no."

I must not neglect to return thanks to the lady and gentleman who who did their little best to honour the country they visited by donning what they, doubtlêss, supposed was the national headgear. Now, it requires a kind of a national instinct to be able to wear a Tam-o'-Shanter properly; the lady, probably wfth the intuitive gracefulness of the fair sex, wore her Tam-o'-Shanter as to the manner born, and the pebble and silver clasp was in correct taste; but oh, dear, her better half seemed far frae hame in't. It was not worn correctly, why, I cannot quite tell, but just it was not correct; this gives him little information, but let him ask a Scotsman to put it on, and he'll see the difference. Might I suggest "Sandy"? I think, in spite of the influence of southern climes, he could wear it properly.

The press was well represented and for the first time many had a chance of gazing lovingly or otherwise on those whose newspaper, magazine, or journal, they had for long studied. Perhaps, Mr. Editor, as your various contemporaries have been giving a loose rein to their Scots' dialect and you have up to now kept a tight rein on that effervescence, you may allow the writer to close these rambling notes with a "drop of Scotch" in the form of personal description of several of the men present at the Convention; the ladies are sacred from the pen of a northern critic, even although a Sassenach does not disdain to take forbidden snap-shots of them; is that not so, Mr. P.?

Wi' a' riverance to the po'ers that be, namely, the michty Press, we'll first tak' the editors and several anes that we recognised frae their writin's, an' that 'll tak' in nearly a-body, but first lat's ca'canny a menute or we speak o' that great man the President.

In John Stuart, a-body seemed someway to drap the Mister, the Convention wis blessed wi' a rare man, an' it was a real pleesure when he wis able to be present i' the body; of coorse he wis present i' the speerit afore that, but that didna quite satisfee us. A big, burly, pawky Scotsman, aye ready wi' a joke, and never tired o' seein' a-body richt, he wis weel worthy to represent us afore a thae Englishers. My blessings on yer frosty pow.

Then, to tak' the editors, and here we sh'd tak' oor editor first; but as I jaloosed frae the look o' 'm he's gey modest, we'll refar a wee, an' tak' him aifter. There's Horsley Hinton, o' the A.P., a weel-faured like chap, wi' no a little o' the æsthetic in his appearance, just sic an ane as ye wid expec' to lead a crusade for the pictorial, ye wid think frae the looks o' 'm, hooever, that his picters wid be brichter, an' no o' sic a dowie natur'. Wall, o' the P.N., is a smart-lookin' chap, wi' a gey shairp ee' whint they gold gleeses o' his, he is likes he kent a thing or twa, an' I wid nearly beat he's a game fechter. Sturmey, o' photography, is a big, well-filled man; he seems a wee solitary in his natur', ye didna of'en see him mixin' up wi' "the boys," but he's a couthie lookin' chiel, an' micht wi' guid guidin' qualifee for a bailie yet. Snowden Ward, o' *The Photogram*, seemed a freen' o' ilka ane, wi' the inner circle he wis at hame; an' wi' the outer crowd he wis equally at hame; he is a man wi' a mission, an' never lost a chance o' shoovin', for it his guild, he even got its ticket on the dark room. Percy Lund, o' the Practical and Junior, is an quiet young chap, maybe a wee back-art, but he wisna blate whan he photographed the photographers o' the leddies. Bedding, the gent that rules this show, is o' guid heicht, as straicht as ye like, "black but comely" (I read that some place, an' maun get it in), rather studious in appearance, an' a man that is aye looked up to—by them wee-er than himsel' at least.

Bridge, the Secretary, seems to hae ae hobbie, the Convention, an' I ken na whare they'll get a successor to 'm, sh'd he tak' it in 's head to resign. He has, in extraordinar' measure, ae thing that nae secretary can dae withoot—tact—an' he levels doon the rouch bits bonnily. Goodwin, his local man, we ken to be guid frae the wark he did, but then he's modest, like a' Scotsmen (he-a, he-a), and disna show 'm'sel muckle; he's a guid man, tho'. Welford was there, cheery as we expectit, but fearfully solemn when he startit his orchestra; if he can play as guid's yon on ae string, what a player he'd be on a full-sized fiddle. George Mason is a couthie, weel-groomed man, speaks wi' a broad Glesca twang, an' is maybe juist gey cannie as a chairman. Bothamley is a smart chap, no like a ceity chap, but mair like a weel-t'-dae country laird; he's a fine speaker, maybe the best. Tate, o' Belfast, is a patriarch. I'm no sure that he's no a Scotsman, he has a rare auld Scots head on him, onyway, and speaks verra siccar. Crooke, o' Edinboro, speaks little; in private he is some gey original ideas; notice his wey o' snapshottin' on boord; when dressed for the pairt, he's a born sailor. Craig Annan, is, of onything solemn, but he's the richt sort; he showed the way for Hielan' honours at the dinner.

I wis quite ta'en wi' S. B. Webber; he's a cheery auld man, juist for a' the warld like a guid honest Scots farmer; he's ane o' thae men ye like. Professor Stebbing frae the "gay city" was a hearty, wee man, speaks guid English, but mixes 't wi' an occasional Frenchie shrug that was raither takin'. Pattison Gibson is a weel-groomed north-country man, wi' a fine, broad North-country twang; I raither liked his quiet, modest speech in favour o' Newcastle as a meetin'-place for neist year's Convention. Ralph Robinson is a plain, unassuming young man, country in appearance, an' hamely in's natur as ane o's ain *genre* picters. Ashton, o' Eastern fame, is o' raither studious cast, wi' a delicate appearance an' a broon beard. Harold Baker is a smart up-to-date man, wi' some life in'm, an' a quick e'e gleamin' ahint his gold specs. "Sandy" Henderson has, it is said, been only catched sleepin' aince; that wis when sailin' on Thursday he wis photographed—he'll ken wha be by an' by; he's a typical auld Scotsman.

But I trow I'll be wearying ye, an' I'll need tae ca' a halt. In spite o' a' that's been said, I've come tae the conclusion that the Convention's a rare affair, that the Conventioners are rare good company, an' that gif' I be able I'll be at Gloucester; it's then me that'll be the stranger.

"An cum thu cuideachd rium?"

A PHOTO-LITHOGRAPHIC HALF-TONE PROCESS WITHOUT A SCREEN.

By A. Albert.

Many have been the experiments to discover a method of transferring to stone or metal a half-tone picture so that it would print in the ordinary litho or book-printing press. Asser, of Amsterdam, the discoverer of the transfer process by means of photo-lithographic paper prints, busied himself with this about the end of the fifties.

Although, through the enormous perfection of autotype in present times, this process would seem superfluous for general work, still it ought, especially in chromo-lithographic printing, to be of considerable service, because the method of preparing the necessary printing plates is simple, and it is not necessary to split up the half-tones into points, grain, or stipple by photographic methods.

In the K.K. Lehr und Versuchsanstalt in Vienna, since December, several examples have been prepared by a process which has already been demonstrated before one of the societies. The process is as follows:—

A good photo-lithographic transfer paper, such as can be obtained commercially, is sensitised in a bichromate bath, squeegeed to glass and dried, and then printed, not too vigorously, under an ordinary negative, such as an outdoor subject, copy of painting, &c., and this is then inked up with a greasy ink, such as photo-litho transfer ink with a velvet roller. The sheet is then immersed in cold water, avoiding air bubbles, and allowed to soak in repeated changes of water (for about three quarters of an hour), till the yellow colour of the bichromate appears to be removed from the paper. If whilst in this state the print is rolled up with a velvet roller slowly and without pressure, all the details of the pictures will appear. If it is rolled too quickly, the image is hard and is rubbed away; if too much ink is used, the whole picture becomes heavy and bunged up in the shadows. By slow and long rolling the first fault may be cured, and the second by using a clean roller. When a beautiful delicate ink image is obtained on the print, it is rinsed with pure water and pinned to a board to dry.

The transfer is effected in the ordinary way, but on a grained stone, by means of which the breaking up of the continuous photographic tones into a grained image is obtained; if the grain of the stone is coarse, the drawing will be raw, sandy, and rubbed away. The transfer, which is ready for etching, may be worked up with chalk or ink by the photographer, which is not possible with transfers produced on polished stone. After etching, the stone is treated exactly the same as a litho chalk drawing, and requires the same care, through the whole run.—*Wiener Freie Photographen-Zeitung.*

BALL-BEARING SQUEEGEES.

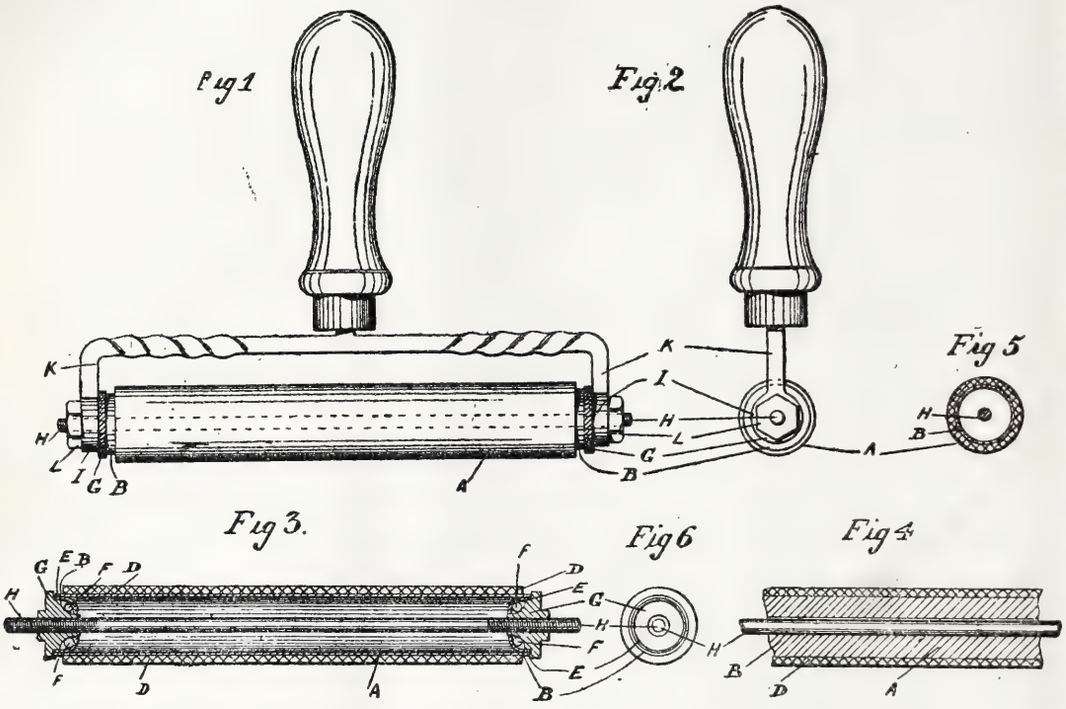
Photographic rolls of ordinary construction, says Mr. H. W. Cottrell, consist of a wood roller covered with rubber, the said roller being mounted on an iron spindle rotating in eyes on the ends of the carrier attached to the handle. Great inconvenience is caused by the said spindle wearing the eyes of the carrier through and the breakage of the same. "By my invention these difficulties are overcome. In carrying my invention into effect I provide the roller with an iron spindle screwed at both ends and furnished with ordinary conical screw nuts. I attach to each end of the roller an ordinary ball-bearing race which I provide with a series of balls, the same being adjusted and held in position by the conical nuts aforesaid, the ends of the spindle being placed in the eyes of

the carrier and held back by lock nuts, thus forming a bearing for the rolls.

"Figs. 1 and 2 show in side and end elevations respectively a photographic roll or squeegee.

"Figs. 3 and 4 are longitudinal sections through the roller. Fig. 5 is a vertical section of the same roller, fig. 6 being an end view.

"The roller, A, consists of a wood or metal foundation, B, covered with rubber, D. Into the ends of the said roller is fitted the ball race, E, and balls, F, which are held in position and adjusted by the conical screw nuts, G, screwed on the spindle, H. The ends of the spindle, H, fit into eyes, I, I, of the carrier, K, and are retained in position by the screw nuts, L, which are screwed up after the adjustment of the roller, A, on the spindle, H."



AIDS TO BUSINESS.

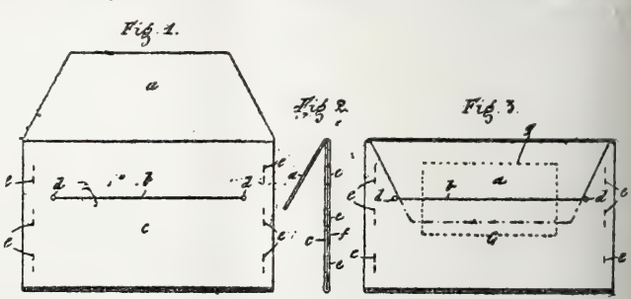
Mr. F. Dundas Todd, the able and learned Editor of our Chicago Contemporary, *The Photo Beacon*, a publication which improves with every number that is issued, gives the following well-illustrated advice to photographers anxious to attract and increase patronage: "Double your callers; whatever happens, double your callers, and you will double your receipts." How can this be attained? In various ways, and one or two illustrations may be suggestive. Talking one day with Mr. Smith, of Evanston, as to the secret of his success, he said he believed it was mostly due to one point—he always tried to keep his place so enticing that the ladies of the town were in the habit of arranging with each other to meet in his studio, which by the way is on the ground floor. While they are waiting for each other they amuse themselves looking over the photographs, and he therefore keeps adding to and taking from the collection daily. The ladies thus know who has been patronising the photographer, and by sheer force of example are apt to go and do likewise. Strauss, of St. Louis, is sufficiently wide-awake to know the importance of doubling his callers, and frequently turns his premises into a veritable art gallery, where all and sundry are made welcome. He has already had at least three of such exhibitions in his new place, and we fully expect to receive the usual invitation to another of the same at an early date. If they were not aids to business, Julius Strauss would be the very last man to meddle with anything that interfered with the smooth running of the business machinery. The formulæ appear to be very simple. Make your studios attractive and interesting, and encourage people to visit them for something besides the immediate business of being photographed. Has such an experiment been tried here?

A NOVEL TONING AND FIXING PROCESS.

This is due to Mr. A. E. Wade, who claims that it both improves the appearance or finish of photographic prints and their resisting capacity to time, in being exposed to vitiating atmospheric conditions in storage, &c., and under various other circumstances of ordinary contact. By the use of his combination solution for fixing and toning, and which, in addition, completes the photograph with greater effect, a considerable degree of economy is assured, and what is of immense importance in general photographic manipulation consists in the fact that the employment of the dangerously poisonous sulphocyanide of ammonium becomes unnecessary by the application of his combination solution. The great active principle of the solution—as composed of appropriate proportions, varying for specific purposes, of chloride of gold, nitrate of lead, nitrate of potash, hyposulphite of soda, flowers of sulphur, and quicklime respectively—is secured by the employment of ordinary water treated by the following special process, viz., the water while in a boiling condition is saturated, or acted upon till saturated, with smoke obtained by the burning of ordinary bituminous coal, or the smoke may be obtained from anthracite or other carbonaceous fuel. After passing the smoke through the boiling water until it becomes thoroughly saturated with it, and then allowing it to cool, the above-named ingredients are incorporated with the fluid thus treated in requisite proportions. The mixture is now agitated, and, after allowing it to subside or clear, the insoluble sediment is filtered off, and the solution is now complete for its intended functions. The prints treated with it are absolutely permanent, whereas those treated with other existing solutions will fade in probably less than two years. Another of its great properties is that the whole of the solution, once prepared, can be entirely used up without adding to its strength, and at the same time the solution thus prepared will remain fit for use at any time during a number of years. Finally, one of its valuable qualities consists in the fact that no previous washing of the prints is required in using it, and, besides, it absorbs silver from the paper, which, where previous washing is necessary, would produce a waste, whereas in this process it will help to enrich the solution and to considerably improve the tone of the picture treated with it.

BROUGHTON'S POSTAL WRAPPER.

Mr. Broughton takes a sheet of cardboard, leather board, or other like material of any size, and folds the same into three parts, viz., the front, *c*, the back, *f*, and the flap, *a*. The flap, *a*, is cut to a special shape, and is slipped into a slot, *b*, cut in the front fold, *c*, as in fig. 3. The ends are fastened together with wire staples, *e*, or by any other suitable metallic fasteners to prevent the contents slipping out. The slot, *b*, is finished off at each end with a hole, *d*, which is punched out by the usual cutting tool.



After the flap, *a*, is slipped into the slot, *b*, as in fig. 3, a label gummed, *g*, over where the flap, *a*, enters, as shown by dotted lines, which seals the packet and prevents the wrapper opening during transmission.

THE BRITANNIA WORKS COMPANY.

It may be of interest to readers to give a few details of the reorganization of the Company on a broader basis. The capital of the new Company is 380,000*l*., divided into 190,000 six per cent. cumulative preference shares of 1*l*. each, and 190,000 ordinary shares of 1*l*. each. Sixty thousand of preference shares and 60,000 of the ordinary shares were reserved for the shareholders of the old Company, and were taken as part payment for the property, the balance of both classes of shares being offered for subscription at par. The capital was largely over-subscribed. The whole of the shares have been taken up and paid for, and letters of regret sent to those to whom allotments could not be made. In making the allotment, preference was given to the trade and to users of the Company's productions, as far as they were known. This point is specially men

ioned because it forms the final link in the chain of co-operation which the Company have been aiming to produce since 1891. In that year the Company not only introduced a profit-sha ing scheme for the benefit of the business and the *employés*, but facilities were given for the *employés* to acquire shares in the Company. The reorganization of the Company enables it to further enlarge the scope of this co-operative scheme by interesting the trade and users in the success of the business, thus embracing capital, labour, and purchaser in one common interest.—*Photographic Scraps.*

Our Editorial Table.

"PHOTOGRAPHY."

By Rev. A. H. BLAKE. 115 pp., price 1s. London: George Routledge & Sons, Broadway House, Ludgate Hill.

THIS is one of the publisher's well-known "Oval" series of handbooks to which it is a worthy addition. Mr. Blake is not only an observant photographer whose work is full of artistic charm, but he writes about his subject with knowledge and distinction. He has designed his book to give a "little practical help to the beginner at the outset, to carry him over a few initial difficulties," and in this object we quite feel that he has been successful. It is just the book that we ourselves would not hesitate to put in the hands of an intelligent beginner (we shudder to think of the number of "beginners'" books turned out by half-educated plate-spoilers which we have reviewed) for it is written in a chatty and almost conversational style, while the information is not too abstruse in form, and, above all, is sound in essence. There is a section devoted to photography from the artistic standpoint—indeed it forms nearly half the book—and this we can cordially recommend for perusal and study, for it is obviously inspired by matured judgment and restraint, and an absence of the penny-a-lining balderdash and word-spinning that is so frequently foisted off to-day as the literature of pictorial photography, by one or two of the persons whose writings such an excellent exponent of conciseness in style as Mr. Blake himself so strangely admires. But this phenomenon does not detract from the excellence of Mr. Blake's own little book, which we sincerely recommend.

AUSFÜHRLICHES HANDBUCH DER PHOTOGRAPHIE (VOL. IV. PART 1). DIE PHOTOGRAPHISCEN COPIRVERFAHREN MIT SILBERSALZEN.

Wilhelm Knapp, Halle a/S.

THE second edition of this section of Dr. Eder's *Handbook of Photography* has reached us. As indicated by the title, it deals with the various printing-out processes in silver. The work has been brought well up to date, and may be regarded as a practically complete history of this branch of photography, as well as a guide to the preparation of the numerous varieties of printing-out papers, their treatment and characteristics. From a technical point of view the work is of great value, and the printer, or amateur, in search of special effects of tone, will find this volume especially valuable.

News and Notes.

MR. F. E. JONES, late of Messrs. Jones & Co., Southampton-row, and late representative for Messrs. England, Bros., has undertaken the management of Messrs. Illingworth & Co.'s West-end establishment, 5, Soho-street.

FATAL EXPLOSION OF ACETYLENE GAS.—A Reuter's telegram, dated Berlin, July 9, says: "A fatal explosion of acetylene gas occurred this morning at the metal works of Messrs. Goliasch & Company in the Linien-strasse here. A foreman was killed on the spot, and another man was slightly injured."

MESSRS. L. TRAPP & CO, of 29, Budge-row, Cannon-street, London, E.C, write: "In your issue of July 1 you give a report of an exhibition by Mr. R. Thiele of a new flash lamp at the Royal Photographic Society's meeting on June 28. We beg to inform you that we are the sole agents for this flash lamp (Weiss's patent)."

A PHOTOGRAPHER'S CANVASSER IN TROUBLE.—At the Rotherham Police Court, on June 28, a young man named Arthur Douglas Thompson was charged with obtaining money by means of false pretences. It appeared that the defendant had been in the employ of Mr. Johnson, a photographer of Rotherham, and it was alleged that he obtained money for photographs, and did not account for same. Defendant was committed for trial.

THE South London Photographic Society's Continental Excursion to Rotterdam on August 13, 1898, under the leadership of Mr. William F. Slater, F.R.P.S., leaves London from Liverpool-street at 8.30 p.m., arriving 8.30 Sunday morning in Rotterdam. Fares: 15*s.* second class, 22*s.* second class and saloon, returning any day, providing there is a party of twenty. Hotel accommodation is to be provided at a cost of 5*s.* 6*d.* per day. It is proposed to visit Dordrecht, Brielle, the Hague and Scheveningen, Delft, and other places. Full particulars will be announced in a few days, and can be had from Mr. Slater, 169, Southampton-street, Camberwell, S.E.

PHOTOGRAPHIC CLUB.—Wednesday evening, July 20, at eight o'clock Discussion, "Photographic Papers." Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Sec. (Mr. W. R. Sutton, 4, Queen-street-place, London, E.C.) will be pleased to forward on application.

AT a meeting of the Congress of Archæological Societies, held on the 6th inst. at the rooms of the Society of Antiquaries, the Right Hon. Viscount Dillon in the chair, Sir J. Benjamin Stone, M.P., President of the National Photographic Record Association, delivered an address upon the objects of the Association. There was on exhibition a collection of photographs by Sir J. B. Stone, Messrs. J. Welch, S. B. Bolas, Snowden Ward, J. Diveri, Harold Baker, G. Scamell (Hon. Secretary), and others, which photographs will form part of the second donation of the Association to the British Museum.

BOLTON MUTUAL PHOTOGRAPHIC SOCIETY.—The members of this Society have sustained a very severe loss by the death, at the early age of twenty-eight, of their highly esteemed Secretary, Mr. Peter Woods, who died at Southport, on July 6. The Society was formed in January 1897, mainly through his exertions, and under his direction it has developed most promisingly. He spared no pains in promoting its welfare, and his genial, captivating manner endeared him to those who made his acquaintance. He leaves a widow and one child, and the members of the Society have conveyed to Mrs. Woods an expression of their sincere sympathy with her in her heavy bereavement.

THE annual outing of the *employés* of Messrs. B. J. Edwards & Co. took place at Southsea on the 9th inst. The company, which included all those engaged in the works at Hackney, and a few invited friends, sat down to an excellent dinner at the Victoria Hotel, an item on the *menu* which was highly appreciated being "XL pudding." The chair was taken by the veteran head of the firm, Mr. B. J. Edwards, and the vice-chair by Mr. T. Cowderoy, the oldest member of the staff. The cordial feeling existing between employers and employed was more than ever expressed on this occasion. The dinner was followed by various toasts and a display of talent in both vocal and instrumental music, which was an agreeable surprise to the visitors. After spending a most enjoyable day, the party returned to London in the evening, well satisfied with their outing.

HIS CHEMICALS WENT WRONG.—At the South Shields Police Court on Monday, Richard Thompson was summoned for assaulting John Salt. The complainant, in the course of his evidence, stated that he had a photographic studio at the pier head. The defendant entered his studio with his wife and baby, and wanted to be photographed. The complainant told him that he could not possibly do it, as some of his chemicals had gone wrong and it was towards the end of the day, but he directed him to another place, where it would be taken. The defendant then became abusive, and struck him two or three times. He sent for a policeman to take the defendant's name and address, and remove him from the premises. The defendant said the complainant struck him first, and another witness said he saw the complainant push the defendant. The bench imposed a fine of 2*s.* 6*d* and costs.

Re GEORGE GUSTAVE GUGGENHEIM, 33, St. John's-square, Wolverhampton, and formerly carrying on businesss in Snow-hill, Wolverhampton.—The Official Receiver for the Wolverhampton District has now issued his report and observations under this failure, from which it appears that the debtor, until January 1894, was an assistant photographer in a situation at Birmingham. He then joined a Mr. Albert Major in partnership in Wolverhampton as photographers, but in August of the same year the partnership was dissolved, and debtor then joined a Mr. Whitlock. This partnership was dissolved in July 1896. The bankrupt has since been engaged as a photographer in Wolverhampton and Birmingham. The statement of affairs filed by the debtor discloses liabilities amounting to 214*l.* 19*s.* 1*d.*, and assets estimated to produce 25*l.* 13*s.* 9*d.* He alleges his failure to have been caused through want of capital and inability to finance and manage his business.

MESSRS. FUERST BROTHERS write that, in view of the success obtained by the pyro-acetone developer (recently put upon the market by them), they give two formulæ which they advise for pyrogallic and hydroquinone; no doubt, they will be of interest to our readers.

PYRO.

Acid pyrogallic	1 part	or	¼ ounce.
Water	100 parts	,,	25 ounces (fluid).
Sulphite of sodium, anhyd.	5 ,,	,,	1¼ ,,
Acetone solution (Lumière's)	10 ,,	,,	2½ ,, (fluid).

HYDROQUINONE.

Hydroquinone	3 parts	or	¾ ounce.
Water	100 ,,	,,	25 ounces (fluid).
Sulphite of sodium, anhyd.	10 ,,	,,	2½ ,,
Acetone solution (Lumière's)	10 ,,	,,	2½ ,, (fluid).

A STARTLING incident is reported from Bilston, at a cinematograph exhibition belonging to Captain Thomas Payne, of Birmingham. It appears that Captain Payne travels about the country with a booth capable of holding 500 people, and on the platform he gives exhibitions with the cinematograph, showing the Diamond Jubilee procession, and many other scenes. Whilst located in an open space adjoining Market Hall, Bilston, he was giving his usual entertainment before an audience of about 200 people, and was just about to give illustrations of the terrible disaster at Blackwall, when one of the gas pipes connected with the apparatus became disconnected, causing a flash and a little noise. The incident was a trifling one, but one of the spectators at the rear of the booth shouted "Fire!" This stupid action frightened the audience, who at once rushed to the doors to get outside. Captain Payne left the cinematograph, and shouted to the audience that there was no need for alarm; but the stampede was so great that, in struggling to leave the booth, people crushed against the canvas, caused a film to ignite, and this, setting fire to some curtains, made the canvas roof of the tent a mass of flames. In a few minutes the roof and the cinematograph were destroyed, the damage being estimated at 40*l.* Two police constables, who were close at hand, rendered great assist-

ance in extinguishing the flames, and the Bilston Fire Brigade were soon on the spot. Captain Payne rushed on the platform, removed several gas cylinders, and thus prevented a serious explosion, but he had his hands burnt somewhat severely; however, he was, fortunately the only person injured by the fire. As the premises were not insured, the loss is a very serious one for the showman. "Captain" Payne, in the course of an interview with a representative, stated that he had been a showman for upwards of a quarter of a century, and had never had a fire or an accident before. He attributed the fire to the person who shouted out "Fire!" and, whilst he had left his usual place to prevent a panic, the fire was caused, and he had to suffer the whole loss.

Patent News.

THE following applications for Patents were made between June 27 and July 2, 1898:—

CAMERAS.—No. 14,317. "Improvement in Photographic Cameras." S. D. McKELLEN.

CINEMATOGRAPHY.—No. 14,369. "Method of and Apparatus for Producing and Projecting Series Pictures." R. KRAYN.

CINEMATOGRAPHY.—No. 14,483. "Improvements in and relating to Apparatus for the Production and Exhibition of Animated Photographs." *J. Dubouloz* and *The Société Demaria Frères*, France. A. F. SPOONER.

PHOTOVISOGRAPHY.—14,469. "Improvements in Photovisographs." L. H. COHEN. Complete specification.

PHOTO-ENAMELS.—No. 14,617. "Improvements in Photographic Enamel Plates, Plaques, Dishes, Window Panes, and like Articles of Decoration or Ornamentation." A. J. A. BERTHELIER. Complete specification.

TRIPOD.—14,652. "An Improved Tripod for Supporting Cameras and the like." W. GREENWOOD.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

July.	Name of Society.	Subject.
16	Croydon Camera Club	Excursion: Balcombe, Worth, and Turner's Hill. Leader, John Smith.
18	South London	*The Colour and Surfaces of Photographic Pictures from the Artistic Point of View.* Roland C. Whiting.
19	Gospel Oak	*Optical Lantern Manipulation and Projection.* W. A. Palmer.
19	Hackney	Carbon Demonstration. Thomas S. Skelton
20	Borough Polytechnic	Toning P.O.P. and Mounting.
20	Croydon Camera Club	Presentation of an Important Photograph to the Mayor and Town Council for the Town Hall.
20	Photographic Club	Discussion: *Photographic Papers.*
23	Birmingham Photo. Society	Excursion: Penkridge. Leaders, J. P. Croft and T. Burdett.
23	Bootle	Excursion: New Brighton.
23	Borough Polytechnic	Excursion: Hayes to Orpington.
23	Gospel Oak	Excursion: The Pool. Leader, G. A. Powell.
23	Hackney	Excursion: Stanford-le-Hope and Mucking. Leader, W. Selfe.
23	Oldham	Excursion: Brereton Hall. Leader, S. Ashton.
23	South London	Excursion: Dartford. Leader, S. W. Whiteman.
23	Southsea	Excursion: Isle of Wight.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 7.—Mr. S. H. FRY in the chair.

Mr. PHILIP EVERITT showed a small aluminium box, made for some other purpose, which he found very convenient as a receptacle for small lenses. Not being specially supplied for such use, they were cheap, and were likely to be of service for the purpose named.

Mr. J. W. HODGES showed some prints on Mariona paper, both smooth and gros grain, toned with platinum. Although these were of warm colours, he said it was possible to get cold and intermediate tints without difficulty. The paper is a printing-out paper.

The CHAIRMAN stated that a young friend had constructed himself a small camera, and now wanted a lens to complete his outfit. Like all youthful experimentalists he wanted a home-made camera, preferring to turn out a bad photograph with his own apparatus than a good one with a ready-made outfit. In this he was obviously more of the mechanic than the photographer. However, he had been commissioned to procure the lens and had purchased the one shown of two inches focus at the price of sixpence. He desired to know how best to mount this bi-convex lens, what stop was required, and whether his friend was likely to get any passable results by its means.

Mr. EVERITT would have bought a periscopic spectacle lens in preference. With the concave side to the object better results would be secured, making allowance for chemical focus. With the lens in question, however, it would be necessary to stop down to *f*-10 at the least, probably to *f*-16, and for mounting he should select a small piece of bamboo or a card tube, and mount it in that with a stop in front cut out of black paper. This he would use at fixed focus, making an allowance of a fortieth of the focus, nearer the plate in focussing, to correct the disparity between chemical and visual foci. This type gave more spherical aberration than the periscopic spectacle lens, and it was remarkable what fine crisp definition the latter gave at *f* 16 at its chemical focus. It had not great covering power perhaps, but for narrow-angle work it was admirable for other than colour work. Such lenses as those be referred to were very cheap; he had bought a dozen or so some years ago for experimental purposes, but the lens shown by the Chairman would be very useful as a finder. Postage-stamp picture lenses might answer the purpose also very well.

Mr. H. C. RAPSON spoke to having seen very good work done with the object-glass of a sixpenny toy telescope, with a correction for focus, the difference between the visual and chemical focus being about one-eighth of an inch.

Mr. E. CROFTON said that Caplatzi had a number of small achromatic periscopic lenses, which would about cover a quarter of a quarter-plate, the size of plate chosen by the Chairman's friend.

A question, reading as follows, was taken from the box: "What influence has green glass on the finished print when used in the printing frame?"

Mr. RAPSON replied that it seemed to have a blueing effect, and gave a brighter picture than without, on printing-out or albumen papers. In other words it made a weak negative print more strongly, and altered the colour of the print to some extent

Mr. HODGES had read that it gave also a soft print from a hard negative in platinum printing, and a discussion ensued.

Mr. A. HADDON observed that he thought the effect was reversed, as stated, in platinum printing, and that hard negatives gave soft prints in platinum, and soft negatives hard prints in albumen, P.O.P., &c., when green glass intervened.

Mr. EVERITT mentioned a table, in Eder's handbook on silver printing, which gave the effect of printing under different kinds of glass for silver paper, which might prove useful.

A discussion took place regarding the best means of masking negatives or shading certain portions in copying in the camera. Several means, such as shading by matt varnish on the back of the negative and the use of the stump, or an alternative involving the application of stained collodion, were rejected as impracticable owing to the difficulty of preventing the structure of the medium appearing upon the reproduction.

PHOTOGRAPHIC CLUB.

July 6,—Mr. E. W. Foxlee in the chair.

The CHAIRMAN, replying to a question arising out of the minutes, said the German plate-makers were not now so backward as they were some four years ago, in fact, they made some very good plates at the present time. He agreed with the querist that German plates were more expensive than those of this country, and some discussion took place on the question of English *versus* German plates.

Mr. R. CHILD BAYLEY, who had recently been working with the owner of a very fine Rowland's diffraction grating, gave a brief description of this piece of apparatus. Several people have at different times tried to rule these gratings, but the amount of mechanical skill required in constructing the machine with which the ruling has to be done was so great that it has so far stood in the way. It is absolutely essential that every line should be equally wide, and equally spaced, and the extreme difficulty of arranging this would be understood when it was recognised that sometimes as many as 18,000 lines were ruled to the inch. The ruling instrument was so sensitive that any one approaching had a disturbing effect by the heat emanating from the body, sufficient to utterly ruin the grating. Consequently the process of ruling is conducted in a glass case, the machine being driven by a water engine fed from a tank at a constant level, and the time taken was about a month for each grating. Concave surfaces, in addition to the original plane surfaces, are now ruled for special purposes.

Mr. SMITH inquired whether, as so little appeared to upset the truthfulness of the ruling, one might not unknowingly be working on a false basis with a grating so affected.

Mr. BAYLEY pointed out that, unless the grating was absolutely true, it was impossible to obtain a proper spectrum with the instrument, and so its work was a proof of its quality.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ACETYLENE FOR PORTRAITURE.

To the EDITORS.

GENTLEMEN,—While experimenting with acetylene gas I filled a toy balloon with the object of weighing the gas. I exploded it, and being struck with the brilliant flash, tried the experiment on a sitter outside after dark. I used two small balloons united together with a thread, and tied to a piece of wood at the desired height, placed a reflector on opposite side of the sitter, having focussed by aid of a vesta. I exploded the balloons, and from the result I think photographers and people who go in for flashlight work may find a use for acetylene gas used in this manner; probably a small mixture of oxygen would assist the combustion

of the carbon set free, and in that case it might be used in the studio. I shall be pleased to give particulars to any one interested.—I am, yours, &c., L. M. Miller.

17, *Suffolk-street, Helensburgh, July* 5, 1898.

RE "EFFECT OF PRINTED MATTER UPON PLATES."

To the Editors.

Gentlemen,—It has been my custom to return plates after exposure *face down* to the original boxes.

The makers of my plates have placed in the bottom of each box an indication number. This number, having come in contact with the exposed film, has left an impression sufficient to spoil a correctly exposed plate after having been in contact as short a time as three hours before development. I have three plates which were in contact with the printed number for about thirty hours before development, and in each case the number has developed as strongly as the exposed image.

I am writing to the makers to suggest a change of ink, but in the mean time think that my experience may prove a useful warning to others who may be in the habit of replacing plates in the original boxes pending development.—I am, yours, &c., Fred. Hitchin-Kemp.

788, *Fulham-road, London, S.W., July* 4, 1898.

[We have over and over again advised photographers not to place sensitised surfaces in contact with printed matter, no matter what the quality of the ink may be.—Eds]

OLD WET-PLATE DAYS.

To the Editors.

Gentlemen,—I do not know if it is worth my while calling attention to an amusing statement made by your genial contributor concerning the photographing of Thomas Carlyle by me. Either he knows next to nothing about Carlyle, or had been possessed at the time he was writing by some misty notion that wet-plate photography was "as old as the hills;" for he tells your readers that I, "in the old wet-plate days, was successful in securing a first-class photograph of the sage, who at that time was a schoolmaster" in Kirkcaldy. Well, it was early in the second decade of this century that Carlyle was schoolmastering in Kirkcaldy, and that was long before I was born or the collodion process invented!

I dare say I would not have troubled you about this matter had the portrait not been considered characteristically important, a likeness of the veritable Teufelsdröckh himself, in fact; therefore it is all the more necessary that no wrong statement of its date get abroad. Not only has it been selected by the Trustees of "the Carlyle's Memorial House, Cheyne-row, Chelsea," and placed above the mantelpiece of Carlyle's study there, but several copies of it have also been purchased by Mr. Alexander Carlyle, one of which he has importantly placed in the room of the house at Ecclefechan in which his uncle was born.

It was in the autumn of 1874 that I photographed T. Carlyle.—I am, yours, &c., John Patrick.

52, *Comiston-road, Edinburgh.*

PHOTOGRAPHING AT THE PARIS EXHIBITION OF 1900.

To the Editors.

Gentlemen,—Will you direct your readers' attention to the fact that the Committee of the great Paris Exposition of 1900 has at present under consideration the question of permissions to photograph in the Exposition and its buildings. There is a danger that a sole right will be sold to one firm, and against this proposal the French photographic papers and some general newspapers are strongly protesting. It seems very desirable that it should be strongly shown to the Exposition authorities that photographers generally are very desirous of having the privilege of photographing (under proper restrictions), and that the granting of permissions for a small fee would not only yield a considerable income, but also an immense amount of free advertisement. We suggest that letters to this effect from individual photographers likely to visit the Exposition, and still more from photographic societies, may, just now, have a valuable effect in modifying the decision of the Exposition Executive.—I am, yours, &c. Gertrude H. Philcox,

Photographic Guild, 6, Farringdon-avenue, London, E.C., July 4, 1898.

THE TRIPLE ANASTIGMAT.

To the Editors.

Gentlemen,—We have no more to say to your anonymous correspondent because we think that the man who attacks in public the honour of another, and does this under the cover of anonymity, is a person of a very contemptible kind, and therefore, to use your correspondent's expression, we are "superciliously indifferent" to his remarks.

Mr. Everitt, however, we know, and are pleased to meet his criticism. His diagram showing the anastigmatic and plano aberrations of a Cooke lens is a *truthful exaggeration* of the original, and we are obliged to his fairness for pointing out that it is an exaggeration, because it is obviously easy by exaggerating a thing to make it appear considerable.

The point which Mr. Everitt raises is not, however, whether the residual aberrations in Cooke lenses are intrinsically great, but whether they are greater than in other anastigmats, and we take it that he will not dispute the statement that of the many types of anastigmat now on the market none is in a strict sense perfect, though several may be considered perfect for practical purposes.

Now, sir, the question as to which of these anastigmats is intrinsically the best is a very large and difficult question to discuss, and one upon which differences of opinion may very well be allowed to exist; for the factors which go towards making a perfect lens are so many and various, and so inter-dependent in the sense that any one may be improved by the sacrifice of others; moreover, the conditions under which lenses are used and the purposes in view are equally varied (on certain broad lines they differ in various countries owing to difference of climate and custom), so that it is in our opinion impossible to construct, to the satisfaction of every one, a definition of what constitutes the most perfect lens.

Even if such a definition could be formulated and accepted, it would be equally difficult or impossible to collect evidence which should faithfully represent each of the various existing types of lenses, or to present such evidence in a clear and unambiguous way.

These difficulties present themselves to us at once when we look at the two diagrams which Mr. Everitt published last week. It is evident that he and we look at such diagrams from very different standpoints, because, whereas he evidently published them with the intention of showing the diagram of the Cooke lens to be inferior to that of the other lens, it happens that to our mind, with our experience of such diagrams, and of the Cooke lens, the proof points in exactly the opposite direction.

Mr. Everitt seems not to be aware that the Cooke lens, of which his diagram is a record, might easily be m dified by adjustment to give a diagram approximately the same as that of the other lens, for the main difference between the two diagrams corresponds simply to a difference in the extent of compromise made between astigmatism and curvature of field.

Mr. Everitt holds the opinion that the other diagram is better than the Cooke diagram, and this view may, to some extent, be consistent with our opposite view, that the Cooke diagram is better than the other, because the fact is that diagrams like these, though they are invaluable for purposes of comparison between lenses of the same type and character, are apt to be very misleading when used for comparing lenses of different types, unless at the same time what we may call the structure of the oblique images which they represent be properly borne in mind.

The oblique image of most anastigmats, when viewed in the testing telescope, presents on either side of the focal point, a more or less sharply defined *line* of light.

The structure of the oblique image formed by the Cooke lens is, however, not of this sort, but presents under high magnification a more or less bright nucleus or spot of light with a fainter, comet-like surrounding attachment.

In the case either of the Cooke lens or of the best of the other anastigmats, these aberrations on their ordinary scale are very small, and with a Cooke lens of the latest type, and say of seven and a half inches focus, are so small as to produce no visible defect in lines $\frac{5}{1000}$ of an inch thick photographed on any part of the plate with full aperture of the lens.

Under high magnification in the telescope, however, the above-mentioned peculiarity of the oblique images of Cooke lenses presents itself, and it explains what several well-known photographers have observed, that the image formed by Cooke lenses turns out much better in a photograph than it appears when viewed by the eye alone upon the focussing screen.

To return, however, to the diagram Mr. Everitt publishes, and setting aside the fact that such diagrams cannot adequately represent the differences between two different types of anastigmat, we should like to say that the form of diagram for the Cooke lens which represents the best practical compromise between astigmatism and curvature of field has been determined by very careful experiment.

A series of lenses adjusted to give diagrams through a range sufficiently extended was tested photographically, and the one which gave the best effect was thus chosen as a standard of reference. Of course, it was necessary in doing this to bear in mind the size of plate upon which the lens has ordinarily to work, and in doing this we chose the ratio of focus to diagonal of plate which has grown customary in England in connexion with older lenses. Their sizes are stated in our catalogue. It may be that some of the anastigmats originating abroad were not designed primarily for English sizes of plates, nor with the same ratio of focus to diagonal, and on this account there may be, among the characteristic diagrams of these various lenses, differences which are not inherent in such lenses as types, but which are due only to different conditions of use.

To avoid complicating the point at issue, we have not hitherto pointed out that the diagram of the Cooke lens, on which Mr. Everitt's chart is

based is one of three years ago, and that since that time, as a result of further experience, the corrections of the Cooke lenses have been substantially improved by us.

The difficulty of collecting evidence which shall be fairly representative of the various types of anastigmat lies partly in the fact that it is impossible to form a just opinion of any make of anastigmat through experience of one or even a few lenses, and that few men have opportunity to carefully examine any considerable number of anastigmats of different makes.

It happens, however, that we ourselves have had a perhaps unique opportunity of doing this, bscause we are constantly receiving lenses of all sorts to have their flange screws converted to the standards of the Royal Photographic Society. In this way we see probably fair average samples of anastigmats, and we have a special instrument, designed for the purpose, which is employed to plot characteristic diagrams of these lenses.

We should naturally feel considerable hesitation and delicacy in publishing these records. We have even some difficulty in mentioning the matter now, because your correspondents somewhat unfairly taunt us with making public reference to other anastigmats, while at the same time they demand that we shall publish the evidence on which our opinion of the standing of the Cooke lens is formed.

If, however, any of your readers who may be interested in the subject, from a scientific and not a merely commercial point of view, will do us the honour of calling upon us here by appointment, and of bringing any lenses they may wish to test in comparison with Cooke lenses, we should be happy to enable them to make such comparisons, and to show them the records which have been made of other anastigmats which have been through our hands.

This, however, we can safely assert, that we have not yet seen an anastigmat which, if we were independent purchasers, we would choose in preference to a Cooke lens; and it is because we have this good opinion of Cooke lenses that we uphold the moderate statements made in our advertisements on our own authority, and quote the statements of independent men who have looked for the best lenses they could find, and, after trying various lenses side by side, have chosen Cooke lenses.—We are, yours, &c., TAYLOR, TAYLOR, & HOBSON.

Slate-street Works, Leicester, July 12, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

H. J. Finch, 79, Peckham-rye, London, S.E.—*Two photographs of J. W. Ewing, M.A.*

Messrs. Debenham & Co., 5, Clifford-street, York.—*Two photographs of group of Lord Wolseley, Lord and Lady Mayoress of York, and others.*

STUDIO.—We can find no reference in our pages to such a book.

COLONEL GUBBINS.—Thanks for your letter, which we will retain for future reference.

L. HEALEY (Drogheda).—The first-mentioned. We do not answer questions through the post.

F. MASCALL.—The Facile camera, made by Jonathan Fallowfield, Charing Cross-road, W.C., would probably suit your purpose.

H. FRANKLIN.—1. Probably a cheap portrait lens of the well-known Petzval form, although your drawing is very obscure. 2. No. 3. Yes.

J. G. CARLISLE.—The articles have not been reprinted. Messrs. Marion & Co., Soho-square, publish a book on the subject which may meet your case.

VICTORIA STUDIO.—S. B. In our opinion the work is far from good; and we should not think a parent would act wisely in apprenticing his son to you.

FERROTYPE DRY PLATES.—BAZAAR. The plates may be had at Fallowfield's, Charing Cross-road. The plates are very sensitive, but whether they are sensitive enough for what you require we cannot say—we rather doubt it.

W. COLLINSON (Burton-on-Trent).—We cannot say. It is certainly not the formula. The prints show such a great want of care in their production and the coating of the paper, that the defect is, doubtless, due to the manipulation.

AURINE.—SUBSCRIBER writes: "In a recent number you quote a recipe for removing rust in which *aurine* is a constituent. What is 'aurine,' and where can it be got?"—Aurine is one of the coal-tar colours. It may be had from Hopkins & Williams and suchlike houses.

C. A. W.—We are inclined to think that you have not hit upon the right cause. We have produced similar markings many times by not rocking the dish containing the plate and developer. May not this be the explanation in your case? We can offer no other suggestion.

COPYRIGHT.—G. W. G. Unless A. has registered the copyright in his own name, with the written permission of B. and C., it will be no use proceeding against E. for infringement. The case is now stated differently from what it was before, but it still seems that A. has no legal copyright.

STUDIO.—A. M. Z. Your query is one that cannot well be answered in this column in such a way as to be of any real service to you. We should recommend you to obtain Mr. Bolas's work on studios, published by Marion & Co. If, after reading through that, you want further advice, we shall be pleased to give it.

GASOLINE —GASOLINE asks: "Would you please tell me what is 'gasoline'; I would be obliged by you telling me whether gasoline is a gas, or a liquid, or both, and if any way dangerous?"—Gasoline is a liquid hydrocarbon and is very dangerous unless used with the greatest care. We should not recommend its use ourselves.

PROCESS WORK.—TYRO. The negative itself, as a negative, is very good for a beginner. But the screen was much too far from the plate, even if the former was a suitable one. Unless you get a properly ruled screen, such as all workers use, you must not expect to get results equal to good commercial work. The best screens are costly, but they are a necessity, like good lenses.

LIGHT FOR DARK ROOM.—NEMO writes: "You will much oblige by answering following question: What medium is best for dark-room light, the illuminant being gas, the illuminated space being 24×18 inches?"—Deep orange glass, which may be had from Hetley's, Soho-square, will be a safe medium, and the light will be a pleasant one to work in; but, if orthochromatic plates be used, then ruby glass must be substituted over the orange.

SEPARATED LENSES.—W. W. A. Canada balsam can be obtained from any of the philosophical-instrument makers who make a feature of microscopes. Instead of trying to re-cement the glasses yourself, we should recommend you to get a photographic lens-maker to do the work for you. Although the operation is a simple one, a novice, without suitable appliances will not always be successful in a first attempt at getting the glasses properly centered.

SALE OF NEGATIVES.—AMATEUR writes: "During my holiday I took about fifty negatives, out of which I can pick fifteen or twenty as good as those from which the enclosed were printed. Can you tell me of any house that would purchase them, so that I can cover the cost of my outing?"—We cannot. We doubt if there is any market for quarter-plate negatives, and, if there were, they would have to be a great deal better than the best of those sent as specimens.

HYDROMETER.—ENGINEER says: "Kindly explain what is meant by 'Hydrometer test.'"—The hydrometer is an instrument for testing the specific gravity of liquids. The argentometer, for testing the strength of silver solutions, and the lactometer, for testing milk, are familiar examples of it. They are supplied by all philosophical-instrument makers. They may be had showing the actual specific gravity, or the density, according to different scales, such as the Beaume, Twaddle, &c.

COATING MACHINE.—DE COMINCH writes: "You should oblige us greatly, if you could give us the address of an engineer constructor of coating machines for celluloid films?"—We do not know of any engineer who makes a speciality of coating machines specially for celluloid films. We should recommend you to communicate either with Messrs. Cadett & Neale, Ashtead, Surrey, or Messrs. B. J. Edwards & Co., The Grove, Hackney. Both firms are inventors of coating machines for glass plates.

STUDIO.—R. O. The design for the studio, as shown in the sketch, cannot well be improved upon, and the same also applies to the arrangement of the blinds. Three or four feet more in the length would be an improvement, or, next to that, the means of taking the camera that far, beyond the end of the studio proper, would at times prove a great advantage—as in taking groups, &c. Many who have built studios shorter than they need have been, to save a few pounds in the first instance, have regretted it afterwards.

SPECIMENS.—R. C. W. (who dates from the Midlands) writes: "Some months back I bought this business with the plant and all the negatives. Amongst the latter was the portrait of a young lady, which makes an admirable specimen. I have enlarged it, and had it coloured as a specimen for the window. Now the lady and her friends object to its being shown, and threaten all manner of legal proceedings unless it is immediately removed. Can they take them, or, rather, would they be successful if they did? Surely, as I have bought and paid for the negatives, I can do as I like with them."—Legal proceedings can be taken, and, if they are, they will be successful, and an injunction will be granted against you to restrain the exhibition, with costs. As you are a new comer in the district, would you not, as a matter of policy, do well not to give offence to your predecessor's *clientèle*?

NOTICE.

With this number of the JOURNAL *is issued a half-tone print of the group of members of the Thirteenth Annual Photographic Convention of the United Kingdom, assembled at Glasgow during the week, July* 4–9, 1898. *The negative was taken, in Kelvingrove Park, by Messrs. George Bell & Co.,* 152, *Sauchiehall-street, Glasgow. A key and list of names will be published in next week's* JOURNAL.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	465
By-paths of Business.—III. Lantern-Slides and Christmas Cards	467
Leaderettes:— Latitude in Treatment — Nine Years' Imprisonment for Taking Photographs	468
On Things in General. By Free Lance	469
Formalin *versus* Alum. By W. B. Bolton	470
Pure Photography *versus* the New Art. By W. B. Bolton	471
The Right to Exhibit Portraits	471
Foreign News and Notes:— The Paper Ring—The Cooke Lens — Incandescent Lamps — The Chassagne Process — Canvas Effects—Acetylene—Pyrogallic Acid	472
Action of Persulphate of Ammonia on Metallic Silver. By Lumière and Seyewetz	473
"Solio"	473
Photography in the Spanish-American War	475
Contributions to the Study of "Flicker"	475
The Photo-telegraph	475
How our Leaders Talk	476
Our Editorial Table:— Cartridge Chemicals—The No. 2 Falcon Kodak—*Mounts and Frames, and How to make them*—*Royal Thames Guide*—*Lays of the Moonlight Men: Tales of '98, and other Irish Ballads*—Photogravure of *Daydreams*—Catalogues Received	476
News and Notes	477
Patent News	477
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Brixton and Clapham Camera Club	477
Correspondence:— Electric *versus* Chemical Printing — Formalin — The Effect of "Backing" on "Speed"—The Triple Anastigmat	478
Answers to Correspondents	480

EX CATHEDRÂ.

As will be seen from a law report on another page, the Eastman Company are to be congratulated on establishing their right to the word "Solio" as a trade mark. The victory has only been gained by great perseverance and expenditure. Ever since 1895 the case has been running its course from one court to another. It was refused by the Registrar of Trade Marks, on the ground that it was derived from the Latin word "Sol" (the sun), and so was descriptive of a silver printing-out paper which might be printed in the sun. It was admitted that it was an invented word, but not in the sense, so it was held, intended by the Act. The Registrar interpreted the Act to mean that an invented word must be absolutely new, and must also be framed in such a way that it could not, by any stretch of the imagination, be read as having any allusion whatever to the character and quality of the goods.

* * *

The Board of Trade, Mr. Justice Kekewich's Court, and the Court of Appeal, all supported the Registrar, and it has remained for the House of Lords to give a more common-sense definition to the term "invented word." Their Lordships have, in fact, decided that if a word is truly an invented word, it may contain some allusion to the nature of the article sold under the Trade Mark. The previous judgment had made it almost impossible for enterprising firms to invent a sensible trade mark. Fortunately, Lord Halsbury, the Lord Chancellor, is himself a distinguished amateur photographer. He stated in the course of the case that he had used the Eastman Company's printing-out paper "Solio" for years, and it had never occurred to him that the name had any reference to the character of the paper.

* * *

Lord Herschell pointed out that the word might equally be held to have reference to boots, from its similarity to the word "sole," or to agricultural implements, from its apparent derivation from the word "Solum" (the soil). It is interesting to note that the actual way in which the word "Solio" did come into use was through an official submitting to one of the principals of the firm the word "Soho," the business then being conducted in Soho Square. This was misread as "Solio," and so it came to be established. The chief point brought out by the case seems to be that the authorities have previously misread the aim and scope of the Act. Its object was to prevent the monopoly by advertisers of any words useful to the general public. Provided no injury is caused by an invented word being registered, the aim of the Act is gained.

* * *

We learn from one of our American contemporaries that the City of Chicago has organized a photographic department in connexion with the city work, and that the official photographer is kept busily employed, with a more or less considerable force of assistants, in making pictorial records of streets in and out of repair, scenes of accidents for which the city might be held accountable in money damages, views of interiors in crowded tenement districts, for use in the investigations of the Board of Health, and numerous other purposes. This is believed to be the first case where a city has instituted such a department.

* * *

Lady photographers in America appear to be quite as enterprising as the female photographers who are rapidly coming to the front in London. The editor of *The Photo-American* tells us that there are to his knowledge two lady photographers in New York City who simply get up compositions for advertising

purposes, and sell them to the advertising agents. Judging from the work they turn out, the class of advertisers who use their work and the most comfortable studios they maintain, he is of opinion that this department of photography is very lucrative to them. Of course, he points out, as soon as the rest of the ambitious photographers realise that there is money in this branch it will become overcrowded, as is usual in everything pertaining to business and money-making. Still, he thinks that these ladies will probably stay in the field they have created through their artistic perception.

* * *

THE Imperial Institute authorities are passing from blunder to blunder with what looks like studied persistency. To the Acetylene Exhibition that was recently opened at the South Kensington variety entertainment building—for it is only in that capacity that the Institute appears to attract the public—few, if any invitations to the press were issued, and the consequence is that what should have been an instructive and valuable exhibition has practically escaped notice, to the great disadvantage and drawback of a new and important industry. One of our scientific contemporaries caustically remarks that the purpose of the Acetylene Gas Exhibition, it was innocently supposed, was principally to show the public what had already been accomplished by British inventors and manufacturers in the production of acetylene gas, and for what useful purposes the gas might safely be used by the public. "It seems, however, that we were mistaken, for instead of furthering the interes's of English inventors and manufacturers, the Imperial Institute officials were party to an action which, in our opinion, is likely to seriously prejudice those interests in the eyes of the public. Let us explain. There are some thirty British firms exhibiting in the exhibition. There are, in addition, two foreign exhibitors, one American and the other German. Now, our British firms have supported this show in the most liberal manner, and considering that the industry is in its infancy, we can vouch that their exhibits are most creditable. Yet the way they have been treated may be judged from the following occurrence :—

* * *

"THE official opening was timed to take p'ace on the 15th ult., at 2 o'clock, and notices to that effect were delivered to some of the Press. With the consent of the Imperial Institute authorities, arrangements were made and invitations issued by one of the foreign exhibiting firms referred to, that a 'private view' of their exhibits, and a luncheon at 1.30 on the same day, would be accorded to the Press representatives. The result was that the Press representatives came, inspected the foreign stall, and practically that only, and having eaten a good luncheon and listened to eulogistic speeches on the merits of the foreign acetylene apparatus, went away with the idea that they had seen all that was worth seeing in the show. As a natural sequence, glowing accounts of the foreign apparatus followed in some of the papers, and in a number of instances to the utter disregard of the merits and interests of the British exhibits and exhibitors." More than one invitation of the nature of that mentioned by our contemporary reached this office, but we declined to avail ourselves of them, for we conceived it to be the duty of the Imperial Institute authorities to see that the technical press had every facility for studying the exhibits at the Acetylene Exhibition. That duty appears to have been neglected, with the result that the exhibiting firms have a strong grievance against the authorities for having failed in one of the elementary duties of exhibition executives—the assurance of the utmost publicity to the exhibition.

* * *

WE have remarked on more than one occasion that little, if any, work in Lippmann's process of interference colour photography had been accomplished by English experimentalists—indeed, until a few weeks ago we only knew of one gentleman who had produced results by the method, and the examples he obtained, while they might be termed promising, were certainly far from successful. There is no doubt that the difficulties of the Lippmann process are such as are not easily overcome—notably so in regard to the preparation of the "emulsion," and the computation of the exposure—especially by those who can only take it up occasionally or intermittently. It is, therefore, with all the more pleasure that we congratulate Mr. E. Senior, the teacher of photography at the Battersea Polytechnic and other allied institutions, upon a remarkably brilliant Lippmann photograph of some coloured ribbons which, with other results, he has recently obtained. Mr. Senior has only been working at the process for a few weeks, but by modifying the Lumière formula of 1893, in respect of decreasing the quantity of gelatine by one-half, he has succeeded in easily duplicating his results—a feature in which, so far as we know, no previous experimentalist had been successful. We have not seen blue, golden-yellow, and yellow-green so finely rendered as in the splendid example Mr. Senior showed us last week. Mr. Senior is of opinion that he has arrived at the conditions that are essential to success in the Lippmann process, and he hopes to publish his experiences at an early date.

* * *

WE congratulate Miss Florence Martin-White upon having had the honour of taking some "At Home" photographs of Her Royal Highness the Duchess of York and Royal children, on Saturday the 9th inst., at York House, St. James's Palace.

* * *

BY command of the Queen, Mr. Horatio Nelson King has taken a new series of negatives of the interior of the Albert Memorial Chapel, Windsor, in which is now placed the recumbent figure of the late Duke of Clarence on his tomb; a very handsome grille surrounds the same, the whole being the work of Mr. Gilbert, R.A. On Monday last Mr. King made his 301st journey to Windsor Castle; extending over thirty years, his railway travelling alone has been upwards of 15,000 miles. He has for over half a century worked hard at photography, and we are informed is the only artist holding a special warrant as architectural photographer to the Queen.

* * *

WE wish we could be instrumental in persuading those of our American contemporaries that reproduce, in half-tone, photographs of the nude or partly nude to abandon the practice. As a rule, the illustrations in the American journals are characterised by great spirit and variety, but in one or two instances the hand of discretion has for months past been absent from more than one editorial office on the other side, with somewhat unfortunate results as regards the "life studies." Here at home we have no hesitation in saying that not even in the least reputable of the gutter journals of London would the pictures of partly and suggestively draped females that appear with considerable frequency in some of our American photographic contemporaries be tolerated. On the

few occasions when nude photographs of a purely cartographic nature have crept into British exhibitions, we have pointed out that camera studies of the nude offend rather than please the artistic perception, and we have been glad to know that our attitude in the matter has won general approval. But it has fortunately not been our duty to direct attention to the publication here of female nude studies draped in a manner which can only be described as suggestive and unpleasant. We trust our American contemporaries will take this hint in good part, and will abandon a form of illustration which can have no effect but to degrade photography in the public eye.

BY-PATHS OF BUSINESS:

III.—Lantern Slides and Christmas Cards.

The last decade has witnessed a tremendous growth of what is called secondary education—though it is of the first importance—and the springing up of technical schools for teaching science and art by modern methods. Among the methods of this higher education the lantern and the lantern-slide take an important place, not only in day classes for boys and girls, but to a still greater extent in evening classes, and in the many semi-scientific, semi-popular courses of lectures frequently held in connexion with such institutions. A demand for lantern-slides of sketches, diagrams, &c., mostly occurring in text-books, is a necessary accompaniment of these uses of the optical lantern, yet we are not aware that the local photographer has seen that it would be to his advantage to make a bid for work of this sort. In fact, the specimens of lantern-slides made by the average photographic portraitist which have fallen into our hands have not been of such a character as to recommend him for work of this kind. A slovenly turn-out, a quarter-plate with half-an-inch cut off, and cover glass likewise having apparently been used (with the result that the slide would be too thick for most carriers); fogged high lights and unrectangular masking; these are some of the charges which might be brought against them. They have all the appearance of having been made on ordinary plates and developed with the usual portrait developer—a mode of procedure hardly calculated to produce a bold and vigorous result. Yet the business can be made to pay. Putting the charge for a slide from a book illustration at one shilling, including making the negative, the work, if only a few dozen are done at a time, is worth having. At the outside the cost of plates, cover glasses, chemicals, is not more than three shillings per dozen, leaving a margin of nine shillings for labour. These figures assume the use of gelatine plates, but if the photographer can work wet plates or can make his own collodio-bromide emulsion, a larger percentage profit is realisable. The present remarks will be confined to dry plates, and the following hints are offered as the outcome of the use of such for preparing very many slides of this kind.

Some simple arrangement for holding the copying camera and the book to be copied is a *sine quâ non*. Inexpensive copying-boards and easels are on the market, or are easily made. The chief difficulty is in holding large and heavy books in position, so that the page lies flat. A good arrangement is as follows: A heavy board, of large size, and of about one and a half inch stuff, having been selected for an easel, two brass bushes are screwed into each end, one a few inches from the top, and the other an equal distance from the bottom. Two pieces of brass tube or nickel-plated iron wire of about three-eighths of an inch in thickness are cut off a shade longer than the horizontal dimension of this board. To each end of each of these rods a strip of stout brass is soldered (about half an inch in width and five or six inches long), at right angles, having a slit, three-sixteenths by four inches, cut in it, the portion left solid being at the soldered end. These side strips are secured to the ends of the board by screws working in the bushes. By loosening the screws the rods can be brought to any desired position on the board, and books of practically any size and thickness clamped firmly in position. The device is due, we believe, to Professor A. H. Sexton. It is simple and efficient.

Taken all round, artificial light is superior to daylight as an illuminant, especially as this class of work is in demand mainly in winter. A couple of good Argand burners answer quite well, but incandescent burners are, of course, better. The use of an anastigmat, working at *f*-6, or larger, is a great help. Short exposures can be made at this large aperture with perfect confidence that good definition will result. As to plates, many have used with success those of "ordinary" rapidity, such as Ilford or Barnet ordinary, for work which did not contain exceptionally fine lines. Using two Argands placed about six inches from the book, and with the lens working at about *f*-16, the exposure need not usually exceed one minute. "Photo-mechanical" plates give better results as regards density and clearness of the lines, but, when working under the above conditions, were found to require too long an exposure. With incandescent gas and a lens capable of working at *f*-6, they would, no doubt, be available.

The developer should be strong if vigorous negatives are to be obtained. Thomas's well-known hydroquinone formula, used undiluted and with the caustic soda replaced by twice its weight of caustic potash, answers admirably for ordinary plates. Payne's hydroquinone formula gives good results with photo-mechanical plates. Another developer of recent introduction which bids fair to supplant either of the above is hydroquinone used in conjunction with formalin. The formula is:—

Hydroquinone	70 grains.
Soda sulphite	2 ounces.
Formalin	80 minims.
Water to	10 ounces.

This gives great density with bare glass in the lines. It is often better to over-develop and to obtain the necessary clearness of the lines by afterwards reducing with Farmer's well-known solution of ferricyanide and hypo. The best way to apply the reducer is, dip a tuft of cotton wool into the liquid, squeeze most of it out against the side of the cup, and to go over the negative (after rinsing from the fixing solution) with the wool. Used thus, it clears off surface-fog wonderfully well without reducing the density of the image so much as if the plate were immersed in the reducer. Flood with water occasionally to avoid yellow stains. Intensification is often advantageous: mercury and ammonia give good results, but in regard both to this matter and to development the reader is advised to refer to previous leaders on these subjects.* For printing the slides one of the special printing frames is such a convenience as to be a necessity: its use enables the subject to

* British Journal of Photography, January 11, 18, 25, and December 13, 1895.

be printed centrally with the minimum of trouble. A slow brand of lantern plate gives the best result, and the exposure should be much shorter than for a landscape negative of average density, the object being to obtain the utmost contrast possible. Thomas's undiluted hydroquinone, modified as before described, is a good developer. Much better results are obtained by over-development and reduction with ferricyanide on cotton wool. It is rarely possible to improve a thin flat slide by intensification. Although for scientific subjects a cold black tone, such as given by hydroquinone-caustic, is very suitable, a warmer tone is to be preferred in many subjects of, say, historical or geographical character, if only to break up the monotony of a number of black-toned slides. Pyro ammonia gives a pleasant warm black; pyro-acetone, as used for bromide prints, a good brown, and any shade from warm black to red can be obtained with uranium. Formulæ for these solutions have appeared so frequently that they need not be repeated here. For masking the slides the ordinary commercial masks, whether circle, dome, cushion or the various sizes of "reduction" masks are useless owing to the fact that almost every slide requires a different shaped mask. A rapid method of mounting such slides was described in the ALMANAC for 1894, and is here repeated. Cut up some strips of black needle paper, three and a quarter inches in length, of various widths from one quarter to three-quarters of an inch. One long edge of each strip should be clean cut. Lay the slide on a piece of white paper, and, moistening a strip, lay it over the portion of the slide required to be masked and rub down. The moistened paper will adhere to the gelatine. Do the same for the three remaining sides, trim off the projecting strips with a pair of scissors, put on the cover glass and attach the binding strip. The indicator spots should be fixed on the outside of the cover-glass so that the slides can be numbered by their users.

Turning now to the subject of Christmas cards, the photographer has been undoubtedly hampered in his efforts to develop trade in this direction by the difficulty of getting really tasty Christmas mounts. This difficulty is happily becoming less each season, and, judging from the specimens on view at the Crystal Palace Exhibition, some really artistic mounts are now obtainable. There is, however, still room for improvement. Too little choice is afforded in mounts for the smaller sizes, such as those one-half or one quarter the size of the quarter-plate. These small views are much more suitable than those of larger proportions, and many choice bits can be cut out of scrap photographs and utilised in this way.

What are wanted are neat and inexpensive cards in black and white or quiet tints, such as Raphael Tuck and other card firms send out with small collotypes mounted on. Mounts with coloured decorative work are apt to "kill" the print which is mounted on them. The subjects suitable for reproduction on Christmas cards must be decided on by the photographer himself. Local views, especially in snow or hoarfrost, are always safe, and are suitably printed in matt bromide. Portraits turned out on Christmas cards are likely to be more popular this year than last. Small sizes, such as midget, or even postage stamp, are the most effective. Figure studies, when really good, and especially pleasing studies of children, lend themselves to this purpose, and it is advisable to reproduce favourite negatives of these subjects on a smaller scale for printing. The photographer ought not to wait for Christmas card orders to come to him. This, like any other kind of business, is none the worse for being pushed. A case in point may be cited. A photographer sent a Christmas card with a view of a little village mounted thereon to the owner of a mansion which had been recently erected on its outskirts, with a view to securing orders for the approaching season. The owner declined the village view, but ordered two hundred with a photograph of his own house (which had to be copied from another photograph). A rather fancy price was quoted, the views printed on bromide, and the order executed within three days, with a profit of something over five pounds. That there were more than half a dozen photographers in the adjoining town, from one of whose photographs the small view was copied, is evidence that this is a branch of business which is neglected. The moral is to look up any views in stock of mansions, country seats, and other property of neighbouring grandees (with money), mount them in tasteful fashion, and submit with price, which should not err in being too low. When the order has to be put in hand, it is generally a case of prints being required at a short notice. A few hints on turning out prints as quickly as possible may, therefore, be appropriately appended.

A negative of the subject to be reproduced having been obtained, four or more prints should be prepared as equal in depth and colour as possible. These are mounted on a stiff card so as to approximate to a square form as closely as possible, a space of about one thirty-second of an inch being left between them. The four prints are then photographed on a single plate, and from the negative thus produced four prints of the reduced size can be taken off at each exposure, with immense saving of time and labour. In preparing the prints we can recommend an enamel bromide paper developed with metol; with identical exposure and development, it is easy to obtain practically identical prints, whilst the black tone is very suitable for copying. The ordinary printing frame should be discarded; the continual removal and replacement of the back takes up too much time. A very convenient bromide printing frame is made by Messrs. Houghton. Metol and potass carbonate is a first-class developer for this class of work; it acts quickly, but, at the same time, is free from liability to choke up the shadows with too much density. It gives a cold black tone, which tones well with uranium. Warm brown tones can be obtained by direct development by using pyro-acetone. The following is a formula:—

Pyro	1 ounce.
Soda sulphite	6 ounces.
Sulphuric acid	1 drachm.
Water to	20 ounces.
Acetone	1 ounce.
Water to	20 ounces.

These two solutions are mixed in equal proportions.

Latitude in Treatment.—The paper by Mr. W. B. Bolton, read at the recent Convention, that was crowded out last week, but which appears on page 471 of our present issue, is one that should commend itself to those who desire a means of wide control in development, such as is claimed by the advocates of Pouncy's gum-bichromate process. In the powder process we have much greater scope for local treatment than there is in the gum-bichromate process, and that too without sacrificing the scenical qualities of the picture, as is too frequently the case in the latter process. Furthermore, though not alluded to by Mr. Bolton, we are not limited in the powder, or dusting-on process to pictures in monochrome, as they

may just as well be produced in colours. Any impalpable pigment, of any colour or tint, can be applied locally, and thus pictures may be produced in the colour of nature. The working of the two processes, it may be explained, is in exactly opposite directions. In the gum-bichromate process the pigment is removed where it is not required, whereas in the powder process it is only applied where thought desirable. As Mr. Bolton points out, there are some little difficulties to be surmounted in working the powder process on paper; so there are in working Pouncy's process, but those who have surmounted them in the latter process, and are able to produce good results by it, are quite equal to doing the same with the powder process.

Nine Years' Imprisonment for Taking Photographs.—More than once we have alluded to the severity of the sentence, of nine years' imprisonment, passed by the Spanish authorities on Mr. Halstead, a British subject, for taking photographs of some fortifications. British subjects before now have got into trouble for photographing fortifications in foreign countries, and in this country too for that matter, for the photographing of them here is equally as unlawful as it is abroad, even if innocently done. The reply given to a question put in the House of Commons, one day last week, puts an entirely different complexion on Mr. Halstead's case from what it appeared before. It seems that Mr. Halstead, though a British subject holding a British passport, was a special correspondent of the *New York Herald*, and Mr. Curzon, in his reply, said that he had been arrested for photographing the fortifications of San Juan, Porto Rico, but was released on its being ascertained that he was a British subject. A short time after he was again discovered photographing the fortifications and guns and was re-arrested, tried by court-martial, and sentenced to nine years' imprisonment. From this statement it is pretty clear that Mr. Halstead was not, as some surmised, sinning unwittingly, as some of our countrymen have done when touring abroad with their cameras. In the circumstances detailed it is not to be surprised at that the Spanish authorities should take drastic steps against the representation of its enemy's leading newspaper, even though he be a British subject. It is probable, however, that, through the influence of the British Consul in Madrid, after the war is over, Mr. Halstead will get a liberal discount off the nine years' imprisonment. Already through him the conditions of the punishment have been somewhat relaxed.

ON THINGS IN GENERAL.

I ONCE heard a clever cynic arguing that the electric telegraph was useless. "What benefit had it conferred on mankind, what better were we for it?" he asked, and really the man he was disputing with was hard set to give a prompt reply. On similar lines I have heard photography pooh-poohed, but there was no difficulty in settling that man if only one example were to be given—the infinite pleasure in the possession of a portrait of some lost dear one. Yet every one will be ready to admit that photography is by no means an unmixed benefit. For example, it has degraded illustrated journalism, and almost killed the beautiful art of wood-engraving.

Then, again, too many can tell us of the misery that can be produced by the snap-shotting cad. An Act of Parliament ought to be passed rendering any one who exhibited in public or private snapshots calculated to cause annoyance liable to be shot. I am often surprised that there have not been, long before now, in default of such a Draconian law as I suggest, cases of public horsewhipping. But all such cases of individual annoyance pale into insignificance before the commercial exploitation of that terribly sad scene of death at Blackwall by the immediate cinematograph exhibition of the event, with all its harrowing accompaniments. The excuse offered is that "the camera went on photographing"—of itself. No doubt, and accommodated itself to the varying position of the steam launch that carried it! The possessor of the films is going to give one free exhibition, but is not going to exhibit it up and down the kingdom; he is "sending it to local exhibitors throughout the country, and trusts that the sympathy and interest thereby excited will result in additional subscriptions for the distressed families." I hope so, too!

While I was penning these lines the Convention was preparing to enjoy itself—or, no, I should say improving its mind—at Glasgow. We all know that the lectures on various scientific aspects of photography are the main attraction of these meetings. They will, too, afford a little relief from the strain that must have been brought about in so many readers' minds by the surfeit of mental pabulum of optical subjects that the readers of the JOURNAL have lately suffered from. The Editors have buried the depth-of-focus question, and, no doubt, have determined soon to deal in a similar manner with the triple anastigmat wrangle. I should just like, however, to put in a word, if only to simplify matters to non-optical readers. As far as I can see, the gravest fault alleged against the lens is that, at the edge of a field of 56°, with a particular lens, the field is curved to the extent of a millimetre and a half. What does this mean in practice? Just this, that, at the edge of a plate not much less in length than the focus of the lens, the image is not sharp, the focus would lie behind the plate to the extent named. Let us reckon what that amounts to.

Herr Klepp does not give the diameter of the lens he tested; but, as it was 186 mm. focus and f-7·7, at full aperture we get the diameter $\frac{186}{7·7}=24$ mm. Hence the diameter of the cone of rays at full aperture increases for each millimetre distance from the focal point $\frac{24}{186}=0·129$. The distance in this case of the film from the focal point being 1·5 mm., we get $0·129\times1·5=0·193$ as the diameter of the disc of confusion by which a point is represented.

Let us see what that amounts to in fractions of an inch. A millimetre being 0·03937 of an inch, we find that, multiplying that amount by 0·193, we get 0·00759 of an inch, which is decidedly less than the hundredth of an inch, which all the parties to the recently buried discussion accepted as an allowable deviation from a mathematical point. Therefore, why all this talk?

The enthusiasts on the gum-bichromate process are having their lines made pleasant by being able to purchase the stuff ready-made; but, at the discussion at the London Provincial Photographic Association the other day, they did not seem to be able to agree upon so simple a matter as the degree of sensitiveness of this paper. Now, it seems to me that there is no reason why the gum-bichromate paper should not follow the well-known rule of sensitised carbon tissue, that its sensitiveness varies with its age. This want of agreement could thus easily be explained.

There are few old photographers who do not view with feelings of pleasure the possibility of the revival of interest in the stereoscope, that marvellous instrument without which, some thirty or forty years ago, "no home was complete." The Editors make an excellent suggestion that portrait photographers should take it up. But, alas! I fear that is impossible for one excellent reason—retouching. Very few people would care for a portrait without retouching, and, if it were adopted with stereo views, the pencilling, which could not be identical on the two prints, would most probably not coalesce, and might possibly appear projected, or recessed, as regards the general level of the face. In any case, as the actual form of the features is frequently tampered with, not to speak of redundancies of figures being "rounded off," there is every probability that these alterations would manifest their presence with a decided and undue prominence. And we may be quite sure that there is no possibility of any such considerations as these putting retouching out of fashion. Speaking of lenses, it is worth while calling attention to an article by "R." in the Journal for the 17th ult. He gives a diagram showing how with the ordinary group lens of symmetrical or rectilinear type a group, if the figures are to be placed so as to be in focus at full aperture, should be

arranged on a very deep curve, not in any way one of the shape of a section of a saucer as often recommended. A word as to this may be useful. This arrangement of figures to get sharpness is only useful with figures at a comparatively short distance from the camera; if a large group is taken, necessitating the removal of the camera to a considerable distance, no practically possible curved arrangement of the figures would be of any avail to counteract the curved field of delineation given by the older types of lenses.

I will conclude by giving what may be a useful prescription to others besides the sufferer who (p. 384), under the name of "Developer," writes complaining of pains in his eyes when he comes into the light after working in the dark room. I expect that the actual pain suffered is due to some little irritation of the conjunctiva, besides the mere shock to the general sensitiveness of the region through the change from darkness to glare. Let a little boric acid (eight grains to the ounce) be kept dissolved in water, and let him bathe his eyes (using a clean piece of lint or a small very clean sponge) with this solution diluted with an equal quantity of warm water. An eyewash of about 80° F. is quite pleasant to use, while cold solutions would be irritating. FREE LANCE.

FORMALIN *VERSUS* ALUM.

YOUR Ex Cathedrâ remarks on the subject of formalin in last week's issue were very opportune, coming as they did simultaneously with the first spell of really hot weather we have had this summer, and without doubt they will convey a useful hint to many who will find themselves in trouble. Perhaps a few additional words on the subject of formalin as a substitute for alum, in which capacity I have used it for some time now, may not be amiss.

I may commence by saying that for ordinary negative purposes I have long relinquished the use of alum except under very abnormal or trying conditions, partly because as a rule the plates now issued do not require it, even though their makers may recommend its use as a possible safeguard against frilling and softening of the film. But even when, as at the present time, some hardening agent is desirable, alum brings with it so many other troubles that, in extreme circumstances, I doubt whether it is any use at all. I read somewhere or other a short time ago a statement to the effect that "more negatives are spoilt by alum than by any other cause;" and, though I should scarcely like to commit myself to a full agreement with that expression, I am free to admit that there is some suspicion of truth in it. However, on the question of its application to negatives I shall have a few words to say further on.

If the opinion I have just quoted had been expressed with regard to the use of alum in conjunction with gelatino-chloride prints, then I should have been quite ready to agree with it to the fullest extent, for I believe I have already more than once publicly stated that gelatine papers have no more dangerous and insidious foe; and it is in this connexion that I have for many months past entirely substituted formalin for alum with, I think, the greatest advantage. I say this because, whereas formerly, despite every care in treatment, it was no unusual thing to find gelatine prints developing yellow patches within a few weeks of their being finished, I have not met with a single instance of the sort since I adopted formalin, and this although the circumstances attending its use would certainly be in favour of instability if formaline possessed the same dangerous properties as alum.

It is not necessary to enter into the reasons why a hardening agent is desirable with gelatine printing-out paper and not with negatives, as they are sufficiently obvious. Suffice it that with the soft and practically perfectly soluble positive film, the use of alum does materially facilitate the later manipulation of washing, drying, and mounting, and it possibly does no harm if the prints are well washed both before and after its use. But there is just the difficulty. During the washing, before its application, if it be sufficient to thoroughly remove the hyposulphites, the principal part of the mischief is done, at least in such weather as prevails at the time I write, for the tender film becomes still softer and more rotten, and by the time the hardening bath is applied it is almost too late to do any good. If, on the other hand, the alum be used when the earliest signs of danger are evident, and before the hypo is removed, or if it be purposely applied as an eliminator, then the seeds of inevitable decay are sown and the life of prints so treated may be surely reckoned as very short. Further than this, even though the preliminary washing be efficiently performed, unless the alum be thoroughly removed by an almost equally prolonged washing, a scarcely better result is to be anticipated.

But with formalin there is no such necessity for careful or prolonged washing before or after its application. So far as I can see, it exercises no chemical action on the silver salts in the print, nor on the hypo, and may apparently be used immediately the print is taken from the fixing bath. Simply for the sake of experiment, I have actually transferred a print direct from the hypo, without washing, into the formalin solution, and after ten minutes' immersion it has been washed and finished in the ordinary way, and now, after some weeks, shows not the slightest sign of change. I am pretty certain that the same would not be the case with alum.

Although for various reasons I do not adopt that plan in the ordinary course of work, I am glad to avail myself of the good offices of formalin at the earliest possible moment. Accordingly, when the prints leave the hypo they are quickly washed in two or three changes of water to remove the bulk of the hypo, and are then placed, in two or three minutes' time, in the formalin solution, and there left to soak for from ten to twenty minutes. The strength of the solution is not very material, except so far as it affects the time of action; I use one ounce of the commercial formalin in twenty ounces of water, using it fresh every time. For economy's sake I use the smallest quantity possible, well wetting each print as it goes in, and leaving them to soak in pretty close contact, turning them over perhaps two or three times during the immersion.

Every one who has used gelatino-chloride paper knows too well the slippery, rotten feel of the surface in hot weather, especially when the sulphocyanide toning bath has been used; but this disappears almost instantly in the formalin solution, giving place to the firm, leathery touch that marks the alumed print. How short an application is really effective I cannot say; but, as no harm appears to come from prolonging it, I prefer to give sufficient.

There is another advantage formalin presents over alum. In order to meet the softening action of the sulphocyanide bath some of the paper-makers recommend the use of alum before toning; but unless it be thoroughly removed—and this is no easy matter—before the prints go into the toning bath, the action of the latter is very irregular. With formalin no such difficulty presents itself, and sulphocyanide may be used in the hottest weather with as much comfort, so far as the physical character of the gelatine film is concerned, as if it were the "combined" bath.

Turning to negatives. Before your remarks of last week were in print I had been experiencing trouble with a batch of rapid plates of a brand I use regularly, that were developed and washed in the evening, and which had scarcely commenced to show signs of drying next morning. Even soaking in spirit made no impression on them, for, after they had become surface-dry, the gelatine seemed as thick and swelled and full of water as before. I went to the extent even of giving one or two of them a dose of absolute alcohol, and, even after that treatment, one of them, placed in the sun to dry, partially melted—an occurrence I never previously remember.

I had three more of the same plates still to develop, and these, after fixing, were rinsed well under the tap, and then placed at once into the five per cent. formalin solution for ten minutes, and finally washed in the usual manner. As a result they dried as usual in a perfectly normal manner, where the others, when they did dry, were marked all over with incipient "fits," as if partly decomposed.

I think therefore it will be agreed that formalin offers decided advantages over alum, inasmuch as while it is equally or more effective as a hardening agent, it can be applied at an earlier, or indeed at any stage of the manipulations without injury to the print or negative. It thus acts not only as a remedy for softening of the gelatine, but as a preventive, by checking it before it has time to start; and, whereas alum is very difficult to remove from the gelatine film when it once gets into it, the formalin is gone as soon

as the "greasiness" (to borrow a term from the old collodion days) has disappeared, though even if not thoroughly removed by washing, its volatile nature would ensure its removal on drying.

W. B. Bolton.

PURE PHOTOGRAPHY *VERSUS* THE NEW ART.

[Paper read before the Photographic Convention of the United Kingdom.]

Although it is perhaps somewhat late in the day to make any reference to the gum-bichromate process, it is necessary to do so in order to lead the way to a suggestion which seems to promise a means of producing pictorial work—I refrain from saying "artistic," as that is a debatable term—and of exercising those powers of individuality that seem to be so much in evidence of late, without overstepping the bounds of pure and legitimate photography.

No one will, I think, deny that the gum-bichromate process in its modern form, as improved and systematised by the much-scorned experimentalist, is capable of giving, in skilful hands, very pleasing results, results that, for certain classes of subjects, are quite as "artistic" as those of the same character produced by other methods of printing. On the other hand, I scarcely think there are many now who will claim for the process that it is either suitable for any and every kind of picture, or that it is perfect in principle; nor are there many who will recognise it as an easy process to work, and those few who have had the necessary skill and perseverance to master its intricacies must by this time have come to the conclusion that the same amount of care and devotion to the work bestowed in other directions would undoubtedly lead to a better return.

As to the cry that was raised some time ago that the text-books were all wrong in teaching that, to secure perfect gradation in printing processes based on the use of bichromate gelatine and its analogues, it is necessary to develop from the under side of the exposed film, I think most of those who know anything of the subject will agree that the writers of those guides will be nearer the truth if they continue in the same vicious course.

It would indeed be strange if all the early workers—Fargier, Abbé Laborde, Blair, Swan, and even Pouncy himself, who is now recognised as the father of gum-bichromate, after vainly endeavouring to get satisfactory results by the direct method of printing, should have resorted to "transfer" in some form as the only means of getting true gradation. Carey Lea, in his *Manual*, speaking of the earlier processes, says: "The only indications of half-tone obtained seem to have been due to inequalities in the paper;" and, curiously enough, the best results of the present day are produced on rough-grained paper. The Abbé Laborde was, I believe, the first to recognise the weak spot in direct printing, and he suggested printing through the paper, but Swan's was the first perfect transfer method, or rather laid the foundation for the present perfect process. I have never seen it stated in connexion with gum bichromate, although Pouncy has been over and over again put forward as having produced perfect results by the method forty years ago—I have never seen it mentioned, I repeat, by either friend or foe of the modern method, that Pouncy himself in 1863 abandoned direct printing and patented a transfer process. In this process, if I remember rightly, the sensitive pigment was spread upon translucent paper, and was exposed with the back of the paper in contact with the negative, which, of course, gave a reversed print. To overcome this difficulty, the patentee gave full directions for transferring the image so produced to another support; but that process does not seem to have been much used, except by Pouncy himself, as Swan's process, which was patented and published a year later, entirely superseded it.

If Pouncy, the father of this forty-year-old "perfect" process himself abandoned it, its present day adaptors can only find fault with the text-books on the supposition that they themselves set up as a new standard of "perfection," one that has been already abandoned by all the honoured workers of the past.

The claims made in favour of the gum-bichromate process by the earlier of its modern *exploiteurs*, were that it was different from anything else, and offered scope for the introduction of any amount of the "personal element;" further, it is, or was, so beautifully simple, not having been "messed about," and "complicated" by the experimentalist, that it was impossible to produce two similar results. Now that the experimentalist has got at it, it has, I presume, lost its charms for many of the earlier workers; but I fail to see how or why in its latest improved form they need turn back upon it. It entails at the present day no greater need for accurate focussing, correct timing, nor any greater attention to technique generally; and, as far as I can gather from the writings of those who have taken the trouble to study and improve the process, while it is possible, with due care, to produce much better results than formerly, it is no whit more difficult to turn them out just as bad.

After all, it must be admitted that the process in the matter of correct rendering of gradation is not a perfect one, though, by various kinds of manipulation—some fair, some doubtfully so—during development, results can be obtained that are satisfactory to a pictorial extent, still the fact remains that its use is confined within very narrow limits. But there is another process of a not very dissimilar character, which offers all the scope for individuality, and, more, gives far more control and infinitely greater opportunity of *creating* pictorial effects than does gum-bichromate, and this, moreover, in a perfectly legitimate and photographic manner, I allude to the "dusting-on" or "powder" process.

In this, as is well known, a sensitive mixture which is practically the same as that used in the modern gum-bichromate process, but without any colouring matter, is exposed to light, and, owing to certain hygroscopic properties of the film, which are destroyed more or less according to the degree of light action, it acquires a selective attraction for any fine powder that may be dusted on to it. Thus, when dusted after exposure with a powdered pigment, the latter adheres to it more or less, according to the exposure, and an image is built up, if the exposure has been correct, in perfectly true gradation.

In a process based on this principle the "control" is practically unlimited. It is not confined to "local treatment," which in itself is a host, but, by the use of colours of different degree of "saturation," shadows may be deepened or lowered, detail strengthened, if it is weak, and, indeed, the progress of the image moulded or modified to the will of the operator.

Of course, there are difficulties in connexion with the process in the application I suggest. First of these is that the positive must be made *from* a positive, not from a negative, but this prevails in other departments of photography. The most serious difficulty is the application of the sensitive preparation to paper as distinguished from glass or other support; or, rather, not its application, but its perfect desiccation without causing the paper to curl or "cockle," for the whole success of the method hinges on the complete and thorough absence of moisture at the time of exposure, and perhaps also at the commencement of the development. However, this is not an insurmountable difficulty, for I have produced, without any special effort, very passable results on paper. Cary Lea published a paper process many—about thirty—years ago, but since then the process has been chiefly used for the reproduction of negatives (on glass, of course) and positives on opal, for which purpose it is admirably adapted.

Those who wish for fresh fields to conquer, and who are not afraid of an obstacle or two, will, I think, find the powder process to possess more than the advantages claimed for gum-bichromate, with the additional one that, in principle, it is a perfect process, and not a makeshift.

W. B. Bolton.

THE RIGHT TO EXHIBIT PORTRAITS.

One of the most frequent questions we have to reply to in the Answers Column is with reference to the right of photographers to exhibit portraits of sitters, taken in the ordinary way of business, as specimens in their windows or show cases, against the expressed wishes of the sitters or others interested. It cannot be too well known amongst professionals that they have no legal right whatever to do so. That question was settled some years ago, in the well-known case of Pollard *v.* The Photographic Company, when Mr. Justice North, who tried the case, ruled that a photographer, who was employed by a customer to take his or her photograph, is not justified in striking off copies for his own use, and selling them, or disposing of them, or of publicly exhibiting them by way of advertisement, without the authority of such customer. He also added that, "In my opinion, the photographer who uses the negative to produce other copies for his own use, without authority, is abusing the power confidentially placed in his hands merely for supplying the customer; and, further, I hold that the bargain between the customer and the photographer includes, by implication, an agreement that the prints taken from the negative are to be appropriated to the use of the customer only." Here is a clear and explicit judgment on the matter, and there is no question on the subject.

Why any photographer should persist in exhibiting a portrait, or desire to show one, against the wishes of the sitter it is difficult to understand, from a business point of view, quite apart from the legal aspect of the

question. One would think that it was not good policy to offend customers, particularly as offence given to one customer in this way naturally deters his or her friends from sitting to the same photographer, from the fear that their portraits, when taken, may be similarly used to their annoyance. Especially does this apply in provincial towns, and it is from them that the greater portion of the queries that we have to answer emanate. We were once asked by a lady friend, who, by the way, made an admirable picture, to recommend a "respectable photographer," to whom she could sit without her portrait being afterwards shown, as she strongly objected, as she said, to being "pilloried in show cases," as she had been after some previous sittings.

Some months back, when visiting the Friday market in the Caledonian-road, we saw a number of very fine carbon enlargements, 24×18 and upwards, highly finished and framed, for sale. They had been a portion of the specimens of a well-known house that went into a limited company, and that were not all portraits of public characters. It might be a question how Mr. Justice North's ruling would apply in a case of this sort, seeing that the pictures were sold in "market overt." Stolen property, if purchased in "market overt," cannot be claimed by its late owner, except under special circumstances, and it might be a question whether the purchasers of these pictures had the right to use them as specimens against the wishes of the originator. It seems a rather knotty point.

FOREIGN NEWS AND NOTES.

The Paper Ring.—The *Photographische Correspondenz* has an interesting communication from its Berlin Correspondent explaining the present combination in the photographic paper trade. All the paper used in the manufacture of printing-out paper comes from two makers, Blanchet frères & Kleber, of Rives, and Steinbach & Co., of Malmedy. The monopoly is due to the difficulty of producing a material to which the sensitive silver surface is indifferent, and to the heavy losses which may be sustained in starting a new factory. But that they are not insurmountable was demonstrated a few years ago, when a new factory was started at Rives, and soon produced paper equal to Blanchet's. The latter firm then bought the new factory, in consideration of an annuity. Although the fashion for photography has increased the demand for paper very considerably, and the manufacturers have been making handsome profits, they have made further use of the opportunity by raising their prices cent. per cent. indirectly. The two manufacturers have combined and founded the General Paper Co. of Brussels for the sale of their paper, and to control the supply. The Dresden manufacturers of photographic printing papers have been compelled to agree to the advance in price, but have contracted to take the whole supply for a period of five years. The other manufacturers of printing-out paper have now been requested by the Dresden firms to take limited supplies at the increased cost price, upon penalty of not getting any paper at all. The supply to each is limited to the quantity used last year. The effect of this combination, if successful, will be to circumscribe the business of all the manufacturers, who have to buy of the Dresden firms. The natural expansion of trade must, consequently, flow to the latter, and it also becomes impossible for any new firm to manufacture printing-out paper unless some other suitable paper can be used.

The Cooke Lens.—The editor of the *Photographische Correspondenz* mentions that he has received a communication from Dr. M. von Rohr concerning the discussion between himself and Dr. Kaempfer as to the rapidity of the Cooke lens. Dr. Kaempfer admits that what he has claimed rests upon an assumption, which appeared to be confirmed by the comparative tests he had made. Dr. Von Rohr, on the other hand, has made comparative tests of an unexceptionable nature with the Cooke lens and the anastigmatic doublet. These were submitted to the Vienna Photographic Association, and showed no advantage in favour of the former. Dr. Von Rohr then proceeds to say: "We are therefore compelled to conclude that, in the present insufficiency of our knowledge concerning the constants of absorption of the new glasses, the means are not to hand by which we could compute the loss from absorption in the various types of lenses. But, to arrive at a correct conclusion, we must know the loss from absorption and reflection, and, by means of a series of exposures, the conditions under which the rays of light are combined upon the sensitive plate. The fact that there is less absorption in the Cooke lens gives no justification for the assertion that, upon theoretical grounds, its absolute rapidity is greater than, for instance, the anastigmatic doublets. Moreover, it is brought decidedly into question by the practical tests which have been made."

Incandescent Lamps.—The *Deutsche Photographen-Zeitung* draws attention to an improvement in incandescent lamps by Dr. Auer von Welsbach, which appears to be of considerable importance. This consists in the employment of metals of the osmium group in admixture (or of osmium alone) which do not melt at high temperature, and thus facilitate the use of stronger currents and the generation of more intense light. These metals may be used in lamps from which the air has been exhausted or not, and they give a very intense light of dazzling whiteness. The patent specification runs as follows: "Firstly, for the use of filaments of osmium, either alone or in admixture with other metals similar to platinum; secondly, for the preparation of these osmium filaments; thirdly, for the preparation of filaments of platinum and osmium with oxides of the rarer earth metals." Auer von Welsbach prepares the filaments by repeatedly dipping osmium wire in a solution of a salt of aluminium, and by subsequent incandescence producing upon it a delicate, even film of aluminium oxide. Filaments thus prepared cannot possibly be melted *in vacuo*, and remain unchanged at high incandescence in the open air. Perhaps the intense, steady white light of Welsbach's electric incandescent lamps will give the photographer the power to dispense with daylight.

The Chassagne Process.—Dr. E. Vogel gives the following simple method in the *Photographische Mitteilungen*, by which coloured photographs may be produced in much the same way as by the Chassagne process. Albumen, gelatino-chloride, and bromide prints may be used, but not collodio-chloride. By the Chassagne process the prints are first treated with a colourless fluid to open the pores of the film. The print is then blotted off and coloured with the three tints, yellow, red, and blue. Instead of the colourless Chassagne solution, the following may be used: 2 grammes of dry egg albumen dissolved in 100 c. c. of water and 2 c. c. of ammonia. The use of the ammonia is to remove any trace of grease, which would prevent the absorption of the colours. The solution should be freshly prepared, as it deteriorates rapidly in summer. A few drops of carbolic acid increase the keeping quality considerably. The colours should be unaffected by ammonia, otherwise the print-preparing solution will cause difficulties. The following are especially suitable:—Yellow: Picrate of ammonia, which may be prepared by dissolving picric acid in water and adding ammonia to the solution until it may be smelt. Red: Safranin G. extra. Blue: Methylene blue. The colours should be very dilute; for instance, half a gramme of methylene blue, dissolved in 1000 c. c. of water, is quite strong enough. It is preferable to keep the colours in more concentrated solutions, and to dilute them as required.

Canvas Effects.—As a novelty we may mention, that Dr. Liesegang draws attention in his paper, the *Amateur Photograph*, to a method of imitating oil paintings practised by Dr. Hiddemann. The plate is first exposed in the camera upon a piece of stretched canvas, and afterwards for the portrait or landscape. It may be mentioned, as a recommendation, that there is no hardness in the shadows in effects of strong sunlight. A piece of coarse canvas is washed, ironed, and stretched quite smooth. Focus quite sharp, and expose with the smallest stop. For the portrait, or landscape, a very full exposure should be given, and development should be controlled and very slow.

Acetylene.—Concerning the reactions of acetylene the *Deutsche Photographen-Zeitung* gives the following communication from Carl F. Reichelt. If treated with peroxide of hydrogen, acetylene becomes graphite, and the same obtains with most of the carbides. The reaction takes place at 150° C., under a pressure of five atmospheres. The person who has discovered this method thinks it may be of use in the manufacture of pencils and printers' ink of great purity, but, at the present high price of acetylene and carbide, there is no prospect of commercial success. Carbide of soda is a white powdery substance with a specific gravity of 1·575 at 15° C., and appears to be quite insoluble. Dry air and oxygen do not affect it at ordinary temperatures; but, under the influence of gentle heat, combustion takes place with Na_2CO_3 as residue. Carbide of soda becomes incandescent in the presence of chlorine, and it burns with explosive effects in the presence of fumes of bromine. Iodine affects it much more slowly, and forms C_2I_2, which melts at 185°. Hydrogen causes no reaction whatever. If thrown into water, carbide of soda explodes, and deposits carbon. CO_2 and SO_2 also render it incandescent. In the cold state it reacts upon a number of organic substances. With the primary and secondary alcohol it produces ethine and the corresponding alcoholates.

Pyrogallic Acid.—Dr. R. E. Liesegang has an interesting short article in the *Photographische Correspondenz* on our old friend pyro. After referring to its value as a developer in the production of stain as well as silver in the formation of the image, he inquires, Of what does this oxidation product consist? The answer not only interests photographers, but dermatologists also, as Dr. Unna pointed out two years ago that oxidised pyro had more curative effect on the skin than pyrogallic acid. The perfectly oxidised substance, insoluble in ether, has been used in medicine under the name of pyraloxin, but without any knowledge of its formula. Berthelot has been studying minutely the reactions which take place between pyrogallol and oxygen in the presence of alkalies, and has published a preliminary article in the *Comptes Rendus*. It appears that the results vary considerably, according to the alkali used. Before complete oxidation takes place, a number of intermediate products are formed in succession, which are to be derived from the primary compound, $C_6H_5KO_6$. The first products of oxidation approximate to purpurogallin. When extracted with ether, they are red, crystalline, and turn blue in contact with air and alkalies. Their formula is $C_{20}H_{20}O_{11}$, and differs from purpurogallin ($C_{20}H_{16}O_9$) by $2H_2O$. The author has also studied the products of complete oxidation. Fugitive acids are not formed in measurable quantity. The author indicates as the chief products, $C_4H_4O_3$, soluble in ether, and $C_5H_6O_4$, soluble in water. These are approximate formulæ, but the true one is probably $C_{20}H_{20}O_{16}$. These substances may be derived by similar equations from pyrogallol:—

(1) $4C_6H_6O_3 + 9O = C_{20}H_{16}O_9$ (purpurogallin) $+ 4CO_2 + 4H_2O$.
(2) $4C_6H_6O_3 + 9O = C_{20}H_{20}O_{11} + 4CO_2 + H_2O$.
(3) $4C_6H_6O_3 + 14O = C_{20}H_{20}O_{16} + 4CO_2 + 2H_2O$.

A complete account will appear in the *Annales de Physique et de Chimie* in the course of a few months.

ACTION OF PERSULPHATE OF AMMONIA ON METALLIC SILVER.

Technical photography does not possess, at present, a process permitting of directly reducing a hard phototype which has been under-exposed and at the same time over-developed without destroying, and more or less weakening, the half-tones which correspond with the shadows of the object photographed.

Negatives presenting this defect of being under-exposed and also over-developed could not therefore be improved hitherto. In fact, the substances utilised up to now for reducing negatives, such as a mixture of ferricyanide of potassium and hyposulphite of sodium, act on the silver which forms the image by dissolving it gradually, beginning from the surface and extending to the base of the gelatine emulsion. On the other hand, it is known that the photographic image is constituted by reduced silver in graduated layers, as the action of the light has been more intense. The reduction of the haloid silver salt by the developer commences actually from the surface to the base, and extends in depth to the region to which it has been more particularly illuminated.

The reducers used until now agitate the surface, and therefore strongly affect the weak impressions, whereas, on the contrary, these should be preserved. We have found that persulphate of ammonia, $SO^4(NH^4)$, in aqueous solution has the property of reducing negatives by acting preferentially on the most opaque parts, preserving at the same time the half-tones of the shadows, which, as a rule, by the methods used at the present day, are the first to disappear.

This result, *à priori* paradoxical, can be explained if it is admitted that the new reagent exercises its action from the base of the emulsion to the surface—that is, in an inverse sense of the substances utilised hitherto.

This hypothesis, which is in accordance with the reactions observed, can be explained in the following manner:—

Theory of Operations.

Persulphate of ammonia, as is known, is an energetic oxidiser. Under the influence of the silver in the negative it should probably give a neutral double silver salt and ammonia, which is soluble in water, the solution having acted on the silver precipitated, moreover, by acid chlorhydric or chlorides. The reaction can really be expressed in the following equation:—

$$SO4-NH4 + Ag = SO4\begin{matrix}Ag\\NH4\end{matrix}$$

Persulphate of ammonia. | Silver. | Neutral double sulphate of silver and ammonia.

Although endowed with energetic oxidising properties, persulphate of ammonia, like oxygenised water, is susceptible of giving reducing reaction; for instance, if a solution of nitrate of silver is added, it rapidly reduces the silver to the metallic state, at the same time producing abundant release of oxygen. We believe this reaction can be expressed by the following equation:—

$$2(SO^4-NH^4)+2(H^2O)+2(AgNO^3) = 2(SO^4HNH^4)+2(NO^3H)+Ag^2+O^2$$

Thanks to this last-named reaction, it is possible for us to explain in a rational manner the peculiar action of persulphate of ammonia on gelatine emulsions containing the silver of the image.

If a negative is put into the persulphate of ammonia solution, this penetrates rapidly into the interior of the gelatine emulsion, and is in contact with the silver. A small quantity of double silver salt is formed, which is diffused in the excess of persulphate of ammonia solution in which the negative is placed. This, in the presence of the soluble silver salt formed, tends to give the reduced silver, but this inverse reaction is produced mainly on the outside of the gelatine emulsion, considering it is there where the excess of persulphate of ammonia necessary for reduction is found and must proceed from the surface to the base of the emulsion.

It is undoubtedly this inverse reaction which tends to lessen (especially externally) the dissolution of silver in the persulphate of ammonia; that is why it is not possible for this reagent to weaken, even in a slight degree, the over-exposure fogs, which, as is known, are constituted exclusively by reduced silver on the surface of the gelatine emulsions.

We have come to the conclusion that persulphate of ammonia acts the best in a five per cent. solution. In a solution more or less concentrated its action presents always the same character, but it is simply more rapid or slower, and leads always to the same final result. If the solution surpasses five per cent., the gelatine may alter. It is therefore recommended not to exceed this percentage in practice, in case very rapid action is desired.

The action of persulphate of ammonia exercises itself on the negatives after washing with water very summarily after fixing, in order to remove the greater portion of hyposulphite of sodium; but then it is necessary, after a few minutes' immersion in the first bath, to replace by a new bath, because the persulphate oxidises the hyposulphite of sodium, transforms it into bisulphite, and it is only when this reaction has taken place that the silver dissolves.

It is therefore preferable, in order not to uselessly employ the persulphate of ammonia, to completely eliminate the hyposulphite of sodium from the negative by washing before the process of reducing is made.

When removing the negative from the persulphate solution, it will be noticed that the action of this body still continues, and, if it is not washed very abundantly at once, the reducing action may possibly continue beyond what is desired.

This can easily be avoided if the operation is stopped when the negative has not yet attained the degree of reduction which is desired, and by putting the negative immediately from the persulphate bath for a few minutes into a ten per cent. solution of sulphite of sodium or bisulphite of sodium. These bodies transform the persulphate of ammonia into sulphate, which does not then react on the silver in the negative.

The operation is terminated by eliminating the soluble salts which remain in the emulsion by summary washing. We would observe that the reducing is more rapid when the gelatine emulsion has been swelled than when it is in a dry state, which confirms, moreover, the action of the reagent. Besides, the intensity of the image after it has been reduced can again be intensified by the usual intensifiers—for instance, bichloride of mercury and ammonia.

Conclusion.—To sum up, it becomes possible by the use of persulphate of ammonia to take the most complete advantage of under-exposed negatives which have been over-developed without having any anxiety as to the hardness of the image obtained and by getting the maximum amount of details, as subsequently the negative can be reduced in the solution of persulphate of ammonia and stopping the reduction at a finished point.

Lastly, it is possible to correct the effects of over-development in the case of normal exposure, a result which no known reducer has been able to accomplish.

Lumière and Seyewetz.

"SOLIO."

[Abstract of *Times* report.]

This was an appeal to the House of Lords from an order of the Court of Appeal dated April 29, 1897, affirming an order of Mr. Justice Kekewich of November 6, 1896. The decision of the Court of Appeal is reported in 13 the *Times* Law Reports, 373, and 14 Patent Cases 487, and the only question—one of great commercial importance and likely, from the principles laid down in the judgments, to influence the practice of the Board of Trade which had been used by the appellants since March, 1892—was whether the word "solio" was a trade mark capable of registration. The Courts below held that the word ought not to be registered, inasmuch as it suggested the Latin word "sol," and was therefore descriptive and bad reference to the processes of photography. From the evidence it appeared that the word originally chosen was "Soho, as the company had formerly done business in Soho-square. It happened, however, to be printed so as to look like solio, and Mr. George Eastman said he chose the latter word in preference as being purely arbitrary. The arguments were heard on June 24 and 28, and their Lordships on the 28th intimated their intention of reversing the decision below, but took time to consider the form in which their judgments should be expressed.

The Lord Chancellor, in moving that the appeal be allowed, said: It

appears to me that to construe the statute now in question it is not only legitimate, but highly convenient, to refer both to the former Act and to the ascertained evils to which the former Act had given rise, and to the latter Act, which provided the remedy. These three things being compared, I cannot doubt the conclusion. Now, the objection pointed out by the Commissioners was that a particular individual could not be permitted to take exclusive possession of any part of our language, and this objection appears to have been in the mind of the framers of the earlier statute when they made the phrase "fancy word" part of the definition of what might be registered as a trade mark. It was the use of that phrase and its accompanying qualification which gave rise to much litigation; and I am certainly not disposed to hold that cases decided under that Act can have any bearing upon the construction of that part of the Act now under consideration, which was obviously intended as an alteration and amendment of the former Act. The present Act provided, among other things, by section 10 that a trade mark must consist of or contain at least certain particulars, the first of which is "an invented word or invented words." This word "solio" is claimed to be an invented word, and it has been adjudged not to be an invented word, and apparently (though I think the association of the two things involves an incorrect construction of the statute) because it is a word which has reference to the character or quality of the goods. I think it is an invented word within the meaning of this statute. I know of no such word as "solio" in any sense which would make it intelligible here, although it is an Italian word meaning a throne, and although it is a Latin word in the ablative case with the same meaning. Not much reliance, however, is placed upon the word having some meaning in a foreign tongue; but what is put is that it may have extracted from it some meaning in relation to the character or quality of the goods because the letters "sol" may be understood to mean the sun. And it is true that Shakespeare, in *Troilus and Cressida*, speaks of our planet "sol," and that, inasmuch as the goods in question are photographic papers and sunlight is operative in producing impressions on photographic paper, it comes within the prohibition against using words which are distinctive of the character and quality of the goods in respect of which the word is sought to be registered. My answer is that "solio" is not "sol" and "sol" is not "solio" It certainly is a very strange thing that you should take three letters out of a word, and by the somewhat circuitous process that has been adopted here arrive at the conclusion that it is not an invented word, and that it does describe the character and quality of the goods. I desire to give my opinion with reference to the particular word and not to go behind it. I can quite understand suggesting other words—compound words, or foreign words, as to which it would be impossible to say that they were invented words—although perhaps never seen before, or that they did not indicate the character or quality of the goods, although as words of the English tongue they had never been seen before. Suppose a person were to attempt to register as a single English word "cheap-and-good," or even without taking so gross an example, using a word so slightly differing from an ordinary and recognised word as to be neither an invented word nor, avoiding the prohibited choice of a word, indicating character or quality. The line must he sometimes difficult to draw, but to my mind the substance of the enactment is intelligible enough, and the Comptroller has to make up his mind whether in substance there has been an infringement of the rule. Of course, also, words which are merely misspelt, but which are nevertheless in sound, ordinary English words, and the use of which may tend to deceive, ought not to be permitted. I am satisfied in this case to say that the word "solio" is an invented word, that it does not indicate the character or quality of the goods, and that the decision of the Court of Appeal ought to be reversed.

Lord Herschell: The Comptroller-General of Patents, Designs, and Trade Marks having refused to register "Solio" as a trade mark in respect of photographic paper, the applicants, who are the appellants at your Lordship's bar, appealed to the Board of Trade, who referred the appeal to the Court. Mr. Justice Kekewich held that the application had been rightly refused, and his judgment was upheld by the Court of Appeal. The ground upon which the Courts proceeded was that the word "Solio" had reference to the character or quality of the goods, and was therefore incapable of registration. The Court of Appeal held itself bound by a previous decision of the same Court in the case of "*In re* Farbenfabriken application" (1 Ch., 1894, 645; 63 *L.J.* Ch., 257), to hold that an invented word could not be registered if it had any reference to the character or quality of the goods. The question turns upon the construction of the section which by section 10 of the Act of 1888 is substituted for section 64 of the Patents, Designs, and Trade Marks Act of 1883. The section to be construed provides that a trade mark "must consist of or contain at least one of the following essential particulars." Then follow seven particulars, distinguished by the letters (*a*) to (*e*). The last two of these are as follows:—(*d*) An invented word or invented words; or (*e*) a word or words having no reference to the character or quality of the goods and not being a geographical name. Before considering the effect of this legislation, I think it well to refer to the fact that these two particulars of which a trade mark may consist were not to be found in the Act of 1883. On the other hand, "fancy word or words not in common use," which were amongst the essential particulars in section 64 of the Act of 1883, are not to be found in the substituted section. It had been held that they did not cover words that were descriptive, and the section had given rise to much litigation and some divergence of judicial opinion. I cannot doubt that this was the origin of the legislation by which the words appearing in the principal Act were omitted, and the provision found in the later Act substituted. In the Farbenfabriken case Mr. Justice North said that he did not see how he could hold "somatose" to be an invented word within subsection (*d*) having regard to the decisions with respect to such words as "Herbalin," "Washerine," and "Valvoline." All these decisions had reference to the provisions of section 64 of the Act of 1883 with regard to fancy words. In my opinion none of the decisions upon that part of the original section have any bearing on the new provisions to be found in the substituted section, the purpose of which was, I think, to get rid of expressions which had occasioned much embarrasment, and of all the distinctions and decisions which had been founded upon them. Those decisions, so far from affording any guide to the true interpretation of the particulars designated (*d*) and (*e*), are likely to lead to error if applied to these new provisions. Addressing myself, then, to the terms of the substituted section, I am unable to find any justification for qualifying the provision "(*d*) an invented word, or words," by the condition that they shall have no reference to the character or quality of the goods. By the words which introduce the section the particulars designated under the headings (*a*) to (*e*) are treated as separate and distinct. "A trade mark must consist of at least one of the following essential particulars." What warrant is there, then, for transferring words found in any one of these particulars to any other of them? With all deference to the learned Judges who have thought otherwise, I can see none. It seems to me to involve an interpretation of the language used which is not its natural grammatical construction. In the Farbenfabriken case Lord Justice A. L. Smith said:—"It is impossible, I think, to hold that the Legislature intended that an invented word might be a word having reference to the character or quality of the goods, whereas a non-invented word might not. There would be no sense in so holding." I am unable to agree with this view. There seems to me to be the broadest distinction between the two cases. Under (*e*) any word in the English language may serve as a trade mark, the commonest word in the language might be employed. In these circumstances it would obviously have been out of the question to permit a person, by registering a trade mark in respect of a particular class of goods, to obtain a monopoly of the use of a word having reference to the character or quality of those goods. The vocabulary of the English language is common property; it belongs alike to all; and no one ought to be permitted to prevent the other members of the community from using, for purposes of description, a word which has reference to the character or quality of goods. If, then, the use of every word in the language was to be permitted as a trade mark, it was surely essential to prevent its use as a trade mark where such use would deprive the rest of the community of the right which they possessed to employ that word for the purpose of describing the character or quality of goods. But with regard to words which are truly invented words, words newly coined, which have never therefore been used, the case is, as it seems to me, altogether different; and the reasons which required the insertion of the condition are altogether wanting. If a man has really invented a word to serve as his trade mark, what harm is done, what wrong is inflicted, if others be prevented from employing it, and its use is limited in relation to any class or classes of goods to the inventor? So far, then, from seeing no reason for a distinction between the particular designated in (*d*) and (*e*), there seems to me abundant reason for not interpolating in (*d*) words which the Legislature has used only in relation to (*e*). In a later part of the judgment to which I have already referred, Lord Justice A. L. Smith says that, to constitute an invented word within the meaning of the section, it must be a word coined for the first time. "Such a word," he says, "is of necessity incapable of having reference to the character or quality of goods, because, *ex hypothesi*, it is an entirely new unknown word, incapable of conveying anything," With this—subject to a qualification to which I will refer in a moment—I entirely agree. An invented word has of itself no meaning until one has been attached to it. But this circumstance does not seem to me to be any ground for qualifying with a condition not applied to them the terms, "an invented word or words." In considering the case of an application to register a trade mark under (*d*) the only question which, in my opinion, has to be determined is whether the word sought to be registered is an invented word. In one of the cases on this subject Lord Justice Kay said: "There is extremely little invention in the matter." It may be that the word "satinine," which was there in question, was objectionable on other grounds, but if the word be an "invented" one I do not think the quantum of invention is at all material. An invented word is allowed to be registered as a trade mark, not as a reward of merit, but because its registration deprives no member of the community of the rights which he possesses to use the existing vocabulary as he pleases. It may, no doubt, sometimes be difficult to determine whether a word is an invented word or not. I do not think the combination of two English words is an invented word, even although the combination may not have been in use before, nor do I think that a mere variation of the orthography or termination of a word would be sufficient to constitute an invented word, if to the eye or ear the same idea would be conveyed as by the word in its

ordinary form. Again, I do not think that a foreign word is an invented word simply because it has not been current in our language. At the same time I am not prepared to go so far as to say that a combination of words from foreign languages so little known in this country, that it would suggest no meaning except to a few scholars, might not be regarded as an invented word. It is in this respect that I desire to qualify my assent to Lord Justice A. L. Smith's proposition, that an invented word can never have a meaning. Coming now to the particular case under discussion, I cannot doubt that the word "Solio" is an invented word, unless it is to be regarded as the Italian word *solio*, which means a throne, in which case it has certainly no reference to the character or quality of photographic paper. If it is not to be so regarded, it has of itself no meaning. As I have said, I think it unimportant if it be an invented word, whether it has reference to the character or quality of the goods or not; but if this were the test of the validity of the word as a trade mark, I must say that I think there is no such reference. I daresay that it might occur to some minds given to etymology that *sol*, the Latin for sun was a component part of it when they found it connected with photographic paper, but the same minds would equally find other root bases for the word if they found it connected with boots or agricultural implements. It seems to me to have no reference to the character or quality of the goods in the sense in which those words must have been used by the Legislature. I think the judgment appealed from ought to be reversed. Lords Macnaghten, Morris and Shand concurred.

PHOTOGRAPHY IN THE SPANISH-AMERICAN WAR.

The following account of the part it was expected that photography would play in the Spanish-American War will doubtless interest many of our readers. It appeared in the July number of the *St. Louis and Canadian Photographer*:—

The War Department is managing this particular branch of military enterprise and in a way to insure the most comprehensive and valuable results. The war studio is to be made a department of a vessel that voyages under the Red Cross. The craft is the *John Inglis*, soon to be renamed the *Relief*, which now lies at the Navy Yard in Brooklyn. She is a steel passenger steamer of about 4000 tons and was purchased recently by the government. Her speed is eighteen knots and in every way she is excellently adapted for the purposes in view. Just at present she is being fitted up as an ambulance-ship, with cots and other paraphernalia suitable for carrying wounded men. She will be painted white, with a huge cross in red on each side to distinguish her as a non-combatant.

The most essential feature will be a dark room. Much of the actual photographing will be done in the operating-room, where the surgical work for the wounded is performed. A pictorial record will be kept of the "cases" treated, which is expected to be of the greatest value to medical science.

The name of the government photographer is not permitted to be mentioned at present. He is a man of the highest distinction in his profession, and better equipped for such business than any other living expert. He is also a practical electrician and a bacteriologist of note, both of which accomplishments will have special value for reasons presently to be mentioned. His acquaintance with electricity will be of particular use in the management of a biograph or vitascope apparatus, by means of which it is hoped to get moving photographs of various interesting incidents of warfare.

The expert photographer in charge will transfer his base of operations to Cuban soil at intervals, the ship going between the island and various ports of the United States. He confidently expects to get some biograph views of land engagements—possibly of those incidental to the siege of Havana—and his hope is that he may obtain a vitascopic series of glimpses of a naval fight off shore. What a marvel, indeed, would be a moving photograph of a duel between two warships, American and Spanish, terminating, of course, in the destruction of the enemy's vessel, exhibited on a stereopticon screen before widely enthusiastic audiences from Boston to San Francisco. The apparatus includes cameras of huge size, which afford accommodation for dry plates three feet square. In addition, there will be photo-micrographic appliances for taking pictures of microscopic objects on a scale enormously enlarged.

One of the most important parts of the photographer's equipment on board of the ambulance ship will not be strictly photographic, although related thereto. It will be an X-ray apparatus for taking "shadowgraphs" by means of Roentgen rays. Necessarily, there will be many bones fractured by Spanish bullets, and in such cases accurate observations of the injuries inflicted will be of the utmost value. The Spaniards are armed with modern rifles of the Mauser make, the projectiles from these weapons at near ranges produce explosive effects, smashing bones to splinters. Amputations, therefore, are likely to be frequently demanded, but it will often be possible to save a limb by definite knowledge of the exact character and extent of the injury, such as could only be secured by making a shadowgraph of the part. Unquestionably during the Civil War a great many legs and arms were sacrificed by hasty surgery.

Surgical work on the battle-field of necessity will be hasty and crude. Hospitals of a permanent sort will be established at whatever port in Cuba is seized and held by Uncle Sam as a base of supplies. Supposing, for example, that Matanzas is thus occupied. One or more large buildings will be taken for the purpose and managed by the army medical service. Every sick and wounded man who can be transported, however, will be put on board of the ambulance ship and conveyed to Tampa, Mobile, or some other convenient port in the United States, where he can be taken care of to better advantage. It may be found advisable to reserve severe operative cases for treatment in this country, when circumstances are such as to admit of delay.

The expert who has been chosen for the work herein described will have a varied field of usefulness, owing to his many technical accomplishments. He will rig his own X-ray apparatus, construct the photo-microscopic machine, prepare "cultures" of any disease microbes that may make their unwelcome appearance, fix up his own vitascope paraphernalia, and generate his own electricity, requiring for this last purpose only a few pounds of coal per diem. The electricity, of course, is needed for producing the Roentgen rays, as well as for the cameras that record the moving pictures. To print his photographs he will want merely a convenient space on the upper deck. The surgical operating room will be well lighted by skylights, so as to be most serviceable for photographic work.

CONTRIBUTIONS TO THE STUDY OF "FLICKER."

At the meeting of the Royal Society, on May 26, a paper on the above subject, by Mr. T. C. Porter, was read. It is reported in *Nature*.

The first part of the paper described experiments made to ascertain the exact relative rotations at which the flicker of a disc, half black, half coloured, vanishes in the different colours of the spectra of sun, and lime light, formed by a diffraction grating of 14,434 lines to the inch. The main precautions which must be taken were briefly stated, with a short discussion of the results, which may be summed up as follows:

The rate of rotation of the disc that the flicker may just vanish is highest for the yellow, decreasing for the succession of colours on either side of this one, being the same for the deepest visible crimson and full green; from the full green to the violet end of the spectrum the rate continues to fall off, till in the last visible rays it is very nearly one-half its maximum for the yellow.

When the intensity of the different spectra is varied, the greater the intensity the more rapid is the rate of rotation necessary for flicker just to vanish; thus, as the stimulus applied to the retina increases in intensity, the impression produced retains its maximum value for a shorter and shorter time. That a brighter illumination of the disc does produce a greater stimulus (*i.e.* that neither the contraction of the pupil, nor any other cause, overcomes the effect of brighter illumination)' is proved by the fact that, the brighter the light, the brighter on the whole is the disc, when flicker has just vanished. Research was made to discover in what way the rotation of a black and coloured disc must be varied for flicker to vanish, when the proportion of the coloured to the black sector varied by stages of 10° at a time, the experiments being carried out in each of the main colours of the lime light spectrum.

Throughout the series of experiments the intensity of the illuminant was kept constant. The results are expressed in a series of rather remarkable curves, the rate of rotation rising rapidly with the instalments of 10° to the coloured sector, then remaining at its maximum, and constant within the errors of experiment, from a coloured sector of about 150° to one of about 240°, after which the rate of rotation falls off somewhat more rapidly than it rose when the coloured sector was small.

The remainder of the paper is devoted to the discussion of these curves, and it concludes by proving from a series of points, taken at random on one of them, that the duration of the impression on the retina undiminished is inversely proportional to the time during which the retina is stimulated. Some other conclusions of interest are arrived at; but, for the reasoning and description of experiments necessary, we must refer to the paper itself: *e.g.* (1) When flicker has just vanished, the effective stimulus at any point of the retina is, to the maximum stimulus the coloured sector can produce, as the angle of the yellow sector is to the angle of the whole disc (*i.e.* 360°), the illumination being supposed constant. (2) The coloured sector always requires a finite time in order to produce its maximum effect on the retina. (3) When the width of the white or coloured sector is increased in steps of 10° at a time, the increment in the apparent brightness in the rotating and flickerless disc follows, within the errors of experiment, the series of 1/0, 1/1, 1/2, 1/3, 1/4, &c., as it should. The paper is the first of a series on the subject.

THE PHOTO-TELEGRAPH.

What is termed an ingenious apparatus, called "the photo-telegraph," and resembling Szczepanik's telectroscope, has been contrived by the Austrian Major Schœffler. This apparatus renders it possible within a few seconds to photograph at a distant receiving station dispatches, newspaper cuttings, &c., which have been put into a camera obscura at the

dispatching station. The telegram, or whatever is to be transmitted, is simply put into the apparatus, the telegraphic transmission taking place automatically. The dimensions of the apparatus are very considerable. It consists of a message-sender and a message-receiver, the two being almost identical. The principle involved is as follows: A wheel covered with selenium cells rotates close to a second wheel, which is provided with a camera obscura. When a sheet of written matter is placed in the dispatch-sender, the parts covered with ink act on the cells differently from the blank parts. As often as the image of a written character falls upon a selenium cell the current circulating in the wheel is weakened. This change effects the dispatch receiver as a difference of light, and it acts on a strip of sensitive paper. As the apparatus at the two ends work, perfectly synchronistically, the situation of the photographic dots exactly corresponds with that of the dots in the original dispatch. Major Schoeffler calculates that such an apparatus will be able to transmit 600 telegrams an hour, that is, 14,000 in twenty-four hours in both directions. If milk glass be substituted for the sensitive paper, and if the machine be made to work so fast that the whole distance is traversed in less than one-seventh of a second, then for a moment the message will appear on the milk-glass plate as a shining image. The action of the major's apparatus rests upon the different effects which white and black produce upon selenium. He dispenses with the reproduction of colour, which the telectroscope does not: but, on the other hand, his apparatus is simpler. The major has just issued a detailed description of it entitled, *Die Photographie und das Electrische Fernsehen.*

HOW OUR LEADERS TALK.

We have received the following humorous skit on the proceedings of one of the London photographic societies:—

July —, 1898, the Hon. Member for Kensal Green in the chair.

The hours of the last meeting were read and, with alterations and additions, were eventually confirmed.

Herr von Fochslee spoke about the relations of snap-shot photography and beer. He had used with much success the stereoscopic camera based on the well-recognised principle of double refraction. An ordinary single camera was employed, which, before use, was filled with a specially strong Bavarian beer, principally used for Court consumption. The well-known doubling effect was most marked.

Mr. McKee was curious to know whether Scotch would have the same effect; and, if so, whether the spirit could be readily removed from the camera for other purposes?

Herr von Fochslee had tried Scotch, found it very difficult to retain, absorption rapidly taking place.

Mr. N. E. Well inquired whether any member could inform him of the difference between a flea and a serpent?

The Hon. Librarian, after reference to Wall's *Dictionary of Photography*, stated that he was unable to answer the question. The question was therefore referred to Captain Hayes, who is an authority on animals.

The Hon. Secretary said that, having been to Margate, he would be able to answer the question after studying serpents.

Mr. Crofter then read a paper on "Patents," but the subject was regarded as bootless by the members.

Mr. Dredge, who wore a pair of deck shoes purchased for his voyage round the world, protested against the last speaker's remarks as a reflection upon himself, and threatened to resign if they were retained in the minutes.

Mr. Viaduct proposed that the Club should congratulate Her Majesty on the occasion of her recent Jubilee.

Herr von Fochslee objected to the word "recent," pointing out that within his recollection several English sovereigns had celebrated Jubilees. The thing, in fact, had been done in the wet-plate days.

It having been mentioned that Mr. Chapman Jones had stated that the ideal negative should consist of pure silver in clean gelatine.

Mr. W. L. Ford, as a dabbler in dirt and a manipulator in mud, protested. His negatives, consisting of filthy pyro stain imbedded in discoloured glue, yielded results of which he felt really proud. He promised to bring several hundreds to the next meeting.

The meeting then adjourned for the purpose of seeing some lantern slides, the previous two hours having been absorbed in getting the lantern to work. The carrier acted as well as usual, and out of many hundred slides three were shown the right way up, and the recorder was instructed to put this on the minutes as an interesting and unique fact.

Our Editorial Table.

Cartridge Chemicals.

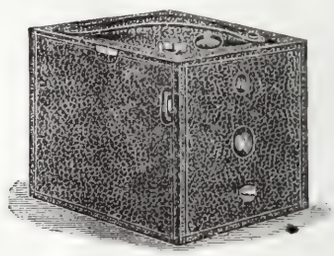
The Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

We have received from the Eastman Photographic Materials Company an assorted series of cartridge chemicals in glass tubes. These comprise toning and fixing salts, pyro developer, eikonogen, &c. The contents of each tube are directed to be dissolved in a stated quantity of water for use. Besides the bodies named, hydroquinone, metol, and amidol are introduced in the series. It is a neat and portable way of issuing definite quantities of photographic chemicals. The cartridges are packed in half-dozen and dozen boxes, and we have no doubt this little convenience will be highly appreciated by amateurs, especially those who travel.

The No. 2 Falcon Kodak.

The Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

This little camera is for square pictures, $3\frac{1}{2} \times 3\frac{1}{2}$ inches, on cartridge film; its capacity is twelve exposures without reloading, the size of the camera is $4\frac{1}{2} \times 4\frac{1}{2} \times 5\frac{3}{4}$ inches, the weight, 19 ounces, and the length of



focus of lens, $4\frac{1}{2}$ inches. The camera is made on the cartridge system, and can be loaded in daylight. It has a lens, with a set of three stops, view-finder, socket for tripod screw, and safety shutter for time and instantaneous exposures. It takes the same spools of film as the No. 2 Bull's eye and No. 2 Bullet Kodaks. The camera is covered with leather.

Mounts and Frames, and How to Make Them.

By Rev. F. C. Lambert, M.A., 146 pp., price 1s.

London: Hazell, Watson, & Viney, 1, Creed-lane, E.C.

Here is a really capital little book, which we can cordially recommend to the photographer who aspires to do his own mounting and framing. Mr. Lambert has not left any part of his ground uncovered, and, indeed, has addressed himself to the treatment of his theme with the utmost regard for minuteness. We are at a loss to imagine what he has left unsaid. Starting with the always-safe assumption that his readers know nothing of the subject, Mr. Lambert, in a series of fourteen chapters, dips into, amongst other divisions of it, the objects, sizes and proportions, texture and surface of mounts; cut mounts; mounting prints; frames, and the tools with which they are made. Of very special use is the chapter containing formulæ and directions for colouring and staining frames. This book, unlike so many recently issued volumes, is well worth a place in every photographer's library.

Royal Thames Guide.

Printed by Unwin Brothers, 25, Pilgrim-street, E.C. 236 pp., price 1s.

This useful book is a guide to the river Thames from Putney to Oxford. It contains thirty-five explanatory diagrams from lock to lock, which tell the voyager where he is, and there are over a hundred illustrations of hotels and well-known scenes *en route*. The book strongly appeals to the boating man, the river-side pedestrian, and the angler, while the photographer is not left out of consideration, for, wherever a dark room is available, a note is made of the fact. The book is crammed full of information likely to be of help to the classes for whom it has been compiled, and it is certainly the best and most exhaustive little guide to the river that has come under our notice. No lover of the upper reaches of the silvery Thames should be without it.

Lays of the Moonlight Men: Tales of '98, and other Irish Ballads.

By William Theodore Parkes. 150 pp. Price 1s. London: Neville & Co., 45, Barbican, E.C.

Though not photographic in character we are happy to recommend this little volume to our readers, to many of whom the author, in his many-sided capacity of artist, journalist, author, engraver, and poet, is favourably known. In the book before us he has once more demonstrated his thorough command of Irish humour and pathos. The lays breathe the spirit of the old days when English misrule oppressed the sister isle, and they appear, it will be noted, at the centenary of the Rebellion. We have no doubt that the book will have the great success it deserves, for, while it would puzzle us to single out any one poem as calling for distinctive mention, we have no difficulty whatever in characterising the lays as a whole as the production of a man of poetic temperament, whose love for his country is only equalled by his profound knowledge of every phase of Irish life and character.

PHOTOGRAVURE OF "DAYDREAMS."

Published at the Romney Studio, 122, Regent-street, W.

WE recently stated that H.R.H. the Prince of Wales had purchased two of Mr. Percy Wood's idealised head studies. One of these, *Daydreams*, is now being issued in the form of a photogravure reproduction, 15 × 12, and a signed artist's proof lies before us. Mr. Wood is the possessor of remarkable artistic skill in producing, from a conventional photographic base, finished pictures characterised by a beauty and refinement of treatment such as we have not hitherto met with in photography. The photogravure of which we are writing convinces us by its charm of effect that Mr. Wood —who is an artist to his finger-tips—has hit upon a branch of photographic portraiture in which he is destined to achieve very marked success. Nothing more pleasing has yet been done in photography, to which the man who is capable of such distinctly fine work is an unmistakeable and welcome acquisition.

The Royal Mail Route to Holland is the title of a little pamphlet issued by the Great Eastern Railway Company, giving particulars of the increased facilities for visiting Holland, Belgium, Germany, Switzerland, Norway, Denmark and Sweden, during the present season, *viâ* the Royal Mail Harwich-Hook of Holland Route, and the Harwich-Antwerp Route to the Continent. It has several pretty illustrations in three-colour half-tone, and will be found decidedly useful to Continental travellers. The publishers are Messrs. Percy Lindley & Co., 30, Fleet-street, E.C.

CATALOGUES RECEIVED.

George Houghton & Sons, 88 and 89, High Holborn, W.C.

MESSRS. HOUGHTON'S catalogue, the 1898 edition of which is before us, has grown to no less than 682 pages—a striking tribute to the firm's enterprise. The index alone occupies twelve pages. A glance through its pages, which have hundreds of illustrations, shows that the firm supplies a vast variety of photographic goods. Nothing in current requirement appears to have been omitted. It is a remarkable volume of its kind. Photographers or dealers may have it free on presentation of trade card.

The London Photographic Supply Company, 134, Borough, S.E.

THIS firm's catalogue takes up 618 pp., and it lists a very large variety of photographic and lantern apparatus and materials. There are hundreds of illustrations, and it should be found useful for reference by all classes of photographers.

News and Notes.

PROFESSOR VON RÖNTGEN has been awarded the Elliot-Cresson Medal of the Franklin Institute of Philadelphia.

THE Annual Exhibition of the Hackney Photographic Society will be held in Morley Hall, Hackney, on November 15, 16, 17, and 18 next.

THE Scottish Engraving Company, of Glasgow, Edinburgh, and 21, Farringdon Avenue, E.C, have sent us some excellent examples of their work in half-tone engraving.

THE LONDON POSTAL STEREOSCOPIC CLUB.—There are a few vacancies for members in the above Club. Full particulars wil be sent on application to L. Camaschella, 10, Derby-villas, Forest Hill, London, S.E.

THE AUSTIN-EDWARDS MONTHLY FILM NEGATIVE COMPETITION.—The Size Camera for current month has been awarded to Mr. Ward Muir, 4, Victoria-road, Waterloo, Liverpool, for his Negative, *A Flower's Study*.

SIR WILLIAM CROOKES, who is president of the British Association this year, is more than ordinarily busy with his presidential address, which will be delivered early in September. It is said that it is likely to be of a startling character.

THE names of the Prize Winners in the Warwick Monthly Competition for July, are, 1st prize, £20, Mr. W. D. Welford, 19, Southampton-buildings, Chancery-lane, W.C.; 2nd prize, £10, Miss Muriel Bell, Jewhurst, East Grinstead; 3rd prize, £5, Mr. John Williams, High-street, Rhyl, North Wales,

PHOTOGRAPHIC CLUB.—Wednesday evening, July 27, at eight o'clock. Discussion "The Camera as a Topographical Recording Instrument." Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Sec. (Mr. W. R. Stretton, 6, Queen-street-place, London, E.C.) will be pleased to forward on application.

TAKING PHOTOGRAPHS IN MANCHESTER PARKS.—The Parks Committee of the Manchester City Council, at a meeting on Friday, 15th inst., under the presidency of Alderman Evans, passed the following resolution:—"That the present regulations, respecting the hours within which Photographs may be taken in the parks, be abolished, and that same be permitted on week days as long as the parks are open." The hours during which it was possible to take photographs in the parks heretofore, were from 6 to 11 a.m., and from 3 to 6 p.m. This involved a great hardship on amateur photographers among the occupied classes, inasmuch as they were unable to follow their hobby on any afternoon, except Saturday. All restrictions as to time, are, however, removed by the above resolution. Of course, photographers will be subject to the general regulations governing the conduct of visitors to the parks.

THE complete manuscript of Mr. F. G. Jackson's *Three Years at the North Pole* has been received by Messrs. Harper, and there is every reason to believe that the book will be published this autumn. It will be issued in two volumes. There will be reproductions of a large number of photographs taken by Mr. Jackson and his officers in the Polar regions, and, in addition, several illustrations by Mr. R. W. Macbeth.

THE Queen has placed the Banquetting Hall of St. James's Palace at the disposal of Mr. Tuekson, who is painting there the great picture of Her Majesty's Diamond Jubilee. The picture portrays the Queen in her carriage at the foot of the steps of St. Paul's, with all her family and foreign Princes grouped at the back. All the Princes as well as the prelates and State dignitaries that were near her Majesty at St. Paul's have given sittings to the artist at St. James's Palace. The painting will be a large one, and already shows that it will be a great success, and will be historically correct in every feature. The artist is supposed to stand on the higher steps of St. Paul's facing Ludgate-hill. Mr. Tuekson is also painting another Diamond Jubilee picture, that of the great State Garden Party held last year at Buckingham Palace, when again the Queen is in the forefront with her family, and the great officers of State and important personages in society are seen to advantage.

THE FRESCOES AT WESTMINSTER.—Mr. Akers-Douglas has asked Professor A. H. Church, F.R.S., who has just presented to the office of Works some further memoranda concerning the wall-paintings in the Palace of Westminster, to be kind enough to advise as to the steps to be taken to carry out his further recommendations on the subject. These have not yet been published, but they contain a suggestion that in the course of the summer of 1899 the frescoes in the House of Peers should once again be cleansed under his supervision, and that the four glazed corridor paintings — *The Burial of Charles I., Charles I. erecting his Standard at Nottingham, The Parting of Lord and Lady Russell*, and *The Last Sleep of Argyll*—should be so treated as to remove all their present disfigurements, such as the grey film and the numerous dark circular patches, possibly of fungoid origin, which are increasing on various parts of the surface of one of the pictures.

Patent News.

THE following applications for Patents were made between July 4 and July 9 1898:—

PHOTO-RELIEVO.—No. 14,814. "Improvements in and Connected with the Production of Photo-relievo Impressions on Paper Card and other Materials." Complete specification. D. LICHTENBERG-MADSEN.

PERFORATOR FOR CINEMATOGRAPHY.—No. 14,965. "Improvements in Machinery or Apparatus for Punching the Holes in Photographic Films for Kinematographs and the like." A. S. NEWMAN and NEWMAN & GUARDIA, LD.

"DOUBLE APPARATUS."—No. 15,035. "An Improved Double Photograph Apparatus." G. BUHL.

PACKING FILMS AND PLATES.—No. 15066. "Improved means of Packing and Exposing Sensitive Photographic Films and Plates." G. C. WHITFIELD.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

July.	Name of Society.	Subject.
26.....	Birmingham Photo. Society ..	*The Lens in Photography simply treated.* Dr. W. J. Foster.
26.....	Hackney	Excursion Points.
27.....	Croydon Camera Club	Conversational Meeting.
27.....	Photographic Club	Discussion: *The Camera as a Topographical Recording Instrument.*
30.....	Hackney	Excursion: Enfield. Leader, J. J. Westcott.
30.....	Leytonstone	Excursion: Zoo. Leader, Dr. W. Pickett Turner.
30.....	Oldham	Excursion: Hardcastle Craggs. Leader, H. Varley.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 14,—Mr. E. Crofton in the chair.

Mr. J. E. HODD endeavoured to get a few hints as to the use of acetone in place of the alkali in development, but nobody knew much about it, and Mr. Haddon had only developed one plate therewith, which he had exhibited on a former occasion.

TONING.

A question was taken from the box, reading, "Why is it necessary to judge the tone of a print in some baths by looking through, and in others by looking at the surface?"

Mr. J. E. HODD, who claimed the authorship of the inquiry, pointed out that with certain papers it was necessary to judge by the light transmitted through the shadows as to whether toning was or was not complete, because, by reflected light, the print might appear well toned long before the correct stage was reached. On the other hand, other papers, notably Wellington's Sylvio, required to be judged by surface appearances only, or the print would be overtoned.

Mr. P. EVERITT queried whether it did not depend upon the tone aimed for,

Again, all emulsions were not alike, nor did they give the same colour in printing.

Mr. HODD called to mind, however, two papers which, he said, gave images of the same reddish-brown colour in printing, namely, Paget P.O.P. and Sylvio. With the former, one had to judge by transmitted light, and with the latter by surface reflection, even when toned in the same bath.

Mr. J. S. TEAPE said that, after using a paper for a short time, one could judge entirely by reflected light with all brands. Personally, he never troubled to look through at all, and rather thought this increased the tendency to over-tone.

Mr. A. MACKIE spoke to a similar effect. As regards defining the particular surface colour of any particular paper when properly toned, he could not satisfy Mr. Hodd, but he should know at once in practice. Extending the scope of the question to the preparation of the toning bath, he spoke to the effect that less sulphocyanide was necessary in a toning bath containing acetate of soda than in one in which this was absent.

Mr. EVERITT asked whether sulphocyanide was the best salt to employ in toning baths? He never used it, and preferred carbonate of soda (washing soda), using a very dilute bath, not more than one-quarter of a grain of gold to the half pint of water, toning in which took about twenty minutes.

Mr. HODD said some papers were not to be toned but by sulphocyanide He had worked with a weak carbonate of soda bath, but the results, if care were not taken, were plum-violet in colour, and very objectionable. He preferred papers that toned with phosphate or carbonate, but all would not do this. He passed round comparative examples by phosphate and sulphocyanide formulæ, toned to surface colour, and which did not materially differ, the former having a little more warmth.

FILMS AND SHUTTER SPEEDS.

Why does the film separate from its celluloid basis after drying, either wholly or in part? was the substance of a further query, and with it went a film, which gave point to the question. The gelatine was slowly but surely detaching itself, and this case was no exception to the rule, others of the same make being affected. There was nothing new in the fact, but what was the reason of it?

Mr. EVERITT said the aim of the frequent matting of the celluloid was to procure the adhesion of the film, but this film, although on matted celluloid, could not be said to be adhering very firmly.

Mr. E BANKS said it was probably due to the celluloid being coated before it was sufficiently seasoned. There had been a shrinkage, and this emphasised the importance of keeping the celluloid long enough to overcome the tendency which newly made material had to split from the emulsion if coated too soon.

In reply to a question inquiring for a simple means of arriving at the speed of a shutter, Mr. EVERITT named an article in this JOURNAL a short time ago, giving particulars of a method involving the use of a pendulum, and accompanied with a table for calculating the speed. The pendulum carries a bright, reflecting spot, and upon the length of the image produced by this upon the plate when swinging before the camera the speed is determined.

Mr. MACKIE said this method involved mathematical calculation, and mentioned that a reliable test was provided by a bicycle wheel, of which the rate of revolution was known, which was very simple, the arc produced upon the plate being measured in the usual way.

PHOTOGRAPHIC CLUB.

JULY 13,—Mr. J. Nesbit in the chair.

Mr. HALSE, who had been absent abroad for some three years, gave a brief account of his doings and of photography at Grenoble, where he had been living. This town is very beautifully situated, and worthy of a visit by all who admired Alpine scenery. The photographer would find an extensive variety of subjects for the exercise of his skill amongst the mountains and valleys and the surrounding country, and Mr. Halse offered a hearty welcome to any member who should find himself in the neighbourhood and visited Grenoble.

Mr. F. A. BRIDGE related the doings of the Convention at Glasgow, which passed off with every success, and at which, besides an excellent collection of pictures, the trade and apparatus manufactures had made some very attractive exhibitions of their productions. Gloucester was the city to be visited by the Convention next summer, and everything promises that the success which had marked previous meetings would attend the coming meeting also. In the course of further discussion, Mr. Bridge related what was to him a unique experience. A few days ago he went to photograph a wedding group, and to his surprise nobody inquired what plates he was using, nor how long he exposed, nor anything at all about photography.

Mr. HARVEY GEORGE said that, on the occasion of the first Yarmouth regatta this year, he had issued forth with his camera to make a few exposures, the day being overcast with a black and threatening sky, but no rain. The result was that the sails of the craft appeared perfectly white against a black or dark background in his pictures, and made very effective bits. The detail was good and sharp, and enlarged to 10×8, he secured some very fair results. He worked at f-16 at a speed of $\frac{1}{100}$ second, and with slow plates.

Mr. F. W. DOWELL stated that he had been endeavouring to determine the speed of a shutter, and in order to do so he adopted the method of turning his bicycle upside down and binding the tyre with a piece of white tape. The wheel was then spun and adjusted to one revolution persecond, when an exposure was made. On measuring the elongated image of the tape and comparing he found the speed to be $\frac{1}{64}$ second, although it was sold as $\frac{1}{60}$. He proposed to project the test photograph upon the screen—original size, the better to decide the speed question.

Some discussion took place regarding the dodge of giving extended exposures in small bites instead of continuously, especially with some subjects, for which an everset shutter was a very valuable acquisition as compared with so many patterns which require setting before every exposure.

Mr. DOWELL inquired whether different methods of developing a plate affected the resulting grain? In a certain instance of a photograph upon a plate number 350 H. & D. which he enlarged, the grain was so frightfully coarse that he substituted plates of only 150 H. & D., which, however, seemed as coarse as the faster plates. Could it be due to the development?

Mr. R. CHILD BAYLEY said it had recently been stated that different developers did not give a different amount of grain for like exposures on the same plates, and that with very short exposures one got more grain than with relatively long exposures. The reason given was important. It was well known that coarseness went hand in hand with speed, and if one gave a short exposure the image was formed upon the coarsest particles of the plate, while with a longer exposure the finer particles were used as well, and the appearance of granularity lessened.

The CHAIRMAN referred to the apparent effect of the mercury-ammonia intensifier upon a rather thin image, in disturbing the original grain of the plate.

The HON. SECRETARY confirmed what had been said, and stated that he also had not been successful in retaining the original grain.

Mr. GEORGE mentioned a case of a friend who had bleached a negative and printed from this without blackening with every success and improvement. The question of the ultimate condition of a negative so treated was discussed—how long it would keep and if at all, without darkening, and the utility of the variation.

Brixton and Clapham Camera Club.—By the kind invitation of the North Middlesex Photographic Society, a combined excursion with the Brixton and Clapham Camera Club, was made on Saturday, July 9, to Low-street, near Tilbury. In contradistinction to Cologne, which is reputed to possess fourteen distinct varieties of smells, one only was in evidence on getting out of the train, but this one was *very* powerful. Once away from the station, however, all trouble in this respect was at an end, and a succession of picturesque farm-houses green lanes, streams, cattle grazing, haymaking scenes, &c., gave plenty of work for both hand and stand camera. One view was let alone, for on a member of the Brixton contingent climbing over a gate to secure a suitable stand-point, a bull decided to investigate the details of camera construction, and a return was made with surprising agility. Altogether, the ramble was a decided success, and a good tea and comfortable return journey brought a satisfactory conclusion to the day's enjoyment.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writer are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ELECTRIC *VERSUS* CHEMICAL PRINTING.

To the EDITORS.

GENTLEMEN,—Will you permit me to take exception to the note on p. 450 of the JOURNAL *re* prints formed by electric *versus* chemical action? Your correspondent appears to have misled you.

In Mr. Friese-Greene's demonstration, the developable experiment only led up to the practical part of the process, which consisted of "*preparing paper* or linen with a weak solution of nitrate of silver and making an electrical impression with metal type, &c., to obtain a black impression, which may be fixed with hypo," *vide* Mr. Greene's demonstration in the June Supplement, p. 46, last paragraph.

In *Photography*, p. 350, it is further stated that "the most obvious commercially and industrially useful form of electric printing seemed to be where a suitably *prepared* paper is used. In this case no development is requisite. . . . In this connexion, Mr. F. Greene showed his first pattern of an electric press," &c. Hence my examples V. VI., and VI. (p. 410 of the JOURNAL), together with others of a previous note, were given to prove that this action is the result of chemical force—the electric current brought to bear upon it being a superfluity, as you allow.

Further, the lecture was stated, by Mr. F. Greene, to be founded upon one given at Bath in 1888 (see p. 715 of the JOURNAL for that year). Here we find that the developable impression of a silver coin upon a bromide plate is made by passing an electric current through a bath consisting of *water acidulated* with hydrochloric acid into which is placed the coin in contact with the plate, ammoniated water being mentioned as an alternate. Examples I. and IV. demonstrate that this is the result of chemical action, therefore the Alpha and Omega of the process is shown to be the result of chemical action.

This only leaves Examples II. and III. to consider. Early in July last I sent you an article which gave experiments showing, among others, that these two examples could be made available with plain water, providing the sample of paper was favourable to the action. (Mr. Greene especially mentions that some papers are better than others.) Now your correspondent will try these examples with plain water, he will find impressions are obtainable. Both paper and water contain traces more or less of acids or bases, such as chlorides, carbonates, sulphates, aluminia, and so on; hence, to obviate an unfavourable sample of paper being brought into use, I suggested damping with water containing

veak chloride to start the action. A weak carbonate or sulphate would ikewise have sufficed.

If Mr. Greene had kept to unprepared paper, as you have been led to elieve, I should have had no *locus standi;* but he had been demonstrating to members of the printing trade with paper prepared with netal salts without development, under cover of this electrical-printing rocess, his provisional protection dating after the publication of my pecification; hence my communications to the Croydon Camera Club nd *others*, for reasons which are obvious.—I am, yours, &c.,

July 15, 1898. HENRY SOAR.

FORMALIN.

To the EDITORS.

GENTLEMEN,—We notice in your issue of yesterday (July 15) you ecommend for purposes of hardening gelatine films the use of a ten per ent. solution of commercial formalin.

We wish to draw your attention to the fact that what you are recomnending to your readers is the subject of various patents of 1894, granted o Aug. Zimmermann, and applied to the hardening of gelatine plates nd films, and such-like, used in photography.

As you are perhaps aware, we are only granting licences for the use of ormalin in photography when Schering's photo-formalin is being used, nd a licence is conveyed with the contents of the bottle.

To prevent any difficulties to the readers of the JOURNAL who may be nder the impression that by your advice they are not infringing on the bove patents, we should thank you to insert our letter in your next ssue.—We are, yours truly, A. & M. ZIMMERMANN.

9 *&* 10, *St. Mary-at-Hill, E.C., July* 16, 1898.

THE EFFECT OF "BACKING" ON "SPEED."

To the EDITORS.

GENTLEMEN,—Mr. T. N. Armstrong, in his paper read before the Conention respecting a standard speed for dry plates, drew attention to he lowering of speed which follows the application of an anti-halation acking to plates; Mr. Bothamley subsequently saying he thought Mr. Armstrong struck a very important keynote when he drew our ttention to the lowering of the sensitiveness of dry plates by applying o the same an anti-halation backing."

May I be permitted to state that I drew attention to this point in an rticle on the subject contributed to THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC published in December, 1897 (see p. 739)?

Since the above paper was published my conclusions have been once r twice challenged; I am therefore particularly glad to find that Messrs. rmstrong and Bothamley support my contention, which I trust has nabled many of the readers of your ALMANAC to avoid the troublesome esults of under-exposure.—I am, yours, &c., HECTOR MACLEAN.

Croydon, July 16, 1898.

THE TRIPLE ANASTIGMAT.

To the EDITORS.

GENTLEMEN,—I wish to add the following few remarks to the discussion oncerning the Cooke lens or triple anastigmat. In your recent issue of uly 8, No. 1992, p, 447, a letter from Mr. P. Everitt is published, with a iagram comparing the astigmatism of a Cooke lens and a Steinheil rthostigmat. It will be seen at an angle of 25° from the axis that the urves of this Cooke lens unite at a point on the ideal picture plane. onsequently, at this particular point of the field there is no curvature nd no astigmatism. Messrs. Voigtländer & Son have explained in their tter to the *Deutsche Photographen-Zeitung*, No. 19, 1898, p. 260, that ey have abandoned such a definite point of intersection of the ideal nd actual picture planes for the instrument, and have sought rather to pread out the picture curve to a wide angle on the ideal plane. It follows om this that the results of the tests I have made with Voigtländer & Sons Triple Anastigmat" do not apply without modification to the Cooke ns as made by Messrs. Taylor, Taylor, & Hobson, unless the latter have eanwhile adopted Messrs. Voigtländer's system of correction. I draw ttention to this to make the matter quite clear.

In thanking you for your courtesy in publishing my last letter, I beg add that I shall not accept any criticism of my tests of the triple nastigmat as justified unless they actually refute my conclusions.—I n, yours, &c., HANS KLEPP.

Weimar, July 11, 1898.

To the EDITORS.

GENTLEMEN,—It is to be regretted that Messrs. Taylor, Taylor, & obson have not given us more specific information than the vague tement that, by a modification of the Cooke lens, a diagram approxiately the same as that of the Orthostigmat might be produced. Apoximately is an elastic term, and I must acknowledge that I look upon sceptically in the face of the following statement made by Mr. H. nnis Taylor in the paper read at the Royal Photographic Society in 94, when speaking of the present type of Cooke lens: "This lens is not intended for more than moderate angles; in fact, in order to gain rapidity, angle of view must be sacrificed to some extent. However, I may say that I am now engaged in working out another combination which will be closer than this one, and will have a full aperture of *f*·8, and will, I have every reason to hope, at least cover a plate whose greater side is equal to the equivalent focal length of the lens, *and a much greater angle of view than this cannot be expected from lenses on this principle.*" (The italics are mine.)

If Messrs. Taylor, Taylor, & Hobson will submit the lens and the diagram, we shall know definitely what can be done, but meanwhile we must remember that the present discussion concerns existing lenses, and not possible modifications.

I agree with Messrs. Taylor, Taylor, & Hobson that a lens is a compromise, and that there is room for difference of opinion within certain limits, but I do not think the argument applies in the present instance. There are a few well-recognised qualities we look for in a lens for general work, and probably we shall agree that rapidity, good definition, rectilinearity, flatness of field, and a considerable angle are the most important. I do not grant it as a fact, but let us suppose that the Cooke is equal to the best of the anastigmats in rapidity, good definition, and flatness of field. We have two other qualities remaining—rectilinearity and angle. Concerning angle, I have quoted Mr. Dennis Taylor, and I would also point to the candid admission of Drs. Kaempfer and Miethe that the Zeiss Satz anastigmat defines considerably more. As regards rectilinearity, I also refer your readers to Dr. Kaempfer's statement on page 362, BRITISH JOURNAL OF PHOTOGRAPHY, June 3, 1898:—"The elimination of distortion is difficult, but for this the means are sufficient to render it quite imperceptible up to an angle of 70°."

This means that outside an angle of 70° it is perceptible, and such is my experience.

In face of these facts I fail to see how it is possible to defend the assertion that the Cooke lens is equal to the best of modern anastigmats, and that it is truly rectilinear.—I am, yours, &c., P. EVERITT.

To the EDITORS.

GENTLEMEN,—Messrs. Taylor, Taylor, & Hobson decline to answer my last letter. The facts are too obviously inconvenient to leave room for any reply, excepting on personal grounds. But the ethical aspect of their letter is at least amusing, for whilst they charge me with attacking their honour, their own sense of what is due to brother members of their craft permits them to make the offer in the final sentence of the last paragraph but one of their letter of the 12th inst. As you may possibly be aware, I am not an optician, and have no connexion of any kind with that industry; consequently I am spared the regret *that* paragraph would inspire.—I am, yours, &c., PHOTOGRAPHER.

[Our correspondent, an able photographer, who has a very great knowledge of photographic optics, has no concern, directly or indirectly, with the optical industry.—EDS.]

To the EDITORS.

GENTLEMEN,—Mr. Dennis Taylor, in his letter published on July 1, says that my insinuation about the Cooke lens being sent to Germany to be improved is groundless. Dr. Kaempfer says (p. 362) that Messrs. Voigtlander have willingly occupied themselves in bringing the lens to perfection, and, he hopes, with success. The two statements are not reconcilable, even by a gentleman of the scientific eminence of Mr. Dennis Taylor.

Messrs. Taylor, Taylor & Hobson's effusion published on the same date is a characteristically laboured evasion of the point which I raised. I said that the original Cooke lens had the centre element of compound form, but that now it consisted of a single glass only, this being a reversion to a discarded system of forty years ago. They do not meet me with a direct denial, but content themselves with casting doubt on my knowledge of the lens. . . . . But, will Messrs. Taylor, Taylor & Hobson look at page 827 of this JOURNAL for the year 1894, where a 4-lens system is described by Mr. Dennis Taylor himself, and will they let themselves go the length of plainly denying that this was the original Cooke lens? Again, they quote Mr. J. Traill Taylor the "distinguished authority on photographic optics." That gentleman, in the JOURNAL for June 7, 1895, describes and illustrates the Cooke lens, "the negative lens being externally a double concave formed of two cemented elements." This piece of "elementary information" was not contradicted at the time, and now when they are told that they have abandoned the use of the four lenses and reverted to discarded triplet systems, all that Mr. Dennis Taylor can do is to refer me to a patent specification which has nothing to do with the matter in question, and to say that the Cooke lens has always been a triplet of three simple lenses, while Messrs. Taylor & Hobson do not go so far as this, but permit it to be inferred that I have made a mis-statement, while they do not specifically say so.

This controversy lies in a nutshell: (1) The Cooke lens is a reversion to an obsolete type of lens construction, now rendered possible by the efforts of German glass makers; (2) it has been sent to Germany to be improved; (3) the assertion that it is equal to the best anastigmats is with-

out a tittle of proof to support it. All the argumentative ingenuity of Messrs. Taylor, Taylor, and Hobson will not alter these three very patent facts.—I am, yours, &c., R. E. CHESTERMAN.

July 4, 1898.

[Dr. Chesterman's letter, from which we have been obliged to delete a number of expressions that were too strong for publication, had to be held over last week for lack of space. As no useful object could be served by the prolongation of this correspondence, we here bring it to a conclusion—the more especially as the scientific lines upon which the discussion originally opened have latterly been departed from.—EDS.]

DR. W. G. GRACE'S JUBILEE AT LORD'S CRICKET GROUND, JULY 18.

THE Prestwich Manufacturing Company, of 744, High-road, Tottenham, inform us that they have obtained a splendid film, fifty-five feet in length, of the "Gentlemen *v.* Players" in procession, Dr. W. G. Grace and Shrewsbury leading, followed by the other members of both teams.

This film is unique, inasmuch as Dr. Grace has not been animatographed before. The two teams representing the "Stars of the Cricket World" are seen *en masse*, and, the pictures being beautifully sharp and clear, are easily recognisable.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

R. Fellows Willson, 118, New Bond-street, W.—*Three photographs of young ladies, head and bust.*

Frances Wilkinson, Greenbank House, Old Trafford, Manchester.—*Photograph of William Henry Holland.*

VERAX.—The address is Walworth-road, S.E.

E. DEBENHAM.—A form for the purpose, price 8*d.*, can be obtained at any Post-office.

EXHIBITION OF SPECIMENS.—C. J. and RIGHTS. See article on the subject on another page.

W. H.—We are sorry we cannot add to the information printed. The inventor's address is Walworth Road, S.E. Write him there.

T. H.—Your question is not clear. Do you mean the plain cards or those having photographs upon them? Let us know and we will endeavour to help.

OLD DEVELOPER.—W. M. We cannot account for the trouble, unless there was too much light in the room at the time of the development. The old developer, also, may have had something to do in the matter, as you say it was five months old.

C. STOKES.—It is quite possible that the difficulty proceeds from the cause suggested. Instead of trying to correct the salt, get some from another source, say from Hopkin & Williams. You will then see if the trouble arises from the source suspected.

CEMENT. R. COOK.—The mountant in question is a trade preparation, and we do not know anything of its composition, therefore cannot give you the formula. For the same reason we can give no opinion as to the action it may, or may not, have on prints mounted with it.

PAPERS READ AT MEETINGS.—LENO. We are in no way responsible for papers read at meetings or the expressions upon them in the discussions afterwards. As you say, some strange ideas are ventilated, at times, at some of the minor societies; but for them the speakers are, of course, the only ones responsible.

TONING DIFFICULTY.—S. TURNER. The difficulty you experience in toning albumen paper (ready-sensitised) may often be got over by immersing the prints, after washing out the free silver, in a very weak solution of washing soda, say, a crystal as large as a walnut, in half a gallon of water. The prints should be well rinsed after they are taken from the soda water before using.

BLINDS FOR STUDIO.—B. DUNN. We should recommend the thick green material enclosed for the south side and for the roof. The thinner blue will do quite well for the north side. But it would look better to have uniformity, and there is no objection to the green for the north side also. The two ends had better be made quite opaque by painting the glass over with dark paint, or, better still, by boarding them up and then papering.

DEVELOPER.—A. L. A. If the plates do not develop well with your "pet developer," we should advise you to use that recommended by the makers of the plates. We can give no better advice.

DISCHARGING COLOURS.—PHOTOPHIE says: "May I ask if you would suggest two or three solutions of different colours which would be rendered colourless by an addition of oxalic or other acid, for a lantern experiment? A green or blue is specially desirable."—Some of the coal-tar colours are discharged by different acids. Perhaps some correspondent who has been experimenting in this direction will give the benefit of his experience.

MEALY PRINTS.—B. & CO. The mealiness of the prints may be due to your printer making the paper too dry after sensitising, and then printing it in frames with pads that have become abnormally dry, as they are apt to do at this season. A certain degree of moisture in the paper while printing is necessary, and when is it "bone dry" it does not yield such good results. The cracking of the albumen is also an indication of over-drying.

OBSTRUCTING LIGHT.—C. C. writes: "I am in a fix. My next-door neighbour is extending his back premises in such a way that it will block out all my side light on the north side of the studio, and, of course, that is the side I most use. Is there any law by which I can prevent that; or, if not, can I get any compensation for the loss? The studio has been built nearly five years."—You have no redress. The studio has not been in existence nearly long enough to claim "ancient lights."

THIN NEGATIVES.—SAWBONES says: Kindly give me some indication, if you can, of the reason of the thinness of the negatives herewith. All I take seem the same. You will see they are of anatomical subjects, and they were taken in a room."—The cause of the thinness, and lack of detail, is due entirely to under-exposure—much under-exposure. Try by giving at least three times that given. Bear in mind there is a very wide difference between the exposure necessary in a room and out of doors.

TINTING VARNISH.—VARNISH says: "I have been trying to tint matt varnish, but I find the colour goes to the bottom of the bottle, and don't touch the varnish. Therefore I shall be very pleased if you will help me by telling me how I can tint matt varnish, say a light red or yellow."—Our correspondent's difficulty has arisen from using unsuitable colours insoluble in the varnish. Most of the coal-tar colours are soluble in the menstrua usually employed in varnishes, and no difficulty will be found with them, and they may be had of almost all colours.

IMPURE WATER.—L. HAYWARD asks: "Would you kindly inform me, through the medium of your valuable paper, what I can do to prevent black spots on P.O.P. prints which come from the water I use here, as it has such a lot of iron in it. Is there any way I can clear water of iron?"—We fear there is no practical method of getting rid of the iron. If it is in the form of particles they may be removed by filtration, but that would be a tedious matter with the quantity required for washing prints. Can you get water from another source—a river or rain water for washing the prints?

LANTERN SLIDES.—SLIDES asks: "1. The best method of producing lantern slides, giving that delicate-toned black, leaving no trace of having been made by collodion bath process. How to produce same without showing any halation if made in camera. 2. Is it practical to use a commercial dry plate of any kind for *best* results?"—1. Several tones may be obtained by the wet collodion process according to modifications in the developers, exposure, &c., and no halation need be expected. Probably the slides, the tones of which are desired, were made by that process. Of that we could the better form the opinion by seeing an example. 2. Yes.

COLLODIO-BROMIDE.—H. HOWARD writes: "Will you kindly give me formula to make a rapid collodion emulsion for landscapes and interiors, and say what rapidity it would be, using H. & D. scale? If I could make one that would reach 70 I should be quite contented. I want the plates to keep about six weeks before and two weeks after exposure. Thanking you in anticipation."—Formulæ for collodio-bromide emulsion will be found on pages 1034–1036 of the ALMANAC. One of them is for a rapid emulsion, though we doubt if it will be so rapid as desired. Collodion emulsions cannot be made of the same rapidity as gelatine ones can. The formulæ are all by old workers.

STAINS ON COLLODION NEGATIVES.—W. writes: "I shall esteem it a great favour if you can indicate how I should proceed under the following circumstances. In making wet collodion negatives through the line screen for half-tone process, I have to give rather long exposures, say up to half-an-hour in all. I develope with a fifteen-grain solution of sulphate of iron; but lately, in spite of extreme care, I am troubled with markings on the plate which arise, I believe, from the irregular partial drying of the plate during the long exposure. Perhaps I ought not to say 'drying,' but rather the collection of nitrate solution in patches on the film. I have seen somewhere or other a recommendation to use a second bath containing glycerine; but I cannot now remember the formula or proportions."—The trouble complained of is what is known as "oyster-shell" markings, and they are prone to make their appearance in hot weather, particularly if newly iodized collodion or one of a horny character, be used. They are avoided by draining the plate very closely before putting it in the dark slide, and well protecting the wire corner with blotting paper, and at the same time using collodion of a porous nature—one that has been iodized for a long time.

*** Several answers to correspondents unavoidably held over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	481
On the Action of Light on the Salts of Cobalt.—II.	483
Leaderettes:— Mr. Halstead's Punishment — Closing of Observatories—South Polar Expedition — The Royal Academy—The late Sir Edward Burne-Jones	484
By the Way. By Dogberry	485
On Pyrogallol. By Ralph Ed. Liesegang	486
Foreign News and Notes:— Superimposed Tri-colour Transparencies—Anti-halation Plates — Titling Negatives — Ferruginous Water—Glycin Developer in Powder—Reproducing Pencil Drawings — The Size of the Silver Grain in Negatives — The Preparation of Tone Plates for Litho and Bookwork	486
Picturesque Tonality in Photographic Work, and How it may be Obtained in Transparencies and Lantern Slides. By William M. Murray	487
Moss's Improved Jet	489
The Actinic Qualities of Light as Affected by Different Conditions of Atmosphere	490
The Influence of Photography on Art. By Valentine Prinsep, R.A.	490
Doyen's Camera: Focussing by Double Reflection	491
The Production of Coloured Photographs: Sershall & Kirk's Improvements	491
About Photographic Films. By Captain W. de W. Abney, C.B., F.R.S.	492
The Antarctic Expedition	492
Our Editorial Table:— Catalogue Received — The Tella Film Camera	493
News and Notes	493
Patent News	494
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club—Manchester Photographic Society	494
Forthcoming Exhibitions	495
Correspondence:— Electric Printing—Pits in Gelatine Negatives—He-a, he-a!	495
Answers to Correspondents	496

EX CATHEDRA.

The latest idea in colour photography is that of Mr. Charles Thomas Jago, who has devised "an improved methed of obtaining permanent coloured photographs," which he thus describes: "I produce a half-tone plate, such as is used for printing illustrations with type, but, instead of reversing the picture as would be done for printing, the reproduction must be same as original. The photo-engraving, or half-tone plate is made by photographing the subject to be reproduced through a screen, as used by photo-etchers for the purpose. The negative thus obtained is used to print or transfer the subject upon the metal plate, by any of the known methods. The plate may be of any metal suitable for etching, and the plate is etched in the ordinary manner. The plate thus treated is to be used as the picture, and, to obtain the desired effects, I carefully rub coloured chalks, pigments, or any suitable tints or colours, into the etched plate. I find colours in powders or pastels preferable, the tints blending easily." The process is certainly novel, but we can scarcely think it is destined to have any considerable practical value. Rubbing coloured pigments into an etched metal plate would, however, probably tend to the production of "permanent" results, so that the process has this valuable quality in its favour.

A feature of the Photographic Convention of the United Kingdom, which we hope will be perpetuated, is the taking of an animated photograph of the members. Last year this was done by Mr. E. P. Prestwich after the official group had been taken, and the result was extremely successful. This year the picture was made on the special steamer, the *Lady Rowena*, on the occasion of the Clyde Excursion, the members defiling round the deck of the vessel as Mr. Prestwich, from his point of vantage, turned the handle. We have seen the positive picture, and, like all Mr. Prestwich's work, it is extremely fine. Doubtless, it will be publicly shown during the autumn. It is to be hoped that these interesting records of the Convention will not be allowed to disappear or perish, for, as time goes on, they will undoubtedly acquire cumulative interest and historical value.

* * *

Every day the value of Röntgen's discovery becomes more and more appreciated, especially in cases of surgery, alike on the battlefield, in the hospital, and the home. In the case of the late severe and regrettable accident to H.R.H. the Prince of Wales, one of the first aids invoked was the X rays. By their agency the injury was at once located, and the extent of it seen. Radiographs were quickly taken to show the fracture as it existed, and what had to be dealt with. These will be retained, and will serve to show, with others from time to time taken, the progress being made by the treatment. There is little question that Röntgen's discovery will materially conduce to the Prince's more speedy recovery.

* * *

Three weeks ago, when writing of the Glasgow Convention, we remarked that the pictorial exhibits were the best that had so far been presented at this annual gathering, and we also pleaded with professional photographers for an increased attendance at the meetings. We have been reading some accounts of the American Convention which met early this month at Celeron, and it appears to us that the idea we have in mind with regard to the educational scope of the British Convention is very well carried out by its transatlantic contemporary. For the last three or four years the American Convention has given the opportunity for the organization of a great display of professional work, and those who are directly concerned in the "bread-and-butter" side of photography avowedly resort thither for the purpose of studying and profiting by the very best productions of their competitors.

We believe that the Exhibition is carried out on a great and comprehensive scale, and, if we are to credit the testimony of those who have publicly alluded to it, the representative character of the work has had a valuable, instructive, and educational effect. In fact, the best American professional productions seem to make their way as a matter of course to the American Convention. The same thing should obtain here at home. We are convinced that the utilitarian possibilities of the Photographic Convention of the United Kingdom are not only not exhausted, but have not yet been fairly tapped. It is not difficult to perceive that, unless it is made something vastly more useful than a pleasant picnic plus a little half-hearted photography, its future existence will scarcely become a necessity. By the way, one of the features of the American Convention is a question box, from which much good is anticipated. The suggestion of such a thing at the British Convention would, doubtless, provoke amusement.

* * *

Two interesting lens items come from the other side. Messrs. C. M. Hayes & Co., of New York, took a group of the recent National Bankers' Convention. The negative was 30 × 25, and showed 860 faces, all perfectly sharp and distinct. We should say this was a very good piece of group work. Messrs. Hayes would find it difficult to secure so satisfactory a result if they took a convention of photographers instead of bankers.—Our optical readers may be interested to know that a "new lens of a novel construction" has just been introduced by Mr. W. T. Gregg, 104, Fulton-street, New York. It is said to be fully described and illustrated in a booklet, *The Gregg Lens*, which may be had on request.

* * *

The Naturograph—or "Selle" process of photography in natural colours—has made its appearance in the United States. The Washington Patent Office appears to have granted a patent for the process, a matter that may legitimately excite surprise when it is considered that United States patents are difficult to obtain by reason of the great reliance which the officials place on the evidence of technical literature. The Selle process, as we have before remarked, is not new, and the value of the Selle patent therefore exists entirely on paper. It appears that a project is afoot in the States for floating a company, capital 40,000*l.*, in order to exploit the process. We shall consider that the astuteness of our American brethren has quite disappeared if the promoters of the company are successful in their object.

* * *

Mr. George E. Holloway, Secretary of the Electrotypers', Stereotypers', Process and General Engravers' Association, in a recently published letter, gives the following gloomy account of the process-engraving industry: "We have no trade journal, nor is the trade large enough to support one. I am practically the nearest approach to a central point for all topics, as I promoted the Association, which has been fairly successful. We have been so long cutting each other's throats that there is still much distrust of shaking hands in too friendly a way with our competitors, but we are getting along slowly. The process-engraving business is in a terrible condition, from disorganization. There is not even a union among the workmen." With regard to the "throat-cutting" complained of, we are under the impression that practical unanimity in regard to minimum prices was arrived at by the process-engravers some two or three years ago; but it was not long before the agreement ceased to be respected. Since then the growth of the industry in the country has probably made the chances of arriving at a basis for the agreement of prices more remote than ever. Again foreign competition is always a serious element to be reckoned with in a matter of this kind.

* * *

An effort, to which we wish every success, is being made in the United States to popularise stereoscopic photography among amateurs. For this purpose Mr. E. C. Patterson has been appointed Associate Editor of the Stereoscopic Department of the *Photo Beacon*. We are told that the matter is strictly commercial, and is to be conducted on purely business lines. It is inaugurated and backed by one of the most successful and pushing camera-manufacturing concerns in the country. The Vive Camera Company have designed and placed on the market a stereoscopic camera "which sells at a price that brings it within the reach of almost every one, so that no one need hesitate about owning an extra camera." To bind all those interested in stereoscopy together, they have organized the Vive International Stereoscopic Society, the aim of that body being the promulgation of stereoscopic photography, and in furtherance of this aim they propose to organize local branches or exchanges, where the members may meet for friendly counsel and advice, examine each other's work and exchange prints, so that each member in a short time may become possessed of a large and interesting set of stereographs. The headquarters of the Society will be in Chicago, where a suite of three handsomely fitted-up rooms has been secured. Money prizes are also offered for competition. Apart from the frank commercialism of the idea the means chosen for making stereo work more popular in the States seem very thorough, and we trust they will be successful. A great deal of nonsense has for years been written in this country about the stereoscopic "revival;" but, before any such movement can occur, the example of our American brethren, in the energy with which they have sought to bring about the revival, will require to be imitated or excelled.

* * *

Specialistic photography—by which we mean the incessant devotion of the photographer to one particular class of work—has always found in us the warmest advocates. We ventilate a favourite theory when we say that to us the man of one idea always strikes us as standing the greater chance of success than the one who does not possess the power of weaning himself from the temptation of attempting to do too many things at once. So it is in photography: a casual look round must convince the observer that it is the man who vows himself to a given branch of photographic production who is more frequently successful rather than the one who allows himself to be led into every little by-path that may present itself to him in the course of his daily or weekly practice. We were never more strongly convinced of the force of our theory than one day last week, when we passed through the light and airy studios of Messrs. George Hana, Limited, of Bedford-street, Strand, and examined the innumerable specimens of this peculiar branch of photography which the firm cultivates. Messrs. Hana, in fact, are the photographic specialists of the music-hall profession. The principal favourites of the variety theatres resort to them for the purpose of having their counte

eit presentments reproduced on paper, and so successful are Messrs. Hana in this difficult department of work, that in a hort space of time they have won a foremost position in a ection of photographic specialism which demands the highest kill and application. As a matter of fact, Messrs. Hana are he "variety" photographers, *par excellence*, in London, and the lever work that they do entitles them to the distinction. The esson from the foregoing remarks which we desire to impress pon our readers is that nowadays, in photography, specialism pells success.

ON THE ACTION OF LIGHT ON THE SALTS OF COBALT.*

II.—Further Experiments with Cobaltic Citrate.

Several sheets of thin unsized paper were coated as before with the cobaltic citrate solution, and dried in the dark. One sheet was then resensitised with an aqueous solution of calcium hypochlorite, another with a dilute solution of chromic acid, and a third with an aqueous solution of potassium permanganate. When dry, each sheet in turn was exposed under a negative to bright sunlight for a period of from two to three hours. No image was obtained in any of the three experiments, the tints of the respective papers remaining to all appearances unaltered.

A fourth sheet of the dried citrate paper was then treated to a wash of a strong aqueous solution of ferric oxalate on its sensitised surface, and, after drying, exposed as before. No image could be discerned when the paper was removed from the printing frame. It was next immersed in a weak solution of platinic chloride, and allowed to remain therein for a considerable time, but no traces of a picture could be identified. A fifth sheet of the sensitised citrate paper was washed over with an aqueous solution of uranium nitrate, dried, and exposed like the foregoing. No image having been impressed, the exposed sheet was immersed in a neutral aqueous solution of potassium ferricyanide, whereupon, almost instantly, the surface of the paper became coated with a vivid green precipitate, which, when examined, proved to be cobaltous ferricyanide. This seemed to indicate that the cobaltic citrate had been reduced to the cobaltous state by exposure to light. Unfortunately, however, owing to the abundance and coarseness of the deposited green particles, the details of the image which was suspected to be formed could not be identified with any certainty, nor was it found feasible, by varying the manipulations, to modify the conditions of the experiment so as to obtain a more favourable and conclusive result.

The chemical reaction involved in this simple experiment, though apparently a rather complicated one, may perhaps be explained by reference to that which takes place when a gelatino-bromide plate is intensified in the ordinary uranium ferricyanide bath, if we suppose the cobalt in the former to fulfil the functions of the uranium in the latter, and adjust the equation accordingly.

The experiments next to be described are of a more instructive character, and should have a particular interest for those who are on the outlook for novel printing processes.

A sheet of unsized paper, sensitised with the citrate solution as before, was, after drying, floated face downwards for one minute on a moderately strong aqueous solution of potassium dichromate.

Subsequent experiments showed that the best results were obtained with a solution containing from twelve to fifteen grains of the crystallised salt to each fluid ounce of water. After drying in the dark for fifteen hours, the sensitised sheet was exposed under a negative for about five minutes in weak sunshine on January 18 of the present year. On examining the paper after exposure, a delicate but perfect image of a beautiful sky-blue colour was found to be impressed thereon, the minutest details of the negative being rendered with the utmost fidelity. With the object of gaining additional density, the frame was again placed in the light. On re-examination after a short interval, a slight increase in depth of tone was perceptible, but this, however, was speedily lost on further exposure. In the course of a few hours a curious circumstance was noticed. By the prolonged action of light, the yellow ground of unaltered dichromate (representing the high lights of the positive image) was gradually bleached, and, at the same time, the blue picture slowly faded from view. Finally, the surface of the paper became perfectly white, both the cobalt and the chromium colouring matter having been completely discharged. A similar bleaching process was presently observed on the back surface of the sheet (owing, of course, to an unsized paper having been employed), and it was also noticed that the blue cobalt image was destroyed slightly in advance of the yellow chromium field.

More of the chromo-citrate paper having been prepared, several prints were taken from the negative, the printing being discontinued at the stage when the blue image had attained its full intensity. Attempts were made to fix these, but without success. On immersing one in water, the blue colour was almost entirely destroyed. It was also found to be discharged by aqueous solutions of certain reagents, viz., calcium hypochloride, dilute ammonia, potassium ferrocyanide, and potassium ferricyanide.

A bath of the last-mentioned salt produced a surface deposit of a bluish-white colour, which did not disappear upon prolonged soaking. In this particular case a saturated dichromate solution had been employed as a sensitiser.

Next, a number of sheets were successively exposed under the negative until the blue image at first formed was quite destroyed, and, like the yellow ground, replaced by a uniform white. These were then distributed for separate treatment, with the object of producing a picture by development. For this purpose, experiments were made with baths containing solutions of the following reagents: ammonia, acetic acid, chromic acid, tannic acid, orthophosphoric acid, potassium ferrocyanide, potassium ferricyanide, cupric chloride, cobaltous chloride, cobaltic citrate, stannic chloride, and barium chloride. In no case, however, was any image produced.

The changes effected by the initial and secondary action of light next received attention. The instability of the blue colouring matter of the picture seemed to favour the supposition that it might be identical with, or at least closely related to, the peculiar blue basic cobaltous compound that is formed when caustic potash is added to a solution of a cobaltous salt. Both compounds are of the same light blue hue, and the latter is quite as unstable as the former, being very readily convertible into the rose-coloured cobaltous hydrate. The composition of this basic compound has been the matter of considerable dispute, and even now its formula can hardly be regarded as settled.

An excess of water would seem to be essential to its formation, a circumstance which points to the likelihood of its being

* Continued from page 293.

a true hydrate, containing one or more additional molecules of water. Now, curiously enough, the chromo-citrate paper, though carefully dried before exposure, was generally found to have absorbed water when removed from the printing frame; in some cases, indeed, to such an extent as to cause it to adhere firmly to the film side of the negative.

It is perhaps hardly permissible to regard this as evidence in support of the view that the blue hydrate is the image-producing body, seeing that the cobaltic and cobaltous salts as a class are decidedly deliquescent. There are, nevertheless, several other circumstances less easily to be explained away that are distinctly favourable to that hypothesis.

For instance, a sheet of paper that was sensitised with a solution of cobaltic citrate containing a considerable excess of citric acid, and after drying resensitised with the usual dichromate solution, was found to be incapable of receiving an image, even after an exposure to light lasting from three to four days. The yellow colour of the paper was, indeed, gradually bleached, but the reaction proceeded more slowly than in the former cases. Immersed, after printing, in an aqueous solution of calcium hypochlorite, no change ensued.

Another sheet was next sensitised, firstly with cobaltic citrate, secondly with potassium bichromate, and thirdly with an alcoholic saturated solution of gallic acid. This paper, the prepared surface of which was of a light brown colour when dried, was then exposed in the usual way, but after a whole day's printing in a good light no image was impressed, nor did there appear any signs of bleaching.

Now, assuming it for a fact that the blue image in the earlier experiments was due to the formation of the above-mentioned basic compound, these results were just what might have been predicted. Owing to the presence of free acid in the prepared papers, no such compound could possibly be formed in either case, and, consequently, no image could be produced.

On the other hand, as it seemed probable that the presence of free alkali might accelerate the building up of an image due to a basic body, or at least not interfere with its formation, the following experiment was made. A sheet of chromo-citrate paper was wetted very evenly on the back with a weak aqueous solution of ammonia, and exposed to sunlight whilst still damp under a negative. In the course of a few minutes an image was produced, not, however, as had been expected, of a blue, but of a yellowish-green, colour inclining to brown in the regions where the action of light had been most intense. On continuing the printing operations for a few hours, the yellow dichromate ground did not appreciably fade, but, after keeping the print in darkness for a few weeks, the image gradually vanished away, seeming, as it were, to diffuse itself over the surface of the paper, which in its turn assumed an agreeable apple-green hue. It was also noted that the green image, before it began to fade, was somewhat weaker than those previously obtained with this paper.

Mr. Halstead's Punishment.—It is pretty clear that the severe sentence of nine years' imprisonment, passed on Mr. Halstead for taking photographs of the fortifications and guns at San Juan, is receiving considerable attention on the part of the English Government. Last week we alluded to a reply given to a question on the subject in the House of Commons, which put a different complexion on the case. Since then, another question has been asked as to whether he was rearrested and sentenced, not, as at first alleged, for a repetition of the offence, but for the original one for which he was arrested and discharged; and the reply given by Mr. Curzon is to the effect that no official confirmation of this statement had been received, but telegraphic instructions had been sent to Her Majesty's Consul at San Juan, that, if the report be true, he is to apply to the Captain General at once for Mr. Halstead's release, on the ground that he has been sufficiently punished, and that it is contrary to usage to rearrest and sentence a prisoner for an offence for which he has already been discharged. Mr. Curzon added, that Her Majesty's Ambassador at Madrid has also on more than one occasion represented the case to the Spanish Government, who are inquiring into it. The publicity given to the severity of his sentence has rendered Mr. Halstead one of the most prominent photographers of the day. Unless there is more in the case than has been published, there is little doubt that the influence of our Government will quickly secure his release.

Closing of Observatories.—At the half-yearly meeting of the Scottish Meteorological Society, which was held in Edinburgh one day last week, Sir Arthur Mitchell, the Hon. Secretary, read the report, which stated that the Directors regretted that, owing to the want of funds, the high and low-level observatories at Ben Nevis would cease to exist in October next. Professor Copeland suggested that a fresh appeal should be made for funds; but the President (Lord McLaren) said that an institution of the kind could only be permanently maintained by Government support. He also said that meteorological investigations, especially in the shape of weather forecasts, if done with anything like precision, would be extremely valuable both to the agricultural and shipping interests. He added that he doubted very much whether, at present, any science of weather-forecasting deserving the name was in existence. We think that every one who takes the trouble to read the forecasts daily issued by the Meteorological Office at Westminster, which costs the country some fifteen to twenty thousand a year, will fully endorse Lord McLaren's statement so far as regards Great Britain.

If anything like reliable forecasts of the weather were issued, they would not only be valuable to the shipping and agricultural interests, but they would also be of great service to the photographer. As it is, he would rather rely upon his own judgment, or that of a friendly agricultural labourer or boatman, than trust in the forecast issued an hour or two before by the Meteorological Office, which is in telegraphic communication with all parts of the Continent as well as Great Britain, and costs the taxpayer so much. Unless this department can do better in forecasting than it does at present, it would be well if it confined itself to recording the weather we have had—one of its most successful functions.

South Polar Expedition.—A German expedition to the South Polar regions is to leave Brussels on Monday next under the command of Lieutenant Krech. It is to call on its way at the Congo, and then proceed to Kerguelen Island in the South Indian Ocean. It has been commented on before that, while there are so many expeditions to the Northern regions, the Southern ones seem to be entirely neglected by explorers. Our Government, though solicited by the Royal Geographical Society to aid in the equipment of an expedition to these regions, recently declined to do so. It is scarcely necessary to add that photography will be a feature in this German expedition, and all will wish it every success.

The Royal Academy.—The election of a Keeper to the Royal Academy, to fill the vacancy caused by the death of the late Mr. P. H. Calderon, R.A., will take place on Tuesday next. It is said that several Academicians will be candidates for the appointment. All the R.A. elections are exciting to those concerned, and, from what we learn, this is not likely to be at all an exception. By the way, the Exhibition of the Royal Academy closes on Monday next—Bank Holiday—therefore those of our readers who have not already visited the show, and those who have and desire to see it again, must lose no time in doing so. We mention the subject

ecause we know that many miss the opportunity because there is plenty of time" between the beginning of May and August, and ly recollect that they have not been till the Exhibition has closed.

The Late Sir Edward Burne-Jones.—One day's sale of portion of the pictures left by the late Sir Edward Burne-Jones, ith which Mr. Fred Hollyer, with his fine platinotype reproctions, has made us so familiar, ninety in number, realised e respectable sum of 24,000*l.* *Love and the Pilgrim*, exhibited at e New Gallery last year, fetched 5500 guineas. Twenty-eight stel studies fetched nearly 5000*l.*, and eighteen water colours made ose upon 7000*l.* A fund is now being raised for the purpose of esenting the National Gallery with a chosen example of the work the late artist. The directors of the New Gallery have decided hold an exhibition of his works next winter, and the profits of e exhibition will be added to the amount that is being raised by blic subscription.

Apropos of deceased artists, a meeting of a committee of the oyal Academy and others, under the Presidency of the Duke of Vestminster, was held one day last week at Marlborough House, y permission of his Royal Highness the Prince of Wales, for the rpose of promoting a scheme to establish some permanent emorial to the late Sir John E. Millais, late President of the Royal cademy. With that object in view, a very influential committee as formed, with Baron Ferdinand Rothschild as Treasurer and Sir . J. Poynter and Mr. Peter Reid as Hon. Secretaries. It was deded to postpone the appeal for subscriptions till the form of the emorial is decided upon.

BY THE WAY.

HE second Glasgow Convention is a thing of the past, and, from all blished accounts, appears to have been accepted as a grand success. ut, without wishing to say anything unkind, I would ask if there not a danger of the "picnic" side of the meeting being overdone, the detriment of the utility of the annual gathering. Of course, e all know that the Convention is looked upon as the photoapher's yearly holiday, just as the British Association meeting rms the outing of science generally. But heaps of ridicule have en cast upon that annual gathering by the more seriously inclined nongst scientific men, although the "British" gets through a vast nount of work at its sectional meetings before it indulges in the ore purely pleasurable portions of its programme. But with our nvention the excursions seem to form the "business" of the eeting, and, after sandwiching in an hour or two of "technical" ork when everybody is too tired to pay much attention to what is ing on, the day finishes, and perhaps a new one begins with more the social business. I cannot help thinking that, since the Conntion is absolutely the only meeting at which photographers from l parts of the country foregather, at least a little more importance ight be given to the more serious side without interfering very aterially with the holiday aspects.

I am glad to see, however, that the subject of speed-marking of ates, to which I referred a month ago, formed a prominent subject one of the evening meetings, and was ably handled by Mr. rmstrong. But—and there is just why I complain—what is to me of his paper? To all intents and purposes it might just as ell have been read at one of the ordinary meetings of some second third-rate society, to fill up the time of the meeting and form a ead-line in the report. But, strange to say, important as the bject is from a really practical point of view to professionals and nateurs alike, it failed to raise any discussion even in a gathering , I suppose, the leading men of both classes in the kingdom. I ink the most enthusiastic Conventioners will agree with me at this is not as it should be.

However, the matter has been prominently brought forward fore an important and representative audience, and the seed thus wn may, in course of time, germinate, and eventually bear fruit. But, ably as Mr. Armstrong handled the question, he scarcely went the length I should have liked. For instance, though he clearly showed the weak points, deficiencies, and difficulties of the present system, he is apparently content with showing photographers how they may "speed" their plates for themselves. Now, I would insist that the plate-makers should correctly mark the speed of plates before they are sent out, for the consumer, even if he have the appliances and the necessary skill, may not have the time. But then again comes in the "personal" element to which reference was made, as well as variations in ideas as to what constitutes the sensitiveness of a plate, and, taking all things into consideration, the whole question can only be settled after a full discussion by some such body as the Convention, the Royal, or a committee appointed by one or other of them.

The Hurter & Driffield method of measurement appears to be all-sufficient if only it were worked in a consistent manner by different individuals, and that, indeed, seems to be the chief difficulty in the matter, the only way of surmounting which seems to be to establish a testing authority altogether independent of the actual makers of the plates, whose official estimate of the speed of any batch of plates shall carry with it the same, or a similar, value as the Kew certificate in other matters. This is, I know, a somewhat Utopian proposition, and one we are not likely to see carried into practice yet a bit; but, until some such arrangement is come to, I fear there will be nothing for it but for each photographer to speed his plates himself.

Mr. Bothamley's paper was one on which not much discussion could be expected, as it was more suggestive than anything else; but there is, at any rate, a pretty certain prospect that next year's Convention will help to elucidate some of the doubtful points in connexion with Hurter & Driffield's development theories. It has been proved, I think, beyond doubt that, from an academic point of view, their deductions with regard to the relation between exposure and gradation are substantially correct, and yet, I think, there are very few practised photographers who can bring themselves to believe that they really have no control in development. It is true that the Hurter & Driffield deductions are so hedged round by conditions necessary for scientific accuracy, but not prevailing in practice, that one may almost be excused asking if those deductions are at all applicable in practice. For instance, there is one particular point referred to by Mr. Bothamley, namely, that the gradation with a given exposure can undoubtedly be altered if the developer be modified before application to the plate instead of after. Well, it stands to reason that a practical man, if he had reason to suspect (or to know) over or under-exposure, would begin to develop accordingly, not commence with the Hurter & Driffield standard solution and try to alter it when too late. But, further than this, if he did commence with a normal solution and find something was wrong in exposure, he would not necessarily confine himself within the bounds of Hurter & Driffield variations, but would probably resort to severely Spartan measures. The developing results recently described before the London and Provincial Association by Mr. Teape, I think, go far to show that it is only within comparatively narrow limits of the developing conditions that gradation follows exposure.

It will, perhaps, surprise some of my regular readers, if I have any, to hear that I have been dabbling in gum bichromate. The process is assuming such gigantic proportions, and, in view of the earlier claims made for it, such comic aspects, that I could not resist the temptation of the old feeling that I must try it; so, having an afternoon to spare, I set to work with what materials I had at hand. At first glance these were not extensive: a stock of bichromate, a bottle of "office" gum, and a camel's-hair dusting brush. However, calling in the aid of a benzoline lamp, a small stock of soot was obtained and incorporated with some of the gum until I judged the colour was strong enough—that was the only formula I followed—and this was brushed over some smooth white wrapping paper and dried at the kitchen fire. Three pieces, after being allowed to assimilate themselves to the moisture of the atmosphere, were placed behind negatives of different density and put out to expose, and within an

hour of commencing operations I was developing a print that promised to be a fairly good one. And such it turned out to be after about two hours' development in cold water without any brush work or other treatment. I say "fairly good," but that is a term that may need fuller explanation.

I don't, of course, mean that I think the picture would have found a place "on the line" at the Salon, and I am quite sure it would not even have been accepted at Pall Mall. It was not good enough for the latter, and perhaps too technical—well not "perfect"—but approaching signs of gradation to be an out-and-out Salon gum bichromate. It had, in fact, some palpable symptoms of gradation in the shadows, but the finer tones were hard and raw, owing to the washing away of the delicate surface skin that should have represented them. The last was just as I should have expected if I had been asked to prophesy the result before gum bichromate had been so much talked about, but the gradation in the shadows I should certainly not have anticipated. There it was, however, but not in sufficient force to justify the wholesale condemnation of the text-books on carbon printing. In fact, the comparison of that style of gradation or half-tone with *a very bad* silver print would more than justify the absolute accuracy of the vilified text-books.

After adopting a definite formula and proper materials, without receding a single inch from the position I have all along taken with regard to the process as a scientific one, I am free to admit, as I have also previously done, that for certain classes of subject it is capable of yielding not at all unpleasing results, and, if it had been allowed to stand on its own bottom without ridiculous claims about giving better results than other processes and similar nonsense, I don't suppose any one would have taken the trouble to say a word against gum bichromate.

But the comic element is looming large when at one of the meetings a successful worker complains that there is a difficulty in picking out the tones in the shadows, and the "sweet simplicity" once claimed for the process is rapidly disappearing as fresh workers appear on the scene. With the commercially prepared paper it is stated to be quite easy to make a dozen identically similar prints from the same negative where a short time back it was the proud boast of one of its friends that it was impossible to make two alike. Then somebody proposes to get half-tone by two or three separate sensitisings and printings. Gaedicke gives us the option of two or three separate coatings in the preparation of the paper, and finishes up with the recommendation to render the paper translucent and print from the back. Oh, dear! oh, dear! where is my simplicity gone?

There was an interesting letter in last week's issue from Messrs. Zimmermann with regard to a patent obtained for the application of the hardening effect of formalin to gelatine negatives and prints, and stating that they only issue conditional licences to use formalin for those purposes with the particular articles they sell. I know this is the fashion with some German chemists, Schering especially. Whether there is any difference between the German and English patent laws that renders such a proceeding permissible in Germany I do not know, but I think it is not the case here. If they have a good patent for the manufacture of any particular article, they might be able to proceed against any piratical manufacturer, but I doubt whether they could stop me doing anything I like with what I buy in open market. The patentee of Condy's Fluid might as reasonably try to stop me using permanganate of potash as a disinfectant; or, if Mr. Augustus Zimmermann chose to patent the use of pyro as a face powder, he might find it as difficult to stop my use of it in that way if I found it improved my complexion.

DOGBERRY.

ON PYROGALLOL.

At the request of several correspondents we have translated the whole of the article of which last week we had a condensed paragraph only:—

Of all the developing agents which up to the present are used practically, pyrogallol may be considered the most general. Whilst all other developers, with the exception of the weak-acting pyrocatechin, give pure silver images, with pyro there may be formed in the film a yellow image which may have an equally strong covering power as the black silver image.

I proved some time ago that this second image is produced by an oxidation product of pyrogallol.

Those places of the gelatine film at which the yellow body is found are tanned. It swells there much less than in other places. There is thus formed a relief which, in many cases, can be used as a substitute for that produced by bichromated gelatine which is generally used. I refer here to Warnerke's process of autotypy. On the use of this for collotype I spoke only a short time ago. Further, dusting-on images may be produced for photo-ceramics.

But of what does this oxidation product of pyrogallol consist? This question has of late become of importance not only for photography—the dermatologist has hitherto used the ordinary pyrogallol. Unna* proved two years ago that oxidised pyro was a much better remedy. The absolutely oxidised pyro, a preparation absolutely insoluble in ether was introduced commercially under the name of pyraloxin,† without the formula of this body being known.

Text-books contain the general assumption that on oxidation in the air of an alkaline solution of pyro humic bodies were formed as well as carbonic and acetic acids.‡

Berthelot has now accurately studied the reactions which take place between pyrogallol and oxygen in the presence of alkalies, and published an excellent report in the *Comptes Rendus*. It is evident from this that the process varies according to whether potash, soda, baryta, or ammonia, was used as the alkali in excess. Before complete oxidation is effected there are formed, one after the other, various intermediate products, which start from a primary compound, $C_6H_5KO_6$. The first product of oxidation is very similar to purpurogallin, one of the substances obtained from pyrogallol, under certain conditions. Extracted with ether they are red, crystalline, and become blue in contact with air and alkalies. These intermediate products thus formed through incomplete oxidation correspond to the formula, $C_{20}H_{20}O_{11}$, which differs from the formula for purpurogallin ($C_{20}H_{16}O_9$) by $2H_2O$. The author has now examined specially the products of a long and complete oxidation. Liquid acids are not formed in any measurable degree. The author has proved that, besides a body of the rough formula, $C_4H_4O_3$, soluble in ether, there is formed as the principal product of oxidation a compound soluble in water of the rough formula, $C_5H_5O_4$. The actual formula is probably $C_{20}H_{20}O_{16}$. All these compounds belong to one and the same constitution, and are obtained from pyrogallol in similar equations:—

1. $4C_6H_6O_3 + 9O = C_{20}H_{16}O_9$ (purpurogallin) $+ 4CO_2 + 4H_2O$.
2. $4C_6H_6O_3 + 9O = C_{20}H_{20}O_{11} + 4CO_2 + 2H_2O$.
3. $4C_6H_6O_3 + 14O = C_{20}H_{20}O_{16} + 4CO_2 + 2H_2O$.

The author's observations prove the tendency of the pyrogallol molecule, which is regularly derived from that of benzole, to split up by oxidation, which destroys the cyclic system lying at the foundation. This decomposition may be viewed in the following way: Of the three molecules of acetylene, which by their combining together have formed one molecule of benzole, that is to say, a relatively saturated polymer, two molecules are burnt and converted into carbonic acid and water whilst the remaining and third molecule combines with three other molecules of the original pyrogallol, and thus forms a new and complicated cyclic system of the kind of triphenyl-ethane.

The complete publication will appear shortly in the *Annales de Physique et de Chimie*. Berthelot has communicated to me personally that his researches on the oxidation of alkaline pyrogallol by exposed silver bromide and further the influence of sulphite are not yet completed.

Finally, attention should be directed to "Versuch einer Classification der sogenannten Gerbstoffe," which Dr. Kunz-Krauss has published in the *Pharmaceutische Centralhallen*, 1898, p. 401. There several groups of tanning substances which occur naturally and artificially are considered. From these it is obvious why it is so easy to produce a relief with pyrogallol development.

RALPH ED. LIESEGANG.

* Dr. Unna, *Klinik. für Krankheiten*, 1896, p. 57.

† *Deutsche Medicinal-Zeitung*, 1897, No. 69.

‡ Schorlememr, *Lehrbuch der Kohlenstoffverbindungen*, p. 539.

FOREIGN NEWS AND NOTES.

Superimposed Tri-colour Transparencies.—MM. Auguste and Louis Lumière describe, in the current number of the *Bulletin de la Société Française*, their method of using the indirect method of producing transparencies in three colours, as indicated

st by Cros and Du Hauron, and examples of which have also been own in England by Ives. They use orange, green, and violet ht filters, and three plates, sensitive to the rays, which these ers pass, and thus obtain three negatives corresponding to the mary colour sensations. The printing and super-position of the ree monochromes is effected by the use of bichromated mucilage thout transfer, the process being based on the fact that, if an soluble substance is incorporated with the gum, all the half-tones e secured. They mix a ten per cent. solution of gum, five per nt. solution of ammonium bichromate, and from five to ten per nt. silver bromide. Spread it on glass in a thin film, expose under e negative, and then wash in cold water, and soak in a suitable e, and then remove the bromide with hyposulphite. Each film is lated from the super-imposed one by a layer of collodion.

Anti-halation Plates.—MM. Lumière point out that the st method of avoiding halation is that proposed by Cornu, namely, e coating of the back of the plate with a mixture of oil of cloves, rpentine, and lamp black, and that some firms have issued plates th a substratum of coloured metallic oxides to prevent the transssion of the light, but that in many cases this rendered development difficult. In 1891 MM. Lumière patented the application of green or red substratum, but that they found great difficulty in eventing the transfusion of the colouring matter into the sensitive m, which meant a considerable lowering of the sensitiveness of the ate. Now they have again turned their attention to the subject, d have discovered an insoluble red colouring matter, which is used a substratum and does not affect the film in any way, and after ation the colouring matter can be removed by the use of a solun of sodium sulphite with the addition of a little acetone. They ve already started making arrangements, and will shortly issue e plates commercially.

Titling Negatives.—M. Hervé suggests the following method r titling negatives, namely, the writing of the title with Chinese k on a very thin piece of gelatine, allow to dry, and then by the l of gum make it adhere to the negative, the writing next to the m, of course. To make the gelatine films he suggests the coating a sheet of glass with a one per cent. collodion, allowing to dry, and en immersing in a twelve or fifteen per cent. solution of gelatine d allowing to dry in a horizontal position, then the title should written and dried, and the film stripped and cut down to size.

Ferruginous Water.—Dunbar and Orth have been experienting with various filtering agents to see whether it was possible remove iron from spring water, and they have found that when it passed through a 30 cm. layer of fine sand with a grain of less an 1 mm., the bulk of the iron was removed. In one experiment, ater which contained 1·1 mg. of iron per litre was passed through e filter and came out almost free, whilst a very strong ferruhous water containing 25 mgrm. of iron per litre contained only mgrm. after filtration. This filter will act efficiently for about urteen days, and then the sand only requires mechanically stirring under a strong stream of water to be again fit for use. They ggest that two such filters should remove almost the whole of e iron.

Glycin Developer in Powder.—Kastner suggests the llowing formula for a dry glycin developer which is founded on übl's concentrated solution:—

Glycin	25 parts.
Potassium carbonate	150 „
Sodium sulphite	65 „

l the ingredients should be separately powdered and then mixed, d for dense negatives 9 parts are dissolved in 100 parts of water, instantaneous work from 5 to 6 parts to every 100 of water. It preferable also to use, instead of the potash, an equal quantity of ed carbonate of soda, and also the anhydrous sodium sulphite.

Reproducing Pencil Drawings.—Professor August Albert tes that, no matter whether wet or dry plates be used, it is exmely difficult to make a successful negative of a faint grey pencil awing, but that, if the drawing be covered with a yellowish-green eet of glass or a film of coloured gelatine, much more contrast is tained.

The Size of the Silver Grain in Negatives.—Dr. Kaiserling reports, in the *Photographische Mittheilungen*, his microscopic studies on this subject, and states that the size of the silver grain is about 0·005 mm. A very sharp eye can only see a point that has a diameter at the least of 0·1 mm. From this it is evident that the grain visible in enlargements is not the actual silver grain. Dr. Kastner's experiments prove that the silver is very irregularly divided in the gelatine, and the shape is generally long, bottle or worm-shaped, whilst round shapes very rarely occur, and they never have sharp edges and corners. That which is usually called the grain of the plate is caused by the action of the rays of light passing through the film. The silver particles lying together in groups form a kind of network, which produces the phenomena of interference and diffraction and repeated reflections. With absolutely regular distribution of the silver particles these phenomena would not appear. In uranium intensification the particles are surrounded by a film, and the size is about doubled, and the grain takes a rounder and more regular appearance. In mercurial intensification the form and thickness are altered, the particles are about 0·0037 mm. long and 0·0024 mm. broad. If they are blackened with sodium sulphite, the blackening takes place only in the centre, the edges appearing like a peculiar scum. It is frequently contended that the grain in wet plates is much finer than in dry plates, but Kaiserling proves that the distribution is much more irregular, and the grains have a tendency to group themselves together, so that, though each individual grain is approximately 0·0014 mm., yet the groups are 0·008 mm. In enlarging the actual grain does not become visible, but the structure produced by the grain.

The Preparation of Tone Plates for Litho and Bookwork.—Aug. Albert gives the following method of preparing tone plates. He uses the following varnish, which gives a good resist:—

Sandarac	100 parts.
Benzole	400 „
Acetone	400 „
Absolute alcohol	200 „

This varnish may be coloured without detriment by the addition of a suitable dye dissolved in alcohol, and for this work he uses the spirit blue of the Badische Anilin und Soda Fabrik in very strong alcoholic solution; the varnish must be filtered before use. The impression is made on the smoothly polished stone or zinc with black ink; the edges, as well as the large places which are to be free from tint, are covered with a thick solution of gum, and when dry, the whole surface is coated with the varnish, care being taken to avoid air-bubbles. After about half an hour the lights may be picked out with etching needle, scrapers, &c., and the work is easily seen in consequence of the blue colour of the film, and the varnish gives very sharp etching.

PICTURESQUE TONALITY IN PHOTOGRAPHIC WORK, AND HOW IT MAY BE OBTAINED IN TRANSPARENCIES AND LANTERN SLIDES.

[*Camera Notes.*]

I.

The difference between a picture and a photograph is ofttimes manifested in the rendering of the tone values of nature. Though we may succeed in portraying the lights and shadows, the gradations, and, by some process now in course of discovery, even the colours, of a beautiful landscape, so that we realise within the limits set to all human effort, relatively, in our print the full glory of the vision revealed by the camera obscura, we have, at best, but produced a good photograph. The painter who starts with no higher motive than to depict nature with the utmost fidelity, skilful though he may be in drawing and truthful in colouring, does not stand on much loftier ground than the ordinary conscientious photographer, though his works may please thousands of people and become famous in the world. To produce a picture, either in pigments or in deposits of metallic silver on paper and glass, something more is required than truth to nature. A picture is founded on truth, yet is not that truth. Truth is stranger than fiction because it lacks the harmony that characterises fiction. And a picture is fiction because the truths that are therein embodied are modified and arranged in obedience to the laws of harmony. The harmony of nature is governed by grand and immutable laws; the harmony of a picture is another kind of harmony, and every picture obeys an organic law of harmony, modeled after nature, peculiar to itself. Sweetness is an element of harmony, but harmony must not be all sweetness. Of all musical sounds, the most perfect concord is the octave, and the next perfect is the fifth; yet these

harmonious concords, if uttered consecutively, are fatal to the production of music.

"The sweetest honey
Is loathsome in its own deliciousness,
And in the taste confounds the appetite."

So consecutive concords of truth may ruin a painting, a novel, a play, and even prevent a photograph from becoming a picture. There is no more beautiful element in a picture than the sky, and no sweeter concord than its repetition in the water and other reflecting surfaces, yet it is a most frequent source of discord in graphic representations, both by painting and photography, and mainly because of a too truthful rendering of its tonality. Though the sky, or the cloudy veil which covers it, often occupies two-thirds of a picture, it is generally to be considered as an accessory rather than a leading motive in the construction of the work, and should, therefore, receive the treatment of a subordinate part. The photographer must not only guard against the false witness that the unequal actinism of the sky continually bears in productions of the camera, but even after employing all the resources of modern invention, such as orthochromatic plates and filtering screens, must be prepared to go a step further, if he would be the maker of a picture rather than the mere agent in the evolution of an automatic process. He must learn to subdue, by artificial means, all the details of the picture, however beautiful in themselves, that interfere with the presentation of the principal idea. While a large paper print undoubtedly offers the best medium for the practice of pictorial photography, giving, as it does, the advantage of various textures and even tints of surface, and the opportunity for skilful retouching by the brush and point, there is no reason why the limitations imposed by the exactions of projection apparatus should deter us from making the small sized diapositives, known as lantern slides, conform to the same æsthetic principles. The methods of obtaining artistic unity, as far as it may be secured by technical processes, must necessarily differ, but the aim ought to be the same; and it is absolutely essential to success that the student should have a distinct conception, not only of the relative tonality expressing the harmony of the original scene as presented to the eye, which constitutes the art of photography, but a knowledge of the tonality required to express the harmony of a picture, which may almost be called the art of painting.

II.

To assist its members to this knowledge, the Camera Club has for many years maintained weekly test nights, presided over by experienced lanternists, at which new work could be submitted for review and criticism, and examples of the lantern slides of the leading photographers of the world presented from time to time for their edification and improvement. Under the present organization, the critics who undertake the onerous duty of reviewing the work of their fellow-members—a matter of some four thousand slides every year—are annually appointed by the Board of Trustees. Formerly it was a frequent complaint that the criticism was too severe for the work of those who followed photography for recreation or amusement, but, as the standard of excellence has steadily been advanced, the objection is quite as often made that it is not severe enough. Especially is the aspiring lantern-slide maker offended if his offering is passed without comment, or with a faint and expressionless approval that has come to signify that it is not worth serious consideration. But the duty of the critics is not so much the correction of ill-doing or the praise of them that do well as to discover the germ of a picture where it exists in a hidden form, and to nurse it, by judicious counsel, till it buds and blossoms into the perfection of matured fruit. Quite frequently the beginner shows considerable artistic taste in the selection of his subject, and presents his interpretation with no small degree of technical skill, yet his work comes short of attaining pictorial harmony, because he has failed to eliminate some disturbing element, or has included some feature of beauty that draws attention from the leading motive of the piece. It is related of Protogenes, the celebrated painter of ancient Rhodes, that, having painted a partridge as an accessory to a picture of a satyr leaning against a pillar, he unhesitatingly blotted it out, after finding that it attracted more admiration than the main subject, in spite of the fact that its execution had cost him many days of exacting labour. It is this lesson that the pictorial photographer must learn, especially if he seeks to express his ideas in lantern-slide form. A subsidiary motive may be tolerated in a paper print that would be painfully discordant when viewed on the magic-lantern screen. The laws of the screen are almost as inexorable as the terrible commands of the Sermon on the Mount: "If thy right eye offend thee, pluck it out and cast it from thee; if thy right hand offend thee, cut it off and cast it from thee; for it is profitable for thee that one of thy members should perish, and not that thy whole body should be cast into hell." By omitting part of a composition, therefore, a picture often makes its appearance, as if by enchantment, from a chaotic mass of details. But, while the division of interest, caused by the clashing of badly balanced parts, is a frequent reason for the failure of a picture, the false tonalities of sky and water, in otherwise satisfactory scenes, have been the most prevailing elements of disturbance. For this, the old dictum, handed down from the original manipulators of the stereopticon, who sacrificed everything to illumination, that skies and other high lights should be represented by clear glass, is largely responsible. Against this false teaching our club critics have resolutely bent their efforts, and their work has been one long crusade against blank skies and unmeaning expanses of water. Recognising the value of the expedients in common use by the exponents of artistic photography, such as modifying the sharpness of subordinate parts, masking, double printing, and other means of securing unity of effect in print form, they have constantly recommended the adoption of similar methods in lantern work. Though they have advocated this by "precept upon precept, line upon line, here a little and there a little," it is doubtful whether their efforts would have received such a large measure of success, as shown in the present high standard of performance in the Club, if one of their number, Mr. Alfred Stieglitz, had not added to his valuable teaching the force of an illustrious example. It was the exhibition of his marvellous slides, in many cases showing effects hitherto deemed impossible in transparencies, that turned our members to the earnest consideration and ardent practice of his novel theories. It was in these slides that we first beheld the tonality of nature modified into the tonality of pictorial harmony, and yet combined with the most delicate translucency. In all the transformations of the relative values of the tints of his pictures, he has never lost sight of the fact that the primary requisite in the lantern slide is clearness. A painter does not willingly hang his work in a dark corner, nor should a lantern-slide maker diminish the illumination of his picture on the screen by making his slides thick. The musician must ever bear in mind the compass of the instruments and voices that are to perform his compositions, and the lanternist, necessarily, must write his harmonies in high registers, or they will be muffled and confused. As much of the effect of Mr. Stieglitz's recent slide work depends on his management of skies and other masses of bright tones, a description of two of his technical methods of rendering these may prove of general interest in this connexion.

III.

The first of these methods was discussed at considerable length in a paper written by Mr. Stieglitz last year, and published in No. 2 of vol. i., *Camera Notes*. As a process, it is possessed of no particular originality, being neither more nor less than an adoption of the ordinary principle of intensity reduction by a modification of what is known as Farmer's solution. But as a mode of applying this process, and especially in view of the remarkable results obtained by Mr. Stieglitz himself by its aid, it may be regarded as marking a new epoch in the art of lantern-slide making. Observing the ease with which slides, accidentally over-exposed or over-developed, could be brought to the proper density by applying the usual mixture of hyposulphite of soda and red prussiate of potash, in the full daylight, it occurred to Mr. Stieglitz to both over-expose and over-develop his slides, *intentionally*, so as to do away with the necessity of guessing at the proper intensity in the uncertain and deceptive light of the dark room. Having adopted this habit, it was but a step further to add the principle of partial and local reduction, which is the characteristic feature of this admirable method of making slides.

In practice, the slide (preferably a chloride plate) is exposed considerably beyond the normal, and is then developed till the image is no longer distinguishable by transmitted light. It is then fixed as usual, and, while still saturated with hypo, is brought out of the dark room for the subsequent operations, which are all performed in white light. It is now immersed in a weak solution of ferricyanide of potassium (about one per cent.), which, combining with the hypo left in the film, slowly reduces the intensity till the image again becomes visible. An occasional rinse in pure water will stop the action at any desired stage. The judgment must now be exercised to decide upon the tones to be preserved in any particular part of the picture. If the sky is expected to recede, so as to throw the foreground and middle distance into prominence, the local reduction of the latter may be accomplished by brush work, employing a stronger reducer for this purpose. A mixture of

Ferricyanide of potassium	6 grains,
Hyposulphite of soda	40 ,,
Water	1 ounce,

will be found strong enough, if used when freshly made. This must be applied with a cautious and skilful hand, for the tones once lost cannot be recovered. The operation is something akin to painting, though, where the painter obtains his effects by the addition of material substances, the lantern-slide maker obtains his by taking away. The success of both, in landscape work at least, depends on the mental conception and appreciation of the values of aerial perspective. While the photographer must needs be equipped with some of the qualifications of an artist for this work, be it observed that the entire operation, from beginning to end, is conducted by purely photographic technical processes. There is no handiwork, in the shape of retouching with brush or pencil, on either negative or slide, which may raise the question, so often urged against the modern exhibition print, whether the artistic result is not due more to the craftmanship of the painter than to the talent and skill of the photographer. Mr. Stieglitz sometimes heightens the effects of this alteration of tone values by the judicious use of colour, obtained invariably by chemical agents, such as toning baths of gold or uranium or iron, and never by painting the slides with aniline dyes or other pig-

ments, which he regards as *from* the purpose of true photography. In the before-mentioned paper he gives directions how these may be applied and various receipts for the solutions. By partial toning, and occasionally local and double toning, he has succeeded in producing a scale of delicate tints, purples, blues, blue-blacks, greys, reds, and browns, but has used this tempting palette sparingly and always in thoughtful consideration of the subject of his picture—a discretion, perhaps, not always exercised by his followers. Since the publication of his remarks on this subject in *Camera Notes*, there have been many fearful combinations of brilliant colours shown on the screen at test nights, but these have about run their course. Several of the experts of the Club, however, have employed gold toning with charming effect; notably Messrs. Fraser and Beeby in night and street scenes, while Messrs. Murphy and Preston have produced some remarkable specimens of double toning in their marines and snow studies. But the great value of Mr. Stieglitz's first method is not colour, but light and shade (chiaro-oscuro), and the power it puts into the photographer's hands of throwing the interest into any of the planes of the picture by the introduction of brightness into that portion. By its means a negative that would yield only a commonplace and unmeaning print may be turned into an artistic study in slide form. If there were clouds in the original scene, they are fully preserved in the copy; if there was only a sky tint, that tint is also utilised in any desired intensity. A sky tint, sufficiently deep to differentiate terrestrial objects of lighter tone seen against it, is infinitely preferable to the incongruous cloud forms so often printed in for that purpose. Where the objects projecting into the sky are of complicated outlines, such as the tracery of trees or the delicate forms of architectures, and it is desirable to show these in their true lighting, it is evident that the process above described presents peculiar mechanical difficulties. It was to overcome these difficulties that Mr. Stieglitz devised his second method of modifying the tone values in lantern slides, which is here, by his special request, published for the first time. In brief, it consists in throwing part of the work of compensation on to the cover glass, with which all slides are bound and protected. It has been the custom of many photographers to print cloud forms on the cover glasses of landscape slides, using for the purpose a second lantern plate, so as to avoid the risk of embodying them with the slide itself. They have generally dodged the difficulties of accurate registry by vignetting them strongly toward the horizon. The presence of this blank band of lighter tone is not only unnatural but invariably reveals the fact that the sky is printed in, and suggests that nature's journeymen had made clouds and not made them well. It may be remarked that the remedy is often worse than the disease, especially when, as is frequently the case, the same cloud does duty for half a dozen slides in the same exhibition. In the method adopted by Mr. Stieglitz each slide is made to contribute its own sky effect. It is most useful in those cases where the tonality is correct except in the aerial region, and where spaces seen through the trees, or other intervening objects, are entirely blank. The slide is first finished as far as possible, and any toning or modification necessary is done before the next step. A mat is then added, accurately cut and centered, so as to allow the exact amount of sky space appropriate to the scene. For this purpose the mat known as the Boston mat, or any other furnished with ledger lines to ensure perfect registry, is to be preferred. If the slide is tested on the screen in this stage, it ought to show perfect tonality except for the handicap of the blank sky; and, by temporarily shutting off the light from the upper part, this fact may be proved. Putting the slide into a printing frame and taking it into the dark room, another lantern plate is placed in contact with it, the mat, of course, intervening, and a short exposure is given by diffused gas light to form the sky tint. This is developed a little darker than necessary and fixed. If the original slide had received colour toning, the cover glass should be treated to correspond. The reducing solution should now be used to wash away all portions of the image that are not intended to perform a modifying office, and likewise to reduce the general tone of the whole to agree with the intensity of the original. The cover glass, when completed, presents the appearance of a partial negative, all the dark parts of the slide showing clear, or nearly clear, glass, including the delicate tracery to be shown against the sky. The high lights of the slide that require to be tempered, such as the sky and the reflections of it from various surfaces, are opposed by different degrees of tone, according to the extent of the use of the reducing solution, but all other impressions should be wiped out. An accurate registry of the cover glass may now be made and the cover scratched or marked over the ledger lines to facilitate its adjustment. A slight temporary binding will hold the glasses together for a trial on the screen, and, if the tones are still too heavy, the cover glass may be further reduced to the exact shade required, when the slide may be permanently bound. It may be thought that all this is a great deal of work to undertake just to make one little lantern slide, but ten of these slides are better than a thousand in which no attention is paid to relative values. A comparison of one of these with and without its cover glass will convince the most sceptical. To see the transformation of tones, and especially to behold the whole foreground leap into life by the tempering of the sky, and objects formerly dark against the clouds become positively luminous, is like viewing the work of enchantment, and makes one think that the name "magic lantern" is not much of a misnomer, after all.

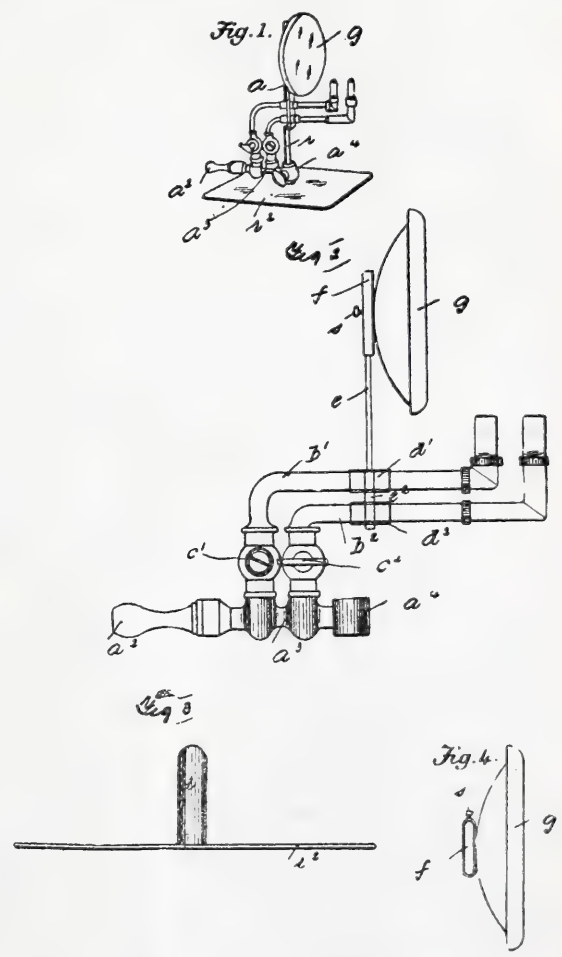
WILLIAM M. MURRAY.

MOSS'S IMPROVED JET.

MR. MOSS's invention has particular reference to those jets in which more than one burner is used.

In constructing a two-light jet according to his invention, he provides each burner with a separate supply pipe and regulating cock, so that the flame of each can be directly controlled and the pressure of gas equalised to a nicety. The main supply pipe, which is horizontally disposed, has the ordinary inlet nozzle fitted to its one end, and has its other end enlarged into a hollow circular boss. This hollow boss is fitted with a small set screw on its one side, and takes on to a circular vertical standard or rod, riveted, screwed, or otherwise secured to a square or rectangular base plate. By this arrangement the jet is capable of being adjusted vertically or in a central direction in respect of the said vertical rod, the set screw only having to be loosened and again tightened when an adjustment is made.

Leading out of the main supply pipe are two separate supply tubes of suitable diameter and length, each pipe being provided with a regulating cock for regulating the supply of gas. Loose sleeves connected together at their middles by a vertical strip of metal, take on to these two delivery pipes, and have a horizontal travel thereon, and on the upper part of this vertical strip of metal he attaches a reflector by means of an eye



soldered on to its convexed back, the said reflector having a vertical travel upon the strip of metal, and being fixed in position, after an adjustment has been made, by means of a set screw working within the eye of the reflector. By thus giving the reflector a vertical and horizontal adjustment, he is always able to keep the same exactly in focus, and so obtain the best possible results from the displayed light.

Fig. 1 is a view in perspective of the jet; fig. 2 is a side view, showing the jet without its base plate: fig. 3 an end view of the reflector, and fig. 4 a side view of the jet's stand or base plate.

The jet, a, has an ordinary inlet nozzle, a^2, communicating with main supply pipe, a^3, which latter has a circular hollow boss, a^4 formed on its inner end and cast in one with it, for the purpose of taking on to the circular upright rod, r, centrally riveted or screwed on to its base plate, r^2, the said boss being provided with a small set screw for effecting an adjustment in the length or direction of the jet, the latter being capable of an all-round movement upon the said upright rod, r.

Leading out of the general supply pipe, a^3, are two separate and independent supply pipes, b^1, b^2, each provided, near their junction with the general supply pipe, with regulating cocks, c^1, c^2, and at their outlets with burners of a suitable type.

Mounted loosely on these two independent supply pipes, b^1, b^2, and so as to be capable of a horizontal traversing movement in respect of same, are two loose sleeves, d^1, d^2, connected rigidly together at their middles by a vertical strip of metal, e, thickened at e^2 for that purpose. Mounted upon the upper end of this vertical upright strip, e, by means of its hollow eye, f, is a reflector, g, the said eye being preferably provided with a small set screw, s, for effecting the vertical adjustment of the reflector, or the latter may be rigidly mounted upon its vertical rod, and have its vertical adjustment effected by raising or lowering the jet upon its supporting pillar, r. A horizontal movement of the reflector is effected by pushing the vertical rod and its attached sleeves in the desired direction along the independent supply pipes, b^1, b^2.

THE ACTINIC QUALITIES OF LIGHT AS AFFECTED BY DIFFERENT CONDITIONS OF ATMOSPHERE.*

Apart from its relation to photography, this inquiry is of importance to the astronomer as involving considerations with regard to definition, the choice of observing stations, &c. I have been led step by step to the conclusion at which I have arrived by the following series of tests often and variously repeated.

Using in all cases uniform samples of sensitised paper or films, and as far as possible eliminating all accidental sources of error, I have, by means of subdued and prolonged exposure, made comparisons between the action of light proceeding from grey or blue sky.

(1) After traversing a length of tube admitting no extraneous light and containing only air at the surrounding temperature.

(2) After traversing the same tube containing various admixtures of smoke and floating mote particles of different kinds.

Here, as was expected, the action of light was impeded in proportion to the presence of foreign matter. Similar experiments being repeated with the same media, but diffused light being at the same time freely admitted on all sides, it was found easy to so arrange matters that a slight addition of white smoke rendered the action of the light more rapid, doubtless owing to myriad reflections from the surfaces of its particles. Next, experiments similar to the above were made with air at normal temperature, which was compared with air variously heated. Here currents, condensation, &c., being as far as possible avoided, it was generally found that heated air retarded photographic action until the sensitive surface itself became materially heated, when action might be considerably accelerated.

Yet more marked comparisons were obtained between the effect of ordinary air and the air in which spirit was evaporating. In these cases, as the air became charged, and its temperature lowered by the evaporation, action was always accelerated in a striking degree. This is but our familiar experience. In moist weather the distance is blue, clear, and sharp. In warm, dry weather distance becomes grey and faded out. In an east wind all things are grey.

Those accustomed to out-door photography are aware how overpoweringly dazzling their sitters will often find the daylight after rain, even though the sky be overcast. Thus, in moist weather the atmosphere would seem to be not only more transparent, but to convey more diffused light, and it does not suffice as an explanation that floating foreign matter has been cleared away. In India, at the time of the late eclipse, rain having been absent for a long period, it was found that the action of even the brightest sun on a photographic plate was far less rapid than might have been expected, and became markedly more energetic subsequently when rain clouds overcast the sky. This I exemplified by various photographic views which were projected on the screen at the last meeting of the Society.

At the same meeting I exhibited a series of photographic landscape pictures taken at regular intervals and with uniform exposure while the eclipse was in progress, which pictures went to show that the slow shutting off of the light, commonly noticed before totality, and its rapid return after totality, was an actual fact, and not a mere subjective phenomenon. With reference to this, Professor Turner had suggested that the explanation may lie in the sudden condensation of moisture occasioned by fall of temperature. The moisture thus condensed had clearly existed previously in the air only in finer subdivision, and its exalted power of transmitting light would seem due to its coalescing in larger particles. It is quite otherwise condensed when the "water dust" produces only the veiling of mist.

Have we some sort of analogy here in the passage of light through grains of, say, broken glass or crystal? The more minute the grains—*i.e.*, the more molecular continuity is destroyed—the more is the light scattered and lost. May it not be so also with regard to moisture particles in suspension? The more subdivided they are, the greater number of limiting surfaces are there to scatter and impair the light. But I am led to conceive that the intensity of light reaching us from the sky is occasionally influenced by another cause. Arago and others have pointed out, not only the familiar fact that clouds may be luminous, but that certain fogs may be phosphorescent, and they suggest that some such cause may account for certain abnormally light, moonless nights; but I would go further and suggest that even clear sky may be phosphorescent also. We are familiar with various bodies, often microscopic, in life or death, fitfully phosphorescent. Various noctilucæ render the ocean at times luminous, and light up the actual horizon. Are there no microscopic organisms in higher strata of the ocean above us which behave similarly?

Again, phosphorescence of such organic matter as may well be in suspension in the atmosphere is thought to be connected with the presence of ozone, which, in the atmosphere, is a varying quantity. And, again, if it be actually true that it is often "darkest before dawn," then it is conceivable that there may be floating particles of the nature of phosphorescent sulphides or luminous pigments, which lose their luminescence as the night proceeds. A series of experimental photographic records seem to indicate that varying tracts of the night sky are occasionally, to some extent, self-luminous, but these results need further confirmation on clear, moonless nights.

* By the Rev. J. M. Bacon, in the *Monthly Notices*, R.A.S.

THE INFLUENCE OF PHOTOGRAPHY ON ART.

[Abstract of Paper read before the Camera Club.]

I will begin by at once acknowledging the extreme debt that we artists owe to photographers. You are, so to speak, the apostles of truth—truth without any subterfuge, "the truth, the whole truth, and nothing but the truth." You have, with a care and a skill which we in our art might envy, from the dawn of photography progressed naturally until you have nearly attained perfection in representing nature. I remember the time when photography was thought to be a very grand thing, and yet, when you saw a photograph of a building, it invariably tumbled inwards; through your skill you have obviated all that, and now, when I see photographs of elaborate foreign buildings, I am agreeably surprised to find that they stand upright. I had thought previously that, as you represent truth, they must have tumbled in in nature, but I perceive now that they stand much as other buildings do. You represent truth; you represent it thoroughly and successfully.

Well, so successful have you been in your efforts that many for some time past have thought that, in consequence of your success and of the development of photography, painting would become an art of the past. I am glad you agree with me, because I do not think it will. Shakespeare says, "There's a divinity that shapes our ends, rough-hew them how we will." The providence that shapes your ends, gentlemen, is the little lens of the camera. That is a mechanical device. I am perfectly well aware that no two lenses ever agree—that every lens has a peculiarity of its own. In another branch in which I am much interested, for example, in ships, we, in the company to which I have the honour to belong, order, say, three ships to be built exactly the same. They are built mechanically and exactly alike, but by some extraordinary means that nobody understands, each one of those three ships has its own individuality. I believe that two lenses made and manufactured by the same maker, and what might be called mathematically and mechanically perfect, will still have an individuality of their own. That is something, but let me tell you that that individuality is not enough. In the beginning every artist was greatly struck by photography; we marvelled at the beauty of the reproductions that you made from nature, at the detail that you could reproduce, and at the perfection of the whole; and there was a time, I think, when art was so much influenced by photography that there was some danger of its becoming too precise, too mechanical, and too thorough in its execution. But, happily, the pendulum has swung round, and at present we are rather inclined to be the reverse, and to go in for what is called "impressionism." But, however much we may worship truth, there is an undoubted truth in art, and that is, that the more individuality there is in the artist's work, the more of himself there is in his work, the better and more skilful will be the picture. There is an old classical legend of a gentleman of the name of Marsyas, who invented the pipe, and who, having by some extraordinary means learned to play on it with great skill, challenged the god Apollo to a contest in music. One piped and the other played on the lute, and the immortals who were present—not the forty Academicians—agreed that the honours were even; but then Apollo, still playing on, began to sing, and the verdict went entirely in his favour. And so it is in art, gentlemen. To a certain extent there is mechanism in art, but there is the human element also, and it predominates and must predominate as Apollo's voice triumphed over the mechanism of the simple lute, and it is that that makes excellency in art. I know that many of you, by some means which I am not skilful enough to explain, but which you probably know better than I do, have managed to instil into photography a certain amount of individuality, so that you can recognise the work of So-and-So or So-and-So perfectly and without doubt. But still there is the fact that you are the slaves of your lenses. The lens is the eye through which you see nature. Well, gentlemen, we consider that nature should be seen with two eyes, and not with one. It is what we see with our two eyes that we try to represent, that is, the impression that nature produces on the ordinary brain when seen through two eyes. What does that give you? It gives you a certain roundness, a roundness which there is in everything we look at.

Another thing is this: I have seen frequently—not too often—subjects done by photographic artists. A "subject" is, no doubt, a very ambitious

effort for a photographer to undertake. He arranges everything with the greatest care—gets his models to pose, and everything of that kind, and then he photographs them, and the result is what is supposed to be a picture. Well, gentlemen, I am sorry to say that that is not our view of art. An artist is a man who should never tell an untruth; I do not mean in real life, but in his art. Everything that he puts into his picture should be absolutely true. But he has the power of leaving out as much as he likes for his purpose. When a great writer writes upon any subject and describes a scene, he dwells on certain points and lets others be indicated by a simple word. That is what you do not do in photography. I know you have means by which, when you have got your focus, you turn it off a little bit and make it more or less vague, so as to give a pleasant result. Well, that is all very well; that is just the same as if I half shut my eyes and look at a thing, but it does not give you the mind of the artist. The great difference between painting and other arts is this, that in painting there is, above all others, first, I should say, the conception of the artist of the thing that he would represent, and after that there is the doing of the thing with his own hand. Now, a musician may compose, as many have done, immortal works. Take Beethoven, for example, with all his sonatas and splendid things. All those splendid things were composed by Beethoven, and they are put in a volume and people play them—more or less well; if they are played well, we admire them; but, if they are not played well, they become intolerable. But an artist—a painter—plays and sings his own sonatas, and will play them and sing them as long as the works exist. You have there the actual handiwork of the man; you see how he interprets each thing that he did. It is that which forms the beauty of painting; it is that fact that removes it from every mechanical process that I know of; and it is that fact, I hope, which in time will prove a good picture and distinguish it from a bad one.

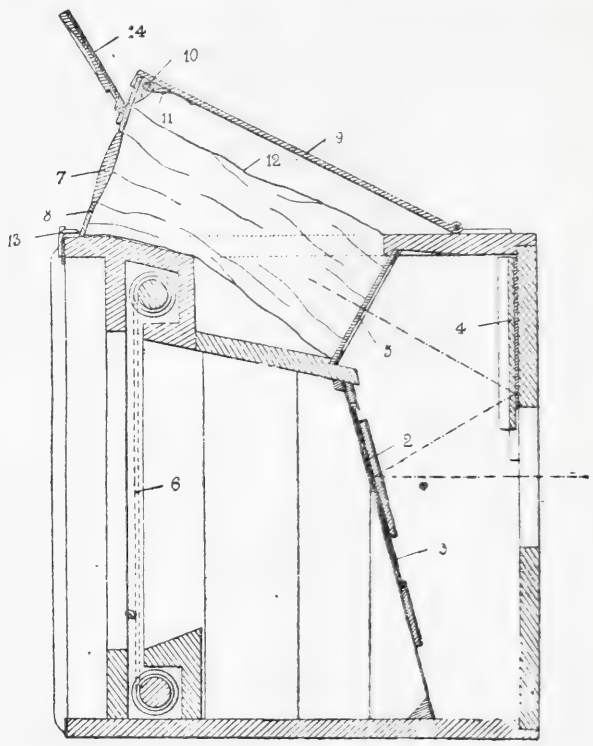
But I do not know how to acquire this. It is for you, with your infinite ability and experience, and knowledge and aptitude, to try whether you can do this. I wonder if you will ever be able to master the lens? I wonder if you will ever be able to make it your slave, instead of your master? At present it is your master. Well, there may be many things that are not discovered yet. We have seen, I believe, colour reproduced in a photograph; at least I am told so. I have never seen it. I read a description of it the other day, and it seemed to me that the colour was not reproduced in the photograph at all, but arose from reflected lights from the photograph. I hope some day you will be able to produce photographs in colour. They will be invaluable to us. They will give us the actual, undeviating, and uncompromised truth. That is a thing that every artist must admire. He can take from it as much as he wants, he can leave out what he does not want, and with the help of those photographs the artist need never go quite astray. Photography has done away with all the stupid conventionality which existed for so many years in the English school, and has rendered it sane, hardy and healthy. I hope you will continue to develop. When I say develop, I mean to do your best to produce works of truth, and at the same time try to get some of that beautiful atmosphere, some of that grace that there is in nature, and which most photographs, I think, seem to lack. Occasionally, perhaps, by chance you do hit upon the thing, but I think some of you do not know how you have done it, and some of you do not like it when it is done. It seems to me you might call in some kindred art or power to help you in your difficulties. Have any of you tried what electricity might do? I am as ignorant as can be about the thing, but it seems to me that electricity has sharpened the ears of the telephone—it has sharpened sound and rendered it more acute, and I do not see why it should not produce some startling effects if you brought it to the aid of the camera. I do not know whether photography is a science or not, but we will take the scientific view of it. It always seems to be that in science men go round in a kind of circle, they discover all kinds of things, but they do not apply them. Now, Edison, who is a great man, was talking to my father-in-law upon the subject of electricity, and my father-in-law spoke of him as a scientific man, and Edison said, "Don't call me a scientific man, I can get as much science as I want for ten dollars a week." Gentlemen, keep your eye upon science; watch what these exceedingly clever men do with infinite pains and labour, and then see what use you can make of it for yourselves. Begin afresh. Who invented the electric telegraph—Faraday? All sorts of people were sending sparks along a wire, but it took an artist to find out that it was useful for sending messages; it never struck the scientific men. It was Morse, who was a painter, who found it out. Do not let science master you. You try and master science. Get the better of your photographic lens, and then, no doubt, you may do something so well that we shall almost call it a picture. VALENTINE PRINSEP, R.A.

DOYEN'S CAMERA: FOCUSSING BY DOUBLE REFLECTION.

THIS is a camera in which the focussing is effected upon a fixed ground glass, well protected from light, after two successive reflections of the luminous rays, one of the reflecting mirrors being carried by the obturator.

The size of photographic cameras for focussing by reflection on to a single mirror is limited, owing to the ground glass having to occupy the same optical distance from the objective as the sensitised surface. By the employment of two successive reflections, M. Doyen obtains the reduction in bulk.

The two mirrors and the ground glass, conveniently placed and well protected from light, are arranged in the following manner:—The luminous rays which have passed through the objective 1 fall first on to a first mirror, 2, which is inclined at about 75°. This mirror is very light, being only 30 to 40 mm. in diameter, and is directly carried by a rapid obturator, 3. The reflected luminous rays fall on to a second mirror, 4, which throws them back on the ground glass, 5. Said second mirror, 4, is arranged vertically, or nearly so, according to the inclination which it is desired to obtain for the ground glass, which is inclined at about 60° to the horizontal. The focussing on to this ground glass, 5, corresponds with the focussing for the sensitised-surface plate or film as required, which is placed at the back of the dark chamber and behind



the obturator of plate 6. The focussing on to the ground glass, 5, is effected by means of a magnifying glass, 7, which brings the image to the distance of distinct vision, and in the focal plane of this glass, 5 This magnifying glass is mounted in a frame, 8, which is connected to the lid, 9, by a hinge, 10, provided with a spring, 11, which tends to always increase the angle formed between the frame, 8, and cover, 9. An opaque bellows, 12, fixed around the magnifying glass, 7, and around the ground glass, 5, protects them entirely from the surrounding light, and allows of focussing without a black head-covering, even a strong sun.

When out of use, the frame of the magnifying glass is folded against the lid, 9, which is closed down upon the apparatus. A hook, 13, secures them in position.

Against this hook, 13, the lower part of the frame, 8, abuts, when the lid, 9, is open.

A small shutter, 14, hinged to the frame, 8, may, if desired, cover the magnifying glass, 7, and, when the sun is at one's back, will prevent the light which might enter through such magnifying glass, 7, coming in through the ground glass, 5, and, by reflection on the mirror, 4, clouding the bottom of the sensitised plate at the time of exposure.

THE PRODUCTION OF COLOURED PHOTOGRAPHS: SERSHALL & KIRK'S IMPROVEMENTS.

MESSRS. SERSHALL & KIRK proceed as follows: From a photograph of the object or objects they prepare in the manner well known and commonly practised a colloid printing film, from which they print by means of the printing ink and printing press ordinarily employed in the collotype process impressions of the said positive photograph. The positive prints are produced on a film of celluloid or other transparent or semi-transparent film.

They take traced outlines from the positive photograph, the said outlines being the outlines of the different colours to be printed upon the colour print hereinafter described, and they transfer the said outlines to lithographic stones, the number of stones employed being equal to the

number of colours necessary to give the required colouring to the transparent positive photograph.

The lithographic stones with the outlines thereon are treated in the way by which the stones are treated in chromo-lithography.

They print from the said treated lithographic stones a print preferably on paper, the said print being produced by a series of printings superposed upon one another, the said printings being in different coloured printing inks. The production of these coloured impressions is effected in the way well known and commonly practised in the production of chromo lithographs. The compound coloured impression produced has in its different parts the respective colours which require to be placed at the back of the positive print on celluloid or other transparent or semi-transparent film to give it, when viewed from the front approximately, the colours of the object or objects from which the photograph has been taken. The colour print described is affixed to the back of the positive photograph by being cemented thereto by gelatine or other adhesive matter, the surface of the celluloid on which the positive photograph is printed and that of the paper on which the colours are printed being presented to each other.

Or the colour printing may be effected on that side of the celluloid film on which the collotype positive photograph has been printed. In this case they protect the positive photograph by a coating of the varnish known in commerce as "glasin," or with mastic or other colourless varnish, the said coating of varnish being allowed to harden before printing the colours upon it. Or in substitution of varnish, a solution of celluloid may be employed.

The claim is for the production of photographs having approximately the colours of the objects represented by producing on celluloid or other transparent or semi-transparent sheet or film a positive picture or photograph, and placing at or attaching to the back of the said transparent positive photograph, a colour print which, when the photograph is viewed in front, colours the said print so as to give the different parts of it approximately the colours proper to the scene or article or articles represented.

ABOUT PHOTOGRAPHIC FILMS.

[Paper read before the Royal Photographic Society.]

The subject is one of increasing interest when one gets into it, and I am steadily at work in carrying on the research, which consists in studying the sections of gelatine films containing silver images, and seeing what results can be obtained from their micro-photographic examination. The experiments take considerable time to carry out, and I have spent some time to learn how to take the best kind of photographs. If I were only a Pringle or a Spitta, I should have not had to go through the apprenticeship I have done. The first thing to do is to get suitable films. Evidently one on glass is not suitable as it is, for one does not care about having sections of glass with the film, and so, if the image is taken on glass plates, the film must be detached. For the ordinary image this is not difficult, and there is nothing to dread in using a very dilute solution of hydrofluoric acid. The film can then be stripped off and washed and dried, and there is no fear of damaging the image by the acid, but, when intensifiers are employed, there is a certain amount of risk of spoiling what one wishes to examine. To avoid this risk celloidine films are advisable, or, at all events, I have used them, and instead of stripping the film have dissolved away the celloidine by means of amyl-acetate, and after washing with spirit have obtained very suitable films. It may be asked why sections of the gelatine and celloidine films were not made, and the answer is that they can be made, but the sections are apt to be irregular, and the celloidine splits away from the gelatine strip. We now come to mounting the sections. This is done in the usual way, the films are imbedded in paraffin wax and placed in a microtome, which cuts sections as thin as a $\frac{1}{600}$ of a millimetre, that is $\frac{1}{15000}$ of an inch. But what I shall show you to-night are only to the $\frac{1}{300}$ of a millimetre or $\frac{1}{7500}$ of an inch in thickness. Razors of the keenest edge are required, and great care must be taken to secure a smooth edge. This is, of course, well known to microscopists, and I only put in this word of caution for the sake of tyros like myself. With these preliminary remarks I pass on to the photographs of the sections. Exposures were made in small squares, doubling the time with each change, and the transparencies of the developed image were measured and plotted in the way that is usually done, and of which I have shown many examples to the Society and elsewhere. A portion of each of these squares was used to make sections, and these were photographed, and hence we have a means of comparing the results of the eye measures with the monochromatic light microscopic measures. The section of the films presents a curious aspect, the grains of silver are of approximately the same size, and, as might be expected, with small exposures the greater number of particles are congregated at the exposed surface of the film. When the exposure is increased, the rear of the film rapidly fills with these particles and crowd together. This is not surprising when I show you a section of an undeveloped film. You will see there is a regular network of bromide of silver throughout, and it appears almost astonishing that rays of light can struggle through it. Side by side with it is a photograph of a grating over 6000 lines to an inch, from which it will be seen that the thickness of the film was about $\frac{1}{300}$ of an inch. It may be interesting to know that this grating photograph was taken from a photograph of a grating taken by contact with a glass ruled surface belonging to me and ruled by Rutherford's machine, on bichromated gelatine. Mr. Butler, of the Royal College of Science, has made many such with the same glass original, and they often give brighter spectra than the glass itself, probably because the furrows are represented by transparent spaces and the unruled part by dark lines. Any how, by this means we have the advantage of comparing on a plate the magnification of the original. To come back to our micro-photographs, of which I show examples, it will be seen that, when we come to the most exposed, we have a dark mass of approximately equal grains, some $\frac{1}{10000}$ of an inch in diameter each grain, the volume of each will be therefore very small, somewhere about $\frac{1}{1000000000000}$ or the billionth of an inch. Now, it is not a very hard matter to count these particles, and we find that, if we apply what I have called the coefficient of obstruction to the number, we get very fairly the results which we obtain from the measured amount of light passing through the "unsectioned" film. This is what we should expect. Further, if we take a fixed length of the image of the film, and measure the light coming through such image (of course cutting off the light coming beyond the edges), we have a means of verifying approximately the counted number of grains; for it is given by the simple proportion of "bare film" to "grained film." I mention these matters to show how checks can be made.

As I showed at the Camera Club some months ago, when we begin to get reversal we get it at the outside of the film first. The grains begin to diminish in size, a fact which I showed by chemical means before this Society a great many years ago, and in the *Philosophical Magazine* in a paper entitled "On the Destruction of the Photographic Image." The confirmation by visible means of a result which was deduced from chemical considerations is of great interest to me, as it confirms up to the hilt what I then stated, and which but few believed. When the exposure is very prolonged, the grains become mere dots at the front surface, even whilst those at the back are of considerable size. Regarding these I may remark that the average number of particles in a fully exposed portion of the film, and in one very much over-exposed so as to give reversal, are the same, the only difference being in the size of the particles. By very prolonged exposure the film will be almost denuded of all grain, and, though total transparency is, I believe, never reached owing to the dots of silver remaining, yet their fineness is such that they require a high power to find.

In the series of properly though increasingly exposed films which I show you there is one remarkable thing, and that is that the film appears to increase in thickness as the silver particles increase in numbers. This is as it should be, for the development took place with metol. With some developers, such as pyro, which are astringent, the film appears to retain nearly an even thickness. Why this is, and how arrived at, I am not at present prepared to say, but such is the fact.

Another point under investigation is the action of intensifiers on the image. The slides I have show that intensification is due to increase in the size of particles, and also to some extent of the formation of particles where there were none before, or in which there appeared to be none. If we take the intensification by means of mercury and the reduction by ferrous oxalate to metallic mercury and silver, we find that the volume of the particles should be of nearly double the size of the original particle, that is, the diameter should be increased by from about 1 to 1·2. Now it is the proportion of the particle that obstructs and not the diameter or the volume, and that means that the obstructive area is increased from 1 to 1·44 nearly, that is, that the factor of "density" is increased in that proportion. Some of the films, of which I have samples, have that theoretical increase in density, others do not quite reach it, and that intensified with silver cyanide far oversteps it. The micro-photograph shows that the average diameter of the grains is increased, and as far as can be judged in the ratio given above. The measures made in the ways indicated confirm this. I have now finished this short paper, meaning it to be a preliminary note to a more elaborate paper. I have omitted many details of measures which I hope to give at a future time, when my experiments have progressed to a further degree.

Captain W. de W. Abney, C.B., F.R.S.

THE ANTARCTIC EXPEDITION.

The Borchgrevink expedition to the Antarctic regions leaves this country in the course of a few days, and the opportunity has been taken to hold an Exhibition of its equipment at 49, Pall Mall, S.W., which will, doubtless, be largely attended while it is available for inspection. Here one is forced to admire the ingenuity which has been brought to bear in adapting clothing, furniture, and other necessities of life to the peculiar needs of such an enterprise. Above all things, economy of space has received particular study, and some of the specimens of collapsible furniture are marvels of constructive skill. Our own immediate interest in the expedition, which Sir George Newnes has equipped at his own expense, lies in the fact that photography is to be employed to assist in the scientific work. The photographic department is in charge of Mr. Louis Bernacchi

of the Melbourne University. Messrs. Elliott's plates and the Eastman rollable film are to be taken, and development and printing are to be conducted *en route*—a very wise proceeding. The apparatus includes a Ross half-plate stand camera and a Newman & Guardia hand camera, both fitted with Ross-Goerz lenses; the Dallmeyer Stigmatic and Telephoto lenses are also included, and much interesting work in long-distance photography is likely to be done.

The expedition is expected to be absent two years. Above the expectation that some valuable scientific work will result from the enterprise, we are sure all will place the hope that the sturdy chief and his plucky little band will return in safety from the remote ice fields of the South.

The secretarial labours in the organization of the expedition have devolved upon an old photographic friend, Mr. A. Kemp, to whom every credit is due for a thoroughly interesting exhibition.

Our Editorial Table.

THE TELLA FILM CAMERA.

Adams & Co., 26, Charing Cross-road, W.C.

ASSUREDLY one of the most ingenious and effective hand cameras yet introduced to the public is the "Tella," which we subjected to rigorous



FIG. 1.

trial one afternoon last week. The changing system is the part of a hand camera by which the instrument as a whole must be judged—by which, in fact, it has to stand or fall; and in this important respect the



FIG. 2.

Tella comes out very strongly indeed. So simple and certain is the method in which the sensitive contents of the Tella exposing chamber are placed in the focal plane and removed from it, that we found from

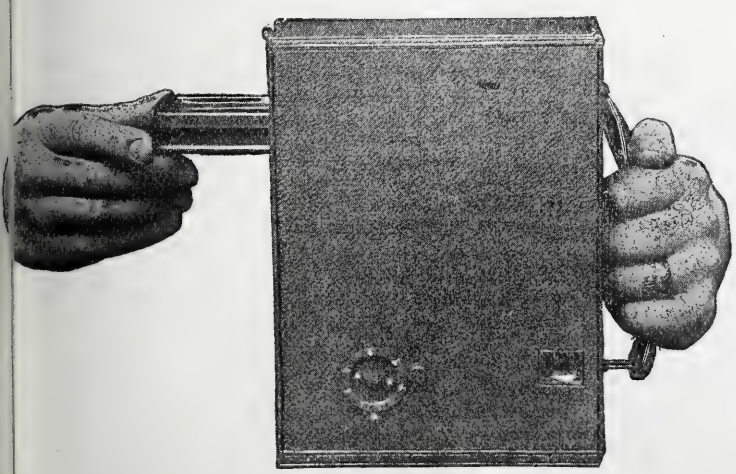


FIG. 3.

observation even a child of tender years could successfully manipulate the camera at the first attempt.

The Tella takes fifty cut films of the ordinary kind. Between each film and its immediate neighbour is placed a little "separator" of the size and shape shown in the first illustration. Either loose films or specially provided packets may be employed. The changing is effected by withdrawing the septum as shown in the larger illustration (fig. 3); a space is thus made between the first film and those at its rear (fig. 4), and in that space the metallic septum enters on its return. But the withdrawal and return of the septum indirectly does something much more than this: it tells you whether you have or have not a film in position ready for exposure, and it further informs you the exact number of exposures you have made. The latter movement is controlled by the displaced film itself, which thus automatically records the fact that it has been exposed; in like manner it is also the film itself that tells you when it is in position ready for exposure. All hand-camera workers will appreciate the convenience of knowing exactly where they are in these two important respects. After exposure the film is deposited in one chamber and the separator in another. We were entirely charmed by the multiplicity of

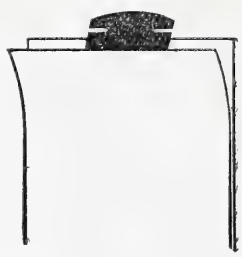


FIG. 4.

useful movements which the mere withdrawal and return of the septum accomplishes: it is a triumph of hand-camera mechanism.

The remaining features of the Tella may be thus briefly indicated. It is 8¼ inches long, 4 inches wide, and 6 inches deep. The lens, one of Messrs. Ross's latest symmetrical series, is fitted with an ingenious revolving jacket, allowing of objects from 8 feet to infinity being focussed. The distances are engraved on the mount, and the movement is both "sweet" and handy. The shutter works from a half to one-hundredth of a second; and time exposures can also be given. Two Brilliant finders are fitted to the camera, which can be used on a stand, and for taking horizontal and vertical pictures; finally, it has no projecting pieces.

We have not for a long time been so pleased with the working of a hand camera as with the Tella, which will surely be popular. It reduces the necessity of the photographer to think of what he is doing down to the smallest extent—it does everything short of actually taking the photograph, and that with only two movements: withdrawing and returning the septum and setting the shutter. We wish the Tella the great success it deserves.

CATALOGUE RECEIVED.

Walter Tyler, 48–50, Waterloo-road.

MR. TYLER'S photographic list extends to 128 pages. It has many illustrations, and particularises a large variety of cameras, lenses, dry plates, chemicals, printing frames, mounts, &c., of the latest introduction. The amateur photographer should find this list of very great use.

News and Notes.

THE Aintree Photographic Society will hold their Fifth Annual Exhibition of Photographic Work in the Aintree Institute, Aintree, near Liverpool, on Wednesday, Thursday, Friday, and Saturday, November 23, 24, 25, and 26, 1898. For any further information apply to the Exhibition Secretary, Mr. D. Travis, Fazakerley, Liverpool.

PHOTOGRAPHIC CLUB.—Wednesday evening, August 3, at eight o'clock. Open Meeting. Subject to be announced. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. W. R. Sutton, 4, Queen-street-place, London, E.C.) will be pleased to forward on application.

OPENING OF PHOTOGRAPHIC ROOMS AT BLAIRGOWRIE.—We have before alluded to the enterprise of the Blairgowrie and District Photographic Association in these columns, and the opening of their new rooms last week chronicles another advancement. In their exhibitions they set a worthy example to many older societies. Of the various classes there was only *one* restricted to members, a great contrast to those societies which have nearly all the classes at their exhibitions restricted to their own members. At the origin of the Association, in 1894, the need for rooms was at once recognised, and two rooms were rented and suitably fitted up, but the Association has outgrown these; they felt "cribbed, cabined and confined," and, when the local volunteers vacated their premises in favour of their new drill hall, the Association set about securing a lease of the building; this they were successful in obtaining, and on Thursday evening the rooms were formally opened. The larger room (about thirty-three feet by seventeen) has been appropriately decorated, mainly from suggestions by Mr. J. Craig Annan, Glasgow, who kindly gave the Association his valuable assistance. The walls are painted in shades of a golden brown and a greenish grey, when the ceiling is in a warm cream colour. In this hall, where the meetings of the Association will be held, as well as various "open" meetings which may be promoted, it is the

intention of the executive to form a "gallery" of photographs by prominent workers, they have already been promised a number of signed prints; these will be suitably framed and displayed in this room, and they hope in time to have a fairly representative collection. The dark room has been conveniently fitted up with benches, sinks, washer, enlarging apparatus, &c.; due attention has been paid to ventilation, and a thoroughly comfortable and convenient working room is the result. At the opening ceremony Provost Templeman presided, and, after a few words of commendation for the praiseworthy work of the Association, introduced Ex-Bailie Steven, who then formally declared the rooms open. Thereafter the company duly inspected the display of members' work on exhibition in the club room, and also examined the dark room and its various accessories, which were explained to the non-photographic visitors by several of the members.

THE incandescent light has been tried at a lighthouse at Yarmouth, and Messrs. Vyvyan and Slader, Elder Brethren of the Trinity House, consider the experiment a great success, as the innovation trebled the power of that particular light. There should be no difficulty in extending the experiment; only in every lighthouse using this means of illumination, spare mantles should always be kept.

A NOTE on the radiation of incandescent mantles has been presented to the Paris Academy of Sciences, by MM. Le Chatelier and Boudouard, in which the authors say that the emissive power of the blue, green, and yellow radiations far surpasses that of red, and therefore the proportion of energy given out as luminosity is great, but is less than would be given out by a black body at the same temperature.

A UNIQUE feature of nearly all homes and offices in Manila is the use of tiny square panes of translucent oyster shell instead of glass. The windows measure on the average six feet long and four feet wide, and contain 260 of these oyster-shell panes, which temper the fierce glare of the sun in the building. In a country where many people go blind from the constant sunshine this is a precaution very necessary to be taken.

PROBABLE ABANDONMENT OF BEN NEVIS OBSERVATORY.—In the report that was presented at the last meeting of the Scottish Meteorological Society, the directors announce that both the high and low-level observatories at Ben Nevis will cease to exist in October of this year, and that this has been rendered necessary in consequence of the want of funds. There is no way, so far as the directors can see, by which these first-class meteorological observatories can be continued except by aid from the State.

AT the last meeting of the Victoria Institute the President (Sir G. Stokes) delivered an address on "The Perception of Colour," describing with great minuteness the structure of the eye and the result of recent researches into the subject. It was, he said, now universally admitted that light consists of reiterations, and the effect of colour was produced by the stimulation of the nerves of the eye. In the group of fine nerve threads there might be some capable of producing different sensations as to colour, although the microscope did not reveal any difference in the threads. The subject was very speculative, but it led to interesting complications, and, at all events, the wonderful complexity of the human eye afforded remarkable evidence of design in its construction.

IN the *New York Monthly Weather Review* recently an interesting account is given of the value of a searchlight for making weather signals known in large cities or seaports at an hour of the evening when it is too late to give warning by the usual method. In the month of February, 1895, the searchlight for the unfortunate battleship *Maine* then nearing completion, was lent for temporary use at the Chicago office at the Weather Bureau, and the experiments were conducted by the present chief of the latter institution. From observers and other persons it was ascertained that the signals were clearly seen at a distance of twenty miles. At present the great cost of maintaining the apparatus in operation would preclude its adoption, but, in the event of expense being eventually reduced, the author thinks it might be used by the Weather Bureau for the purpose of immediately disseminating forecasts made from the evening observations.

THE GLARE OF THE ELECTRIC LIGHT.—Many devices, such as ground and coloured glass, have been tried with the idea of eliminating the disagreeable glare from the tiny filament of the electric light, but all of them have been attended by loss of light. What is said to change the surface of the globe entirely into a luminous body doing away with the extreme brilliance of the filament, is a spiral feature, done by winding around the globe, from the spike to the tip, a thin cord of glass, like the cord wrapped around a spinning top. The manner in which the spiral is applied to the bulb is interesting. It is first made out of rod glass bent on the shaper of the same form as the particular sample of glow lamp, and in its separate state is quite a springy affair. To get it down on the bulb it is divided half way down, the halves are blown together when in place, and the end of the spiral is blown into the spike of the lamp. The other end is secured by an extension of the brass cap. It appears that there is actual junction only at the two poles, so that there is no danger of the bulb cracking under the strain of unequal heating and expansion in the spiral. An important point in the whole matter is that there seems nothing in the process to prevent the finished article being turned out quite cheaply, which, of course, is the essence of the business from a commercial point of view.

A CONTEMPORARY states that Mr. A. W. Clayden recently exhibited in a lecture on photographing meteorological phenomena some lantern-slide views of clouds taken by him after a process recently invented by him—photographs showing beautiful blues in all their shades, from ultramarine down to perfect white, various greys and some iron-red and greenish tints. The revolutionising feature of the Clayden process consists in the fact that these coloured photographs are positives; that is, according to the statement given out, he has succeeded in obtaining coloured prints by a purely chemical way of developing the same on a specially prepared plate. The process at present is restricted to lantern slides, but these are not coloured by painting but by development, while coloured paper prints loom up distinctly in the near future. Bright red rays, the inventor says, have so far escaped him, but he believes that further experiments and probably a longer development will realise the mastery of that defect.

THE GLOWWORM'S RAYS.—The glowworm's light is said to have been shown to be due to the emission of rays similar to Röntgen's. Three hundred glowworms were caught near Kioto and placed before photographic plates screened from the light by several thicknesses of black paper, together with plates of brass, copper, and aluminium. A piece of cardboard with a hole in it was placed between the metal and the photographic plate, and for two days the arrangement was kept in a dark chamber sheltered from all foreign lights. On developing the plate, however, it was found to be blackened, except the part opposite the hole in the cardboard. The rays of the glowworm would appear, therefore, to penetrate metal and excite luminosity in cardboard. When there is nothing between the sensitive plate and the glowworm, the rays are said to behave like ordinary light; but, in traversing some metals and cardboard, they seem to acquire properties like that of the X rays, or it may be that the ordinary glowworm emits X as well as ordinary rays. This account savours somewhat of the improbable, and, in regard to the latter part of it, there may be a third explanation.—*Revue Sci.*

Patent News.

THE following applications for Patents were made between July 11 and July 16, 1898:—

ANIMATED PHOTOGRAPHY.—No. 15,195. "Improved Apparatus for Taking and Exhibiting Moving Pictures." Complete specification. C. STAFFORD-NOBLE and H. C. NEWTON.

TRIPOD STANDS.—No. 15,256. "Improvements in the Method or Means for Securing Cameras and other Instruments to Tripod Stands and the like." H. T. A. RENBOLD.

ANIMATED PHOTOGRAPHY.—No. 15,454. "Improvements in the Photographic Reproduction of Moving Objects and in Apparatus for Viewing and Exhibiting the Photographs Produced." S. D. WILLIAMS.

ANIMATED PHOTOGRAPHY.—No. 15,503. "Improvements in Apparatus for Exhibiting Zoetropic Pictures." C. RALEIGH.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

August.	Name of Society.	Subject.
1.....	Croydon Microscopical	Excursion: Chiddingstone and Hever. Leader, J. H. Baldock.
1.....	South London	Excursion: Burnham-on-Crouch. Leaders, C. H. Oakden and J. T. French.
2.....	Birmingham Photo. Society ..	Excursion: Oxford. Leaders, C. Court Cole and E. Underwood.
2.....	Hackney	Open Night.
2.....	Rotherham	*Platinotype Printing.* Mr. Hemmingway.
3.....	Borough Polytechnic	Open Night.
3.....	Photographic Club	Open Meeting.
5.....	Croydon Microscopical	Conversational Meeting.
6.....	Borough Polytechnic	Excursion: Longton to Theydon Bois.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 21,—Mr. H. Snowden Ward in the chair.

Mr. J. E. HODD, in passing round for examination a Daguerreotype portrait, said that it had been recently taken from its old mount and remounted in its present case. The point he wished to emphasise was that in the changing it had lost all the tinting which until then had been excellently preserved. What had been a scarlet coat was now quite colourless, and the bloom on the face had likewise disappeared. Mr. Hodd was anxious to know if anything could be done to restore the colouring, and what was the cause of its disappearance.

Mr. A. MACKIE had an impression that the original colour had been applied by dusting on with fine brushes, and that, in removing the portrait from the frame for remounting, some of the colouring had been knocked off. Finding

he could not remedy the accident, the man who was intrusted with the work, no doubt, removed it all, but Mr. Mackie thought it could be recoloured by the method originally used if a competent person could be found. As regards some brush-like marks to be seen with the aid of a magnifier and a suggestion that they were the result of imperfect polishing of the plate, he did not think that such a fine image could have been produced on anything but a first-class plate. Failing the discovery of a man who was familiar with this work, he thought a miniature painter might be found who would be able to make good the deficiency.

Mr. EDWARD CROFTON showed several Daguerreotypes of the 1851 Exhibition, presumably by Negretti & Zambra.

A discussion took place on the subject of halation, and on its relation to exposure.

Mr. EVERITT asked for opinions as to the assertion that the backing media used to counteract halation had the effect of reducing the sensitiveness of the plate; in other words, that the plate required a longer exposure when backed than when used in the ordinary way.

Mr. JOHN BEEBY, speaking from his own experiences, thought that a longer exposure was necessitated by a backed plate than the same plate, in an unbacked state, would require. He had made some exposures on a subject having strong contrasts, for slide work, using a backed plate and giving a longer exposure, but, notwithstanding this increased exposure, the image did not suggest, by its time of appearance or any other peculiarity, that any more exposure had been given.

Mr. E. BANKS pointed out that the sensitiveness was, of course, the same in either case, but the effect of backing upon a plate would be to absorb the light which would be, otherwise, reflected from the back surface of the glass through the film. This reflected light would perform no useful office, and indeed would spoil the image, but the result of its action upon an unbacked plate might give one the impression that unbacked plates were more sensitive than backed plates of the same initial sensitiveness.

The question of the proposal by the authorities of the forthcoming Paris Exhibition to offer for tender the sole right of photographing in the precincts of the Exhibition received some attention. It is understood that some form of memorial to the authorities against such an action is contemplated.

Mr. BEEBY, of the New York Camera Club, showed a number of interesting slides, chief amongst which were representations of New York streets in winter garb and during the rains. Many of these were shown in appropriate cold blue tones, produced by sulphocyanide toning. The result of a discovery that he was working with, an accidentally combined developing and toning solution, was shown, with further examples of the same action more systematically carried out. The colour was pleasing, and, in the cases mentioned, of a warm brown tone. One of the slides also showed the possibility of getting value in the sky, where otherwise it was absent, by making upon the cover glass a weak negative impression from the slide itself. The deposit could be removed where not required, and the effect was decidedly an improvement in softening what was a rather hard and bare sky. The slide and cover glass were afterwards shown apart. Mr. Beeby used a Cooke 7½ inch lens, at *f*-8, with a rapid Stanley plate, the exposures ranging from seven minutes, for some night pictures shown, to slow-speed shutter work for the wet-weather slide.

Mr. EVERITT thought it would have been preferable to have printed in a suitable sky from a cloud negative to toning down the sky, as had been done by Mr. Beeby. In the latter case, however, it would be an improvement to give a deeper tone than was shown. Mr. Everitt also thought the aperture of the lens was fully large. He noticed in some examples that the foregrounds were rather too soft, although he did not necessarily object to softness.

Mr. BEEBY agreed that the slide would have been better for a deeper sky. He attributed the softness of foreground to the conditions under which the work was done, with a strong wind blowing, an umbrella to manage, and other adverse circumstances.

PHOTOGRAPHIC CLUB.

JULY 20,—Mr. F. A. Bridge in the chair.

Mr. H. SNOWDEN WARD showed a camera, one of the Thornton-Pickard Company's make, fitted with a tilting head for both upward and downward work, and giving full scope for any degree of tilt. The baseboard is provided with false hinges, so that the camera may be readily hinged for use in either direction. He also showed Beresford's Rectiscope, a small optical instrument for reinverting the image as seen on the ground glass. The idea of a practised photographer wanting the image on his ground glass to appear the right way up was received with expressions of incredulity, but it was thought by the maker that the instrument would be found of great advantage to photographers. Mr. Snowden Ward likewise showed a dark slide with aluminium shutter, and minutely described the devices in this and other patterns wherein the shutter draws completely out, to prevent the fogging of the plate when opening or closing the slide. Spring light traps, which close when the shutter is removed, were, nevertheless, unable to prevent access of light if the shutter were withdrawn or inserted askew, and this fault was sought to be remedied by plush strips overlapping one another. There was still, however, the probability that in a short time the pile of the plush would be flattened down, but this last fault was removed by shaping the longitudinal section of the shutter at its end to an S-like form. By such means the pile of the plush rose into the recesses on either side, and in this way was better able to effect its purpose.

A letter from the Photographic Guild was read, in which an appeal is made for assistance in inducing the authorities of the 1900 Paris Exhibition to forego their intention of inviting tenders for the sole right of photographing at the Exhibition.

The unanimous opinion of the members was in favour of the movement, and suggesting as an alternative source of income the granting of permits to such as should apply, at reasonable prices. A resolution to this effect was adopted.

Mr. C. A. RUDOWSKY showed specimen prints upon, and passed round sample packets of, the Protalbin paper, a vegetable albumen emulsion paper, made at Lilienfeld's Vienna Chemical Works. The paper is manipulated as is ordinary albumen paper, and all the advantages of albumen, gelatine, and collodio-chloride papers, without their defects, are claimed for the new paper. Mr. Rudowsky also showed examples on Lantin's Albuminate emulsion paper, and presented sample packets.

Mr. JOHN BEEBY, of New York, showed a fine selection of slides, embracing snow and rain effects in New York streets, night scenes, and others. Most of the slides were toned to a cold blue colour, a few being locally treated as between sky and landscape, and others the result of development and toning in a combined bath. Mr. Beeby exhibited also slides by Mr. Fraser, who has done considerable and excellent work in the direction of night photography.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The Monthly Meeting of the above Society was held, as is usual in the summer months, out of door.

The destination was Liverpool, for Eastham, the leader being Mr. Harry Wade. The weather was all that could be desired, and on arrival at Liverpool the party at once made for the landing-stage, where many interesting snap-shots were obtained, both of the busy crowd, always either embarking or arriving, and also of the shipping on the river. At 3.30 steamer was taken to Eastham, where many views were obtained in the woods and on the shore.

Tea was provided by the Ferry Hotel and, besides the members of the Society who sat down, there were also friends Sykes and Ashman, of the Manchester Amateurs. On arrival again at Liverpool there were opportunities for those who had plates left in the form of a fine sunset.

The return journey was made at 8.30, arriving at Manchester at 9.15.

Six cameras were present and seventy-two plates were exposed.

The party comprised Messrs. W. G. and C. H. Coote, F. W. Burton, H. Wade, Miss Bowker, and Mr. J. and Mr. Wolfenden.

FORTHCOMING EXHIBITIONS.

1898.	
Sept. 26–Nov. 12	... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
,, 30–Nov. 5	..... Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
November 15–18	..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15	Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ELECTRIC PRINTING.

To the EDITORS.

GENTLEMEN,—In reply to Mr. Soar's statement in your JOURNAL, I beg to assert that the effect I obtain is with the means I employ; it is impossible to obtain prints without the aid of electricity—am sorry to think Mr. Soar treats electricity in this connexion as a fallacy. He evidently has something to learn, which time will prove.—I am, yours, &c.,

39, *King's-road, Chelsea, London, S.W.* W. FRIESE-GREENE.
July 23, 1898.

[An article by Mr. Soar on the subject of Mr. Friese Greene's letter, which we have been obliged to hold over for several weeks, will appear in our next.—EDS.]

PITS IN GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—In your issue of July 15 you mention having received complaints lately of the formation of pits or holes on the gelatine surface of negatives. I had a dose of this trouble during the warm weather, and the conclusion I came to was that the gelatine had decomposed through the plates being too long in the washing trough.

In a number of towns water has been scarce, and a sufficient supply has not always been procurable for washing purposes. Plates therefore not being properly washed might be left in the water all day, or even over night, and the long immersion in the rather lukewarm water decomposed the gelatine, which took the form of pitting.

Whether my theory is right or not, I got rid of these markings by removing the plates from the tank after a short immersion, say, about an hour, and allowing them to dry off, and rewashing for about an hour next day.

In regard to the length of time one of your correspondents says the film took to dry, this points to the same cause, as a film left a long time in water takes a proportionately long time to dry.—I am, yours, &c.,

FRANK P. MOFFAT.

125, *Princes-street, Edinburgh, July* 19, 1898.

HE-A, HE-A!

To the EDITORS.

GENTLEMEN,—Though your journal is not, perhaps, the proper medium for discussion on the proper derivation of words, you may find room for a few lines in reply to your North British contributor's sarcastic comments on southron inability to pronounce "Hear, hear." Perhaps your contributor is not aware that the exclamation is no call to an act of audition, but merely an assent. It is a corruption of the Cymraeg equivalent of "Yes, yes," which, I believe, is spelled by our Welsh friends "Yr, yr." It is the same original as has been corrupted by our nautical population into the ready "Aye, aye, sir!" with which the sailor acknowledges an order. An interested Welshman will punctuate your conversation with frequent assents in words as above given, but with no suggestion of an aspirate (which has no place in the words), or of the rolling northern "r," which is equally out of place. He says—"Ee-a, ee-a."

I am bound to admit that the Southron, in voicing this cry, has usually no idea of its derivation and real meaning, but his accidental adhesion to the proper pronunciation is at least as sensible as your contributor's position in defending a wrong pronunciation based on ignorance of the true meaning.—I am, yours, &c.,

Y. WYDDFA.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

ALBERT LEVY.—Many thanks.

T. S. M. W.—We have forwarded your letter to a likely gentleman.

W. H. H.—In our next.

DEBENHAM & CO.—We only make such announcements regarding registrations effected by ourselves.

ROSE VILLA.—Address Messrs. Oborne, Red Lion-square, who, we believe, make a speciality of such cards.

GEORGE HERRETT.—The questions appear more formidable on paper than they really are. You surely would not object to answer them at a personal interview? We do not think them at all unreasonable. We ourselves have been through the same ordeal.

POSTAGE-STAMP PORTRAITS.—T. HICKS. Cameras and lenses for these portraits are stocked by all the large dealers, such as Marion's, Fallowfields, and like houses. They will quote prices, which, of course, are dependent upon the number of lenses used.

P. O. P.—T. SIMMONS. The "P. O. P." papers are not made for development, and it is not to be wondered at that you have failed with the one named. If you desire to curtail the exposure by subsequent development of the picture, there are plenty of papers for the purpose in the market.

GREASE ON NEGATIVES.—C. BARSTOW asks: "Can you inform me how I can remove grease spots (three small ones) caused by a candle, from a negative?"—The grease may, no doubt, be removed by treating the negatives with benzole. Try immersing in a dish of benzole for a few minutes, and, if that does not take it out, repeat the operation once or twice.

PLATINOTYPE.—PORTRAITIST writes: "The firm with which I am connected do a good deal of platinotype portrait work; will you kindly say what should be the best kind of negative for the purpose of printing by this process?"—A vigorous one such as will yield a brilliant print on albumen paper; weak and flat negatives are not suitable for this process.

UNMANAGEABLE APPRENTICE.—H. W. B. The remedy in your case is very simple: give the lad a week's notice and send him about his business. As the indentures are not stamped they are not binding on either side; he is simply a weekly servant. It might be as well to communicate with the lad's friends before taking this step, as he is some distance from his home.

STANNOTYPE.—S. E. WARD. The Stannotype process is one that will yield good results as lantern slides, but it is not an easy one for a novice in photography to learn, or one who has had no experience in the working of bichromated gelatine processes. It is true that it involves no costly outlay for plant, but you would find it, in working commercially, more economical to adopt the Woodburytype process, notwithstanding the cost of the hydraulic press.

P. R. S.—If the originals are American, you would be running no risk; but, as there is a doubt, we should advise you not to reproduce any of them.

CARBON PRINTING.—C. HAWKINS. The inequality in the depth of the prints, though they may all have had the same exposure by the actinometer, is due to what is called the continuating action of light. Do you not know that the longer prints are kept after they are printed, the darker they prove when they are developed? If prints receive the right exposure, and are then kept "three or four days," they must be expected to prove too dark when developed.

REPAIRS.—ALPHA. It is quite clear that the landlord is within his rights in serving you with notice to repaint all the outside work. It seems that, according to the terms of the lease, you covenanted to paint all the outside work of the premises every three years, and the inside every seven years. As the three years have expired you will have to do the work, and he can enforce it being done, or you will probably have to forfeit the lease; but even that will not release you from being sued for damages. We are supposing the lease contains the same clauses that repairing leases usually do.

MOTTLED NEGATIVES.—ROGO asks: "Could you kindly say is there any cure for the mottled marks on enclosed negative? They appeared on two negatives after fixing in hypo and chrome alum, recommended by Mr. Harold Baker in your ALMANAC a year or two since. Being called away after fixing them, they were left unwashed for nearly an hour, and at the end of that time showed these markings. On examining the fixing bath, I found a green precipitate; but other negatives, washed immediately after fixation, were all right."—There is no means of getting rid of the markings now. They appear to be due to a precipitation of sulphur in the film.

DOUBLE EXPOSURE.—E. F. L. writes: "I send you enclosed bad prints of a stereo I took at my boy's school games, snap-shot, $\frac{1}{10}$ of a second, poor light. There were only three boys running; where do the blurred ghosts come from? Same on each side. I took several other shots from same point of view; they are all perfect. Why ghosts of boys only, and not of the people looking on?"—There seems to have been a second slight exposure on the same plate, as the boys are in a different part of the ground, and in different attitudes, though, of course, the onlookers occupied the same place, though their faces are turned in following the course of the boys; hence their unsharpness.

ANCIENT LIGHTS.—NEW LIGHTS writes as follows: "Adjoining and running the whole length of my garden is property with two windows having undoubted ancient rights. Can I build a studio at right angles to the *space between the windows* which is brick work? Am I right in thinking that windows with ancient rights have to get their light straight and not sideways? My studio would only be eight feet to the eaves and would not shut out any light worth speaking of, only a little from the side ways; but my neighbour, if he has the right to stop me, would do it."—We imagine, from the rough sketch, that your neighbour has the right to stop you, as you must stop his "Ancient lights" in any way—directly or sideways—and the sketch shows that it would be in the latter direction.

BROMIDES, &C.—VARIOUS asks: "Could you kindly inform me (1) Whether there is any method of getting rid of yellowness in the whites of bromides, and the cause (hydroquinone developer)? (2) Can the quality of a platinum bath be judged by placing some ounces of the developer in the sunlight, and noting the amount of platinum which is precipitated thereby? also (3) Is it correct that unless a photographer himself focusses a subject he cannot copyright the photograph?"—1. No. There will be no yellowness if the fixing bath is new and the prints are kept in motion while they are in it. 2. Not reliably. 3. It is the author of the work in whom the copyright is vested. The one who focusses need not be the author of the work, that may be done by any one without affecting the authorship.

VARIOUS.—LEARNER says: "Will you kindly answer these questions: 1. What does *f*-8, &c. mean in relation to a lens? Can you recommend an inexpensive text-book, giving just as much information on lenses as a careful photographer should know? 2. In developing with ferrous oxalate, am I right in supposing that oxalate gives density, and that iron gives detail? Is it possible to make first-class negatives with the above developer? 3. My studio has no blinds, but the side light is ground glass. What is the least expensive method of controlling the top light, by blinds or movable screens?"—1. *F*-8 means that the aperture of the diaphragm is one eighth of the focal length of the lens. *The Optics of Photography*, by the late Mr. J. Traill Taylor.—Whittaker & Co. 2. Yes. Good negatives can be made by this developer, and it is largely used on the Continent. 3. Blind or curtains will be the more convenient.

SPOTS.—G. E. H. writes: "I enclose two small photographs mounted on glass with gelatine, one of which has been backed with ordinary demy paper pasted on with starch. They form part of a batch of about twelve dozen which were mounted at the same time, and all of which exhibit the same defects as enclosed. I have mounted many thousands of prints in this way during the past eight or nine years and have never met with this defect before, and am at a loss to account for it. These prints (albumen) have received exactly the same treatment as previous batches, the only difference being, that since mounting they have been stored for a few weeks in a new shop, I have recently acquired near the sea, but apparently quite dry. If you can give me any clue to the mystery, I shall be very much obliged?"—With only the data given, we can in no way account for the spots. The only suggestion we can make is that they may be due to particles of foreign matter in the mountant at the time it was used; or it may be that they were present in the atmosphere of the room in which the mounting was done.

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Contents.

	PAGE
Ex Cathedrâ	497
The Care and Preservation of Photographic Lenses	499
Leaderettes:— A Novel Ferrocyanide Process — A Rival to Acetylene—Ethylene — Improvements in Crookes Tubes: M. P. Villard's Method —Mr. Lyman Sayer's Method	499
Photographic Workers at Work:— XXII. Messrs. C. A. Steinheil Söhne, Munich	500
The Value of Photographic Residues. By Prof. Alexander Lainer	501
Combination Lighting. By T. N. Armstrong	502
Paper Enlargements. By J. P. Nott	503
Important Copyright Decision	504
The Formation of Prints by Metallic Contact. By Henry Soar	505
Turkish Delight. By Richard Penlake	506
Calculating Exposure and Exposure Meters.—I. By John A. Randall	508
Developing Bromide Paper in Lengths	508
Substitutes for Albumen	509
Our Editorial Table:— *Das Fernobjectiv—Die Farbenphotographie — Photography Annual*, 1898—Catalogue Received	509
News and Notes	510
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club	510
Forthcoming Exhibitions	510
Patent News	510
Correspondence:— Stereoscopic Lantern Projection—Electric *versus* Metallic Contact Printing — The Philadelphia Photographic Salon — Photo-engraving Prices—Free Photography—He-a, he-a!	511
Answers to Correspondents	512

EX CATHEDRÂ.

A Constantinople correspondent writes: "The superstition concerning the number thirteen is by no means a local one, it has spread to all parts of the globe; in Constantinople, especially, they seem to have the 'thirteen fever' in rather a bad form. In one of the principal shops of that city hangs a 12 × 10 group, representing the president of a certain club and twelve of its officers, all in uniform. Seated with these gentlemen is a little Turkish lad, who, it cannot be said, is well dressed, but rather in the costume of a match-seller. The effect is certainly very curious. Inquiries show that the club did not notice its unlucky number until the photographer refused to photograph them, 'because,' said he, 'a group of thirteen never does take well, and that I have proved after over twenty years' working.' The members of the group then with one accord agreed that such would really be unlucky for the club, which had only then just started, and the lad was called in from the street to join the group, which he did, no doubt being highly pleased at the opportunity offered for joining a group of gaily dressed 'effendis.' The group is not improved by his presence, but its value as an advertisement is increasing, and the club is progressing."

"Don't come to Turkey with a camera," is the advice of our correspondent. "I had my dark slides taken away the second day," he says, "but soon recovered them again. I am warned by the police not to go out without a permit from the Porte. I applied to the latter through the British Consul three weeks ago, and have heard nothing. I have now placed the matter in the hands of the French Consul, who says he can manage it. I hope he will, as I have wasted over three weeks. I have had some funny experiences; they would make a good 'Travellers' Night,' if ever I had the time or opportunity to give them."

* * *

The same gentleman also narrates the following amusing incident of the misfortunes of a thoughtless button-presser: "Another of the 'press-the-button' sisters has come a 'cropper.' This one left Jerusalem (having never before exposed a plate) for the purpose of making a photographic trip east of the Jordan. 'All is so very easy,' she said; 'the man in London told me to press the button,' &c, and away she went by way of Jericho, Es-Salt, and Mount Nebo. Returning again to Jerusalem, she asked a reader of The British Journal of Photography, who was staying in the same hotel, if he would be so good as to take out the roll she had used and put in one the man had given her. This he did, but imagine his surprise when he found the roll she had been using was nothing more nor less than the dummy spool put in for the purpose of experimenting with the mechanism. The fact was fully explained in a specially written letter of instructions she had carried about with her unopened. 'Oh,' said she, when the letter was opened, 'I thought they were some sort of advertisement, and I never bothered to open it; I was so busy exposing!'"

* * *

An interesting development of the photographic art, says the *Melbourne* (Australia) *Age*, has just engaged the attention of Mr. Justice Williams in the Supreme Court, on an action to recover damages for alleged infringement of patent. The case was one in which Alfred Martin, of Wanganui, New Zealand, proceeded against John Cross Dearden, trading as Richards & Co., photographers, of Ballarat, for an injunction restraining the defendant from using plaintiff's patent for an improved method of producing embossed or bas-relief photographs, and claimed 1000*l.* damages for alleged infringement. Defendant denied that he had infringed the patent, and urged that he

had experimented on producing the photographs in respect of which the complaint was made before the plaintiff had obtained his letters patent. After hearing the evidence, Mr. Justice Williams held that, as a matter of fact, there had been no infringement by the defendant of plaintiff's patent, and he therefore gave judgment for defendant, with costs. There was a large bar engaged, and the costs amount to a considerable sum. Those who are interested in bas-relief photography will find particulars of Mr. Martin's invention in our ALMANAC for 1898 (p. 842).

* * *

AN old friend, Mr. Tanquerey, who was formerly identified with the "free-portrait business" in Paris, and, if we mistake not, in other native and foreign cities, has bobbed up again, this time at St. Petersburg, where he appears to have located a "Société Artistique de Portraits." Of this institution Mr. Tanquerey modestly says: "The above is the name of a first-class association of artists, formed for the purpose of executing artistic crayon portraits at prices within the reach of almost any one. Our portraits, made after any photograph sent to us, are the finest that can be produced; they are perfect likenesses of the subject, and are finished in an artistic manner. In order to introduce our work in England, we have decided to make a limited number of our portraits to some prominent people, absolutely free of charge, believing that to be the best and cheapest method of advertising our work among the English-speaking people. We therefore make you the following *bonâ-fide* offer, viz.: If within fifteen days from date you will send us a photograph of yourself or any member of your family, living or dead, we will make you from same one of our finest life-size crayon portraits absolutely free of charge; the only favour we ask you in return is to recommend our portraits to your friends and acquaintances. Enclosed please find one coupon entitling you to such portrait, which please return to us by mail, with your photograph, so that we can make you the life-size portrait free."

* * *

PRESUMABLY those who venture to send their photographs to be enlarged will be asked by Mr. Tanquerey to have them suitably framed,—and there is the whole scheme laid bare. We wonder how many of our readers will part with their photographs and will advise their friends not to impose upon the good nature of this St. Petersburg philanthropist?

* * *

THE agitation in favour of the adoption of the metrical system has taken the practical form of a suggestion that some of the Government departments should set the example of using it. We understand that Mr. Balfour received at the House of Commons, last week, a largely signed memorial, presented at the instance of the Decimal Association, on the motion of Sir Samuel Montagu, seconded by Lord Kelvin, asking that in the Custom House, Post Office, and other public departments, the Government should use the metrical system, or give the equivalents of English weights and measures in the metrical proportions. The memorial is signed by 14 peers, 62 members of the House of Commons, trades unions representing 150,982 members, 205 merchants and manufacturers, 43 warehousemen, 39 book-keepers and clerks, 8 ship-builders and ship-owners, 26 chartered accountants, 58 engineers, 21 institutions representing 5273 members, 86 chemists, 12 bankers, 37 clergymen and solicitors, 329 school boards, heads of colleges, and professors, and 84 others. Mr. Balfour promised to consider the matter, with a view to ascertaining what could be done to meet the views of the memorialists. It is to be hoped the Government will signify its assent to the request of the memorialists, for it is obvious that, with the Departments of the Civil Service using the metrical system, its adoption by the commercial community must follow as a matter of course.

* * *

ADVERTISING "search" and "flash" lights certainly have their uses in increasing the illumination of our cities by night, but on æsthetic and other grounds objection is often taken to them. It appears that these interesting lights are in all probability to share the fate of the sky signs and become "regulated" by our municipal rulers. It is announced that a circular has been issued by the London County Council to the Vestries and District Boards of London asking for particulars of the uses of "search" or "flash" lights for advertising purposes in the highways under their control, and whether they are in favour of new by-laws being made by the Council for regulating and limiting the use of such advertisements.

* * *

To a recent meeting of the New York Microscopical Society Mr. W. G. Levison contributed an interesting note on the "Collection of Pond Life on Photographic Plates." While examining some ordinary photographic plates under the microscope, he found an interesting way of catching and holding minute organisms for examination under the microscope. He found numbers of these forms adhering to gelatine-coated photographic plates after the plates had been in the water the usual time allowed for washing them after coming out of the hypo solution. The number of forms varied with the length of time the plates were in the water. By placing the plates in a box used for washing the hypo from the plates and letting the city water run through it, he collected on them a few large diatoms, many smaller ones, and a large number of small active forms. When the film had become soft, after being in the water several days, vorticellæ and other infusoria appeared anchored to them. These forms appeared, although the box was in a dark place and was frequently used for washing the hyposulphite solution from the plates and for washing acid solutions from metal plates. For convenience in examination, he cut the plates into small pieces, so that he could put them in a cell, film side up, and examine them with a thin layer of water over them. Mr. Levison's experience led him to believe that these plates can be successfully used to collect pond life by leaving them a greater or less time submerged in the pond. It first occurred to him that the gelatine might attract these forms for food purposes only, but this would hardly answer for the appearance of the larger forms, even though he tried to collect them on other surfaces with little success.

* * *

THE late Prince Bismarck owed to photography the brief, but undeserved, reputation of having indulged in a flirtation with a once celebrated opera singer. It is said that Bismarck met the cantatrice at Ischl in 1865, and unthinkingly allowed his photograph to be taken with her. The picture produced a sensation at a moment when the presentment of the elder Alexandre Dumas with Mdlle. Ada Isaacs Menken, of "Mazeppa" fame, was being discussed. The sale was stopped.

THE CARE AND PRESERVATION OF PHOTOGRAPHIC LENSES.

MANY persons pay high prices in order to obtain the most perfect lenses procurable, and, when they have got them, do they all take the necessary care to preserve them in their pristine state of perfection, except perhaps the brass work? Two or three instances have recently come under our notice in which undoubtedly first-class lenses have, by the treatment they have received, been reduced to merely second or third-rate ones. A few weeks ago we spoke of the lens as a photographic tool, and we venture to say that many mechanics take far greater care of their tools, and give greater attention to them, than do some photographers with regard to their lenses, notwithstanding their greater delicacy, as the scratched and chipped glasses, dented mounts, &c., of hundreds of instruments in constant use prove.

When a lens is first issued by the maker its surfaces possess a high degree of polish, but by careless treatment that may be very materially reduced, with some glasses, even in a few months, and then the instrument will not yield the same brilliant results that it did originally. Brilliancy of the image is largely dependent upon the perfect polish of the surfaces of the glasses, and the more highly polished they are the more brilliant will be the image formed. This may easily be exemplified in the following way: Take a lens with a slight film of dust upon it, such as it will acquire by standing in a dusty place for a day or two, and place some object—a watch dial or a white card with printed matter upon it—near a window, where it will be strongly lighted, and focus its image upon the ground glass. It will then be seen that the image appears grey and lacking in vigour. Remove the dust and it will be found that the image now is far more brilliant, the printed matter will be blacker and the white much whiter than before.

Now, what happens in the case of a thin film of dust on the glass occurs also when the surfaces of the lenses lose their fine polish and become dulled by abrasion or erosion. There will be a lack of brilliancy in the image, and correspondingly so in the negative. The dulling of the surfaces is brought about by incautiously cleaning the lenses, that is, not thoroughly removing the dust before cleaning. Too often, when a lens is cleaned, it is simply wiped with the first thing that comes to hand, frequently the focussing cloth, which may also be charged with dust, or a pocket handkerchief. It will easily be understood that, if there are any gritty particles on the glass, the rubbing necessary to the cleaning will cause more or less abrasion of the highly polished surface. A slight abrasion does not show as a decided scratch unless it be caused by such things as road grit, sea sand, coke dust from the studio stove and like matters which are exceedingly sharp, unless it is examined with a magnifier; but it is one, nevertheless, and a series of them from time to time destroys the polish and renders the surface of the glass, in a minor degree, analogous to that of ground glass, or what is termed by opticians "semi-polish," like that on the lens before it receives its final polish. Before a lens is cleaned, any dust upon it should always be carefully removed by blowing or, better still, by a camel's-hair brush. It may then be cleaned with a piece of soft silk, or wash-leather, with a few drops of alcohol.

The surfaces of some glasses deteriorate by rusting or oxidation. We were a short time ago shown one of the new anastigmatic lenses the surface of one of the glasses of which had become coated with an iridescent film that quite destroyed its previous fine polish. This action was, no doubt, accelerated by the lens having been kept, when out of use, in the dark room and fully exposed to its damp atmosphere. Lenses, when out of use, particularly those made with some of the new Jena glasses, should be kept as much as possible protected from the atmosphere, moisture, light, and dust, for, apart from the mistiness or greyness of the image caused by the dulled surface of the glass, their rapidity is seriously impaired.

It has been suggested before now that, when the surface of a lens has become eroded, or dulled by continuous careless wiping, the defect may be remedied by repollshing the surface with putty powder, or rouge, applied on cloth or on the palm of the hand. So it may, as far as the polish is concerned; but it is obvious that the "polishing" must be carried sufficiently far to remove the erosion or the minute scratches, that is to say, that some of the glass must be ground away. Doing that without suitable appliances means that the figure of the lens might, and probably would be, considerably altered, and thus the remedy would prove even worse than the disease.

Sometimes accidents, unfortunately, happen to lenses; for example one may be dropped, and, if the glasses are not cracked, it is frequently thought that no injury has been sustained beyond a dented mount or cell. That is not always the case, however, for the denting of the brass may have produced sufficient pressure on the glass to alter its figure and condition, and thus materially impair its quality. When an accident of this sort occurs, the lens should be carefully examined, and, if the glasses can be freely rotated in their cells, it may be assumed that no injury has been done; but, if, on the other hand, it is found that either of the glasses has become jammed in the cell, it should be sent to the maker to be released. If the fall has happened to chip any of the glasses at their edges, it is not the serious matter that some might surmise, as it will not, practically, interfere with the performance of the instrument; but the chipped portions must be covered with black varnish, neatly applied, to avoid reflections from them, the only inconvenience from an accident of this sort being the loss of light from the parts stopped off by the varnish rendering the lens slightly slower.

A decided and deep scratch in the glass is not such a great detriment as some imagine; but, if it is very deep, it is advisable to treat it in the same way as the chips, namely, filling it in with black varnish, or even ink applied with a pen will do. There will, of course, be a slight loss of light, but that is all.

As the lens is the most important tool the photographer works with, and there is much more to be said on its care and treatment that materially affects its performance, the subject will be further dealt with in a future article.

A Novel Ferrocyanide Process.—This, which was originally devised for dyeing purposes, possesses so many points of photographic interest that it will be desirable to describe its principal features. Mr. F. Carter is the inventor, and explained his method before the New York section of the Society of Chemical Industry. The fabric is coated with the usual ferrocyanide and ferric ammonium-citrate mixture, and exposed and developed in the usual manner. The fabric is then washed and treated after the manner of dyers when adjective dyes are used. Briefly, the print is first washed in weak caustic soda solution till the blue is decomposed, then washed in hot water, then given three minutes' immersion in a hot solution of phosphate of soda, with the purpose

of improving the colour of the finished picture. After washing for a short time in hot, then in cold, and again in hot, water it can be placed in the dye bath (at a temperature of 160° F.), to which glue size has been added with the purpose of keeping the whites clear. When the print is thus placed, the dye is added and the heat raised to 180°; when the desired shade is reached, the print is withdrawn, passed through a bath of neutral soap to clear the whites, then rinsed in hot, and finally in cold, water. Resorcin green gives a green colour, gallo-cyanine a violet and blue, alizarine a purple; alizarine brown, sepia tones; or logwood or other naturally formed dyes may be used. It will be seen that, provided the paper would stand the treatment, there is no reason why ordinary blue prints should not be treated in this manner to obtain a variety of colours; in any case, the facilities offered for printing in various colours upon any cotton fabric should make the process valuable for many purposes to the possessors of suitable negatives. (See p. 445 *ante*.)

A Rival to Acetylene.—According to the *Scientific American*, a Chicago iron-worker has invented a new process for the production of ethylene which possesses the merit of extreme cheapness, the chief ingredient being produced from a waste by-product in the manufacture of pig iron. Briefly put, the process in as follows: The slag from the iron furnace while in a molten state is poured into a converter shaped like a Bessemer vessel, and powdered coke poured into the air blast, which is forced through the melted slag, the converter being tipped backward and forward meanwhile. The mass is then passed between carbon electrodes conveying a powerful current, and becomes converted into a material which, being poured into moulds and allowed to cool, forms a substance more like glass, and twice as heavy as coal. This is termed carbolite, and is put on the market in tins protected by wood-casing. Each pound will produce five cubic feet of gas in a similar manner to carbide of calcium, the particular gas in this case being ethylene, one cubic foot of which is equal to fifteen of ordinary coal gas.

Ethylene.—The illuminating power is as just stated. An automatic plant is easily fitted up in a simple and inexpensive manner; the cost of piping is slight, and the maintenance of plant merely nominal. According to the authority quoted, heat or power can be produced at one-tenth of the present cost. "This latest product of electro-metallurgy and electro-chemistry, which is really a process for the utilisation of the by-products of iron-making, is destined to work wonders, and the near future is certain to see its future exploitation and development."

Improvements in Crookes Tubes—M. P. Villard's Method.—The great defect in the average Crookes tube lies in its inability to accommodate itself, as the vacuum becomes intensified by frequent use of the tube. M. P. Villard proposes to get rid of the difficulty by utilising the process of osmose. M. Villard proposes the addition of a platinum tube closed at one end, and with the open end sealed to a glass tube, itself sealed to the bulb. The platinum, being heated by a gas burner is, by osmose, penetrated by the hydrogen of the flame, which then enters the main tube. The gas flame being removed, no more hydrogen passes; but by placing a loosely fitting platinum sheath over the platinum tube, and then playing the flame upon this outer piece, the occluded gas in the first platinum is given off on its inner side, and so the vacuum can be altered at will.

Mr. Lyman Sayer's Method.—This experimenter starts with the assumption of the desirability of an automatic device for keeping the vacuum at any desired tenuity; his apparatus is not complicated, but is singularly ingenious, and is stated to work perfectly. It is supplied with two cathodes—one of the ordinary form, the other connected with an addition to the tube to be described, and receiving the current through an adjustable spark gap. This addition consists of a small bulb containing caustic potash, and directly connected with the main bulb. An auxiliary tube, well exhausted, surrounds the small bulb, and contains the second cathode fixed directly opposite the potash bulb, so that when the current passes the latter gets bombarded and becomes hot (it is provided with a platinum protecting cap). When the coil is set in action and connected with the Sayen tube, the spark gap can be so arranged that the current shall pass through the secondary cathode (which is nearer the anode than the main cathode). Heat is thus generated upon the potash; it then gives off moisture, which reduces the main vacuum, though the small tube vacuum is unaltered till a point is reached when the easier way for the current is through the main cathode. The action then becomes automatic. As the main vacuum again becomes excessive, a spark or two will pass across the gap; moisture will again be given off, and again the correct degree of exhaustion is restored, and so on. When the tube is put aside and the potash cools, it reabsorbs the moisture it gave up, and the original high vacuum is restored. If these explanations have been followed, it will have been perceived that, by adjusting the length of the spark gap, any desired exhaustion can be brought about and automatically retained.

PHOTOGRAPHIC WORKERS AT WORK.—XXII.

Messrs. C. A. Steinheil Söhne, Munich.

The name of Steinheil is inseparably connected with the progress of photographic optics, and, after the memorable work of Professor Petzval, that of Dr. Adolph Steinheil marks one of the most important stages in the improvement of photographic lenses. The firm with which Dr. Adolph Steinheil was so long associated was founded by Carl August Steinheil, a native of Rappoltsweiler, in Alsace. Carl August Steinheil was born on October 14, 1804, and was educated for the law, but his attainments in physics, mathematics, and astronomy soon attracted the attention of the Royal Academy of Science at Munich, and in the twenty-sixth year of his age he was elected an Associate. Seven years later the honour of membership was conferred upon him. King Maximilian II. of Bavaria, whose influence contributed so largely to the importance of Munich as an artistic and intellectual centre, invited Steinheil thither. The city had acquired some renown in optics through the work of Fraunhofer, and it was the desire of the King to revive and increase it. In 1855, Carl August Steinheil migrated to Schwabing, near Munich, and there founded the optical works which have since attained such high reputation. The improvement of the telescope was Steinheil's first occupation and in this he was assisted by his son, Dr. Adolph Steinheil, who undertook the mathematical calculations. In constructing the astronomical telescope on the Gauss principle, it soon became apparent that, to obtain a larger field of definition, the calculations must not be confined exclusively to the axial image, but that a second extra axial point must also be taken as a factor. These considerations led Dr. Adolph Steinheil to study the construction of photographic lenses, where the oblique pencils are of so much importance. Although the work was undertaken rather with a view to the elucidation of the principles which should govern the construction of telescope objectives, it was of great service to the photographer. In these calculations Dr. Adolph Steinheil sought the help of Professor Ludwig von Seidel, and to him is due the merit of discovering convenient formulæ for the oblique pencils. In 1865 appeared the first photographic lens calculated by Dr. Adolph Steinheil. This was the periscope, a non-achromatic combination formed of two suitable menisci with their convex surfaces outwards, and with a stop placed in the intervening air space. It is still used for hand cameras with fixed focus, and has the distinction of being the forerunner of the Aplanat, its achromatic copy. The Aplanat made its appearance in 1866, and has, for many years, been the trusted friend of the photographer, to whom it has been known as the rectilinear, the symmetrical, the euryscope, and by a variety of other names. As a recognition of the value of this invention, a gold medal was awarded to the firm at the Paris Exhibition of 1867. In 1871, Dr. Adolph Steinheil was requested by the War Department at Vienna to construct a lens for the correct reproduction of maps. As the result of this work, the series of wide-angle aplanats was constructed, and to mark the appreciation of his services, Dr. Adolph Steinheil was decorated with the order of Franz Joseph.

The years 1872 to 1881 mark a period of considerable activity on the part of the firm in the domain of photographic optics. The landscape

aplanats were issued, and a long series of calculations was undertaken for the production of a lens of large aperture, flat field, and with the minimum of astigmatism.

These calculations led to an entirely new departure. The symmetrical type was abandoned, and in its place a combination was arranged in which a positive front lens was coupled with a negative back lens of considerable thickness, and the errors of the one were compensated by opposite errors in the others. These lenses have an aperture of *f*·6·5 and, by introducing an air space in the back component, a portrait series was produced with rapidity of *f*·4. The type is known as the Antiplanatic Series and the less rapid lens has been further improved of recent years by use of the new Jena glasses. The introduction of Messrs. Schott & Genossen's improved optical glasses acted as a stimulus to further inventions, and Dr. Adolph Steinheil conceived the idea of improving the aplanat, or symmetrical, type by adding another element to each component for the correction of astigmatism. This third element might be a negative lens enclosed between a biconvex and a positive meniscus, the one of higher and the other of lower refractive power than the negative lens enclosed; or a second type might be constructed, with a positive meniscus enclosed between a biconvex and a biconcave, both of higher refraction than the enclosed meniscus. The work of calculating both these types was deputed by Dr. Adolph Steinheil to his son Rudolph. The first series was calculated by a German patent applied for in March 1893, but particulars of the Goerz lens had already been submitted to the authorities, and Messrs. Steinheil's work was thus anticipated. Nothing daunted, the second lens, known as the Orthostigmat, Series II., was taken in hand, and, after considerable legal difficulties had been surmounted, a patent was granted to the firm in 1896 for this lens. Messrs. Voigtländer had also made a similar independent invention, known as the Collinear, and, in accordance with German patent law, a licence was also granted to them for the manufacture of the lens. In consequence of the refusal of a German patent for the first series of the orthostigmat lens, Messrs. Steinheil resolved to open a branch establishment in Paris at No. 13, Rue Ste. Cécile, and the lens is there being made under the superintendence of Herr Paul Zschokke, who was for many years associated with Dr. Adolph Steinheil in his lens calculations.

We have referred more particularly to the various forms of photographic lenses introduced and made by Messrs. Steinheil, but this is only one branch of optical work in which they have earned distinction. The telescope has received some important improvements at their hands, and the appreciation with which their work is regarded may be gauged by the fact that they have been intrusted with the grinding of two telescopic objectives for the Potsdam Astro-physical Observatory. One of these lenses, 31½ inches in diameter, is intended for astro-photographic work; the other, for optical purposes, measures 20 inches in diameter. The firm is also noted for its prisms and spectroscopes. The light analyser used by Kirchoff and Bunsen in their important researches was specially constructed in accordance with their directions by Messrs. Steinheil, and it is interesting to note that the same form of spectroscope is still in use. As an instance of delicate and exact workmanship, their spherometer must command admiration, for it is possible with this instrument to measure the radius of a lens accurately within one ten-thousandth part of a millimetre. Plane and plano-parallel glasses and mirrors are also specialities with Messrs. Steinheil, and are made of any desired thickness, from one seventy-second of an inch upwards.

In March 1890 the business of the firm was removed to specially constructed new buildings on the Theresienhöhe, at Munich, and in visiting the works we could not but admire the care with which they had been planned and the suitability of the site. The building is situate on elevated ground to the east of the city, from which it is separated by a large open space about half a mile in width, known as the Theresienwiese. The works consist of a central building and two wings, arranged in such a manner that the work-rooms shall receive the largest possible quantity of light. In passing through the rooms we were shown the various processes of grinding, polishing, and mounting photographic lenses. The greatest care was manifested in each department to secure perfect workmanship. In the fine grinding, the lenses are worked glass against glass, and in the polishing no less than five grades of polishing powder are used. The centering of the lenses particularly attracted our attention, for the workman was not allowed to determine its accuracy by watching the reflected image upon the surface of the lens as it rotated in the lathe, but a mechanical indicator was used to show that the lens was in true position and spinning on its optical axis. Some optical glass was also being worked with flat surfaces, and a specimen was placed in the testing instrument for our inspection. This instrument consists of a stand supporting two small telescopes, fitted with cross wires adjusted to equal angles. If the surface under examination is true, the images of the cross wires will coincide, and thus we found them. We were also shown one of the new objectives in preparation for the Potsdam Observatory. For the grinding of these lenses it has been necessary to construct special machinery. Passing from the workrooms, we were shown the long passage specially planned for testing large telescopes. This is between 40 and 50 yards in length, and is of material assistance to the firm in rendering them independent of climatic conditions. We finally were shown the large testing room in the central building, where each lens, before it is sent out, is tried on the camera upon test objects. A record of the photographic performance of each lens is kept, and none are sent out unless conformable to the standard adopted by the firm. We trust photographers may long continue to benefit by the skill and careful workmanship of these justly celebrated opticians.

THE VALUE OF PHOTOGRAPHIC RESIDUES.

[Translated from the *Photographische Correspondenz.*]

From correspondence, as well as from communications to home and foreign professional papers, I continue to hear complaints concerning the small sums paid to photographers for their silver residues. About a month ago a Hungarian photographer wrote to me that he had received only fl. 25 (2*l.* 1*s.* 8*d.*) for three and a half kilos of silver chloride and eight kilos of paper ash, although these residues may have been worth fl. 100 (8*l.* 6*s.* 8*d.*).

In my *Guide to the Rational Collection of Silver, Gold, and Platinum Photographic Residues and the Determination of their Value*, there is a complete account of all the best methods of recovering the precious metals from photographic baths and washing waters. On page 2 there is a table of the theoretical and actual amount of silver contained in chloride-of-silver residues, likewise of the actual amount of silver contained in the trimmings of various kinds of silver paper. The following remarks will render these more complete :—

A kilogramme of dry, pure chloride of silver contains 750 grammes of metallic silver, which, at the market price of silver at the time of the publication of my book, was worth fl. 37 to fl. 38 (3*l.* 1*s.* 8*d.* to 3*l.* 3*s.* 4*d.*).* In practice, it has been found that chloride-of-silver residues, sent by photographers to the refiners, never contain this amount of metallic silver. In the following eight samples of silver residues I have calculated the actual amount of silver present per kilo :—

1. 645 grammes Ag.		5. 453 grammes Ag.	
2. 687	,, ,,	6. 541	,, ,,
3. 475	,, ,,	7. 673	,, ,,
4. 628	,, ,,	8. 627	,, ,,

The average amount of silver in these eight samples is 600 grammes, being equal to fl. 28 per kilogramme of chloride residue. But there is no reason why the photographer's residues should not be of the richest kind, if they are collected rationally. In the examples given, the largest amount of silver per kilogramme was 687 grammes, which was worth fl. 32 (2*l.* 13*s.* 4*d.*). According to this, the three and a half kilogrammes of chloride residues, to which we have referred, should be worth fl. 112 (9*l.* 6*s.* 8*d.*), if carefully collected and dried.

For precipitation of the silver chloride hydrochloric acid is preferable to common salt. Paper coated with emulsion, if washed in hard water, often gives an extraordinary amount of calcium salts, which again soluble in hydrochloric acid. Silver is usually precipitated as sulphide from fixing baths by means of liver of sulphur. Herr Weiss received fl. 26·45 (2*l.* 4*s.*) for a kilogramme of silver sulphide obtained in this way. This return compares less favourably, because there is usually a large amount of sulphur mixed with the silver sulphide, and therefore the value of the silver obtained from Ag_2S is less than from silver chloride. Nevertheless, the sum of fl. 26 per kilo for sulphide residues is well worth attention, and the various fixing baths should never be thrown away, which unfortunately is too often the case even in large establishments. Some *employé* or assistant in the business would, doubtless, be very glad to look after the waste, if some portion of the returns were given him for the trouble. We should mention here that sulphide of lead is also precipitated where combined toning and fixing baths are used; consequently the entire residue would contain, besides sulphide of silver, sulphide of lead, sulphur, a little sulphide of gold, and oxide of aluminium. Those photographers to whom the smell of sulphuretted

* One kilogramme of silver could then be sold for fl. 47 (3*l.* 18*s.* 4*d.*), or bought for fl. 50 (4*l.* 3*s.* 4*d.*).

hydrogen is objectionable I would recommend to use zinc dust for precipitating silver from the fixing baths.

The proportion of silver contained in the ash from silver papers varies very considerably. From practical experience the amount varies from 39 to 600 grammes per kilo, or in money from fl. 1·70 to fl. 27 per kilo (2*s*. 10*d*. to 2*l*. 5*s*.). From this it is evident that the value of the ash depends upon the source of supply. It may also be of interest to the professional photographer to know the value of the trimmings from collodio-chloride paper. As no particulars are to hand for reference, I have ascertained the amount of silver in a weighed quantity of unfixed collodio-chloride paper trimmings, and have found that one kilogramme gives 211 grammes of ash, which latter contains 56 grammes of silver. Consequently, one kilogramme of collodio chloride trimmings is worth 1 krone (10*s*.), and one kilogramme of ash 5 kronen (2*l*. 10*s*.).

It should also be remembered that a considerable amount of silver may be lost in burning the paper without proper appliances. It would therefore appear preferable to send the paper direct to the refiners, or to fix out the silver in old fixing baths. The silver can be easily recovered from old fixing baths.

The professional photographer is not so much at the mercy of the refiner as is usually supposed, and should observe certain rules, which I would summarise as follows :—

1. The residues should be collected in the purest form, and should be free from foreign substances, such as corks, &c.

2. The residues should be well dried by exposure to air before storage.

3. Chloride, sulphide, metallic silver, &c., should each be kept separate and stored apart.

4. Reliable average samples should be taken of each kind of residue and kept in bottles. Samples should be sent to the refiners for determination of the quantity of fine silver contained. The cost of these tests is small.

5. Before sending the residues to the refiner they should be weighed. The total value may then be ascertained from the sample tests. (Rule 4.)

The complaints to which we have referred may not cease if these rules are observed, but the latter will be of service to the professional photographer and to well-known reliable refiners. The publication of exact returns and of further particulars will bring about more regular conditions in the valuation of residues.

We would mention, in conclusion, that it is desirable to divide the residues in equal parts and send them to different refineries. Considerable difference will be found in the amount returned from each, notwithstanding the equality in value of the parcels sent.

Professor Alexander Lainer.

COMBINATION LIGHTING.

With professional photographers more especially it frequently happens that they are called upon to execute some commissions that entail the exposing of sensitive plates in such positions as would certainly never be chosen were the standpoints left to their own judgment or selection. This sort of forced working enters largely into the requirements of such subjects as are intended to illustrate books and periodicals, as well as pictures required for legal purposes, in which it not infrequently happens that the camera must assume one standpoint only, no other position being permissible.

The meaning of this arbitrary course must be evident to any professional worker whose experience has taught him the advantage of being able to select the best standpoint for any subject, having full regard to the existing light at command, and under which, if left to his own judgment, he would most certainly adopt in preference to all others.

On the principle, however, "that he who pays the lawing chooses the lodgings," work has to be performed at times in such situations and under certain conditions of lighting that tax a photographer's energies to their fullest extent.

In interior working perhaps more than in any other class of subjects will this arbitrary method be required, such as, for example, certain subjects of great historical interest that are required for half-tone reproduction in the illustrating of books, &c.

During the last few years it has somehow or other fallen to my lot to have to undertake a large amount of this class of photography, ranging from the well-lighted drawing-room of the ducal palace to the poor but, from an historical point of view, equally interesting interior of a fifteenth-century dwelling, and but few of which are now remaining, as well as the dark crypts and corners of many of our cathedrals, in which the structure, both from an archæological and architectural point of view, could never be photographed with the aid of daylight.

It is not, however, in such subjects as dark interiors of the cathedral type that the greatest difficulty will be experienced, for more often the subjects which try a photographer's skill to the greatest extent will be found in many a modern dwelling, where from some cause or other he is called upon to take the view bang up against the window. One noted example of this kind I can well recall to mind as I write. It happened to be a fine dark oak saloon, lighted with three oriel windows having a south-east exposure. The windows were of most exquisitely stained glass, in which no one colour could be said to predominate over that of another. These end windows were the only source of lighting the room, the tone of which was dark and sombre, and the proprietor insisted upon having the view of the room executed so that these windows were included right in the centre of the picture. This meant working dead up against the light, and, with dark oak panelling and furnishings, meant a long exposure indeed; in fact, just one of those subjects that was practically impossible of execution by means of daylight from the standpoint required. Seeing the stained-glass windows were required to be clearly defined in all their details, as well as the oak carving, no plate of any description was capable of yielding such results, bearing in mind the protracted exposure for the back of the saloon, without being hopelessly clogged up from over-exposure of the high lights in the windows.

It is in subjects of this description that the great utility of combination lighting comes into play; in fact, without such, the view I have referred to never could have been taken satisfactorily.

Another instance of this kind may be mentioned in connexion with some of the views in the crypts of Glasgow Cathedral, where the exquisite carvings on the capitals of the pillars have backgrounds of clear and in some instances stained-glass windows, the pillars and windows both being required free from any halation for half-tone reproduction.

In the latter example a totally different treatment and course of procedure was required from the former, and consisted in executing the photograph by means of a combination of waning daylights, and the shutting off the lens completely until absolute darkness sets in, and then by means of a system of powerful paraffin lamps, so throwing the light upon the carvings as to beautifully throw the same ink relief of light and shade, free from any harsh or great depth of shadow.

The lamps used for this purpose were of what is termed the mitrailleuse form, specially made for photographic purposes a good many years ago, and before the advent of the flashlight; in fact, it was when experimenting with these same lamps that, in conjunction with Mr. Hugh Reid, of Glasgow, we discovered the flashlight, and which was first shown to the Glasgow and West of Scotland Photographic Association. The lamps I refer to, and which I regularly use for such subjects as may be termed inanimate, are of fully one hundred candle power, and they are easily disposed of in any position that may be desired upon such a stand as a pair of house steps. In such a subject as I am describing, with a fast plate and the lens stopped down to *f*·22, something like twenty minutes was required for exposure, but then what a fine gradation of high light and shadow they give. These negatives were all of 12 × 10 size, and have since been reproduced to illustrate a very high-class work, in which the architecture of Glasgow Cathedral is most minutely described; in fact, without the method of combination lighting employed, such illustrations never could have been provided.

In another instance where it was required to depict the tracery and bosses on the roof situated in close proximity to the great east window, the light from which quite throwing such portions of the roof immediately overhead into deep shadow, and thereby quite burying such architectural features from view, recourse had to be had to a very different mode of treatment, for in this instance the great height of the roof necessitated the standpoint of the camera being a considerable distance away, probably not less than 200 feet, and the difficulty was how to throw sufficient light up to the dark portions of the roof, so as to bring into view the bosses and other architectural features specially wanted for reproduction.

Neither the most powerful flash lamp nor paraffin lamps of any description were of any use in this case. So I had to have recourse to another method of lighting the particular portion of the roof. In this case a wonderful result was obtained by using a powerful mixing lime-light jet. I don't know its actual candle power, but it was pressed to its utmost capacity, and with the open base it possessed I should say was at least equal to fifteen-hundred candle power, the front lenses of the lamp were removed, and the condenser only employed to project the light. An exposure of twenty minutes yielded a very fine negative that has since been reproduced and given the utmost satisfaction, but in this case I believe I used all the stops, from the largest to the smallest, during the exposure of the plate, so that I cannot say at what aperture the lens was working; this continuous changing of the stops during very long exposures in some classes of interior working is of great value, especially where a large range of depth of shadow in a foreground has to be dealt with as well as a considerable amount of detail that is better lighted in the extreme distance.

In several instances I can recall to mind the assistance that flash lamps have yielded in conjunction with daylight. In the saloon previously referred to, had it not been for this method of lighting, I would have been powerless to get the picture at all. When I speak of flash-lamps I do not mean the foolish toys that are placed upon the market, and which burn only a few grains of powder. For really serious work, such as I am speaking of, these little toys are of no practical value.

In such places as crypts of cathedrals, bonded stores, and the like, where a large area has to be lighted up, this means serious business indeed, and such is never accomplished by burning a few grains of powder. I calculate the quantity more by ounces than grains when a really big thing has to be accomplished. Of course, there are smaller areas than I have stated, where a less quantity is sufficient, and so much light is not desirable; but, from the first moment that I, along with Mr. Reid, discovered the flashlight, I saw quite well that, if light was wanted, powder must be burned, and I think I have tried as many means as any one so as to get the best results. The first method that Mr. Reid and I tried was the wash bottle blowing the powder into a gas flame; and to a large extent I use the same wash bottle yet as was used in our first experiments. Only I have an attachment of my own devising that burns methylated spirits instead of gas. With this I can get up a light that astonishes all who see it; but, for large area work, I have another and many more powerful arrangement, consisting of as many little cups as I like into which any quantity of pure magnesium powder is placed. These are all at the same moment of time projected into twelve-inch cones of flame, and, seeing that sometimes as many as a dozen of these cones or flames are burning at the same instant of time, and into which probably as much as a quarter of an ounce of powder is thrown from each cup, it follows that it takes something like three ounces of powder to charge the lamp for one blaze; but then it is a blaze indeed, and should be seen to be properly understood. Some of my readers may wonder what sort of exposures a lamp of this kind will yield. Well, I like always to use as slow a plate as I can; but, even with this slow plate, it permits the lens being stopped down for some subjects to as much as f-22, and this is of the greatest value where any depth of working is required in interiors.

For many years I had a strong partiality for slow combustion powder, but I gradually got to dislike the poisonous fumes that such gave off. In my opinion, there is nothing to equal pure magnesium, and such should never be used in conjuction with any other material, such as sulphur or chlorate of potash. Any trouble I ever heard of with the flashlight was traceable to the use of the magnesium powder with other compounds. As yet, I have never had the slightest accident when using it, and this success I attribute solely to my firm determination never to use any powder that contains other than pure magnesium.

I know quite well, the idea is to have a very bright flash in the shortest possible space of time, so as to prevent any movement in portraiture, and, to effect this, even gunpowder has been used as a compound with magnesium; but I never yet could see the safety of such, and I understand this has led to disastrous consequences in one or two instances.

The great difficulty with some methods of burning magnesium lies in the smoke that is emitted. No doubt this is a serious matter in some situations, and, perhaps, there is no better way of dealing with the nuisance than by the adoption of confined receptacles, such as were used in the ignition of the slow-burning mixtures used in studios before the magnesium light came into use. These lamps had glass fronts, and, where no facilities were at hand for conducting the smoke outside the studios by means of funnels or bellows tubes the lamp was removed itself outside the studio after each exposure, the smoke being bottled up inside; by this means the room was kept tolerably clear of smoke.

In conjunction with daylight, there is no doubt artificial lighting, in its many forms, plays an important part, and brings within the pale of practical photography many subjects that otherwise it would be impossible to deal with.

T. N. Armstrong.

PAPER ENLARGEMENTS.

The man who essays enlarged negatives should not confine his efforts to glass, otherwise he misses some new and delightful experiences and effects.

Once over the initial stages there is something very pleasant about the making of enlarged paper negatives; the work simplifies itself into the mere exposure and development of "bromide" prints, a branch of the art known in some degree to the veriest tyro; the only detail of the manipulations likely in any way to embarrass the worker being the final process of waxing the negative.

One simple but sufficient reason why one should not altogether neglect this department of photography is the fact the dry plates of the larger sizes are not to be readily purchased in the average town, nor are they if purchasable, entirely free of suspicion as regards *age*, whereas bromide paper will usually be found in the shops in rolls and fresh enough for the purpose; the point is debatable, but I think on the whole, if it was a case of "Hobson's choice," I should prefer old paper to old plates.

Any arrangement in use for enlarging may be adopted. I much prefer the old, simple, and cheap method of enlarging by daylight in the old familiar way of a blocked window, with north light and with ground-glass screen and reflector for use, as they generally will be, if necessary. The apparatus may be simple and homely, almost any old bellows camera will do to carry the lens, but the latter must be one giving good definitions, provided with stops and of focus not greatly exceeding the length of plate to be enlarged; the mechanical contrivance for holding the paper must be in alignment with the optical arrangements; the operating room must be for a time a perfect dark room or rather as much like the inside of a big camera as we can imagine it to be; the transparency from which we design to make the negative should be of good colour, sharp, clear, clean, and not too dense; in as many words, the more perfect the picture from the technical point the better chances of a successful result.

Presuming now that we intend to make enlarged negatives, measuring 20×16, which is a popular size and proportion, the first thing to do is to provide at least three trays. Wooden trays, neatly made, varnished inside and out, and enamelled, are handy, light, and practically indestructible, if carefully used (I have had some in use for fifteen years). They are, moreover, cheap and easily made; they will not come to grief as do porcelain dishes at the first blow, and, unlike the glass-bottomed variety of tray, the most dismal invention of the past two decades, they won't "let everything through," if you, in the sepulchral darkness of the developing room, suddenly mistake the jug or bottle for the work table; a man who can pass through a calamity of this kind without profanity has qualifications which should lead him to the episcopal bench. However, the trays should be of ample size; it is a good plan to make 20×16 negatives on sheets measuring the full size of 23×17, trimming down after they are finished and waxed. The trays, being perfectly flat, do not lead to *waste* in the matter of developing solutions.

Some preliminary trials will be advisable with regard not only to exposure and development, but waxing. We may make these trials on the small scale, using the transparency, and making prints *by contact*; carrying the process through from beginning to end in this way, we shall be better equipped for work when we come to the more serious business of handling the large pieces of paper; exposures must be ample, and, allowing extra for the enlargement, should develop up as clearly and easily as in the smaller contact print. Especially is this experience useful when we are gauging the density of our negative print; this density should be quite two degrees more than in the case of a positive print; we must not only allow for the weakening effect of the "hypo" bath but, after waxing, when you have rendered the paper transparent, there is the possibility of flatness in the resultant prints if the negative is not of normal density.

In the matter of development, or rather as to choice of developer, we may use hydroquinone, amidol, or a metol-hydroquinone solution; the developer should be used at first under strength, that is to say, *diluted*, building up the picture by the addition of stronger solutions, if necessary. It is, of course, very difficult to add to what has already been said many times upon the same point; as a fact, I may say that any standard hydroquinone or amidol developer will do for our purpose if moderately restrained or otherwise diluted; fixing, washing, and drying follow in the usual way. In all cases I find the better technical result by using a piece of paper a size larger than actually wanted; this allows for neat trimming up after waxing the negative.

A fourth dish or tray, this time of stout zinc, is used for the waxing process. A tray can be very readily made out of sheet zinc by measuring out the space required, bending down (using one side and end of a table as a guide) the sides and ends, squaring up the corners with a block of wood and mallet, afterwards soldering them if thought necessary; a tray can be extemporised in this way in less than ten minutes, and quite good enough for the purpose.

Now for waxing. In order to do this satisfactorily and with the least trouble and mess, make use of the domestic kitchen; there should be a good fire on the way, and no one about to interfere. Spread out in front of the stove two or three newspapers (they are not really necessary, but they serve to silence any feminine scruples), put the zinc tray in a warm place, and then melt in a pipkin, over boiling water, about a pound of clean paraffin wax—a cheap article, and one which can be used over again. Let the enlargements be perfectly dry. Now, in front of the fire place the print in the tray, pour over it the melted wax, and see that it is thoroughly saturated with the wax; of course, the tray must be hot enough to keep the wax liquid for a few minutes at least. This done, remove the print by two corners, lifting it out in front of the fire so that superfluous wax will drain off. As the print is gradually drained and withdrawn from the heat the wax sets, and, by the time we have removed the enlargement to an adjacent table, is dry and finished, except for any trimming required. This all sounds rather like a greasy and messy business, but is not so at all.

It is quite possible to wax a dozen negatives in this way in less than half an hour, and without making any mess whatever. The room should be fairly warm, though, and the fire hot. The novice will possibly find it necessary to *even* his waxed negatives; he is apt to get too much wax on. This can be once more drained off in front of the fire, and then finish them between folds of blotting-paper under a hot iron.

It is impossible to make, by any mere arrangement of words, the waxing of paper negatives at all attractive, the mere word is suggestive of mess and discomfort; this is unfortunate, for many are deterred by reason of it from attempting an easy and satisfactory process of enlarging. If nicely made, paper negatives are as satisfactory in the workroom as glass, possibly more so, and are certainly as lasting, while for lightness and convenience of storage they are infinitely better.

J. P. Nott.

IMPORTANT COPYRIGHT DECISION.

On Friday, July 29, in the High Court of Justice, Queen's Bench Division, before Mr. Justice Mathew (without a jury), an action brought by Mr. Gambier Bolton (supported by the Photographic Copyright Union) against the London Exhibitions, Ltd., and Wiener's, Ltd., for an infringement of his copyright in one of his well-known lion studies was heard, and after a hearing of nearly three hours was decided in his favour.

Mr. Crump, Q.C., and Mr. G. W. Ricketts (instructed by Messrs. Neish, Howell, & Macfarlane, solicitors to the Union) appeared for the plaintiff, whilst Mr. T. E. Scrutton, supported by two other juniors, appeared for the defendants.

Mr. Scrutton is well known as an expert on copyright law, and until the present proceedings has hitherto always appeared for the Union in their actions against infringers.

It was proved by the evidence that the defendants, the London Exhibitions, Ltd., had instructed their co-defendants, Weiners, Ltd., to prepare a large bill or poster for the purpose of advertising their Exhibition now being held at Earl's Court, and, out of a number of designs submitted to them, selected one by a Mr. J. W. E. Page, who described himself as an artist of repute and a medallist; and in a prominent position in this original sketch appeared a large animal which he described as a lion, but which the plaintiff, as as authority on natural history, described as a "sick rhinoceros with a human face." The design was accepted by the London Exhibitions, Ltd., on the condition that this extraordinary hybrid animal should be properly drawn in, and should appear as a genuine lion in the poster, when finished. Mr. Page forwarded with his original sketch (unaltered) to Weiners, Ltd., who are lithographers and makers of coloured posters, a copy of the publication produced last year by George Newnes, Ltd., and known as "All about Animals," in which appeared the lion study by Mr. Gambier Bolton, known as No. 304, and bearing plainly in its right-hand corner the word "Copyright."

In spite of this, however, as plaintiff alleged, the photograph was enlarged and *traced* from, every line, curve, and position of each hair being identical in the photograph and the poster; and considerable amusement was caused when the huge bill, measuring about thirteen feet by ten, was suspended by the defendants' counsel's orders—a most fatal one, as it eventually proved—from the gallery of the court and facing the Judge, whilst the plaintiff, not to be outdone, promptly filled the jury box, close to the Judge, with some framed specimens of his 44 × 34 inch enlargements of wild animals, including that of the lion, No. 304.

It was at once plainly seen that the figures were identical, and in spite of the fact that Mr. Page swore again and again that the lion in the poster was produced direct from his hybrid in his original sketch, and not from plaintiff's photograph in any way, directly the original negative of No. 304 was handed to the Judge, with a negative, made to scale, of the lion in the poster, and these were superimposed the one above the other, the case was practically over, as both fitted so closely that, as was said at the time, "there was not a hundredth of an inch difference between them," excepting the curve of the tip of the tail, which had been altered.

Mr. Scrutton, after a cross examination of the plaintiff, called four witnesses for the defence (including the artist), and then quoted case after case from the authorities, in the attempt to prove that plaintiff had no claim whatever against defendants, and, after a short reply from Mr. Crump, Q.C., the verdict was given for the plaintiff by Mr. Justice Mathew in the following words: "I am clearly of opinion that in this case there has been a reproduction of this work of art of the plaintiff's in the first poster that was published. The photograph of the lion is a remarkable work of art of that description; anybody who saw it would always remember it. It is impressive enough to produce that result, just as any one who sees Landseer's lions in Trafalgar-square would readily recognise any drawing of those lions afterwards.

"This, as the plaintiff explained, cost some trouble, and involved him in considerable delay to catch the right attitude and position. It is a very striking work as I see it before me now. He has been using that and other photographs for the purpose, as he has explained, of those who take an interest in animals and natural history, and he has had the exclusive sale of this and other photographs of animals that I dare say were equally successful. It is some time since this photograph was originally produced, and, no doubt, the observation may be made that the public had got tired of the picture in question, and had begun to be indifferent to the photographs that he was still selling; but the public taste in such matters may revive, and I really have to say what it would have been fair that the plaintiff should have asked from the Exhibitions Company if they had come to him to be permitted to reproduce his lion in the way they have done, because it is extremely unlikely that at any time hereafter the portrait will have the vitality which it had previously possessed. It has become public property, advertised most extensively in London, and, to use the expression that has been used in the course of the case "vulgarised as a work of art."

"Well, he is entitled to penalties, the penalties go to him, and I have to say what the penalties ought to be, and I award him, in respect of this reproduction, the sum of fifty pounds.

"Now, an attempt was made, in the first instance, on the instructions given to Mr. Scrutton, to make out that there was no copying at all. I was told of the artist who drew the original design, and was informed that he would be called, and that it would appear that the lithograph was from his original sketch. I confess that I was highly startled, with the materials that were then before me, at the hardihood of that statement. The artist was called, and when the sketch was produced it appeared that there was nothing that could possibly be used for the purpose of a poster in that part of the sketch which related to the animal in question; but it was indistinct and hazy, and it was clearly intended that the lion should be found by somebody else, and should be subsequently inserted.

"I had the lithographer called before me, and he said, with perfect propriety and candour, that he had copied Mr. Bolton's lion. He appeared to have got at that, in the first instance, from seeing Newnes' book. He did not conceal for a moment that the details had been supplied from Mr. Bolton's lion. His instructions were not to copy it, but to use it for the purpose of reproduction—"for the purpose of detail" was the expression. No doubt he understood that he *was* intended to copy it, and he copied it with very great accuracy, it does very great credit to his skill as a copyist; no one who looked at the one and looked at the other could doubt that the poster was a reproduction of the original photograph, and, that being the position of things, it appears to me that fifty pounds ought to be the amount of the penalties to which the plaintiff is entitled.

"There only remains the question of whether both the defendant companies are responsible for that. I have come to the conclusion that I ought not to say that the London Exhibitions Company ever authorised this reproduction, but they were unfortunate enough not to have taken the precaution that they ought to have taken, that the lithographer whose labour they employed did not violate this Act of Parliament. Although I therefore give judgment for them, they shall have judgment without costs. The judgment against the Messrs. Weiner will be judgment for fifty pounds and costs.

"I do not think it necessary to grant either the injunction which is asked for or the account which is asked for, but I give liberty to apply in case there should be any attempt to reproduce the original poster or any other copy of the photograph."

With regard to one or two points in this judgment, it was proved by evidence that "the first poster," as described by the Judge, the one containing the *tracing* of the lion photograph, was covered over by the orders of the London Exhibitions, Ltd., very shortly after the receipt of the letter from the Union's solicitors, and the artist, Mr. Page, admitted drawing the lion for the second poster, now on the London hoardings, which was pasted over the first; this new lion was constantly referred to all through the case as "the caricature lion," and Mr. Scrutton was considerably taken aback when, after asking plaintiff why it was persistently called by this title, Mr. Gambier Bolton described it as "an impossible lion in an utterly impossible position," that it was suffering from kidney disease in an aggravated form, having a large hole in the lower part of its back, immediately over those useful organs, which no lion in a normal condition of health ever showed; that the position of the front paws was a physical impossibility to any member of the cat tribe, whilst the face was that of a bad-tempered human being suffering from a dyspeptic attack, and that, as an admitted example of Mr. Page's *original* work, nothing could have been produced in court more likely to assist his (plaintiff's) case.

The artist, Mr. Page, was flatly contradicted by his witness Mr. Hager, the lithographer who was supposed to support his evidence, for, whilst the former swore that the lion in the first poster was drawn straight from his original sketch on to the stone, the latter freely admitted the copying of Mr. Bolton's photograph, which he stated *was forwarded to him by Mr. Page*, with the original sketch, Mr. Hager being described by the Judge as a skilled copyist.

The point of the liability of the defendants, the London Exhibitions, Ltd., was felt to be one that should not be unduly pressed against them, as it was clear that they had not authorised the use of the photograph in their written instructions to their co-defendants, but the Judge marked his feeling of the carelessness of their conduct, in not having taken the precaution of finding out from where the artist had got the lion in the finished poster, instead of the hybrid animal to which they had so strongly objected, by ordering them to pay their costs; whilst the other defendants not only have to pay the penalties to the plaintiff, but have to pay all his costs as well as their own, and possibly those of their co-defendants in addition, should they decide to bring an action against them for this purpose, as they reserved the right to do, if necessary, and they lose, too, the sum of forty pounds which they admit having already spent, in altering the lion on the original poster, on instructions received from the London Exhibitions, Ltd.

The point as to the injunction and account of all posters used was not pressed on behalf of the plaintiff, as it was felt to be unnecessary so long after the first poster had been covered over.

Mr. Scrutton drew some amusing and totally unlooked for replies from Mr. Gambier Bolton during the cross-examination, which provoked loud laughter, and in which even the Court joined. Counsel, starting with the remark that this particular study, No. 304, did not appear in the list issued annually by the plaintiff, was condoled with

over his apparent loss of sight of recent years, as the photograph was seventh on the list which he held in his hand. Again, when the artist's original sketch was handed up to him, with a request that he would take particular notice of the squares drawn on it in pencil, which are used by lithographers in reproducing and enlarging a sketch on to stone. plaintiff replied that he could with difficulty see certain squares on the sketch, but not over the lion portion of it. But, even granting that they were there, any person could draw them, and that counsel should know that this could not be taken as evidence of the publication of the hybrid creature in the sketch, which, as a matter of sober fact, he knew had never been used for that purpose at all; which proved to be the case a little later on. Some further amusement took place when plaintiff complained to the Judge that some of the first posters, bearing his *traced* lion photograph, had not been covered over, a month after the receipt of his letter by defendant's solicitors, for, on counsel pressing him as to why he had not informed defendants exactly how many and where the unaltered posters complained of could be seen, he subsided amidst great laughter at the reply that he (plaintiff) had other and better things to do than to hunt over London and the suburbs for posters, which the defendants were unable to find for themselves.

Mr. Gambier Bolton writes: "Once more piratically inclined artists and their employers have been taught a sharp lesson, for in addition to the penalties awarded to me . . . . the question of damages having been dropped in this case . . . . they have to pay the whole of the costs, and, as these are extremely heavy, it is not improbable that we shall be called upon to witness the edifying spectacle of the employers fighting out this point in the law courts.

The case is interesting and instructive from another point of view, and might go down to posterity as an altogether unprecedented case, for I believe it to be the first occasion on which we have been able to get the "tracing artist" to enter the witness-box. It is strange too that this desirable result should have been directly brought about at the instance of the counsel, so often employed in the past by the Union in the prosecution of offenders of this class, but who on this occasion forsook the Union and who has expressed the opinion that "an endeavour should be made, where possible, to put the artist on oath," and so evidently to lead to the result so greatly desired by all who have suffered at piratically inclined individuals' hands.

It would ill become me to close this case without a reference to the great assistance I have received from the Photographic Copyright Union, and especially from their solicitors, who have carried everything through with such success; and I would again appeal to all who are interested in our art-science, whether as commercial or amateur photographers, to send in their names to our Secretary, at the Photographic Section of the London Chamber of Commerce, Botolph House, Eastcheap, London, E.C., without delay (a subscription or fee being entirely *optional*), and thus to strengthen our hands in the fight against those who would steal the result of our labours, and attempt to pass off our original work as their own."

THE FORMATION OF PRINTS BY METALLIC CONTACT.

Researches abound and multiply on the subject of latent images, and their formation. Some experiences are here formulated in contravention to those laid down by Mr. Friese-Greene in his lecture at the Croydon Camera Club, published in the June Supplement of the Journal under the title of "Electric Prints with Photographic Reagents." They may also have some bearing upon the researches of other workers.

It will be presently shewn as a self-evident fact that the impression of a visible image by contact between metal and prepared paper holding a metallic salt is due to chemical action, and to this force alone, notwithstanding the electric current which was brought to bear upon it in the demonstration.

Then, if this visible image can be thus obtained, it is but natural to infer that the electricity used by Mr. Greene in the formation of his ethereal molecular latent images was probably superfluous, and the generation due likewise to chemical action alone.

Starting upon this hypothesis, it was first necessary to ascertain what substances were likely to be present in his examples which might enter into the building up of a latent deposit.

In water itself, amongst other chemicals, are found carbonates, sulphates, chlorides, silica, and alumina. In paper, strange coincidence, carbonates, sulphates, chlorides, silica, and alumina are likewise there. Of course, in neither case are they all present together. These given are used amongst others in the manufacture of paper, but acids and bases are generated in the material itself, by reactions, the result of storage, by products of the combustion of gas and other sources. Then, further, water contains traces of metals and foreign matter, besides that mentioned, whilst extraneous gases from the atmosphere are amongst its impurities, the influence of which might take a share in promoting chemical action.

With the knowledge, however, that the substances first stated were likely to be present in some form or other, the experiments were accordingly based and are here given.

Example I.—Take a piece of ordinary paper (in these trials a common writing paper), damp it with plain water. With a silver point write upon the moist paper. (In this experiment a silver toothpick was used.) The paper is then immersed in, or brushed over with, a ten per cent. bath of iron sulphate. The exact strength is immaterial. A slight image appears, which can be intensified by dropping upon it some of a ten per cent. solution of silver nitrate. Result: the concealed writing is made visible; in other words, a coloured deposit is formed of the latent one.

Example II.—A soda accelerator, used in developing and consisting of soda carbonate and soda sulphite, is to be found in the dark room. Take a few drops and further dilute it with water. Immerse a piece of paper into this, then write upon it with a metal stylus. It may be either of iron, copper, silver, zinc, or lead (in this instance it was a round-pointed iron hairpin, with the japan rubbed off). The paper is put through the same reactions as in the previous test. Result: a print as before, but darker.

Example III.—A platinotype acid clearing bath of hydrochloric acid and water was next tried for damping the paper. A piece of lead foil rolled round a pointed bit of wood was the stylus. When developed, the result was a good print.

Example IV.—Fuller's earth had been obtained for absorbing a grease mark made upon the mount of an enlargement. Here we had a porous silicate of alumina. Some of this was agitated with water, and, without allowing the sediment to quite settle, paper was immersed into it. After proceeding as before, the result gave a strong grey-black print. In this case a piece of copper bell-wire was used to write with.

The methods were then varied, other samples of paper tried, and in some cases the mode of developing was reversed, the silver being applied before the iron. In all trials a visible image was brought out. Other substances could have been used in the experiments, but these were thought sufficient to show that images can be formed by simply writing with a metal point upon paper under certain conditions without the aid of the electric current. This seemed satisfactory.

As in the previous trials, a certain amount of friction would have to be used, which, in some cases, especially with lead, might have left a minute portion of metal upon the paper, and, if such was the case, would allow for the action of the developer. Endeavours were, therefore, made to obtain prints from metal by simple contact without friction upon paper under similar conditions of damping, the metals brought into use being lead or type metal, zinc and copper, as these are the metals in use for mechanical printing.

Examples V. to VII.—Type metal not being handy, the leaden capsule from a pyro bottle was taken. Paper prepared with chemicals, as in the previous second, third, and fourth examples, was brought consecutively into contact with the metal, pressure being obtained by rolling them down with a rubber roller used in the mounting of photographic prints.

Examples VIII. to X.—In these experiments a piece of finely perforated zinc left over from some used as a partial cover to a ventilator in the dark room was brought into requisition after having been rubbed clean with glass paper, similar damping baths being used as with the lead relief, the mode of obtaining pressure being varied. The paper and metal was placed between the leaves of a book, and contact obtained by a copying press.

Examples XI. to XIII.—For the copper examples a bronze coin was used, the paper being pressed down on the coin with the fingers, the procedure in all else being the same as before. In every trial an image discriminating the points of contact was obtained. In some cases, if the print did not come up in the iron bath, it had the silver solution applied, and in other cases it was changed again to the iron bath, stronger images being thus obtained. It was noticed, however, that the bath deteriorated in its working by so mixing the chemicals. The paper was therefore slightly washed between the operations. In some instances stronger images resulted by longer contact; at other times weak parts came up in consequence of not having had even contact all over. Paper damped with water alone (as in No. 1 example) was tried, but did not bring up satisfactory images in all cases, presumably because the samples of paper did not contain the chemicals requisite to help the reaction. Pyro, and iron, and bichromate, and silver, as developers, were tried, with satisfactory results.

Upon coming to that part of the subject where impressions are made upon prepared paper, one gets to a familiar part of the matter. It has been experimented upon under many conditions for some considerable time by the writer and his colleague, Mr. J. W. Cooper. Here a developer is not required; simple chemical contact instantly brings out an image brilliant and sharp as any copper-plate print.

Example XIV.—Prepare paper by damping it with a weak solution of lead nitrate, say, fifteen grains to the ounce, and bring this into contact with the zinc or copper photo-mechanical block. A type-metal or lead block, unless it be an electro, is not available in this experiment, for obvious reasons. The result will be a strong jet-black print, which does not require fixing, as the lead salt on the paper not decomposed is unaffected by light to any marked degree, but the atmosphere will cause it to fade after some time. Copper salts will also make a print, but the image itself decomposes rapidly. Other salts lend themselves to this process, but the best results can be got from silver nitrate. Prints can be made upon paper prepared or damped with this salt from type metal,

zinc, copper, lead, iron, and other metallic substances of a strong colour varying from red to blue-black according to the metal used and other conditions, simple contact only being required. The unacted-upon salt is fixed out with soda hyposulphite to make prints permanent to any ordinary circumstances. They, being composed of metallic silver, are amendable to reactions under a great variety of conditions.

A piece of well-damped P.O.P., brought into contact with a metal relief will demonstrate the possibilities of this process.

For a full description of the method see pages 620 and 621 of the JOURNAL for 1897.

Before leaving this part of the subject, I should like to point out that bromide of silver plates, or paper damped with a weak solution of ammoniated water, give good images by simple contact with copper blocks or bronze coins without requiring any developing. Some other of the metals are available under special conditions, but prints can be got from most metals by simple contact with the bromide of silver salt whilst humid, the latent image formed being then developed, as in the case of light-struck pictures. They do not offer any advantage over printing-out images by metallic contact. It is interesting, however, more especially as Mr. Greene grounds his recent demonstration upon the lecture given by him at the Bath Photographic Club in 1888, and published on page 715 of the JOURNAL for that year. By the preceding means the impression of the coin upon the bromide plate could have been obtained by him without the aid of the electric current.

Practical results herein demonstrated likewise prove the superfluity of the electric current where a suitably prepared metallic paper is used to form direct prints by contact with metal without development.

Further, it is positively shown that prints are obtainable by simple contact under certain conditions, whereby a latent deposit is formed developable into visible matter. Therefore in this case also electricity is so far a superfluity.

It will not be absolutely asserted that electricity cannot aid the formation of this latent print, but I maintain that it can be obtained without bringing the electric current to bear upon it at all. In coming to conclusions the theorist very often ignores forces which are likely to be coefficient or coequal. So, moreover, one force may be mistaken for another, if not carefully examined. Of course, for the purposes of argument or other reasons, it may be convenient to assume conclusions. They may be correct, but are liable to be erroneous. I have endeavoured to show, by experimental or observed facts, that the conclusons arrived at by Mr. Greene are at fault.

HENRY SOAR.

TURKISH DELIGHT.

THE delight of the Turk seems to me to be that of putting as many obstructions and inconveniences as possible in the path of a photographer. It may be therefore that a few of my experiences with them during the last four months will be of some service to those who intend to visit the land over which waves the Turkish flag—if, indeed, they have the courage to do so after reading this article.

Had I been a confirmed hand-camera worker ,my path would undoubtedly have been smoother, but to do anything like passable work in the covered bazaars and narrow, vaulted streets, it is absolutely necessary to use a stand camera, which type, of course, attracts the eagle eye of those in authority quicker than a so-called detective would do; hence, perhaps, ninety per cent. of my troubles. For general street work a hand camera is certainly very useful, but one has to be extremely careful if minarets are included in the view or distortion will be evident, as they tower up very conspicuously above the low, narrow streets.

After leaving Egypt—where, by the way, I found work fairly easy—I went to Jaffa, and it was there I began to realise that I had entered the land of the Sultan. Many tourist agents boarded the steamer; but, as I had an introduction to Gaze's manager, I placed myself in his hands. He was an exceptionally sharp and clever fellow, and got my apparatus through the customs with the exception of a small box containing thirty empty dark slides. I had been warned in Cairo not to fill them, as they would probably be opened at the custom-house, and such proved correct. I was sent for to the office, where I found three officials playing at opening and shutting the slides, and, after explaining that they were "used up," *i.e.*, empty, &c., and, furthermore, did not intend to use them in this country, but was going back to England as soon as possible, and many other pretty little stories, I was allowed to go. A few tourists on board who had cameras, refused to put themselves into an agent's hands, as they thought it better and cheaper to go ashore "on their own." These people had great trouble in the custom-house, many cameras being opened and heavy "backsheish" necessary to get them through, such a policy is more expensive and troublesome than joining agents; the latter pay the authorities a fixed price per head passed through by them, and in nine cases out of ten nothing is opened, but the agent's word taken as Gospel. I have no hesitation, after passing through four Turkish custom-house, in recommending all photographers to join one of the large contractors as the fee paid him will be less than that demanded in what many truthfully call the "robbers' den."

While at Jaffa I had sent me a gross of dry plates. They were addressed to a certain hotel in the town, but upon inquiry I found the customs authorities would not let them pass until I made a personal application. I went alone on the first visit, but I soon found that it would take me about six months, and as many pounds, to get them through. I then asked Gaze's man to go with me. He went, and this is a rough outline of what happened. The man in the customs office refused to see about them until he had "backsheish," which, in due time, he got; we then found he would not leave his office, but called another man to go with us to the goods shed; this good man also refused to do his work unless backsheish was forthcoming. The examiner, the man who signed the receipt, the porters who carried them, the gate-keeper, and numerous other minor officers all wanted backsheish—some got it, others did not; any way, that visit to the custom-house cost me three hours and (with duty) considerably over two pounds. I forget exactly what the duty was, but I was told that instead of paying it I could leave plates to the value; a hasty mental calculation, however, told me to pay the money, more especially as they had by some accident slightly undervalued the plates. How they managed to make such a small mistake I cannot imagine, as I saw over the clerk's desk a complete list of dry plates, their sizes and prices.

Work in Jaffa is easy. I met with but one trouble, and that while attempting to photograph a group of wives wailing over the grave of their lost husband. I asked my dragoman to look at, talk about, and point to a certain tree a few feet beyond the widows; this he did very nicely while I was focussing, but, before I could make an exposure, I had around me a howling crowd of about thirty natives who must have seen through my little game; whether or not, I am bound to confess I left that cemetery very much quicker than I entered it.

Ramleh and Lydda were the next places I visited, and all went well with the exception of a few young Muslims objecting to me photographing the tomb of St. George at the latter place; but, while my dragoman was arguing the point with them, I was making my exposures, and in the end we parted friendly, because they, no doubt, thought I was packing up at their wish.

In Jerusalem one generally reckons on doing the most work, and it was in this grand old city that I made over 500 exposures in a little over two months. Compared with my after-experiences, Jerusalem is certainly an easy place to work in as long as one keeps to the general street work: it is when the holy places and interiors are attempted that trouble begins. I had special introductions to two consuls in Jerusalem, and their advice to me, when looked at side by side, certainly seems very curious. I prefer not to name the gentlemen, but give the incident, and it should prove an interesting puzzle to allot the replies to two different nationalities. One said to me, "Do not do anything rashly, but come if possible and ask my opinion about each place, you cannot be too careful while in this country." The other said "Go where you like, do what you like, and if you get into trouble send for me." I did not trouble either of them very much, two visits each was all I paid them.

There are many places that claim to be the paradise of photographers, but in my humble opinion nothing can better the Mosque of Omar at Jerusalem. All intending visitors to this building, whether photographers or not, must apply to the Consul, who, at the appointed time, sends his kavass to accompany the visitor. The kavars on his way to the mosque calls at the barracks for a military officer, and between these two officials one is permitted to inspect the mosque and its treasures, no photography is allowed therein according to the law, but by aid of a little backsheish the two officials can be made to shut their eyes to a hand camera, and all is well. A stand camera is, of course, more noticeable, and therefore not allowed without a special permit from the Pasha, and which he has never been known to grant. I knew for a fact stand cameras had been used in the grounds, and I intended to do my level best, accompanied by a reasonable amount of coin. I told the Consul this, and as he probably saw a determined look in my face, he promised to talk the matter over with his Moslim kavass, and do his very best for me. At 6.30 the next morning I was awakened by one of the hotel servants, who said the kavars wanted to see me at once. "Come now," he said, on seeing me a few moments later (he spoke little English), "come now and photograph pictures, come now with me to mosque." I thought it a chance not to be missed, although my breakfast was — and off we went.

On our way there I asked what the amount of the bribe was to be, as I preferred paying a lump sum to one man, and let him settle with those in charge of the various departments; such a method I find better than tipping each one—very often the wrong one—separately. The sum finally agreed upon was 25*s.*, and the fellow deserves the highest possible praise for the manner in which he carried out his contract; he managed things so well that I worked unmolested until 11.55 a.m., when he said it would be best to go, before trouble began. I thought so too, especially as I had made fifty-two exposures. Many who knew what I had done said that I hold the record, as I was longer in the place than any other "unbeliever" had been. During the morning I paid a man 5*s.* to fetch more plates, which brought the total up to 30*s.*

The Church of the Holy Sepulchre is the next place of importance to photographers, and certainly the most difficult. The consuls have nothing whatever to do with this building; it is therefore unnecessary to seek their aid. The exterior can only be successfully taken from the roof of the Greek convent opposite. Sixpence to the doorkeeper, and

6*d.* to the monk who gets the ladder, makes the business very simple. We, of course, have Christians here to deal with, and they, all the way through Palestine, are better disposed to photographers than the followers of Mohammed. Although Christians occupy the church, the doorkeepers are Moslims, and this is where the trouble begins. Almost everything inside the church requires magnesium, and it is for this reason many photographers do not bother about it. Whilst, however, I was taking my first walk round the place (without a camera), I noticed one enthusiastic amateur place his pocket Kodak on the steps of the Chapel of St. Helena, and gave an exposure of one minute. I gave two hours, and even then under-exposure was the result.

Five or six Moslims generally sit in a recess against the door, and it was to these I applied for particulars of permits. They told me the priests never allowed a camera inside, and my only way was to make it worth their (the doorkeepers') while to let me in during the hours the church was closed, *i.e.*, 10.30 a.m. to 3 p.m. I paid two visits to the place during closing time, and used magnesium until the whole building was so full of smoke that clear pictures were no longer possible. I got off with a fine of 10*s.* for the two visits, and that I consider fairly cheap. Two dozen exposures were the result.

The usual tips to the keepers of the many Christian churches will pass in the camera, but a charge of two francs is made for photographing the Garden Tomb of Christ (so called).

The "place of ascension," on the Mount of Olives, belongs to the Muslim, and, after many attempts to gain admittance, I gave up in despair. At the Tomb of David five pounds was demanded by the Muslim keeper, which, needless to say, he didn't get. After my visit I sent many people to inquire, and the reply was always the same. The interior *has* been photographed, and very good prints may be obtained for fivepence. I bought one.

I was stoned whilst photographing the Jews' Wailing Place, and also at the Ninth Station of the Cross; at the latter place I was badly injured by a very large stone being dropped from a roof.

At Bethlehem all went well. The usual backsheish enabled me to photograph anything. The soldier who kept guard over the manger was so pleased with my flash lamp that he refused (!) to take anything, he said he had never spent such a pleasant time before, and asked me to go again.

No one, whether a photographer or not, is allowed to go down to Jericho, the Jordan, or the Dead Sea, without a guard, and whilst with him I had no difficulty whatever. It was when I lost him in Jericho that the natives were troublesome, and objected to me photographing their dirty mud huts. Bethany is on the Jericho road, and here small backsheish only is necessary to photograph the home of Martha and Mary, and the Tomb of Lazarus.

Hebron is said to be the roughest town in the country, and, after many visits, I should recommend no one to venture far without picking up with a soldier. The poor fellows are only too anxious to walk with visitors and to earn sixpence. I walked between two soldiers all one morning for one shilling, and I could never make up my mind whether I looked like the Prince of Wales or an army deserter. On my first visit I could not find a soldier for some considerable time, and I commenced working alone. I had round me, in a few moments, a crowd of natives, who howled and danced like savages, and when I set up my camera to focus the mosque, some one, whilst my head was under the focussing cloth, hit the camera with a stick and knocked it down. I was told afterwards that my head was aimed at, but, being covered up, they probably didn't know exactly where it was. In the midst of the bother two soldiers appeared and cleared away some of the mob, and afterwards kept with me until I was in my carriage and safely on my way back to Jerusalem. On my next visits I engaged the soldiers before starting work, and all went well.

Before leaving Jerusalem for the purpose of taking a journey through the interior of the country it is necessary to apply to the authorities for a local passport, called a "tezkereh." A form is given, on which are printed fourteen questions, one of which is "occupation." Here a difficulty arose, for, on this trip, I acted as correspondent for two London newspapers, and it was a question of which was likely to be the best treated—a journalist or a photographer? As my photographic troubles had been great, I sought refuge under the cloak of "our special correspondent;" but, alas! what a blunder I made. Before sending in the paper I happened to meet one of our best English authorities on Palestine, and, at his suggestion, I filled in "artist," "because," said he, "artists are really considered very harmless people." Now that I am leaving the country I beg to differ, and, on the next visit, I intend finding a new occupation altogether.

After leaving Jerusalem I photographed in all the villages without hearing any objection until I arrived at Nablous. Entering the town in the evening, I happened to meet the English missionary, who I had been introduced to a few weeks previously in Jerusalem. He told me that only the day before an eminent American photographer had been stopped work in the midst of posing a group of children belonging to the mission school, and ordered to leave the town at once, as no photography was allowed. His visit with the missionary to the authorities was of no use, and he was obliged to go. This was not good news. The missionary cheerfully suggested that I should get up early in the morning, and get what views I wanted before any one of importance got about and stopped me, and also to clear off as soon as I had finished, and not hang about in the hope of getting more. After my tent had been pitched some few minutes an officer visited me, wanted to see tezkereh, and to know all my business, &c.; but I carefully kept from him the true facts. My dragoman had carefully covered up the boxes containing the dangerous (*sic*) materials, but I, nevertheless, anxiously watched his eagle eye sweeping over the contents of the tent. After getting his backsheish (which is always looked for after troubling you), and we a few of his cigarettes, we parted, I thought, on very good terms. He must, however, have had suspicions, for shortly after his departure a man in a "butcher's-blue" suit, red fez, and a large sword came to say he had orders to watch the tent. We, of course, said we were very pleased to see him, and made a big fuss over him.

Early next morning I peeped through the door of the tent and found my soldier friend fast asleep; probably it was his snoring that awakened me. I gave my dragoman orders to pack the tent, &c., and to pick me up on the road, as I intending going before the caravan for the purpose of photographing a few things on the road. I left the tent by the back way, as I thought it a pity to wake the soldier by leaving the proper way, and went at once for the views I required, the caravan picking me up a few hours later on the road to Jenin. That is how my negatives of Nablous were obtained.

At Jenin other soldiers visited me for the purpose of examining papers, but they objected not in any way to the cameras they saw in the tent, or to me using one the next day in town.

Leaving Jenin, I worked quite comfortably in the smaller villages—Jezreel, Shunem, Nain, Endor, Tabor, &c., until I reached Tiberias, where I was turned out of the castle grounds, fortunately after making all necessary exposures. Work round the shores of the Sea of Galilee went well, as did that during my journey to Nazareth. At Nazareth I found my tent pitched beside that of the American photographer spoken of previously, and many pleasant hours we spent together, talking over our troubles in a foreign land, and of matters connected with the photographic art both in England and America. Had we not met, I should have had a terrible tale to tell of Nazareth, but my path was smoothed by his useful tips, and refusal was met with at but two places, Joseph's Workshop, and the Table of Christ, both of which, however, my friend obtained a few days before. The reply I got was to the effect that they had already been photographed too many times. A large backsheish was offered, but the priest was firm. I would like to give my friend's terrible experiences, but for the present I will keep to my own.

The journey to Haifa and Acre passed off very well. I noticed, however, at the latter town I was followed all the time by a soldier, but he said nothing, probably because I was careful to keep away from the fortifications. I have every reason to believe the authorities kept a strict watch on my movements, for, on entering Tyre the next evening I was met by two soldiers, who warned me not to unpack my apparatus, as they had orders from their chief to smash all cameras, and, as a proof of this, one of them opened his pocket-book and gave me the name and address of a well-known English photographer whose camera they seized a month previously. If they had not received news from Acre, how should they know my business? To my great surprise, no soldiers were stationed outside my tent that night, but whether or not they were lurking round some corner I cannot say. I paid a visit to the chief, who received me very kindly and said he had given orders and there was an end of it. That is all I could get out of him, and he gracefully retired. Tyre has one of the most picturesque harbours I have ever seen, and I deeply regretted that I could not use a camera. As soon as I was outside the city walls I heard a gun fired; I asked some natives the meaning of it, but the reply was that they did not know, as it was very unusual. I have my own private opinions about that salute, but I am really too modest to write them.

When going to Sidon I rode on ahead of my caravan and entered the town some hours before. I then set to work at once and made all the exposures I required. I thought perhaps the caravan would be again stopped, but fortunately I was mistaken, as no officials appeared during the two days I was there.

Beyrout was the next stoppage, and here I worked in peace and comfort, probably because the British fleet laid at anchor in the bay. The sailors spent an enormous amount of money in the town and the natives were generally in good temper.

No trouble was met with in the Lebanon, at the Cedars, Baalbeck, or in the villages *en route*.

Damascus was my last place of call, and, to me, certainly the most interesting, and the finest field of work for the camera. To work almost as one pleased in such a grand old Oriental city was a silver lining to the dark cloud that had hitherto overshadowed my tour.

The places I least expected to visit I had a hearty welcome (when, of course, the backsheish was forthcoming) and I found no difficulties whatever.

Much work has to be done from roofs and minarets, the claim on the pocket is therefore very frequent.

As I wait here at Beyrout for the ship to carry me away, I cannot but look back with pleasure on my tour through this grand old country, and I look anxiously forward to a time when all the petty prejudices will be

put on one side and a photographer will be allowed to work in peace. That time is slowly but surely drawing near. I go now to Constantinople, out of the frying pan into the fire, I am told. Perhaps; I shall see. RICHARD PENLAKE.

CALCULATING EXPOSURE AND EXPOSURE METERS.

I.

THE experienced photographer is able to judge the required time of exposure, without arithmetic or mechanical aids, to a certain degree of accuracy; not absolutely, for he is liable to error, especially when called upon to deal with conditions which are unfamiliar. His conclusions thus contain an element of uncertainty. An examination of the negatives of a photographer who professes to guess the right exposure under all circumstances will confirm this opinion of his inability to carry it out. Taking a broad view of the matter, it is evident that strict accuracy in timing exposure, guided simply by personal judgment, is only possible to a very limited extent, as to reach it completely would be an intellectual achievement quite beyond the average mental capacity. To one who has considered the problem of securing correct exposure this will be no surprise. At the very least, six or seven variable factors have to be determined; some French authors enumerate no less than thirty-six, which implies a complication that can hardly be worked out mentally during the brief period between drawing the shutter of the dark slide and removing the cap of the lens. This complexity indicates that the photographer who estimates the time of exposure from experience must fix his attention mainly on the chief factors that determine the result, neglecting a considerable number of the minor influences. Even when allowing such, the vital data cannot be reduced below four variables, and, assuming exposure demanded scientific precision, numerical or mechanical aids would be a necessity. Fortunately, exposure may vary within considerable limits, and it is for this reason alone that arbitrary methods of exposing the plates are practical. Beyond this, the average worker is favourably placed, for he is constantly occupied with the same set of values, either in view, interior, or portrait work; whereas, if it was usual to meet daily with the whole thirty to forty varieties, some mechanical help, or a very long experience, would be inevitable. In the end, a system of calculating exposure is the same as the method of experience, for, as Professor Burton said long ago, the practised photographer carries a complete set of exposure tables in his mind, ready for use at all times. Seeing, therefore, that years of experience only result in exposure tables, which can be derived in other ways, it seems unreasonable to expect the beginner to undergo this long course of training when the object can be achieved at once. Custom, prejudice, and ignorance are at present against the adoption of mechanical methods of calculating exposure, but their acceptance is assured when once the certainty of results obtainable is compared with the unreliable character of mental estimations.

Already many mechanical aids to finding exposure are on the market, and it is not uncommon to hear complaints from those who have purchased, and do not find them the success they were led to expect. Like all tools, the exposure meter must be used with intelligence, and its nature and principles be first understood before its full merits can be brought out. In face of this, it is to be regretted that these instruments have been captured by the trader and the patentee, men who do not concern themselves with giving instruction beyond the bare working details of their own particular instrument. As a consequence, there has not been published since 1888, when Hurter & Driffield patented the actinograph, and, forming an honourable exception, gave full details of its working and principles, any publication of information respecting instruments for calculating exposure. Patents and private interests have also effectually stopped scientific investigation; so much, indeed, that during the last five or six years hardly a page of printed matter will reward the seeker after truth on this topic. In France this has not happened to the same extent, and several books of some 200 pages each, treating of the subject in theory and practice, are available.

A knowledge of this scarcity, and a conviction that the exposure meter is a valuable instrument still awaiting discovery by the bulk of photographers, has induced me to attempt, with the best of my ability, to treat of this subject, and so help in part to meet a long-felt want.

The principle of the exposure meter was given to the photographic world by Mr. A. S. Platts, who in 1886 read a paper on "Systematic Exposure" before the Sheffield Photographic Society. As stated above, the photographer arrives at the time of exposure from the minimum data; so, too, Mr. Platts begins by selecting the chief factors, reducing to the fewest possible the conditions necessary to calculate a correct exposure. These he enumerates as seven: Subject, light, season, time, lens, stop, plate, which he proceeds to tabulate, and to assign to each a relative numerical value. He has four tables: (1) for the nature of the subject and the character of the light, compiled from Burton and others; (2) the season and time of day, after Dr. Scott; (3) the lens and stop; (4) the speed of plates. Having secured these relative values, Mr. Platts found a unit for calculation by experiment. He chose a panoramic view in sunlight on a fine day in June at noon, using a f 10 diaphragm, these being the units of Tables 1, 2, 3; on a slow plate the exposure required was $\frac{1}{20}$ of a second; this brand of plate was numbered 20, and became the unit of Table 4. Other plates were numbered on the same basis, a plate double the speed being 40, and so on. To find any exposure, Mr. Platts multiplied the factors of tables 1, 2, and 3 together, and divided the product by Table 4. This would be a reliable method of calculating exposure, assuming the divisions of subject and light admitted of no difference of opinion. No two persons, however, agree on these points, and the inherent difficulty of securing a common acceptance of the value of "cloudy," "dull," "bright" days, or of a "landscape," "interior," or "portrait indoors" is an obstacle in the way of its application. It was therefore quickly suggested that the light and subject tables should be replaced by an experimental test of the value of the light by means of an actinometer used immediately before exposure. The principle of calculation is the same as Mr. Platts proposed; only, instead of using four factors, they are reduced to three:—

1. The actinic value of the light = A.
2. The diaphragm number = D.
3. The speed of the plate = S.

$$\text{Then} \quad \frac{A \times D}{S} = E, \text{ or exposure.}$$

To find a numerical value for the actinism factor, a standard tint is selected upon an actinometer that gives its record from the darkening of a sensitive paper. Taking the same plate, subject, diaphragm, and exposure as previously, we will assume the paper requires but one second's exposure to darken to the standard tint, then

$$A = 1, D = 1, S = 20, \text{ and}$$
$$\frac{1 \times 1}{20} = \tfrac{1}{20}, \text{ second exposure.}$$

From which it is obvious that when the darkening required 2, 4, 8, or 16 seconds, the exposure must be $\frac{1}{10}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ seconds, respectively.

Any other standard tint can be made the unit by modifying the plate-speed number; thus, supposing the darkening was continued for four seconds, the plate-speed unit must be 80, to give a proper arithmetical basis, since

$$\frac{4 \times 1}{80} = \tfrac{1}{20}, \text{ second exposure.}$$

This practice of beginning with certain conditions as a basis is exactly the photographer's device; he holds in his mind the impression of a landscape, for example, under a brilliancy of illumination which required one second's exposure with a known plate and size of diaphragm to give what is termed a good negative. Any variation from these standard conditions, size of diaphragm, brightness of light, or speed of plate, he allows for by extending or reducing the time of exposure.

Only one modification remains for description to bring the exposure meter up to its present form, that is, the application of the slide rule, first employed by Mr. Ackland some ten years back. The slide rule is solely for the purpose of avoiding arithmetic. JOHN A. RANDALL.

DEVELOPING BROMIDE PAPER IN LENGTHS.

DESCRIBING his method of achieving this object Mr. Arthur Schwarz points out that heretofore, in order to produce a large number of photographs, simultaneously, the sensitised paper strip had to be conveyed by mechanical means through the different baths required for developing, toning, fixing and washing purposes. The greater the production the larger had to be the baths, and, as in the former treatment the paper strip was guided by a vertical band, the depth of these baths was limited, and hence they had to be increased in number, thus requiring a considerable space.

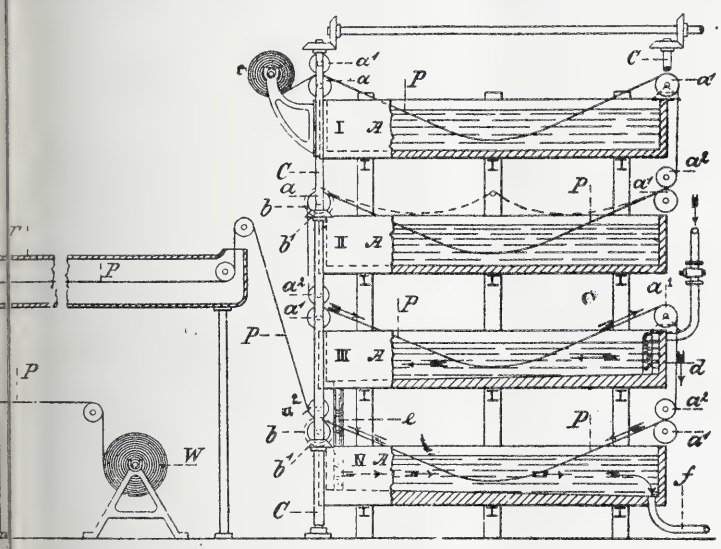
Moreover, in order to guide the paper strip safely through the baths, a travelling band was used, and, as it passed from one bath into the other it carried with it a certain quantity of the liquid contained in one of these baths into the following bath, and, as it is obvious that the cleaner the solution in a bath the more efficient it is and the longer it will last, the former *modus operandi* was very defective.

By his plan he remedies these defects, and for this purpose the baths are so arranged and superposed as to dispense with the use of a travelling band passing from one bath to the other without interfering with the continuous feed and passage of the paper strip through the different baths which, according to this invention, takes place in a zigzag direction.

The accompanying drawing is a sectional elevation, illustrating the arrangement.

This arrangement consists of four superposed baths, A, I., II., III., and IV. By way of example, the first two baths may serve for toning and fixing purposes, while the two lower baths may serve merely for washing purposes. One may obviously use any number of superposed baths either for developing, toning, fixing, or washing. On each side of bath I are arranged guide rollers, a a^1, made of material capable of withstanding the action of the liquids in the first two baths. Near the side of the adjoining bath below is mounted above the same a feed roller, a. On the left-hand side of bath I. is fixed a bracket carrying the paper band, P, on which the photographs are printed, and which is wound up in the shape of a roll upon a suitable axis or rod. From this roll the paper band or strip is conveyed down to the lowermost feed roll over a number of guid

ollers, a a^1, and feed rollers, a^2, in such a manner as to take a zigzag ourse from the guide roller, a, on one side of the bath to the guide oller, a^1, on the other side of the same. The paper band, P, will thus ass as shown in the drawings from the roller, a, to the roller, a^1, of ath I., through the solution contained therein, then down between oller a^2 and roller a^1 of bath II., so as to pass through the liquid con- ined in the same, whence this paper band, P, passes over the roller, a, f bath II. on its way to bath III. between the rollers a^2 and a^1, through hich bath it passes, and from which it makes its exit over roller a^1 in rder to pass over roller, a^2, between rollers, a^2 and a^1, through bath IV., nd then over roller, a^2, at the end of such bath on to the drying appa- atus. Where the paper band, P, passes into the next bath, it is guided etween a guide roller, such as a^1, and a feed roller, such as a^2, which nparts motion thereto. The guide rollers, a or a^1, which operate in con- nction with the feed rollers, a^2, are provided with bevel wheels, b, neshing with the bevel wheels, b^1, of the vertical shafts, C, driven by evel or other gearing, as shown in the drawing by way of example. The ttendant can, in consequence of this arrangement, watch the action of ne solutions on the paper throughout the whole length of the baths, and nus ascertain that such solution is of suitable composition. Throughout ll its stages, the state of the photographic paper band can be watched at very moment. Should the portion of the paper band which is being eated in one of the baths, say bath II. for instance, have to be sepa-



tely withdrawn from such bath, the operative raises that portion with stick, and suspends it in the position shown in dotted lines above th II.

The arrangement of the baths in superimposed order not only onomises a considerable amount of space, but enables one attendant have the whole series under control. In the two lower baths, III. and ., where the paper band is finally washed, water is caused to run con- uously in a contrary direction to that of the paper band, this water ing supplied by the perforated pipe, d, running along bath III. down e pipe, e, into the bath IV., and escaping, finally, out of the discharge pe, f. The flow of the water, as well as the direction of motion of the nd are fully indicated by arrows in the drawing. This method of shing the paper band is highly effective, and, if desired, the two baths ay be tilted in order to increase the effect.

As the paper band issues from bath No. IV. it is passed through the e pipe, T, of a heating appliance of the kind shown in the drawing, in der to be thoroughly dried, after which it is wound up on an axis in the m of a roll, W. This heating appliance may obviously be of any itable construction.

SUBSTITUTES FOR ALBUMEN.

ESSRS. Jolles and Lilienfeld of Vienna propose using for the film hich contains substances sensitive to light, albuminous substances of ain soluble in alcohol, such as fibrine, mucedine, gliadine and the like ch by itself or mixed together, or in connexion with albumen, gelatine, loidin (collodion) or other ingredients suitable for photographic rposes.

The albuminous substances are used in alcohol solution and may be posited upon the paper either suitably salted and afterwards sensitized the substances sensitive to light may be emulsified in the solution of buminous substances, in the following manner.—

The albuminous substance is dissolved in an alcohol, salted in the ual way with a haloid and a solution of silver salt in a thin stream erwards added thereto, whereby the silver haloid salt produced will be iformly emulsified. The addition of an organic acid and that of a bstance which makes the paper pliant, such as glycerine, castor oil and the like, is desirable. The method described may be used cold or warm, the order of the additions may be varied at will and the finished emulsion is used for the production of the plates, paper or diapositive in the usual manner.

They state that the treatment of the paper is most simple as the same can be toned off rapidly and properly in any bath without having to prepare the bath specially, as is the case when using other emulsion papers and the consumption of gold is very small.

The paper requires also no special attention in the toning bath as it can be exceedingly easy toned off and fixed. The pictures obtained after the toning off and fixing are said to show extraordinary beauty and the light parts are particularly clear.

Our Editorial Table.

Das Fernobjectiv.

Verlag von Gustav Schmidt, Berlin.

This work, by Herr Hans Schmidt, of Munich, forms Volume No. IX. of the Photographische Bibliothek, and is dedicated by the author to Dr. H. W. Vogel. It contains an excellent exposition of the optical principles involved in the tele-photographic lens system, written in a manner that must bring the work within the grasp of the general reader. The description of the various tele-photo systems, and the positive lenses that may be used in forming the combinations is also of much practical value; but, whether from "Nationalstolze" or want of knowledge of Mr. T. R. Dallmeyer's work, the author has omitted it from his consideration, and this we consider a blemish in an otherwise excellent little volume.

Die Farbenphotographie.

Verlag von Wilhelm Knapp, Halle a/S.

Dr. R. Neuhauss contributes Volume XXXIII. to Wilhelm Knapp's Encyklopädie der Photographie, and the student of Lippmann's process will find much of value in Dr. Neuhauss's account of the results of his work. The author strongly recommends albumen as a vehicle in photographing the spectrum, but for mixed colours gelatine should be used. His search for a suitable gelatine would have been amusing if fraught with less disappointment, but, having found it, he is generous enough to inform his readers where it may be obtained. There are also some good practical hints with regard to other materials and concerning various branches of the work. We can strongly recommend it to the student of colour photography.

Photography Annual, 1898.

Edited by Henry Sturmey. 1898, price 2s. 6d. London: Iliffe, Sons, & Sturmey, Limited, 3, St. Bride-street, E.C.

This portly and well-got-up volume well maintains its reputation as a compendium of information and statistics of the year. An immense amount of labour has obviously been expended in its production. Besides the usual statistical information there are a number of contributed articles on practical topics, and the progress in the science of photography in 1897 is minutely detailed by Messrs. C. H. Bothamley (chemistry, &c.), Chapman Jones (optics), A. Taylor (astronomy), and P. E. B. Jourdain (radiography and other applications of photography to science). All these sections of the volume are of the greatest value, and are most serviceable for reference. There are many very fine half-tone and other illustrations in the book, which is admirable throughout.

Catalogue Received.

W. Watson & Sons, 313, High Holborn, W.C.

A new edition of Messrs. Watson's photographic catalogue has just been issued. It extends to over a hundred pages, and we note that, while deserved prominence is given to the well-known "Acme" Cameras for which the firm has so long been noted, a great variety of other apparatus is also illustrated and described. The catalogue indeed is well up to date in regard to the latest introductions to the market, and is nicely turned out. Messrs. Watson's manufacturing premises comprise Nos. 9, 10, 11, 16 and 17, Fulwood's-rents, High Holborn, and provide 24,000 square feet of space. Being adjacent to their warehouse, these factories and the work done therein are under their immediate and personal supervision. Their stock of mahogany, consisting of about 100,000 feet of the choicest kinds, is seasoned in their own factories. Messrs. Watson carry out, as far as possible, the system of fitting the parts of their cameras and lenses to standard gauges, so that, in the event of loss or breakage of dark slides, fronts, screw nuts, &c., extra ones may be supplied without the necessity of sending the instruments to fit them.

News and Notes.

MR. RÉNÉ BULL, the famous war artist of *Black and White*, has left for the Soudan, taking with him an Adams de Luxe hand camera.

MR. ROBERT BROWN, photographer, Inverurie, died recently. He was well known in photographic circles in the north, where he and his sons have long held prominent positions for high-class work.

PHOTOGRAPHIC CLUB.—Wednesday evening, August 10, at eight o'clock. Members' Open Night. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. W. R. Stretton, 4, Queen-street-place, London, E.C.) will be pleased to forward on application.

THE next meeting of the Manchester Photographic Society will take place on Saturday, August 13; it will be in the form of an excursion to Addlington, Cheshire. Train leaves Manchester (London-road) at one o'clock; members may also go out by the 1.45 train, and join the rest of the party at Addlington Hall. All inquiries to be made to the leader, Mr. James Wood, 34, Church-street, Manchester.

Re JAMES SHARP, photographer and sewing-machine dealer, Silloth.—The public examination of this debtor took place at the last sitting of the Carlisle Bankruptcy Court before the Registrar. Replying to questions put by the Official Receiver, the debtor stated that he had not been able to bring forward a proposal for the benefit of his creditors, because he had not been able to get the money he expected. He was willing to sign an order of adjudication. He had carried on business in Station-street, Silloth, since November last. For three years previously he carried on business in Griffell-street, under the name of Sharp Brothers. He had a brother who was a farmer, but he had no interest in the debtor's business. His brother used to help him on busy days, and if the business had been a success his brother would, no doubt, have joined him in partnership. The business in Griffell-street paid expenses. He had no capital when he commenced, but obtained goods on credit. He did not borrow any capital to start with. He had another brother, who was a jeweller at Workington. Debtor was never in the jewellery trade. He sold the business in Griffell-street at the end of last year for 61*l.*, but he estimated it to be worth 112*l.* His brother at Workington had nothing to do with his business. He was surety to Mr. Purvis, some months ago, for his brother Thomas. Debtor gave a promissory note for 26*l.*, and his brother received 20*l.* in cash. When he left Griffell-street he only had 61*l.*, and his debts amounted to 50*l.* The land on which the studio was built belonged to him. It was given to him by Mrs. Boyd. He built his house and studio at a cost of 1800*l.*, but the money to build them was borrowed from various sources. Mrs. Boyd became surety for him to the White Sewing Machine for 100*l.* The document was not signed "Ann Sharp." He was present when she signed it. She gave her name as "Ann Sharp" to the Manchester Securities Company, when he borrowed money of them. He and Mrs. Boyd were going to get married at that time, and that was why she used his name. Mrs. Boyd did not assist him in the business. She lived privately and took in lodgers. He owed Mr. Purvis 30*l.*, and Mrs. Boyd was liable on that. Mrs. Boyd had borrowed money for which debtor had become liable. He at one time proposed to transfer his business to Mrs. Boyd. Mrs. Boyd had two children, one aged five and the other seven. The Official Receiver said that, before proceeding any further with the debtor's examination, he must ask for an order on the debtor to file a cash account showing his transactions during the past twelve months. Mr. Edwards, on behalf of the debtor, said he did not think it could be done, as the books had not been kept in a proper manner, and, besides that, it would not answer any useful purpose. The Registrar: I do not quite understand the position of Mrs. Boyd. Mr. Edwards: They are not married yet. If she marries, she reduces her income from 350*l.* to 50*l.* per annum. The Registrar: Oh! The examination was then ordered to be adjourned.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

August.	Name of Society.	Subject.
9.....	Ashton-under-Lyne.....	Excursion: Delph (for Denshaw) Leader, Henry Miller.
9.....	Hackney	Open Night.
10.....	Photographic Club	Members' Open Night.
10.....	Southsea	Excursion: Bursledon.
13.....	Ashton-under-Lyne.....	Excursion: Liverpool. Leader, Robert Marsland.
13.....	Hackney	Excursion: Stort Valley. Leader, Dr. Roland Smith.
13	Leytonstone	Excursion: St. Albans. Leader, Mr. Gibbard.
13	Manchester Photo. Society	Excursion: Addlington, Cheshire. Leader, James Wood.
13.....	Oldham	Excursion: Marple. Leader, R. T. Taylor.
13-21	South London	Excursion: Rotterdam. Leader, William F. Slater, F.R.P.S.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 28,—Mr. E. Human in the chair.

The meetings during July and August having been set aside as Open Nights, for which no papers or demonstrations have been arranged, subjects for discussion are assigned to each meeting, that for the present meeting being "Depth of Focus." It was thought, on account of the interest which has recently again been shown in the question, that it would be a fruitful source of discussion, but probably by reason of the small attendances during the summer, it only drew forth a small conversational discussion.

The new developer ortol was the subject of some further talk, more especially with a view to elicit some of the practical experiences in every-day usage with this reducing agent. It was humorously remarked by one of those present that, so far, all the writings as to the new developer went to show that ortol was *nearly* as good as pyro. On the other hand, the name of a photographer who had adopted it with delight in place of the pyro-ammonia developer was mentioned by Mr. Welford from actual knowledge.

PHOTOGRAPHIC CLUB.

JULY 27,—Mr. Hans Müller in the chair.

Several members showed some results by the protalbin and albuminate papers distributed last week.

Mr. J. BRIDGES-LEE opened a discussion on

THE CAMERA AS A TOPOGRAPHICAL RECORDING INSTRUMENT.

He referred to the small degree of interest which, until recent years, had been taken in the matter by England the while other countries from time to time had been steadily advancing in the application of the camera as a surveying instrument. The inherent difficulties which beset one's path had much to do with this. The adjustment of the camera needed to be most exact to render the subsequent interpretation of any use, and, again, the lenses procurable in early days did not possess the accuracy and perfection of modern instruments. Absolutely true perspective, as given by these lenses of to-day, was imperative if the information was to be of any practical value. The application of photography to surveying had of late received considerable attention by the Surveyor-General of Canada, who found that for rapidity and accuracy of result it was ahead of the ordinary and older methods. Mr. Bridges-Lee described his work in the construction of an apparatus which should record on the picture all the data requisite for the interpretation of the same. It comprised very delicate levelling motions to ensure the plate being in a truly vertical plane; provision for placing the plate at a fixed focal distance; vertical and horizontal hairs (adjusted so as to produce an image upon the plate), the intersection of which exactly denoted the optic axis of the lens; a tangent scale divided in degrees; a magnetic compass and scale, and other accessories. Risks of error were reduced by the fact that nearly everything was recorded automatically upon the plate, which bore the following particulars: The median vertical plane, the horizon of the instrument, the principal point of the picture, the magnetic bearing of the principal plane, a scale of horizontal angular distances right and left of the principal plane, in addition to information as to the station, barometric pressure, time, date, and series number. Mr. Bridges-Lee passed round some photographs, taken in this way from points in Trafalgar-square, on the Union Club and Drummond's Bank. These pictures had been compared with the ordnance map of the district, with the result that both agreed in every particular. Many surveyors used photography as an *aid* in their work, but pictures such as were given by the instrument described constituted themselves all the records required. Mr. Bridges-Lee saw a tendency to a more extensive use of photography in surveying; the St. Gothard Tunnel, he believed, was surveyed by photography, and in India, Canada, Mexico, and other parts of the world much good work was being done.

Mr. T. WILSON CAIRNCROSS, of Cape Town, said he had been engaged surveying on Table Mountain in connexion with their waterworks, and had used the camera a good deal as a supplementary aid. The subject of surveying purely by the camera was of great interest to him and one to which he was giving his attention.

Mr. BRIDGES-LEE added that the plate used was 5×4, the lens a Zeiss. Films would not answer, as the slightest buckling, although not apparent to the eye, affected the perspective. The lens used was of five-inch focus, but some of the earlier forms had lenses of about six inches. It was a good plan to increase the length of exposure by interposing a chromium-green screen. The effect was to better render the distance and do away with any haze. In conclusion, Mr. Bridges-Lee explained how to interpret the particulars recorded upon the negative, and to plot the points within the area of the picture to practical application.

FORTHCOMING EXHIBITIONS.

1898.

Sept. 26–Nov. 12 ... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square.

,, 30–Nov. 5 ..... Photographic Salon. Hon. Secretary, R. Craigie, Camera Club, Charing Cross-road, W.

November 15–18 ..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.

,, 15–Dec. 15 Yorkshire Exhibition. Hon. Secretaries, 13, Cheapham-street, Bradford.

,, 23–26 ..... Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Patent News.

THE following applications for Patents were made between July 18 and July 23, 1898:—

CAMERAS.—No. 15,893. "Photographic Cameras and Appliances or Attachments thereto." M. KAHN.

ATE-CARRYING CASE.—No. 15,720. "Improvements in Carrying and Transferring Case for Photographic Dry Plate." Complete specification. J. C. KIMSEY.

POSURE METERS.—No. 15,738. "Improvements in Photographic Exposure Meters." A. DANIELL.

LLOTYPE MACHINES.—No. 15,988. "Improvements in Collotype and Similar Printing Machines." A. COE.

Correspondence.

Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.

We do not undertake responsibility for the opinions expressed by our correspondents.

STEREOSCOPIC LANTERN PROJECTION.

To the EDITORS.

GENTLEMEN,—It would, perhaps, be extremely rude on my part to pear to contradict you as to your footnote to my letter of July 8; but m bound to say that you are quite mistaken in saying that there was stereoscopic effect in the pictures produced at Niagara Hall. It was e common remark of every one and particularly noticed by lantern perts. Nothing of the kind is visible in the ordinary lantern pictures, d the purpose of my letter was, if possible, to draw some expressions opinion as to the cause of this difference in results from apparatus ctically similar. I have my own opinion, of course, and briefly mened it in my letter, but will now go into it a little more fully, with your rmission.

I believe the reason why ordinary lantern pictures do not exhibit such reoscopic effects are these: 1st. The pictures are printed or toned to e colour all over—usually black, but sometimes even red or deep blue; d, if they are coloured, the colour is laid over the black photograph. is may be art, but it is certainly not nature. The proper rendering of tance, atmosphere, and colour are absent, and, as the eye does not ognise the subject in this dress, it treats it as it does a print or awing, and to this appearance the shape and size of the pictures lend emselves perfectly.

This latter difficulty might, I am sure, be got over in the ordinary ntern by representing the pictures as though seen through a window ening on a balcony. The eye requires something in the near foreound as a base from which distances may be inferred or judged to give e illusion of reality and thus of stereographic projection.

In the Electrorama the illusion of the entire horizon takes the eye at ce from a mere picture to an outdoor view, such as the eye is ustomed to see without limitation, and such pictures, even without our, exhibit the stereoscopic effect, because no photograph taken by e camera is projected in exactly the same way as it was taken. Nature pears spherical to the eye and to the camera, therefore spherical—or nearest approximation cylindrical—projection places the eye in the ne relation to the picture as in nature, and, if the picture itself is perly coloured and the distances correctly rendered, the illusion to the e is complete. But the colouring must be artistic, *i.e.*, natural. Not water is blue, nor are skies Prussian blue and yellow in nature, nor terfalls blue and white, and so on. Such things may be pretty after book illustration and poster type, but may fail to present the eye h a true copy of nature and affront it with a caricature.

T. W. BARBER.

If there is one subject more than any other to which, for years st, we have personally devoted considerable study, it is that of reoscopic photography; and, Mr. Barber and his lantern experts the contrary notwithstanding, we cannot allow it to be assumed t we were "mistaken" in denying to the *monocular* projections Niagara Hall effects which can only be produced *binocularly*. e panoramic photographs referred to, by their size and nature of bject, of course suggested the effect of distance—a not very nderful thing to achieve; but they were not at all stereoscopic, t is, they did not, and could not, exhibit the least trace of true ief. We have seen just as good effects produced by ordinary ntern-slide projection. Mr. Barber's idea that a large lantern nsparency, artistically coloured, gives the "illusion of reality, l thus of stereoscopic projection," is obviously unsound on theolical grounds, and is not realised in practice.—EDS.]

ELECTRIC *VERSUS* METALLIC CONTACT PRINTING.

To the EDITORS.

GENTLEMEN,—Mr. Friese-Greene's assertions, however dogmatical they y be, fail to constitute facts. My article, written some two months ago, ich you purpose publishing, will show that his electrical current is not necessary in printing from metal by contact with a support holding a metalic salt in a humid state; hence, if Mr. Greene persists in using this process under cover of any extraneous method, he must take the consequences.

Presuming that an electro-chemical action is set up between the metals, that would not affect my patent rights. The claim is for the resulting print under set conditions, the theory of the precise action taking place being quite immaterial.

I might perhaps mention that I do not lay any claim to the making of the latent images. They show little value in this process compared to the printing out impressions. Some use may no doubt, however, be found; hence their publication for what they are worth.—I am, yours, &c.

85, *Grove-road, Bow.* HENRY SOAR.

THE PHILADELPHIA PHOTOGRAPHIC SALON.

To the EDITORS.

GENTLEMEN,—As the time for the above Exhibition is now rapidly approaching, I shall be glad to hear from British exhibitors who intend supporting our American friends in their laudable efforts to engineer an International Exhibition of artistic photography, at which the sole honour will consist in the picture's acceptance.

There are many exhibitors who are distinctly in favour of such exhibitions, notably our own Salon supporters, and I especially urge upon them the desirability of giving support to Philadelphia. I may add weight to the argument by pointing out that the organizers are offering to pay all expenses upon frames from and to London. The only cost to the exhibitor will be that to my office, *i.e.*, railway carriage or other delivery.

I have received many entries from the Continent. The Association Belge will be well represented, as also France, Germany, and Holland, besides smaller contributions from other countries. It makes me all the more anxious, therefore, that Great Britain should take at least equal rank in pictorial photography at Philadelphia.

Our best workers, no doubt, have much to do with the coming Royal and Salon Exhibitions, but I hope they will make a little extra effort in order to show America what we, as photographic workers, are capable of.

Prints need not be framed; in fact, they are preferred that way, but frames are not debarred by any means. They must reach my office on or before September 1, carriage paid.

Prospectuses, entry forms, and labels for back of pictures, I shall be pleased to forward. In fact, I will stay at home next Friday in order to cope with the applications I feel sure ought to result from this appeal.

19, *Southampton-buildings, Chancery-lane, W.C.* WALTER D. WELFORD, *General European Agent.*

PHOTO-ENGRAVING PRICES.

To the EDITORS.

GENTLEMEN,—You have paid me the compliment of commenting on an extract of a letter of mine addressed to an American process-trade journal.

You refer there to meetings which were held about two years ago, when a large majority of the London trade were present, and an impression seems still to remain that there was unanimity in regard to minimum prices arrived at, but, as you state, not adhered to.

As a fact, there were two equally divided parties present, one of whom regarded the prices fixed as too high and the other as too low, and, although a small majority of those present agreed to the adoption of these prices, it was understood that there was no chance of getting an agreement signed under such circumstances, and there was therefore no breach of faith by any firm for not adhering to any agreement which was never completed,

It is within my knowledge that many old-established firms with considerable capital invested in the process trade have obtained no return during the last two years, and, as notwithstanding the increase in numbers the trade has been fully occupied, it is a gloomy outlook to know that we have all plenty of business mainly at a price which does not pay expenses.

Foreign competition is not the serious element you seem to think, as the time in which the work has to be executed for modern requirements prevents it leaving the country, and at the present there is little, if any, advantage in price.

Country competition has undoubtedly lessened the chance of improving prices, but personally I am of opinion that bottom must have been reached and reaction must set in shortly.—I am, yours, &c.,

GEORGE E. HOLLOWAY, *Secretary.*

The Electrotypers', Stereotypers', Process, and General Engravers' Association (Limited by Guarantee),

47, *Lincoln's Inn Fields, London, W.C., July* 29, 1898.

FREE PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—Having noticed some weeks ago, in THE BRITISH JOURNAL OF PHOTOGRAPHY, letters in reference to a system practised by certain

firms of giving gratis with their goods (such as soap, papers, &c.) a bromide enlargement, I would like to call attention, through your valuable paper, to the fact that it is not in England alone that the already much-cut-up business of photography has to contend with this system.

I have just been called upon by an agent for a certain soap, who offered to give me the magnificent sum of 1*s.* 3*d* per negative of each sitter who presented their *soap* tickets or coupons, said negatives to be sent to Glasgow for enlargement.

I was also informed that a photographer in a large town near here had done them for the soap firm, and now it seems the said photographer has to send his canvassers to this town for orders after cutting his own throat in his own town.

You will pardon my taking up your valuable space, but I feel that the like of this should get wind, so that all right-minded business men may put their foot down and refuse to do such work, which must tell against the profession to an enormous extent through time.—I am, yours, &c.,

A. L. D.

HE-A, HE-A!

To the EDITORS.

GENTLEMEN,—Your Welsh correspondent in to-day's issue seems to have taken his ideas of derivation from the gentleman who suggested the derivation of "Solio" from Sol.

Why should a Saxon have gone to a strange language, which he probably did not know, for a word to express assent when the language of his ancestors was quite capable of supplying him with what he wanted? Is there any sort of evidence that the Cockney went out of the Saxon districts, which were on all sides of him, to far distant Wales for words in daily use? Is it likely that, to express assent in popular assemblies, which he had brought with him from across the sea, he was forced to adopt a word from the Celtic peoples whom he had driven away? Is it not more probable that he has adopted a mispronunciation of a word in his own ancestral language (a change similar to that he has made in other words) rather than that he has borrowed a foreign word and corrupted it.

I have assumed that the Cockney pronunciation is wrong, but, in fact, though I am no philologist, I am not at all sure that what are called *mispronunciations* are not really correctly representative of ancient practice, and that the real corruption is not often the accepted use.—I am, yours, &c.,

J. F. T.

July 29, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPH REGISTERED :—

Debenham & Co., 5, Clifford-street, York.—*Photographic group consisting of H.R.H. the Prince of Wales, Lord Roberts, and other officers.*

A. MACGREGOR.—Sorry we are unable to advise. It is entirely a question for a medical man.

COL. GUBBINS.—Thanks for your letter, which, of course, exactly states the exact position of matters.

PHOTOPHIL.—Your query, as we were unable to answer it ourselves, was inserted in our issue of the 22nd ult., and there have been no replies.

STAINS ON PRINTS.—D. TROLLOPE. The stains are clearly caused by handling with unclean fingers, probably contaminated with hyposulphite of soda, when the prints were washed or when they were being toned.

F. W. PICKFORD.—You would probably be able to recover; but the amount awarded to you would be much less than if the photograph had been registered before infringement. We should advise you not to risk an action.

ANXIOUS INQUIRER.—Taylor's *Optics of Photography*, Abney's *Instructions*, Wall's *Dictionary*, Meldola's *Chemistry of Photography*, Chapman Jones's *Science and Practice of Photography* should suffice for your purpose. The books may be ordered of any dealer.

GUM-BICHROMATE PAPER.—E. H. D. says: "In your last issue, page 486, your contributor "Dogberry" speaks of "the commercially prepared (gum-bichromate) paper." Will you kindly tell me where the gum-bichromate paper may be had; I do not see it advertised in any paper, or priced in any catalogue of the principal agents?"—In reply: The paper is, or was obtainable from the Gum-bichromate Paper Company, 61, Battersea-rise, S.W.

CERAMIC PHOTOGRAPHY.—S. OSBORNE asks for directions for producing photographs burnt in on china. Space is much too limited in this column to give working details of processes. We should recommend our correspondent to obtain the work on the subject published by Messrs. Dawbarn & Ward, Farringdon-road, E.C.

STAINS ON LENS.—OXON. The deterioration of the surface of one of the lenses is due to the use of an unstable glass in its construction. If the lens is a tolerably new one, it should be sent back to the maker. The stains, however, will practically make but little difference in the working of the instrument, except to make it a bit slower in working.

PATENT.—PICKWICK. You are quite rightly informed. You are not entitled to affix the word "patent" to the contrivance, inasmuch as you hold no patent for it, and, by doing so, you are rendering yourself liable to a heavy penalty. Merely securing a provisional protection does not entitle you to call the thing "patent." You may, if you like, say, Provisional protection obtained.

UNSUITABLE LENS.—T. SPENCER. The fault in the copy of engraving sent is due to the lens. A lens of the rectilinear type, of eleven inches focus, must not be expected to give fine definition, with perfect illumination, all over a 12×10 plate. If your camera will not extend long enough to take the longer-focus lens, you should get a lengthening cone made for the front. That will get over the difficulty.

J. G. SINCLAIR.—*The Photographic Times* (New York), *The Photo Beacon* (Chicago), *Wilson's Photographic Magazine* (New York), *St. Louis and Canadian Photographer* (St. Louis), *American Amateur Photographer* (New York), *Photo-American and The Professional Photographer* are the principal. Those and any others will, doubtless, be obtained for you by Messrs. Dawbarn & Ward, 6, Farringdon-avenue, E.C.

RIGHT TO PHOTOGRAPH.—S. W. J. If the grounds are private property, and the organizers of the flower show have sold the exclusive right to photograph the opening ceremony, and the interiors of the tents, to another photographer, they have, of course, the power to prevent your taking photographs in the grounds, although you may pay for admission. 2. Yes. Certainly the photographer can copyright any and all the photographs he takes, and can proceed against you for piracy if you copy them.

INSOLUBLE TISSUE.—W. H. H. It is evident that the tissue was insoluble, and that it was due to the sensitising, as upon testing the unsensitised sample sent it was found to be perfectly soluble. It is very unusual to employ the bichromate of ammonia for sensitising the tissue; it is the potassium salt that is usually employed, because it is found, in every way, to be better suited to the purpose. Under the circumstances detailed, such a stain as that on the metal plate is just what was to be expected.

CARBON PRINTING.—W. WILLIAMS asks how to get matt-surface prints developed on flexible support? Develop the prints and transfer them in the ordinary way. When stripped from the support, soak them until they are thoroughly softened, in cold water. Then squeegee them on to a ground-glass plate, previously waxed, and allow to dry. When stripped off, they will have a matt surface. The simplest way to produce matt-surface prints, by double transfer, is to develop on the ground glass and transfer from that.

REPAIRING BROKEN NEGATIVE.—B. REID. As it is only the glass that is broken, and the film is not injured, the repair is very easy. Place the broken negative on a plate of glass, to support it, and immerse in a very dilute solution of hydrofluoric acid, say ten to fifteen drops to the ounce of water. In a few minutes the film will become loosened, and the glasses can be removed. Wash the film in one or two changes of water. Have ready a glass plate coated with gelatine, and allow to set, and on this float the film, remove and allow to dry. If the film expands in the water, it may be brought back to its original dimension by immersing it in alcohol, but there will be no expansion if the negative had been previously alumed.

LOSS OF DETAIL IN PRINTS.—PRINTS writes: "I have lately been troubled with my P.O.P. prints, at times having a bleached-out appearance, being greatly reduced and all the finer details gone. I particularly notice it after the alum bath has been newly made up (I alum the prints before toning, as directions), and suspect the alum is the cause of it. Could you kindly inform me if bad alum could cause this defect, or if it was too strong made up. Would that have any effect on the print? I dissolve the powder alum with hot water—nearly boiling (about 2 oz. to 20 ozs. water), and use when cold, it being made up generally the night before using?"—The alum bath is certainly very strong for its purpose. Try using it much weaker. As no mention is made of the toning bath used, we cannot offer any further suggestion, except, perhaps, the prints are over-toned, or maybe the bath exhausted of its gold.

YELLOW PRINTS.—STAIN asks: "Will you kindly give me your opinion as to the cause of the yellowness, back and front, of enclosed silver prints. As our printer has just spoilt a large batch of prints, chiefly 12×10 and 10×8, by reason of this defect, and I cannot trace the cause, I thought you might help me in the matter. The paper was floated same day as toned, and printed very well. Acetate toning bath is used, and the prints changed to this peculiar colour in it. The previous day the bath had yielded excellent results, which points to some foreign element having got in it. Can you suggest anything? Our printer can give no reason for the defective prints, so I ask your help to trace the cause. The sulphocyanide bath is used sometimes for P.O.P., but not in the same dish as far as I can say."—Evidently the water in which the prints were washed prior to toning was contaminated with hyposulphite of soda or similar substance—might be sulphocyanic. It may be that a trace of it was in the toning bath itself.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1997. Vol. XLV.—AUGUST 12, 1898.

Contents.

	PAGE
Cathedrâ	513
Recent Silver Prints more ugitive than Older Ones?	514
sulphate of Ammonia	515
derettes:— rtificial Albumen — The Decompositions of Pyrogallol — M. Becquerel's Dark Light — Portraits of Bismarck — The Ben Nevis Observatory — Experiments in the Air — Weather Forecasts for the Present Summer — Royal Academy Keeper	516
tings. By Cosmos	518
eign News and Notes:— nlarging from Film Negatives—Water Gas—The Price of Platinum—Orthochromatic Plates—Fluid Gelatine—Soldering Aluminium—A Novel Application of Photography — Lippmann's Colour Photographs	519
tical Copying. By Percy Lund	520
"Développement Confiné"	520
tgen-ray Printing	521
tch-book or Camera?	523
A Photographic Tour—Past and Present. By F. H. Wenham	523
An Australian Travelling Studio	524
The Thornton-Pickard Competition	524
Our Editorial Table:— The Busch Lenses — Samples of Mounts—"Sepac" Retouching Medium — Lantin's Albumenate Emulsion Paper — *Jahrbuch für Photographie und Reproductionstechnik für das Jahr 1898* — *Bonnie Scotland's Resorts*	525
News and Notes	525
Patent News	526
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club — Herefordshire Photographic Society	526
Forthcoming Exhibitions	527
Correspondence:— Stereoscopic Lantern Projection—Action of Printed Matter on Undeveloped Plates—Markings on Plates	527
Answers to Correspondents	528

EX CATHEDRÂ.

e Select Committee on the Museums and Science and Art partment, after two years' labour, has concluded its report. e result is a document marked by the severe stringency of ne of its recommendations. Out of some 740 officials, 300 traced to relationships. The Committee recommend the olition of a large number of the staff appointments. They ell in suggestive terms upon the management of the iseums, which has not, it is affirmed, been for the interest of e department itself or of the public. The Committee also ommend the appointment of a Minister of Education, and ke proposals with regard to the control of the museums at inburgh and Dublin. From the second and final report it pears that the Committee's scheme includes a Free National iversity of Science and Art, with a Cabinet Minister as its ancellor, a Parliamentary Secretary, offices in Whitehall, a cretary of the Department, and numerous high officials and visers, for the purpose of promoting, by the aid of the wealth treasures in our museums and picture galleries, the higher ication.

* * *

It is announced that applications for space at the Paris Universal Exhibition of 1900 should be sent to the Secretary of the Royal Commission, at St. Stephen's House, Westminster, not later than August 20, 1898.

* * *

Last week a Hamburg newspaper announced that "at the instance of Prince Herbert Bismarck, and on the application of the Altona Provincial Court, proceedings have been taken by the Hamburg police authorities, in virtue of paragraph 123 of the Criminal Code, dealing with violation of domicile, against the photographers Wilcke and Priester, for having, shortly after the death of Prince Bismarck, entered the château without authority, and taken photographs of the deceased." It seems incredible that the photographers should have acted entirely without authority in such a matter, or that they should have been able to gain admission to the death chamber. There is, however, a suggestion that the photographs were taken at the instance of an august personage, which may explain Prince Herbert Bismarck's action in the matter.

* * *

A subsequent account states that the forester who permitted the two photographers to enter the death-chamber shortly after Prince Bismarck's death was instantly dismissed, without pension. His indiscretion and that of the two photographers was betrayed by the late Prince's clock, which figured also in the photograph, and pointed at a quarter-past two o'clock. The culprits had effected an entrance into the death-chamber through the window opening out upon the park; and for this reason Prince Herbert Bismarck has instituted proceedings against them for the criminal offence of "disturbing family peace."

* * *

Mr. George Scamell, Hon. Secretary of the National Photographic Record Association, 21, Avenue-road, Highgate, N., writes: "As, no doubt, there are many amateur photographers at present making use of their cameras to record the interesting buildings and scenes they may come across during their holiday rambles, would you allow me to remind them, through your columns, that the National Photographic Record Association will be glad to receive prints of any subject suitable for the collection now being formed and deposited in the British Museum for public reference. Such prints should be in platinum, unmounted, and forwarded to my address."

Some persons would have us believe that the newspaper of the future will wholly or very largely consist of illustrations—that mere descriptions and literary contributions will then rank less in importance than they do now. Reproduced photographs and sketches will be allowed, as far as possible, to tell their own story and the pen of the journalist will get rusty with desuetude. We do not share these views as to the eventual predominance of illustrations over typographical matter in popular publications, although it is quite plain that the world has recently run into an age of illustration. Nearly every day sees the birth of some new venture which gives prominence to phototypic or other kinds of pictures, and it may be safely said that it is entirely due to the camera that the illustrated press has reached its present flourishing state. But, if it is an age of illustration, it is also an age of reading. Never was there so much reading of all kinds done as now, and it is a significant fact that the most widely read newspapers and periodicals are those which are not illustrated.

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Excellent as are the illustrations which are given in the best modern periodicals, we are disposed to agree with a recent writer in his complaint that the literary matter which accompanies these pictures is only too frequently of the most meagre kind. There is, in fact, as we have observed, a well-grounded fear that, though a most praiseworthy amount of attention is often bestowed on the art side of an illustrated newspaper, the literary side is somewhat markedly neglected, the matter being scrappy, inadequate, and scamped. The writer we quote puts in a plea for the cultivation of a new kind of writer, the "descriptive camera reporter," who should step into the vacancy that possibly exists in the ranks of modern journalism. It should be his duty to photograph well and to write well: "In this pushful, resourceful age, it should not be difficult for the descriptive reporter, either by his own efforts or by the assistance of the proprietors of the illustrated paper which may be fortunate enough to have him on its staff, to obtain technical proficiency in photography, so as to enable him to give the best prints as well as the most vivid word pictures. His proprietors could provide a dark room and studio, so that he could develop his plates and prints if necessary, and photograph any celebrity who might visit the editorial sanctum, or be interviewed there. The development and printing might be considered as poaching upon the preserves of the professional photographer, and where it could be done, and the arrangement was satisfactory to all parties, there would be no reason why he should not have the work. There are, however, in journalism, periods of high-pressure work, when the ordinary photographer's speed of print-production could not be tolerated by the wide-awake, energetic editor, eager to outstrip his literary rivals. Hence it might come about that the proprietors would prefer everything done on the premises. It would appear, then, that the proprietors of our illustrated papers owe it to the public to seek out those in whom the twin gift of descriptive reporting and photography exists, or, failing in that, to make arrangements for the training of the most suitable members of their staffs, for the grafting of the photographic *forte* on to the reporting stem. But photographic societies might assist in bringing this matter to a head by their representations and agitations." We have no faith that photographic societies could be of any help in such a matter; but probably there is plenty of room in the illustrated press for the kind of journalist-photographer the writer we quo has in his mind. To some extent the class is, of cour already in existence, but it must be much more general called into use than is the case at present.

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Our Constantinople correspondent from whose interesti letter we last week made one or two quotations gives t following additional information relating to the difficulties h has experienced in photographing in the Turkish capita Intending visitors to that city should make a note of the ol stacles that obstruct the comfortable use of the camera on th shores of the Bosphorus: "I have not been allowed to do an stand-camera work here, and it was only with difficulty that have obtained a few snap-shots. I never was in such a awful place before. I have had any amount of exciting ex periences, plenty of rows with the police, and it is a wonder have kept out of prison. Hand-camera work is fairly easy i you go the right way to work, but stand work is not possibl unless you are prepared to give very heavy tips—I should say at least 500*l.* would be necessary to get anything like a respectable set. Applications to consuls are useless and I have spent six weeks troubling first one official and then another without the least success. I have left my applications in the hands of the Porte for the purpose of seeing how long it will be before I get a reply. My troubles have been numerous, and sometimes very amusing. The Sultan's third son, age 14, has this week started photography. A hand camera and enlarging apparatus were presented to him by an English officer. The two elder sons are expert amateurs, and a man is always at the palace to help and teach them. With such an army of photographers around him the Sultan should be more kindly disposed to others who visit his country."

* * *

In connexion with the Co-operative Festival and Flower Show at the Crystal Palace, a photographer's competition has been organized, the Council offering prizes for photographs of the best-decorated arbours, rockeries and greenhouses, and the best laid-out gardens. These were shown last week in London. Among the exhibits were numerous photographs of workmen's town gardens, showing strips and squares of ground, but often full of flowers and tastefully laid out. Prizes are also offered for the best back yard florally adorned, and for the best window garden; and there were many pretty photographs exhibited in these classes. Some photographs of garden views and country scenes had also been sent in by professional photographers. A collection of interesting drawings and photographs was also to be seen, including a number of portraits of leaders in the co-operative movement, such as Holyoake, Vansittart Neale, and Tom Hughes; a labour exchange note issued by Robert Owen, and a membership card of his social institute. There were photographs of the Leclaire statue and of M. Godin, the founder of the great iron-foundry at Guise.

ARE RECENT SILVER PRINTS MORE FUGITIVE THAN OLDER ONES?

This question, an affirmative answer to which would suggest grave thoughts, has so often been put to us that we propose making some observations upon it in the hope that they may lead to a useful discussion on the subject. We may at once say that the actual questions we have heard have been put in

a far more positive form than as above—in a form, indeed, in which the question was begged. But, while we would not go so far as to admit that only one reply, and that an affirmative one, is possible, it cannot but be admitted that, if a collection of photographs going from a time as far back as a score of years (we are not dealing with the pre-alkaline toning days) down to the present time, be examined, a very large number of the more recent prints will be found to show distinct signs of fading. There should be an explanation for the existence of such a condition of things. What is it?

One important point bearing on the matter may first be considered. Owing to the facilities afforded by modern processes and modern apparatus, there exists an immense body of camera-workers without training and without knowledge, enthusiasts and others who may be said to turn out daily tens of thousands of prints quite apart from the battalions of button-pressers who send their films away to be developed and printed from. The old workers feel very disgusted at the photography-made-easy of the day; but, when they had to make their own dry plates and sensitise their own paper, no one but a complete enthusiast took up photography as a hobby. It was an important thing, and he took himself and his work seriously; he read and studied his photographic literature, never missed reading his weekly journal, and knew a great deal about what he was doing, and did it well. Nowadays a camera is taken up as lightly as a tennis racket, and, indeed, much more thought is given to a present score than to the future of a print. Is it to be wondered at that prints made in such a jejeune manner should be fleeting? Further, it is incontestable that the fatal facility of snap-shotting is not conducive to toughen the mental fibre of the photographer to a point at which he would consider it a duty to endeavour to secure permanence in his prints. We have had detailed to us the experience of a photographer who comparatively recently took up dealing in photographic materials. He tells us he was at first aghast at the extent to which the combined toning and fixing bath was used, and improperly used. He found numbers of his customers would have this bath, and went on using the same lot of solutions as long as there was a drop left! He did his best to show the evil of such a course, and recommended separate baths, so as to ensure as far as possible permanency in their prints. But it was all to no effect, and he found that the only result of persisting in his advice was to alienate custom. "It was too much trouble, and when the bath had been much used it gave such a nice colour," and so on. Evidently such a state of affairs, if at all common, would suffice to explain the fading of a large proportion of recently produced prints.

Then, there is another factor to be dealt with. Photography and photographic materials are subject to the same craze that is eating into the integrity of almost every manufacture of the present day—the craze for cheapness. We do not say anything about cheap paper; there is plenty of good paper on the market, little of it, indeed, is anything else; but we have cheap (and nasty) "hypo," cheap chloride of gold, and, last but most important of all, cheap mounts.

With regard to this latter point, we may say that we unhesitatingly believe an immense number of prints, not those of the snap-shotting amateurs only, but of first-class professional men, to owe their fugacity to the cardboards they are mounted upon. We have seen thousands of prints mottled and faded from a cause which could be attributed to nothing but bad mounts. We do believe that it is the endeavour by new makers to put on the market mounts at a price that should beat down competitors that has led to the production of a cardboard whose composition was such that it could not fail to be injurious to the prints mounted upon them. Professional photographers have told us the same thing; they point to prints mounted upon boards ten or twenty years ago, when one or two foreign makers held the command of the market, which prints were still in good condition, while later prints, produced with equal care and under precisely similar conditions, but mounted on another make of card, have become utterly ruined, spotty and bleached in an irregular manner. We believe it to be a fact that one large foreign mount-seller some years ago admitted that the cardboards he had been using proved to be defective in this way. It was explained that the makers of the card, and the seller of mounts cut to sizes and printed, &c., were two distinct classes; the cutter—whose name only appeared—was dependent upon the seller of the raw material. Be that as it may, it is very probable that this competition among mount-sellers—who are now to be found in France, in Germany, in Austria—has, in too many cases, though productive of lower prices, been disastrous to the integrity of the photographs mounted upon them.

We could write much more on this latter phase of the subject; but it would unnecessarily lengthen this article. Enough has been said to form food of discussion, and which we hope may follow, and that something may be done to stem the tide of fading photographs.

PERSULPHATE OF AMMONIA.

By the courtesy of Messrs. Fuerst Brothers we have been favoured with a sample of persulphate of ammonia specially prepared by Messrs. Lumière Frères for the purpose of reducing over-dense negatives in the manner recently described by them. As the salt has been frequently mentioned during the past few months, and considerable difficulty has been experienced in obtaining it, we are glad to be able to announce that Messrs. Lumière have now placed on the market a definite and reliable preparation.

Not only has it been difficult to obtain, but a very large amount of uncertainty as to the composition of the salt appears to have been prevalent; for, although it has been stated on high authority that for many years past the persulphates have been perfectly familiar "even to elementary students in chemistry," we fear that this is only one more instance of how the typical elementary student knows a great deal more than the really practical man. We have in our possession at the present time three separate samples of the supposed salt, obtained from as many different commercial sources in London, not one of which is anything more than, we presume, the ordinary "bisulphate of ammonia." When, however, the same authority, a week or two later, refers to what is evidently intended for persulphate as bisulphate of ammonia, we are forced to the conclusion that, however well posted in such matters the elementary student may be, there is, to say the least, a great deal of carelessness on the part of those who ought to know better.

As a matter of fact, either of the terms mentioned may be applied with strict accuracy to the new salt, but the mischief is that one of them—"bisulphate"—is the recognised, or one

of the recognised, names of a different salt altogether. As to the other, making allowance for a good deal of latitude in nomenclature, it is doubtful whether, even before the discovery of the new salt, the term persulphate could be legitimately applied to the "acid" sulphate, but such seems to have been the case. The normal or "neutral" sulphate of ammonia has the formula $NH_4^2SO_4$, and next to that comes the "acid" or hydrogen sulphate, commonly called the bisulphate, with the formula NH_4HSO_4. Beyond this are several other combinations in which the relative proportion of SO_4 is constantly increasing, so that the term persulphate as applied to the bisulphate is distinctly a misnomer.

The persulphates have the composition—taking the ammonium salt as the example—of NH_4SO_4, and contain just double the proportion of sulphuric acid as compared with the neutral sulphate. They are formed, we believe, by the electrolysis of the acid salt, hydrogen being eliminated, and the per-salt formed at the negative electrode.

$$NH_4HSO_4 = NH_4SO_4 + H.$$

The product so obtained, or as sent out by MM. Lumière, is in fine crystals, resembling ordinary table salt, and dissolves readily in water, though to what extent we are as yet unable to say, having so far confined ourselves to a five per cent. solution as recommended. The solution, when freshly made, smells strongly of ozone, but this soon passes off upon exposure to the atmosphere. It may be, in fact, for practical purposes, considered as a solution of bisulphate of ammonia, containing free oxygen, and analogous in its action, to a certain extent, to hydroxyl. Reversing the above equation, we have

$$2(NH_4SO_4)H_2O = 2(NH_4HSO_4) + O.$$

and from the very strong evidence of free oxygen there can be but little doubt that, on solution, it reverts to the state of hydrogen sulphate.

Although at the present time we cannot pretend to have thoroughly tried the salt, we are yet prepared to testify that it fully answers the purpose for which it has been introduced, and, from what we have seen of its action, we believe it will eventually prove of great utility in other directions. We shall limit ourselves in the present article to a few remarks on the general behaviour of the solution. This we have employed at a maximum strength, as recommended by MM. Lumière, of five per cent., and this we find to operate with great regularity and fair rapidity, but its quickness of action depends very materially upon whether the film has been dried before application or not. A freshly developed and well-washed gelatine negative will, with the strength of solution we have named, show signs of reduction in less than a minute, but an old negative that has been some time dry will probably, even though well soaked first, be some time before it shows any sign of action. With a newly developed negative it is important that the hypo be first well washed out, otherwise the energy of the reducing solution will be expended on the oxidation of the fixing salt.

As regards the relative reducing action upon the lights and shadows, we can more than corroborate the claim put forward that it attacks the heavy deposit before it touches the finer detail. This phase is perhaps better studied in connexion with positive prints than with negatives, and tested in this manner we have found that the heaviest shadows of a dark dress can be reduced beyond what is necessary, and for practical purposes spoilt, before the most delicate details of white muslin are apparently touched. In another case a very old negative, probably fifteen or sixteen years old—a church interior with the window so hopelessly "halated" that not a sign of the tracery was evident—was submitted to the solution, with the marvellous result, after two or three hours' action, that every line in the window was visible and *printable*, while the faintest details in the under-exposed portions of the negative are preserved intact. A more severe and at the same time more satisfactory test could scarcely be applied.

While we thus freely speak of the capabilities of this salt as a reducer, it is just as well to look squarely in the face of possible difficulties or dangers. If we take the solution after it has been used for reducing, and add to it a drop or two of a solution of a soluble bromide or chloride, we get at once a copious precipitate of silver. What, we would ask, are the apparent chances of permanency of a gelatine film that has been subjected for any appreciable period to the action of a solution, however weak, of a silver salt? It seems that, in order to avoid ultimate change, the film, especially in the case of a paper print, should undergo a second fixing, or, at any rate, some kind of precautionary treatment. A P.O.P. print, reduced in a *fresh* solution, which would not therefore be heavily charged with silver, showed a distinct line when exposed for thirty seconds to sunshine partially covered with an opaque card, but the colour did not materially alter with longer exposure. This shows, however, that the danger is there, but in another article we shall in all probability have more to say on this part of the subject.

We may conclude by saying that, with the MM. Lumière's salt, we have not noticed in the slightest degree any of the staining or irregularity of action or softening of the gelatine alluded to by our esteemed friend, Mr. G. W. Webster, in our issue of July 8. Negative films as well as prints—P.O.P. and bromide—were left all night in a five per cent. solution diluted with an equal quantity of water, and afterwards washed for several hours. Although reduced to merely ghostly proportions, the toned prints having little but the gold image left, there is not the least sign of stain or irregularity amongst them, and, despite the lengthened immersion and subsequent washing, the film appears, if possible, to be harder than before treatment. We can only suppose that our friend has been using a preparation differing from MM. Lumières'.

Artificial Albumen.—At the recent meeting of the International Congress for Applied Chemistry, Dr. Leo Lilienfeld read a paper on "The Synthesis of Albumenous Substances," and demonstrated before his audience that by means of the condensation of phenol and amido-acetic acid with phosphoric chloride oxide, he could produce pepton, which is a substance that has hitherto been believed only producible from organic matters. Some of our daily contemporaries have had quite sensational articles on the subject, such as the production of "meat from chemicals," &c. There is no question that Dr. Lilienfeld has achieved a great deal that was before considered an impossibility, and thus added something to chemical science. But we imagine, notwithstanding the sensational articles in the lay press, that it will be a long time before chemically produced "meat" will take the place of our beef and mutton, or that artificial albumen will supersede the natural product of our old barn-door friend for our albumenised paper for photographic purposes. Still Dr. Lilienfeld must be credited with a great chemical achievement.

The Decompositions of Pyrogallol. — The actual chemical compound produced when pyro, in combination with an

alkali, is darkened by the absorption of oxygen, has been a subject of investigation among chemists, and is of interest to photographers in a twofold capacity: First as to its influence upon the nature of the image which, as we need scarcely remind our readers, consists, in the case of pyro development, of something more than merely reduced silver; secondly, on a point of personal comfort. If it were definitely known what the oxidation product consisted of, there might be some hopes of being able readily to get rid of the stains upon the fingers, and upon the linen of the user. M. Berthelot, in a recent communication to the Paris Academy of Sciences, following upon a previous one upon the same subject, finds, however, that the product in question is not a single compound of definite quality, but is of varied nature, according to the nature of the alkali employed, whether potash, soda, baryta, or ammonia. In this connexion it may be noted that, while in this country the use of baryta in the pyro developer is rarely if ever alluded to, there are in France many published formulæ in which its employment is indicated.

M. Becquerel's Dark Light.—We have on many occasions brought before our readers accounts of M. Becquerel's investigations into the radiations of what he terms dark light, which possesses properties very similar to the Röntgen rays, capable of the penetration of thick pieces of wood and other opaque bodies. He found, it will be remembered, that these radiations were inherent to the metal uranium and its salts in a very remarkable extent, and further investigations in the same field by M. and Madame Curie have led to the remarkable result of the probable discovery of a new element. These investigators had already discovered that certain minerals containing uranium and thorium (pitchblende, &c.) emitted the Becquerel rays to a marked extent. A large number of experiments were made in the endeavour to separate the particular constituent of the minerals alluded to that were active in the emission of the rays, and eventually a body was extracted which was more active than uranium to the remarkable extent of 400 times. The experimenters searched among all known elements for one that had an action at all comparable with this, but had no success, and they therefore state their belief that they have discovered a new element, and they propose to term it polonium (from the birthplace of one of them). The only objection to this theoretical body is that the active substance extracted does not give any spectral line except such as are due to impurities.

Portraits of Bismarck.—Bismarck is gone, and portraits, the last taken especially, are in great demand in all parts of Germany, as well as on the Continent generally, and here. The great artist, Leubach, of Munich, we learn, was commissioned to paint a portrait of the Prince on his deathbed. Bismarck, like the late Lord Beaconsfield, had a great objection to being photographed, though not to the same extent. We believe that the only published portrait of the late Lord Beaconsfield was one that was taken at the express wish of the Queen when he was visiting Her Majesty. The late Mr. Gladstone, on the contrary, had rather a *penchant* for sitting for his portrait, and its publication, and it was not difficult for any local photographer in the district in which he was visiting to obtain sittings. Hence the large number of portraits of him that have been published as compared with the other two illustrious statesmen.

The Ben Nevis Observatory.—In the Civil Service estimates in the House of Commons on Friday last, on the vote of 4,452*l.* for sundry grants in aid of scientific investigation, Dr. Clark moved a reduction of 500*l.* as a protest against the probable closing of the Ben Nevis Observatory, owing to want of funds. He thought it a scandal that so valuable a meteorological station should be dependent upon private generosity, and asked if the Government could not make a grant of 500*l.* for five years for its maintenance. Mr. Hanbury, in reply, said he sympathised with the hon. member, but it was a question of the proper allocation of the funds, and he would consider the possibility of a proper allowance being made to Scotland for the purpose they suggested. It will be remembered that a fortnight ago, when we mentioned that at the half-yearly meeting of the Scottish Meteorological Society, when it was stated that for want of funds the high and low levels of the Ben Nevis Observatories would have to be closed, the President remarked that he doubted whether any science of weather-forecasting deserving of the name was at present in existence.

Seeing that the Meteorological Department at Westminster costs the country some fifteen to twenty thousand pounds a year, some may ask, Do we get full value for our money? So far as the weather we have had, that is, no doubt, rightly recorded, for it is a thing of the past and easy of record, and may, perhaps, be useful in the future. But, in the matter of forecasts, those who give any attention to those supplied to the daily papers by the Meteorological Office have their own opinions, and strong ones too. Cannot something better be done in this direction for the same outlay? If it could be—and why not?—it would be of immense value to agricultural and shipping interests, and, we might add, to photographers also.

Experiments in the Air.—Last week, in the grounds of Shaw House, near Newbury, were commenced an important series of experiments by the Rev. J. M. Bacon and others under the advice and assistance of Lord Kelvin, Lord Rayleigh, and other scientists. Their object was to observe the effects of vibrations, acoustic, electric, &c., in the higher regions of the atmosphere. During a preliminary captive ascent Mr. Bacon succeeded in making a series of successful kinematograph exposures from the car of the balloon. Afterwards the balloon was liberated and an elaborate and carefully planned set of observations made. We need not refer to the results of a non-photographic nature, but may indicate the part photography is designed to play. Refraction of the atmosphere is to be experimented upon by means of a series of snap-shots of the sun as she disappears below the horizon. The spectrum is to be photographed below and aloft to determine the extent to which lines due to the earth's atmosphere are to be found at various altitudes. To investigate by photography the relative actual quality of the atmosphere at different altitudes. Finally, to attempt to photograph the solar corona from high altitude. The photographing of this phenomenon, so prominent a feature of the sun's margin during eclipses, has been attempted under ordinary conditions, but without practical success, owing to the glare of the atmosphere; the pureness and freedom from suspended particles of the atmosphere at great heights should lead to success in this direction it will be of the greatest interest to scientific men.

Weather Forecasts for the Present Summer.—A well-known humorist once wrote that "we should never prophesy unless we know," and some of the weather prophets of the year are already feeling the force of this dictum. For some weeks past we have had unprecedentedly fine weather, combined with, on many days, a very high actinic quality of light; yet, if we turn to *Symons' Monthly Meteorological Magazine* for June, we find a paper by Mr. A. B. MacDowell in which, basing his observations upon the rainfall at Greenwich since 1841, he finds that (1) in the first five years after a sunspot minimum there have always been more dry summers than wet, and that in each group of five consecutive years ending with a sunspot minimum year there have been (with one exception) more wet summers than dry." These facts point to a tendency to a wet summer this year! It seems probable that Mr. MacDowell will now have to tabulate two exceptions instead of one.

Royal Academy Keeper.—The election of Keeper of the Royal Academy, to which we referred a fortnight ago, and which took place last week, resulted in the appointment of Mr. Ernest Crofts, R.A. The vacancy was caused by the death of the late Mr. P. H. Calderon, R.A. Mr. Crofts was elected R.A. in 1896, and is a well-known painter of historical pictures.

Apropos of art matters, the Hampstead Art Society, have memorialised the Hampstead Vestry, urging the erection of an art gallery in connexion with the Central Public Library in the Finchley-road. The matter was referred to the Library Committee. Hampstead and district is the home of very many of our leading artists, and it is only appropriate that it should have an art gallery. If the Vestry entertain the idea, it is to be hoped that the residential artists, and included in them are some of the very first, will contribute liberally towards making the collection worthy of the neighbourhood.

By the way, the presentation print of the Art Union for this year is an etching by C. O. Murray, after a painting, *In Manus Tuas, Domine*, by Briton Riviere. Of late years, the presentation prints have been etchings, but formerly they used to be line engravings, and many of them are fine examples of the work of some of the best engravers we have had. Alas! line engraving seems, like mezzotint engraving, to have become almost a thing of the past. Photogravure, no doubt, has had much to do with that. A photogravure plate of the best kind can be produced in a few weeks, whereas a line plate, of equal size, cannot be produced within a year or two, and sometimes even longer time. Hence there has been no inducement to fill the place of the old style of engraving with new blood; and then, again, the cost. Still the old style is highly appreciated, as witness the prices that are often realised at auction sales. The Art Union have never seemed to have recognised photogravure. But why, it is difficult to say, seeing that high-class photogravures would be better appreciated by many of its subscribers than some of the pictures issued to them during the last few years.

JOTTINGS.

The silly season has begun. I observe it suggested that, as the Royal Photographic Society is shortly to take larger and more suitable galleries than those it at present occupies, for the purposes of its Annual Exhibition, the Photographic Salon should hold *its* Exhibition contemporaneously with that of the Society, and under the same roof: side by side, in fact. Now, the removal of the Royal Photographic Society's Exhibition to the Grafton Galleries or the New Gallery is practically forbidden by financial considerations. The Society cannot at present afford to pay more for exhibition space than it already does, and, as, of course, increased gallery room would mean increased expenditure, the chances of an advantageous change are clearly somewhat remote. Besides, there is the question of better meeting room and office accommodation than is afforded at Hanover-square to be faced before long. This is a matter of more importance than increased gallery space, for everybody realises that the Society badly needs a convenient and dignified house of its own, whereas the necessity for larger exhibition space is not at all acutely felt. The Pall Mall Gallery is not found to be inadequate to the Society's immediate requirements, although increased room, were it cheaply available, could doubtless be put to profitable use.

The notion that the Society and the Salon should hold two distinct exhibitions in one suite of galleries is not worth serious consideration. It looks like a *ballon-d'essai*, thrown up to see which way the wind blows. But I should not be surprised if the suggestion did not conceal a trap into which it is hoped that the Salon will fall, and so encompass its own destruction. There is not now so much difference in trend and style of work between the two Exhibitions as to make them sufficiently distinctive, sufficiently great in contrast, sufficiently opposed in totality of effect, for a sharp, clear line of separation to be drawn. Thus, assuming the joint exhibition idea to be carried out, it would be seen that the points of resemblance between the two would greatly outnumber the points of dissimilarity. There would then be practically a distinction, but no difference, and consequently one of the Exhibitions would be quite superfluous. One of them is largely so already, but it is kept alive by its geographical independence and other contributory features, the sacrifice of which would mean immediate extinction. I am well aware that, in tendering the Salon the useful advice not to fall into the snare that has been laid for it, I am postponing the period when it will be my pleasant duty to write its epitaph; but I can wait.

The free-portrait scheme has not been heard of lately in this country, but it appears still to be worked from abroad. It is a thousand pities there is not some representative photographic body whose duty it should be to warn the general public against parting with photographs to be copied in the expectation that a gratis enlargement is to be the reward of such trustfulness. The matter is essentially one that concerns professional photographers, for the artifices by which these free-portrait gentry only too frequently palm off ornate but cheap frames at fancy prices casts a reflection upon the whole of those who follow photography as a means of getting a livelihood. Nobody is so unjust or so ungenerous in his strictures as he who has been "had" with his eyes open, and there is no doubt that professional photography has to suffer a great deal in public estimation for the numerous frauds and tricks that are perpetrated in its name.

"A. L. D." last week (p. 512) stated that he had been called upon by the agent for a certain soap, who offered him one shilling and threepence per negative of each sitter presenting certain coupons, the negative to be subsequently used for enlargement. I understand "A. L. D." to complain that the price is low. So it is. Yet, on the other hand, one and threepence for a *carte-de visite* negative must be remunerative, judging from the fact that here, in England, ("A. L. D." dates from Scotland) three *carte-de visite* prints for one shilling, and three cabinets for two shillings are very commonly supplied at a profit. I presume in the case quoted retouching would not be included. If a photographer could only get enough of them to do, he might make a very comfortable thing out of taking quarter-plate negatives all day long at fifteen pence each. I could tell "A. L. D." a great deal about prices ruling in his profession which would convince him that the case he alludes to is not nearly so remarkable as he imagines it to be.

"Pictorial" and other self-styled "art" photographers will find some instructive if disagreeable reading in the paper on the Influence of Photography on Art by Mr. Prinsep, R.A. (p. 490). Mr. Prinsep does not know much about the details of photography; but he hits the nail on the head when he points out that the photographer is the slave of the mechanical devices he employs in producing his results, a fact sufficiently formidable enough in itself ever to preclude the possibility of photography being recognised as a fine art. Mr. Prinsep speaks as a common-sense artist. We want a few more such utterances to kill the pitiful self-delusions of which some "pictorial" or "artist" photographers are possessed. Let us be content to call ourselves photographers, the results we produce photographs, and the craft we practise photography, and drop the jargon of "art" and "pictoriality," and we shall speedily win the respect of painters and others, instead of provoking and hardening their contempt.

One of the sights of photographic London is the newest palace of King Kodak in Regent-street. In the bright, handsome, and delicately decorated saloons which the Eastman Company has here provided, you might fancy yourself the occupant of a beautiful Kensington mansion, rather than a commercial establishment devoted to the sale of photographic apparatus and printing papers. It has struck me that the pleasing effect of the enterprise of such houses as Messrs. Eastman, Messrs. Wellington & Ward, and others who have recently called in skilled decorative aid to enhance the beauty of their exhibition-installations, should convey a valuable lesson to the photographer in the design, furnishing, and adornment of his studio. Surely it is time that photographers generally endeavoured to impart an appearance, a sensation, of lightness, elegance, and refinement to their studios instead of obstinately clinging to the lumbering upholstery of the "pedestal" period? If I were going to start in business as a photographer at the West-end

of London to-morrow, I should take a leaf out of Messrs. Eastman's book and give somebody like Mr. George Walton *carte blanche* in the decoration and furnishing of my studios. The public is tired of photographic conventionality as it manifests itself in our portrait studios, and the man who realises the fact and makes a movement of originality will, I feel sure, find success awaiting him as a reward.

I have been sailing in Broadland for a few days. I own to having made an effort to forget a while how to spell the word "photography," and I did not take a camera with me. But, in my journeyings over the reposeful waterways of East Anglia, I saw innumerable amateurs armed—that is the word, "armed"—with hand cameras. You can always learn a little by watching other people doing something in which you happen to be interested, and one thing was borne in upon me as a result of my observations of these "enthusiastic amateurs" at work, and this was that the intelligent use of the hand camera is an accomplishment not largely possessed by the general public. Scarcely one in a score of those I saw photographing seemed to know how the camera should be held, and, judging from the majority of subjects that were exposed upon, most of the films and plates used were wasted. It might pay somebody to start a hand-camera school.

The man who cannot appreciate the rivers and broads of Norfolk and Suffolk hath no love of nature in his soul. The charm of the reed-bound dykes and streams, the silent broad, and the lonely mere, disturbed only by the pure music of the birds and waterfowl, grows upon one. I think it is about eleven years since I first began my East Anglian wanderings, and, after all that time, the mellow poetry of these marshland solitudes still has the freshness of a first impression, and no sound is so soothing to me as the sighing of the wind in the ronds. To the photographer there should be a special delight in cruising over the rivers of the English Holland, for is it not due to the greatest photographer of this generation—Dr. P. H. Emerson—that so much is known of the natural history of Broadland, and of the manners and customs of those that dwell therein?

COSMOS.

FOREIGN NEWS AND NOTES.

Enlarging from Film Negatives.—Dr. E. Vogel recommends the following procedure, in the *Photographische Mitteiungen*, for obtaining good enlargements from film negatives that show imperfections in the celluloid. Strip the gelatine film from the support by Lainer's method with an alkaline solution of formalin in the following proportions:—

Water	200 c. c.
Caustic potash, or caustic soda, of a solution 1 : 3	15 „
Formalin	4 „

After five to ten minutes' immersion in the above, the negative is transferred without washing to a five per cent. bath of hydrochloric acid. The negative should remain five to ten minutes in the acid bath, and may then be stripped. The stripping will be facilitated if the gelatine film has been cut through near the margin of each of the four sides before immersion in the formalin bath. The stripping should be done in the acid bath by rolling off the gelatine film with the fingers, and this should be done as soon as the film shows signs of leaving the support. Transfer the film to a dish of water, pass a glass plate beneath the film, and lift the two in contact from the bath. Shift the film to the edge of the plate and turn over a strip about a mm. in width. This will keep the film in position whilst it is stood up on the opposite edge to dry. With ordinary care this method of stripping is almost free from danger to the film.

Water Gas.—We read in the *Wiener Freie Photographen-Zeitung* that water gas has been adopted in one of the hospitals of that city for lighting and heating. Dr. Strache's system has been adopted, and it only requires the labour of two men to produce the ordinary daily supply. Its chief recommendations are its cheapness in comparison with coal gas, its whiter light when used with the incandescent mantle, the smaller amount of carbonic acid produced in burning, and the diminished risk of explosion. This gas has hitherto been shunned on account of its odourlessness, but this difficulty is removed by admixture with sufficient carbylamine to give it a characteristic smell. It also has the peculiar property of indurating the incandescent mantles. The mantles are consequently less fragile, and the glass chimneys may be dispensed with.

The Price of Platinum.—In the *Oesterreichische Chemiker Zeitung* Dr. Erdmann mentions as a cause of the fluctuations in the value of this metal, the variations in the rainfall in the Ural Mountains, whence the chief supplies are derived. Platinum is found in a very finely divided state, and is obtained by washing. The supply of water in the Ural district is precarious, and it is only sufficient for ordinary wants if there have been heavy continuous rains. When water is plentiful, the output of platinum is three times as great as in dry seasons, and prices are thus materially affected.

Orthochromatic Plates.—Professor H. W. Vogel, the father of orthochromatic photography, remarked recently, at a German Photographic Society, that few persons understood how to use colour-sensitive plates. In consequence of this, the advantages of orthochromatic plates were not fully appreciated, and they were not much used. If the coloured glass, or fabric, used for the dark-room light, allows the green rays to pass, the plates will certainly be fogged. The image formed by the yellow and red rays is slow in appearing in development, and the fear of over-density induces the photographer to transfer the plate to the fixing bath before the true colour effect is reached. Some commercial plates also leave much to be desired in the way of colour sensitiveness. Professor Vogel is of opinion that few photographers know how different is the effect of an eosine plate as compared with the ordinary dry plate.

Fluid Gelatine.—The *Photographische Chronik* mentions that a German patent has been granted for the preparation of gelatine fluid at ordinary temperatures as follows:—

Chloral hydrate	250 grammes.
Gelatine	400 „
Water	1000 „

After standing forty-eight hours, the solution is ready for use, and, if necessary, it may be cleared by decantation. The solution may be used for photographs.

Soldering Aluminium.—The *Photographische Chronik* publishes the following particulars: Twenty c. c. of chemically pure sulphuric acid are diluted with 100 c. c. of distilled water. Add 20 grammes of sulphate of zinc, and when dissolved also add 20 grammes of potash alum. After standing an hour, the solution may be filtered, but the longer it is kept before filtration the better will the solution be found. This solution is used as a flux. Very small pieces of zinc or tin are placed in contact with the parts to be soldered and moistened with the solution.

A Novel Application of Photography.—According to our Belgian contemporary, *Helios*, Madame Gratamagaska, known as *la femme pétomane*, has been accused by a fellow-artist of producing her deep trills by a mechanical device concealed in her pocket. As the lady could not be requested to refute the aspersion by demonstration in natural costume, the Judge exemplified his wisdom by deciding that a phonograph should be used to record the trills, and that photographs should be made of the waves of air produced by the voice, in the same manner as the air currents are photographed at the discharge of projectiles.

Lippmann's Colour Photographs.—Dr. Neuhauss, in his recently published work on this process, advises the use of albumen as a vehicle if photographs of the spectrum are wanted. The process is comparatively easy. Albumen to which ammonia has been added will keep a considerable time, and gives the best results when old. Take the whites of three hens' eggs, add two or three cubic centimetres of ammonia, and whisk completely to froth. Let the vessel stand until the albumen is again

fluid. The glass should be very carefully cleaned. Coat as with collodion, pouring off the excess into another bottle; turn the plate slowly on a whirler to equalise the film, but avoid extreme thinness of film. When dry, the plates will keep indefinitely. The excess of albumen poured off the plates must be filtered before second use. Sensitise in red or yellow light with the following silver bath:—

Distilled water	100 c. c.
Nitrate of silver	10 grammes.
Glacial acetic acid	10 c. c.

Leave the plates in this bath two minutes, wash for fifteen minutes, and then immerse successively for three minutes in each of the following baths:—

No. 1.

Water	200 c. c.
Alcoholic solution of cyanine (1 : 500)	1 „

No. 2.

Water	200 c. c.
Alcoholic soiution of erythrosine (1 : 500)	1 „

After whirling the plates stand them up in the dark room to dry. The sensitised plates will keep about a fortnight. The colour baths should be freshly prepared, and not used for more than six or eight plates. The silver bath may be used continuously if small proportionate additions of silver nitrate and glacial acetic acid are made. It must be kept perfectly clear by shaking up with a couple of teaspoonfuls of kaolin and exposure to light. Filter before use. For development prepare three solutions:—

A.

Water	100 c. c.
Pyrogallol	1 gramme.

B.

Water	100 c. c.
Bromide of potassium	10 grammes.

C.

Ammonia.

Take 5 c. c. of A, 7½ c. c. of B, and a few drops of C. When the image begins to appear, add a little more ammonia. The colours are more brilliant with the following pyro-carbonate developer:—

A.

Alcohol	100 c. c.
Pyrogallol	10 grammes.

B.

Water	60 c. c.	freshly
Ammonium carbonate	10 grammes	mixed.

C.

Water	10 c. c.
Bromide of potassium	1 gramme.

Take 7½ c. c. of A, 20 c. c. of B, 6 to 8 drops of C, and 30 c. c. of water. This developer is very slow, and requires fifteen to twenty minutes. Fix in an acid fixing bath.

VERTICAL COPYING.

A week or two ago, in the course of an able leader in this Journal, the writer recommended lantern slides and Christmas cards as a line well worthy the attention of the professional photographer, and he made many practical suggestions connected with those matters. In referring particularly to preparing lantern slides of diagrams, sketches, &c., copied from text-books, he expressed the opinion that some simple arrangement for holding the copying camera and the book to be copied was a *sine-quâ-non;* but his adaptation of a heavy board fitted with clasps of brass seems to me an exceedingly cumbersome and unnecessary arrangement, and I propose now to explain briefly a plan which I adopted some little time ago for work of a similar kind.

The method consists essentially of putting the book or other object flat upon the floor, and arranging the camera above, instead of in the usual horizontal position, which latter involves the necessity of placing the objects on end, a position often very difficult to manage properly without special apparatus. In vertical copying, however, the difficulty is not with the objects, but with the camera. It must be rigidly fixed exactly parallel above, and yet there must be full access to admit of focussing and for necessary operations. So long as the sketches, illustrations, or other objects to be copied, are simply for employment as lantern slides, the vertical copying arrangement is very simple indeed. The negative need not be larger than quarter-plate, in fact, the nearer it is to 3¼ inches square, the greater is the saving in expense, time, and trouble. A quarter-plate camera should therefore be used, and all we then need is a simple means of holding the camera in a vertical position, so that there is no interference with focussing and with the insertion of the slide.

Take a piece of firm deal or pine, from 26 to 30 inches long and from ⅜ to ½ an inch in thickness. Midway between the two ends bore a small hole to allow the tripod screw to pass easily through, so that the camera may be fixed in position firmly. These matters will be better understood



Fig. 1.

by reference to figs. 1 and 2. The next operation consists of screwing securely at each side of each end of the long rod a block of rectangular wood about 6 × 4 × 2, two blocks at each end, making four in all. The contrivance is then placed on two chairs, and elevated to the proper height by means of books or boxes. The object of the end pieces is to keep the apparatus from movement, and this is more effectively accomplished if some weighty article be placed on the top of all at each end after the camera has been fixed in position, and levelled by aid of a spirit level. It may be mentioned that, theoretically, the rod should be more than half an inch in thickness; but, since in practice the majority of tripod screws are not long enough to extend further than half an inch, some little sacrifice of absolute rigidity may have to be made.

To work the arrangement, sit on a chair or stool, and, in lieu of a focussing cloth, use a small cylinder of paper or cardboard about five or

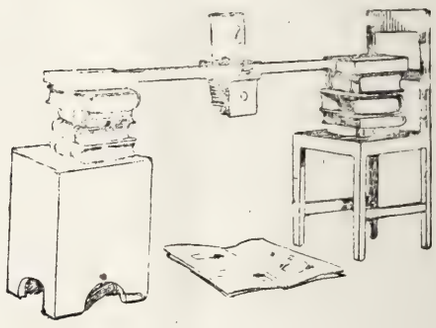


Fig. 2.

six inches high. The camera once fixed at the right angle is not moved, but the objects below, placed on a board or a sheet of brown paper are moved to and fro, or raised till the right position is arrived at. For copying very heavy books this method is far superior to working horizontally, and for a great many objects, such as mineral subjects, fossils, flowers, grasses, &c., it is almost a necessity. The advantage of such an arrangement will also be evident when dark days make artificial light desirable. An incandescent burner or two may be brought with facility to a suitable position for illuminating the objects, and their power can be increased by a mirror or sheet of cardboard. These things are easy to fix on the floor, but, when required at an elevation to suit the horizontal camera, all sorts of difficulties are certain to arise.

Percy Lund.

"DÉVELOPPEMENT CONFINÉ."

Captain Colson has been studying the effect of the depth of the developer on its action on the plate. A plate was exposed for a very brief time to a candle flame, and then placed in a very dilute metol developer, and on top of it was placed a plate exposed in the ordinary way, face downwards, so that the two films were only in contact at one end, whilst at the other they were kept apart by a small piece of wax 3 mm. thick. There was thus a wedge-shaped space formed which was filled with developer, so that it was possible to observe how the developer, which varied from 0 to 3 mm. in thickness, acted. In this position the plates were left without movement for one hour. Where the thickness of the developer was more than 1 mm. the image was fogged, and where thicker than this wavy and starlike stripes were found, which, as is well known, are readily formed when the dish is not rocked. All these faults disappeared where the thickness of the bath was less than 1 mm. The

best part of the plate was where developer was 0·5 mm. thick. With thinner films the development was weaker, but it was still noticeable on the edges of the plates where they touched. If the developer was less than 0·1 mm. thick, halos appeared round all the sharply defined tones. At the edges of the two tones, the darker obtained a darker rim and the lighter tones a lighter rim. With the plate that was exposed to the candle an even tone was not obtained, but the blackening increased with the thickness of the developer, and was almost nothing where the two plates touched. Under the thickness of 1 mm. there was developed, however, a negative of the plate that laid over it, because the developer was immediately robbed of its developing power by fully exposed parts, and was therefore not in a condition to here develop an equal fog, so that there was formed a fuzzy image corresponding to the greater or less quantity of the developer, which was exhausted by the upper plate. When a strong developer such as ortol was used there was formed a reversed image even with a thickness of 0·5 mm.

Founded on these experiments, Colson has now suggested a process of development to which he has given the above name, and which is carried out as follows: The exposed plate is soaked in water for one or two minutes, and then placed in a developer and covered with a glass plate, through which the appearance of the image can be seen. If the quantity of developer enclosed is too small to vigorously develop the image, the glass plate is lifted up for a moment and fresh developer allowed to flow over the negative and the glass plate again put down. If the plate is thoroughly damped, the glass can be readily lifted.

This method of development has a great advantage for line drawings and lantern pictures, as it gives extraordinarily clean pictures. With unknown exposures also it gives good results. Plates which are too hard may be developed soft and the process of development may be watched well. The same effect cannot be obtained by dipping the plate into the developer and taking it out, as the oxidation of the developer readily fogs the groundwork of the plate.

RÖNTGEN-RAY PRINTING.

M. Georges Izambard of Paris, who describes himself as a literary man, has devised the following system of utilising the X rays as the foundation of a method for superseding typographic printing. We give M. Izambard's description in full, and as nearly as possible in his own words.

The X Block-printing by Means of the X Rays.

I. Purpose of the Invention.

It is a new process for the simultaneous and instantaneous printing on both sides, by means of the X rays, of numerous sheets (of sensitised paper) superposed in quires or blocks (newspapers, trade papers, &c., whatever their size may be). It purposes to obtain new results analogous to those obtained as yet through typographic printing and other processes derived therefrom. It tends to suppress: firstly, composition; secondly, striking off by the printing machine.

1. It can suppress composition, it allows mere handwriting or any kind of writing machine to supply the place of the long, complicated, and irksome work of associating and disassociating printing types (composition and distribution). This will cause an economy of time and workmanship, inasmuch as a small number of workmen will be able to do more work in a few minutes than a large number in several hours.

2. It can suppress striking off by the printing machine. The operation of striking off, in spite of the progress realised and the marvellous improvements press machinery has received, remains, nevertheless, very slow work, the sheets having to be printed one by one. Nobody had yet come across the idea that a means might exist of printing them all at the same time. This means it is that starting from the known property of the X rays I have endeavoured to find. I cause these rays to act at one time on a block of sensitised paper, or even on several blocks placed circularly around the radiant centre, thence a new saving of time which the plainness of the working stock employed easily accounts for.

II. What Means does the Process Employ? The Ray-proof Ink, the Ray-proof Dust, the Type Screen.

The means thanks to which the X rays may be employed. I consider as the very substance of my invention; it consists in a ray-proof substance, be it an ink or a powder, with which characters are to be traced upon a screen. This screen I call "the type screen." It consists of a sheet of paper, pasteboard, thin wood, leather, or tissue, drawn over a framework. We place the screen between the radiant centre and the block of sheets we wish to act upon at one time. The characters alone, stopping the X rays on their way, will prevent their acting on the sensitive emulsion spread over every sheet of the block, whereas the remainder of the screen being of paper or wood will let the rays through easily as a plate of glass would any ordinary light, The type screen here plays about the part of what is called in photography a "phototype." In fact, the type screen will let the X rays through just as the plate or film of a phototype exposed in a framework will admit the white light or the daylight.

III. The Various Operations.—All the Sheets forming a Block Impressed at the same Time.—The Ray-proof Ink, the Type Screen.—Printing and Handwriting Reproduced.

We take some photographic paper which an emulsion has sufficiently sensitised (a gelatino-bromide emulsion, for instance). This paper must be cut out out into sheets of an equal size, which we will then superpose (the gelatinised side turned upwards) in order to form a more or less voluminous quire. This block having to be exposed to the X rays must be wrapped in black paper, in order that the daylight may not affect it. Before operating, we place above the block, as we would a screen, a sheet of paper, cardboard, or wood, bearing characters of a metallic substance. We can strike out of a sheet of metal the full or hollow characters we want and stick them on the screen in the desired order; but this would mean much time and patience. It will be better, in order to simplify our task, to compose a page of typography by means of ordinary printing types. We must ink this page and draw a proof of it on the paper or tissue of the type screen. Only, instead of smearing the inking roller with ordinary printing ink (of which the Röntgen rays would leave but insignificant traces on the sensitised paper), we must have recourse to a special sort of ink, much less pervious than this to X rays, and which must therefore be composed in greater part of metallic or calcareous ingredients. Thus, just as during the exposure the white rays are intercepted by the shades of the phototype, so will the X rays be during the radiographic process by the ray-proof ink (I shall not speak here of the composition of this ink, considering that I give later on all necessary information regarding it as well as the various manners of preparing it—as the possibility of substituting a likewise metallic or calcareous powder). We are equally free to fill up the page with handwriting, to use the pen or the brush in order to reproduce autographs, drawings, music, &c. We only have to dip our pen or pencil into the specially prepared ink, and, as before, the type screen, thus covered with ray-proof characters or lines, will give us after a few minutes', or even a few seconds', exposure to the X rays, as many proofs as there are sheets in the exposed block. The number of proofs thus obtained (which must next be "developed" and "fixed") will be in proportion to the time of exposure, to the thickness of the layer of ink, as well as to the radiographic "opacity" of this ink, to the thickness of the sensitised paper, to the degree of sensitiveness of the emulsion, and, above all, to the combined strength of our elements and induction coil and tubes, especially to the length of the spark given by the Rühmkorff coil.

Optional Use of a Writing Machine.—But why should we take the trouble to compose when any writing machine will do our work with an incomparably greater speed? We need only smear the machine's inking apparatus, be it a tympan or a roller, with ray-proof ink, to be able to draw in a few seconds an unlimited number of copies of the text which will have been directly printed upon the type screen. The idea we have had of using, instead of metal characters, a ray-proof ink, has alone rendered possible, and even easy, the assistance of a writing machine which until now would have been considered totally impracticable, because no other means of striking off was contemplated but the press, with which, indeed the use of a writing machine is incompatible.

The Sheets Impressed on Both Sides.—Until now we have only thought of impressing one side of the sheets contained in the block, the other not having been previously sensitised; and this with good reason, for, had it been otherwise, all we should have printed on the obverse would have more or less appeared on the reverse, but inverted, as a drawing on transparent paper would appear were we to look at it on the wrong side. This, however, can be avoided, the sheets remaining, nevertheless, liable to be impressed on both sides, and even simultaneously; to obtain this result, the lines on the odd page, instead of coinciding with those of the even one, must, on the contrary, alternate with them, the paper having been, of course, sensitised on both sides, not on its entire surface, but by parallel stripes, alternating from one side to the other, the lines of the obverse (sensitised) coinciding exactly with the space lines of the reverse (unsensitised unterlines), and *vice versâ*. In consequence, we must adopt a constant space between the lines. This space may be as wide as the total height of the type, or wider, but in no case narrower, or the tops and the feet of the letters would get entangled, thus producing a sort of "fulling."

To prepare the type screen in order to print the sheets on both sides, we write page 2 directly on the back and between the lines of page 1, or else we write page 2 on a separate sheet, which we stick on the back of the other, being careful, however, not to let the lines coincide. Likewise, placing this double screen in front of the block we wish to impress, and which is still protected by its wrapper, we shall have to take all necessary measures in order that the lines on the screen should coincide exactly with the sensitised parts which are to be impressed.

Final Operations: Automatic Developing, Fixing, and Rinsing.—I need not describe here the operations, which consist in developing and fixing;

these will take place in the usual manner, with use of the best adapted chemicals, doses, and methods. We must grant, however, that the time and care required to develop, fix, and rinse, as these operations are practised in photography in order to obtain fine proofs, may seem a hindrance in the present case. We must simplify the work, for the reproduction of a photographic page may be carried through with care and taste without requiring, nevertheless, the refinement that a work of art, landscape, or portrait, would. I will therefore point out, should speed be sought for, above all, the simplifying means that can be adopted in developing and fixing.

In a room lighted with a red light some large square vats will be prepared to receive the impressed blocks as soon as they have been rid of their protection wrappers. The bottom of these vats must be provided with taps to let the water run out, while a movable double bottom consisting of a metallic trellis will render the drainage easier. The developing and fixing liquids will, at the right moment and in the needed quantity, flow into these vats through a system of pipes laid on the sides, so as to supply a rotatory current. Other pipes will, in the same way, bring us the water required as well for the intermediate as for the final rinsings. After the suitable immersion, and the water having run out, the blocks may be allowed to remain in the vats, where they will drain through the metallic trellis; or else they may be conveyed into a room heated to the purpose, or even exposed to draughts of hot air. Their drying may also be hastened by the immediate neighbourhood of quantities of chloride of lime, which is known to absorb dampness very rapidly. We may let the gelatino-bromidised paper drying on over or in front of a clear fire, provided it has been steeped before the rinsing in a solution of ordinary formol at three per cent.; the gelatine becomes thus entirely insoluble.

No doubt that in some cases the very weight of the block may prevent the developing and fixing liquids from penetrating entirely between the superposed sheets. This inconvenience will be avoided if the sheets in the blocks are separated one from another by sheets of blotting-paper. The draught printing off by means of the X rays, as the subsequent bathing will not take us longer for this, as the block can be prepared beforehand in the manner we mention. In this case, however, they will, of course, contain half as much sensitised paper as before, their thickness remaining the same, and the number of drawn proofs will, in consequence, be smaller by half.

Printing in Black on a White Ground.—The actually manufactured (gelatino-bromide) papers and other similar ones used to reproduce phototypes give, as is usually said, a positive from a negative, and *vice versâ*, which means that the portions of their surface reached by the light blacken. If we make use of this sort of paper, our sheets will be printed in white characters on a black ground. Should we wish to obtain the opposite result, black characters on a white ground, we must add to the developer some product known to "upset" the image. Such products are mentioned in all the most recent photographic treatises. We might reach the same end by furnishing the writing machine with hollow characters (*caractères en creux*) instead of full ones (*caractères en relief*). It would then be the little square surface surrounding the letter that the ray-proof ink would cover and transfer upon the screen, the result being a black impression on a white ground, obtained on both sides of the paper as easily as on one alone.

It is to be remarked that (to produce a negative on the type screen, and consequently a positive on the sheets composing the block) we can take advantage of the well-known properties of bichromated compounds (gum, gelatine, or albumen), and obtain thus, with the help of photo-collography and without loss of time, the photo-typographic *cliché* we require, for, the radiographic ink we use being like printing ink, a fatty substance, will adhere as the former would to the bichromated parts of the sheet which will have been previously exposed to the sun. (See here below.)

The "Radiographic" or "X Ray-proof" Ink.—The composition of this ink will vary according to the use we wish to make of it, but in all cases it may be composed in greater part of a very divided metallic or calcareous powder, in order that it may form with the other ingredients a close mixture. To produce this powder we can use bronze or copper, white zinc, or white lead. For handwriting white lead in a solution of gum will be very suitable. The powder may be mixed preferably with boiled linseed oil for the writing machine or ordinary typography. White lead well ground down, as it is manufactured for painting purposes, will be found preferable. The various compounds may also contain some alkaline bromide, like bromide of potassium, which opposes a pretty strong barrier to the X rays. I form there a weighty claim regarding the appropriation of this ink to constitute what I call the type screen. There are two kinds of radiographic ink; one is fatty, the other non-fatty. Besides, we may add, with either in several cases, a bichromatic mucilage. But we need not do it always; not even with employ of the photo-collography, as in the following instance:—

Let us prepare, instead of ordinary ink, a bichromatic mucilage (that has not been previously exposed to the action of light) wherewith we write by means of a pen, or wherewith we print by means of a type-writing machine. We roll thereupon an ink-roller that is coated with fatty radiographic ink; therefore the letters, having not taken the fatty radiographic coat (by virtue of their preventive mucilage), remain alone permeable to the X rays, whilst all the page is elsewhere impermeable. Here is the requisite negative type screen for the printing in black on a white ground.

Another Way of Proceeding; the Impervious Powder Employed Separately.—One need not necessarily use a ready-prepared ink or paste; but wet the pen, the brush, the tympan, or pad, or ball, or roller, or ribbon of a type-writing machine with any unmetallised substance, provided it be sufficiently gummy or sticky and do not dry too quickly, say, as a solution of gum, a varnish, or ordinary printing ink. We then print the type screen, over which we next sprinkle the pulverised metal as we might to powder ordinary ink in order it should dry quicker. The powder adhering, of course, only to the inked surfaces, these become at once quite opaque. Should a little powder remain on the uninked surfaces, we remove it with bellows or by any other means of ventilation.

Printing on Large-sized Sheets.—If it is possible to impress simultaneously several blocks by means of a single tube, in some cases, on the contrary, we shall want several tubes to impress one block, and that will be when the size of our paper will be very large, offering a very extensive surface. Indeed the X rays emanating from a central point, and, as is well known, spreading in a straight line only, without reflexion or refraction, would strike perpendicularly the nearest parts, *viz.*, the centre of the sheet, and obliquely its furthest extremities. The perpendicular rays would impress the paper as desired, while the oblique ones, working their way in a straight line, would remove the reproduced image more and more from the centre as they penetrated further in the block, the last sheets of which would be covered with distorted lines and fringed letters, having perhaps so far lost their shape as to be unreadable. In short, these distortions would recall the spherical aberrations produced in optics by certain defective lenses. This defect might, in a certain measure, be remedied by curving the block provided with its type screen so far as to place all the points of its median line at an equal length of radius, in order that it should form a portion of a circumference, having the radiographic tube as its centre. This is, however, only shifting the difficulty, for theoretically we should have to give the block not a semicircular, but a hemispherical curvature. Fortunately, we can do better. If we have, for instance, a large-sized newspaper to print, we can set several induction tubes to do the work simultaneously, increasing, of course, at the same time their respective batteries. We must be careful, however, to separate the tubes from each other by sufficiently thick metallic partitions, in order that the rays, issuing from different sources, should not by crossing each other impede their respective effects.

Correcting the Proofs.—The proofs obtained with the type-writing machine will be almost faultless, provided we be sufficiently attentive. This is not the case with manual composition, where mistakes are often made in distributing, letters often placed upside down in the composing stick, &c. Nothing takes more time or is more wearisome than the overrunning required to correct typographic proofs, not to speak of the delays that may be consequent on a slip of a letter-packet, of a column or an entire page "falling into pie" at the last moment. With the new process nothing of the kind is to be feared. We scratch out on the screen the defective words and use the writing machine to write them over again, an operation which will leave no trace upon the proofs. Is an intercalation necessary? We use a second sheet of paper, upon which we write the lines and paragraphs required to complete the text, even as the additional readings proceeding from the authors. The passages which are to be suppressed or lengthened having been previously cut out of the text with a pair of scissors, we take advantage of the making-up and stick the corrected passages in the spaces left vacant for them. This will not require, as might be thought, a minute cutting-out; for, provided the additions be properly adjusted to the text of the proof, a little more paper than necessary for them to coincide exactly with the empty spaces may jut out without inconvenience, whereas all paper untouched by the ray-proof ink remains absolutely permeable to the X rays.

Making-up and Paging.—The properly called making-up is easy enough; it consists in sticking in a given order and dividing into columns and pages the proofs drawn with the machine according to the "measure" adopted; next, when superposing the twin pages which form the double screen, in alternating the obverse and reverse lines, as I explained before.

A Curious Cryptographical Appliance.—Governments and their agents might employ our process to print, under sealed envelopes, State papers, diplomatic documents, confidential circulars, in fact all so-called "secret" documents, which could not until this day be kept strictly secret, considering they had to be composed and struck by third persons. This is how to operate: The high functionary in his office need only use our ray-proof ink to write out with an appropriate writing machine his original text. He next encloses it (unfolded, of course) in a large-sized envelope or bag bearing his seal on one of its corners. It is then sent with his orders to the establishment appointed for official publications. There are kept already sensitived blocks of a known size and capacity, wrapped and sealed in an untearable wrapper. Before these we need only now place the envelope, sealed as it has remained, and expose the whole to the action of the X rays, in order to obtain the desired number of copies. The operation being thus centralised, all scattering avoided, and no third persons interfering, takes place rapidly enough to be super-

intended, from beginning to end, by the manager of the establishment, who is aware of his responsibility. Immediately afterwards, the envelope and the blocks, their seals yet unbroken, are returned to him who gave the order, and who may either do himself the developing and fixing automatic work, or let it be done before him in a dark room attached to his office; or, better still, enclose each paper in a thick envelope and leave the care of developing to the person to whom the circular communication is sent, what will certainly cost to them a less time than to read a cipher.

Recapitulation.—Any sort of writing machine, the inking roller of which is provided with a ray-proof ink, may serve to write on a single sheet ray-proof letters. This single sheet is placed as a screen between the X rays and a block of sensitised paper. Thereof results a simultaneous and instantaneous print-impression on numerous sheets; there remains to develop and to fix. Such is, in substance, my "block-printing process."

This elementary combination suffers different readings, viz.:—

I. If we use an ordinary writing machine, the characters of which are in *relievo*, a white text appears on a black ground, as would a negative proof; but, if we furnish the writing machine with characters in hollow, viz., if we reserve on the tip of the keys a little metallic cube, wherein the letters are scooped, indeed the type screen is figured by a continued series of lines, and the lines by a series of little opaque squares; each square in its middle contains a clear letter permeable to the X rays. It is really a negative, the final result, after the radiographic operation, will be positive pages, viz., a black text on a white ground.

II. If we use, to prepare the type screen, an unmetallised ordinary ink, provided it be sufficiently gluish, it will suffice to sprinkle pulverised metal over the screen sheet. The inked places will become thereby quite impervious to the X rays.

III. If we use, to write on the type screen, a bichromatised mucilage not previously insolated, and thereupon set in motion an inking roller coated with "fatty" radiographic ink, this fatty coating will adhere to the unwritten surface of the page, which becomes opaque, while the letters, not receiving this ink, remain permeable to the X rays. The text, as before, appears black on a white ground.

III. *bis.* Here, again, the metalline powder can be separately sprinkled on the screen, and adhere to the unwritten surface, the letters excepted, which will remain permeable and appear black.

IV. If we use for the blocks a paper partially sensitised on both sides, viz., by parallel allotments, alternated in order that the sensitised lines of the right page coincide exactly with the non-sensitised interlines of the back page, our blocks are thereby enabled to be impressed on both sides.

V. We are at liberty not to use one radiant centre alone, but may place suitably several induction tubes in front of one same block, separating the tubes from each other by metallic partitions. We shall thus print large sized-blocks, and avoid spherical aberration.

VI. We may, by virtue of our method, put in execution such-and-such an appendant operation as, for example, the copying of sealed documents on sealed blocks. There is the method with its different readings. Hereafter are the results.

The method gives us in general:—

Not merely, as with current radiography, some negative phototypes on glass or film, requiring a subsequent drawing or insolating, ... but even immediate positives on paper, without subsequent drawing or insolating, these copies being similar to those obtained by the printer's work, and as readable, as numerous, but rid of typographic composition and press machinery, and therefore more rapidly produced.

The method gives us in particular:—

Not merely, as with current radiography, (*a*) drawn silhouettes of opaque bodies or autographical writings (*b*) in white strokes on a black ground (*c*) on one side alone (*d*) on small-sized sheets, ... but also (*a*) characters printed with the writing machine (*b*) in black on a white ground (*c*) on both sides (*d*) on large-sized sheets, as used for newspapers, and so forth.

The method is therefore a combination of various means, some of which are already known, others either entirely new or renewed by partial improvements, but aim all, however, at an entirely new result, "the simultaneous and instantaneous printing of numerous sheets."

SKETCH-BOOK OR CAMERA?

THE *Daily Chronicle* of Monday last contained the following article suggestive of the theory that the camera is supplanting the sketch-book:—

The cheap facility of the snap-shot camera is an excellent thing—especially for illustrated papers—but it involves a social risk which it is just as well to recognise before it is too late to think of remedies. Our grandmothers were assuredly not as artistic in their instincts as we might have wished. But at least they had this inducement to do their little best in drawing and painting, that they could get no personal record of things and places they had seen except by "sketching" them for themselves. The efforts they made were often pathetic, and sometimes appalling. But that was the fault of their teachers, and of the deadness of "early Victorian" public opinion in these matters. We have changed all that. An unkempt boy or girl in the Board school of a London slum can get teaching which is excellent, as the recent astonishing exhibition of work at the Hugh Myddelton School made evident to everybody. The teaching has become good, not by any mystery of genius, but by the mere application of common sense, which is usually one of the last qualities to be applied in matters of professional reform. But now that we have sane teaching, and a considerable opening for "design," and a comparatively favourable state of public taste and opinion, a deadly danger threatens us. Any fool can take a snap-shot; and myriads do. That is infinitely swifter and simpler—cheaper, in a word—than even the slightest personal note. Is it not much to be feared that even the children in whom we have trained eyes and hands to a very tolerable point, and in whom a certain observation of nature and a certain love of beauty has begun to bud, will spoil it all when they arrive at the years of indiscretion, by exchanging the sketch-book for the camera?

It used to be supposed that the capacity to draw even a fairly probable flower was wonderfully rare, and that it was almost a mark of genius to be able to make a serious sketch. And, in fact, while our methods of teaching were bad, it did require some natural gifts to surmount the curious obstacles which were carefully placed in the pupil's way. But the supposed rarity of the power to draw is quite imaginary. All children, with a little encouragement, will try to draw. It seems to be a natural development of their devouring zeal for imitation in every form. Moreover, there are probably few bright children, if there are any, who cannot, with a little pains and patience, be got to draw simple objects from nature with very passable truth. At the outside, no doubt, they will fall into the fallacy of trying to draw not what they see, but what they think they ought to see. A table has four legs; therefore, if they draw a table, they must put in the four legs somehow, even if they have to stick the furthest one in any comic and impossible position. But once they have been persuaded that what they have to do is only to put on paper what their eye actually does see, and have been shown in a few simple cases what that is, and how they may seize the more characteristic points in it, then they can almost teach themselves. The very fact that their drawings grow visibly better under their eyes is a delight to them and a stimulus to further efforts. Children who hate to draw generally hate it, for the very proper reason that they "cannot make the things come like." The moment they see a chance of realising the delights of artistic reproduction, they are just as keen about it as more gifted persons, since the desire to imitate, for some mysterious reason, is inborn in the race, and the instinct that makes it amusing to draw the outline of a beast is as old as Palæolithic man.

It will be a thousand pities if either cheap photography or the devouring claims of bread-and-butter designing should kill down the wider chances which the growing generation has at last obtained. Of us who are older, few had any decent chance of learning to use a sketch-book intelligently, unless we got it after our school days were over by special trouble. The school children of the present ought to be able with great ease to draw an animal or a plant, a cottage or a landscape, whenever they choose. They will probably be glad enough to do such things for recreation on rainy summer days, if their elders have the sense to put them in the way of it. They will gain by it not only an intelligent pleasure, but also that intimate familiarity with nature which in a civilised and hurrying generation it is so wofully easy to lose. And they will help insensibly to make the cultured public opinion, in which alone it is possible for real art to live.

A PHOTOGRAPHIC TOUR—PAST AND PRESENT.

HAVING perused with much interest the article by Richard Penlake in the last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, I herewith offer some remarks contrasting the past with the present conditions of a photographic tour through Egypt and Syria.

In the year 1856 I accompanied the late Francis Frith in a journey through the above countries. We were fully equipped with all photographic apparatus and necessaries. This was in the early days of the wet-collodion process. We did not anticipate much in the way of successful results, for, as far as we were aware, we were the first to carry the process into hot countries. Bottles with glass stoppers were not suitable for containing collodion, as no such stoppers will prevent evaporation in these excessively dry regions. Our stock was therefore contained in numerous small bottles closed with the best picked corks.

From the delays occasioned by adverse winds, or their entire absence, our journey up the Nile was long and tedious, but, being anxious to reach our destination, we did not occupy time by attempting to take a single picture on the way. At length, having reached Wady Halfa, we made the first essay on a view of the rock and river scenery above this—the second cataract. We pitched our small black developing tent on the sand. Soon the temperature therein registered 114°. The first bottle of collodion uncorked popped like ginger-beer and its contents bubbled on the plate. After ten seconds' exposure the developed picture was all in a fog, and filled with pinholes from sand dust. This caused us some apprehension as to ultimate success. However, we next well watered the sand within and around the tent, and spread a wetted white sheet over

it, and, after the next exposure of only four seconds, succeeded in obtaining a satisfactory picture. After this we never had a failure, and, on account of the certainty of the glorious light from cloudless skies, we obtained without an impediment the whole series of temple and other views down the river; on our way back to Cairo, we met with no interruption or disagreeable incident, for even then Egypt was the land of the free for travellers, we were quite at liberty to go where we liked and do just as we pleased. After taking views (during which we were never mobbed) we prepared for the journey through Syria and Palestine. Only at Jerusalem were we hindered from getting any near pictures of the Mosque of Omar, as some furious fanatics were sure to rush out and savagely beckon us away. This opposition had nothing to do with photographic-picture taking, as they knew nothing about this. At that time death was the penalty of any Christian caught in the interior, but it now appears, by the narrative of Mr. Penlake, that this prejudice of the departed old ones may be quite overcome by the influence of the all-potent backsheish. We travelled leisurely through all the districts named by your correspondent, taking photographs of every city and place of interest, with some adventures, but not any unpleasant incidents connected with photography, for neither the authorities nor the natives had as yet even heard of this art. A straggler would now and then look at the view on the ground-glass screen. They evidently considered us as "Mageroons" (fools or madmen), amusing ourselves with some sil'y plaything.

We traversed the valley of the Jordan from the Dead Sea to its source at Banias, with all the superb oleanders in full bloom (a little paradise for snakes and lizards). All the water obtained from the Jordan was slightly brackish, and rather unsuitable for washing our negatives, as it caused a milky deposit of chloride of silver. The Nile water when filtered was perfectly pure and suitable for this purpose.

Throughout this part of our journey, we were not much importuned for backsheish, and seldom gave any, as the idea had not yet occurred to any one that we could be doing that which might bring a profit.

At Baalbeck a few idlers thought they might signalise and honour our arrival at the ruins of the temple by getting up some kind of demonstration, so they previously lighted a bonfire composed of dung. As we found the dense and disgusting mal-odorous smoke from this obscured the prospect from our best point of view, we at once knocked the pile to bits. This caused some irritation, but we easily got them into good humour again.

At present, since that time, now that the object and occupation of the photographer is generally understood, it appears that he has to pay heavy backsheish at every place that he visits. I may mention that we had passports, including a special licence to carry arms and ammunition. These were viséd at various places at a fee ranging from one to two shillings, but were not always signed with the local Arabic seal; in these cases perhaps they were not able to read.

F. H. Wenham.

AN AUSTRALIAN TRAVELLING STUDIO.

In a recent issue of the *Australian Photographic Journal* there are some illustrations of the West Australian timber industry, from photographs by Messrs. Shaw Bros., Albany, Western Australia. One of the pictures shows the photographic encampment, the presence of printing frames on the ground pointing to active photographic work to be in progress. A dog and a man adorn the rural scene, in the background of which one sees a substantially built tent with "Shaw Bros." inscribed upon it, and the firm's profession indicated by the drawing of a mug and the word "fakers" in close juxtaposition—"mug-fakers." Concerning the peripatetic firm of Shaw Bros., the editor of our contemporary makes the following remarks:—

"A glance at our illustration of Mr. Shaw's travelling 'studio,' at present pitched in the wilds of a Westralian 'karri' forest, reveals to any one who can decipher the hieroglyphics on the dark room that the subject of our article does not arrogate to himself the proud title of 'artist photographer,' generally sported by his peregrinatory brethren; but, as a simple 'mug-faker,' enrols himself among the humblest of the shadow-catching fraternity. As a mere 'Jack-of-all-trades' who, during a somewhat varied and adventurous career, afloat and ashore, has tried some fifty odd different occupations, but none which he disliked less, he disclaims any pretensions to pose as an authority, except perhaps on photography under difficulties, and some painfully purchased experiences in the 'how-not-to-do-it' direction.

"Until on the point of sailing for New Guinea for the third time, on this occasion as leader's assistant on an exploring expedition organized by the Royal Geographical Society of Australasia, the subject of our notice had no acquaintance whatever with what it is now libellous to term 'the black art;' moreover, he confesses having previously entertained that lofty contempt for its powers, more or less assumed by all who can with any facility parody nature with paints or pencil. Another member of the party, however, who has since obtained some notoriety in connexion with Australian exploration, taking charge of the 'art' department, it was suggested to Mr. Shaw that he should undertake photography. As he had never before declined any 'job' except bullock-driving, which he refused simply on the score of linguistic inefficiency, Mr. Shaw at once accepted the *rôle*, and, after the purchase of an outfit and one or two very elementary lessons from the Museum operator, behold him henceforward the slave of the three-legged tyrant.

"Space does not permit any detailed account of his pictorial exploits in the interior of the dark island, but since then he and his two brothers, of similar Bohemian tastes and tendencies, who contracted the plate-spoiling fever from him, have travelled nearly all over Australia and South Africa, in covered waggons drawn by horses or bullocks, among the stations out back or through the wilds of Mashonaland, in Rob Roy canoes on all the principal rivers, in all manners of conveyances, from tandem sulkies to tip carts, and even on the ubiquitous 'bike,' but seldom without a camera, and generally depending upon it for a living.

"About two years ago Mr. Shaw and one of his brothers settled for a time in Sydney, making a speciality of marine and quick animal work. Our readers may remember a sample of their work in the form of a flight of carrier pigeons taken on the wing in the one-thousandth part of a second, reproduced in these pages, and exhibitors can hardly fail to have noticed their names on the prize-list on the rare occasions when they competed.

"However, the *cacoëthes vagandi* again asserted itself, and they are now both running Westralian branches, while the third brother hangs out the shingle of Shaw Bros. somewhere in Central Africa."

THE THORNTON-PICKARD COMPETITION.

The last date on which the Company can receive competing pictures for inclusion in their 200*l.* prize competition is September 1. They are receiving prints for inclusion in both classes from many different parts of the world, and are anticipating that they will have a large assortment of beautiful and interesting pictures. The following are some particulars of the competition for which 200*l.* in prizes are offered:—

Class I.—100*l.* will be given in prizes for the best sets of instantaneous photographs taken with the Thornton-Pickard "Amber" or "Ruby" camera and shutter.

Class II.—100*l.* will be given in prizes for the best sets of instantaneous photographs taken with the Thornton-Pickard shutter.

50*l.* of each 100*l.* will be paid in cash, the remainder in apparatus of the Company's manufacture.

Class I.—For photographs taken with Thornton-Pickard camera and shutter. First prize, 50*l.* in cash; second prize, 25*l.* in apparatus; third prize, 10*l.* in apparatus; three prizes of 5*l.* each, 15*l.* in apparatus.

Class II.—For photographs taken with Thornton-Pickard shutter. Any make of camera, including hand cameras, allowed. First prize, 25*l.* in cash; second prize, 15*l.* in cash; third prize, 10*l.* in cash; fourth prize, 5*l.* in apparatus; ten prizes of 3*l.* each, 30*l.* in apparatus; fifteen prizes of 1*l.* each, 15*l.* in apparatus.

The principal rules are as follows:—

Quantity of Prints.—The prizes are offered for sets of prints. Each set must consist of four prints from different negatives. Any number of sets may be entered in either class. They may all be different subjects, or a series of the same subject in different styles or positions, but must be instantaneous exposures.

Size of Prints.—The prints may be any size, but must be printed direct from the negatives. Enlargements not allowed.

Mounting of Prints.—All prints must be mounted; this may be done in any way the competitor desires, but framing is not allowed.

Printing Process.—The pictures may be printed by any process, on any kind of paper, but transparencies are not allowed. Composite negatives or printing from two or more negatives not allowed.

Retouching.—Ordinary spotting of defects on the prints or negatives will be allowed, but retouching will result in disqualification.

Winning Pictures.—These prints will become the absolute property of the Thornton-Pickard Manufacturing Company, Limited. The negatives are to be loaned to the Company upon request for six months, during which time every care will be taken of them, but the Company cannot accept any responsibility for damage. The Company reserves the sole right to publish these winning pictures, and to use them for advertising or other purposes.

Successful Competitors will require to furnish such information as may be deemed necessary, as a proof of *bona fides*, and to submit the apparatus tor inspection; also to state when and where it was purchased, if desired. The Judges may require the negatives to be produced for inspection upon request before making their final decision.

Apparatus Used. — Intending competitors in Class II. may use any make of camera (including hand cameras) provided the genuine Thornton-Pickard shutter is used to take the photograph. Intending competitors in Class I. must use both Thornton-Pickard camera and shutter. Either the "Amber," "Ruby," or any other pattern of Thornton-Pickard camera may be used.

No competitor can enter in both classes.

The copyright of the winning pictures shall be vested in the Company.

Our Editorial Table.

The Busch Lenses.

The Rathenow Optical Manufacturing Company (late Emil Busch). Wholesale Agent: H. F. Purser, 33, Hatton-garden.

The Busch lenses have been well known on the Continent and elsewhere for many years, and, in placing them on the British market, Mr. Purser points out that the reputation of the firm was chiefly gained for Petzval and wide-angle lenses. The list before us illustrates and describes lenses of the symmetrical, portrait, hand-camera, and wide-angle series, together with various other optical productions. Special prominence is given to two series—the Rapid Aplanat, and the Detective Aplanat. We critically examined the image produced by a lens of the first-mentioned series, and were highly pleased with its optical qualities. At full aperture, *f*-8, an eight-inch covered a half-plate exceedingly well, the curvature of field being small, while we were agreeably surprised at the noticeable absence of astigmatism. Nothing finer in the way of definition could be desired. The lens has obviously been well corrected, and its good qualities combined with its cheapness should make it popular. The Detective Aplanat series is designed for hand-camera and stereoscopic work. The shorter foci objectives work at *f*-6, and at that aperture a $4\frac{3}{4}$, as might have been expected, perfectly covers a quarter-plate. Jena glass is used in the construction of the Busch lenses, which are well finished, the surface polish of the glasses being very high. They strike us as very admirable optical productions, and have, doubtless, a great future before them.

Samples of Mounts.

George Houghton & Son, 88 and 89, High Holborn, W.C.

Messrs. Houghton have sent us for inspection a large assortment of samples of mounts, all exhibiting tastefulness of design and tone. They include slip mounts with fancy g. b. edges for small photographs. grey embossed folding slips, stock mounts in view and portrait sizes, plain and gold bevelled, plain embossed, plate sunk, India tint, and many other varieties. There is something in this selection to suit all styles of photographs and idiosyncrasies of taste.

"Sepac" Retouching Medium.

Manufactured by The Sepac Company, 4, 5, and 6, Fletcher's-buildings, Chester.

If all the special preparations of the recently formed Sepac Company are as good as this retouching medium—a sample of which we have recently tried—then will that Company deserve extremely well of its own *clientèle* and the photographic world at large. There is always room for photographic preparations of the highest class, the outcome of practical experience. The Sepac medium gives a perfect surface for taking the pencil, and it seems difficult, if not impossible, even under conditions thereto most favourable, to displace the retouching when once it has been applied. An expert retoucher, to whom we have submitted a sample of Sepac medium, speaks in the highest terms of it. The medium has an amber basis, and its good working qualities should make it popular among retouchers.

Lantin's Albumenate Emulsion Paper.

Agent: C. A. Rudowsky, 3, Guildhall-chambers, E.C.

This paper, as its name would seem to imply, is, doubtless, prepared by an emulsification process. The film possesses all the best characteristics of a high-class albumen paper; it is even and strong, does not blister, and has a fine semi-matt surface, while it may be handled without fear of easily damaging the prints. The results we obtained on the paper were of the highest class, and quite comparable to the best effects yielded by other silver printing-out processes. The treatment and toning formulæ recommended are of the usual types, with the exception of the following:—

Stock Solution for Warm, Brown, and Purple Tones.

Acetate soda	10 grammes.
Distilled water	1 quart.
Sulphate of copper (solution 1 : 1000)	5 grammes.

Take, twenty-four hours before use, as much as is necessary for toning, and add—

Stock solution	100 grammes.
Chloride of gold (solution 1 : 200)	5 ,,

After using once, make up with stock solution as much as is required, and add sufficient gold solution at least six hours before use. When the bath is discoloured, throw away.

From Mr. Wilfred Emery of 3, Soho-street, W., we have received a sample of pyrogallic, which appears to be of great excellence for development purposes. The same gentleman has also shown us a half-plate "Apek" camera. This is very portable and compact, has all essential movements, and is cheap.

Jahrbuch für Photographie und Reproductionstechnik für das Jahr 1898.

Verlag von Wilhelm Knapp, Halle a/S.

Dr. Eder's annual will be welcome to all who are interested in the technical aspects of photography and the various mechanical printing processes. It gives a record of the progress of the year in each department, and a number of valuable original articles. Dr. M. von Rohr contributes an article on the "Optics of the Planar Lens." A. and L. Lumière and Seyewetz give an account of researches concerning the chemical constitution of developers. J. Gaedicke writes respecting the influence of higher temperatures upon the latent image. There are also a number of articles on radiography by Dr. Leopold Freund, Professor A. Soret, Hofrath O. Volkmer, and others, and many interesting contributions respecting photo-engraving, three-colour printing, and other methods of reproduction. We would suggest a revision of the list of English publications, some of those given being mere advertisements, and we note that The British Journal Photographic Almanac is still attributed to the late Mr. J. Traill Taylor.

Bonnie Scotland's Resorts.

Published by Higgie & Co., Rothesay and Glasgow.

The tourist in Scotland will find this little compilation, which, though occupying over 120 pages, will slip easily into the waistcoat pocket, of great assistance to him in his wanderings. It gives brief notes relating to the more salient characteristics of the principal points of attraction in Scotland.

We have received the Proceedings and Transactions of the Croydon Microscopical and Natural History Club for the year 1897-98. The volume contains some interesting papers and data on scientific subjects. The Club, as is well known, has a photographic section, to the excellent work of which there are numerous references.

News and Notes.

Photographic Club.—Wednesday evening, August 17, at eight o'clock. Discussion: "The Influence of the Small Camera upon Pictorial Results."

Chemicals and chemical and medical preparations exported from the United Kingdom in the half-year ending June 30 amounted in value to 4,391,846*l.*, as against 4,631,705*l.* for the same period of 1897, a decrease of 239,859*l.* On the other hand, the exports for the month of June show an increase of 50,030*l.*, the total value for the month being 678,061 in 1898, and 628,031*l.* the previous year.

The Patent Office.—During the rebuilding of the Patent Office (old block), the business of the library is being carried on in premises situated in Chichester-rents, Chancery-lane, and the specifications, books, and other works of reference have been removed there. The office for deposit of applications for letters patent, inquiries, &c., has been transferred to the new buildings in the Garden-court, Staple Inn.

A memoir has been presented to the Paris Academy of Science by M. P. Curie and Mdme. S. Curie, on a new radio-active substance present in pitchblende, which is believed to be possibly a new element. It is said to have a much greater effect than uranium, as described by Becquerel, and the authors conclude that it is a new metal, and suggest the name Polonium, as an indication of the country from which the pitchblende was obtained.

City of Belfast Y.M.C.A. Camera Club.—The Fifth Photographic Exhibition will be held in the new halls of the Young Men's Christian Association, Wellington-place, Belfast, from October 24–29. The opening ceremony will be performed by the Right Hon. the Lord Mayor. Four gold, eight silver, and seven bronze medals will be offered for competition. Entry forms and all further information can be obtained from the Hon. Secretaries, Messrs. J. M'Cleery and H. Rew, Y.M.C.A., Wellington-place, Belfast.

It is said that one of the frauds practised in Spain is the imitation of well-known articles of British manufacture. The labels of these goods are printed in such a manner as to lead the confiding public to believe they are purchasing the products of the best known British firms, whose name appears on the label in large capitals. A close inspection, however, reveals the words "better than" printed in small type above the firm's name, while the actual manufacturer's name is so written as to deceive many purchasers.

The Picture-sale Season.—The picture-sale season just concluded has been relatively uneventful. True, a very decided appreciation has taken place in the auction value of outstanding works by Rossetti and the late Sir Edward Burne-Jones, and Millais' *Order of Release* made as high a sum, 5000 guineas, as has ever been paid for a work by him. On the other hand, no sensational prices can be recorded for examples by British portraitists, nor have any canvases comparable in importance with the four Turners, which in the Pender sale of 1897 brought over 30,000*l.*, come under the hammer. Moreover, instead of thirty-two pictures, as was the case last season, having been knocked down for 14,000 guineas or upwards, no more than sixteen dispersed since January 1 reach or exceed this limit. Of these, three are by foreign masters, four by British portraitists, and the remaining nine, including the *Mirror of Venus*, the *Chant d'Amour*, and *Love and the Pilgrim*, by Burne-Jones, may be classed as subject pictures by native artists.

A COMMERCIAL "INTELLIGENCE" DEPARTMENT.—There was issued on Tuesday week, in the form of a Blue Book, the report of the Departmental Committee appointed by the Board of Trade to inquire into and report upon the dissemination of commercial information and the collection and exhibition of patterns and samples. The Committee recommend the establishment of an office, whose function it shall be to meet the constantly increasing demand for prompt and accurate information on commercial matters so far as it can be met by Government action.

A "NEW" THEORY ON SUNLIGHT.—We extract the following from a daily contemporary: "A new theory regarding the sun has been introduced by a New York scientist, Mr. Francke L. Woodward, who has been making some experiments regarding the nature of sunlight. He claims that the sun is a great cathode machine, throwing off X rays. As the result of this theory, he holds that the space between the earth and the sun is quite dark, bearing out the Scriptural idea of the "outer darkness," even the sun's rays being invisible until they come in contact with the atmosphere of the earth, which acts in exactly the same way as the fluorescent screen, and causes illumination. As a deduction from this theory, Mr. Woodward considers that comets are not fiery nebulous masses, but 'simply detached portions of atmosphere illuminated by the passage through them of the X rays of the sun.'" It appears, however, that the new theory was first propounded by an English physicist in the *Electrical Review* during January, February, March, and April of this year. The American, Mr. Woodward, has simply confirmed the original English theory.

PHOTOGRAPHIC EXPERIMENTS IN THE AIR.—The investigations which may be described as researches into the effects of the atmosphere on various acoustical and electrical effects commenced recently from the grounds of Shaw House, near Newbury. The experiments were carried out under the direction of the Rev. J. M. Bacon, Dr. R. Lachlan, Mr. J. N. Maskelyne, and others, with the advice and assistance of Lord Kelvin, Lord Rayleigh, and other scientists. The balloon was in charge of Mr. Percival Spencer and his brother, and was filled with 40,000 cubic feet of gas. During a preliminary captive ascent, Mr. Bacon succeeded in taking some excellent photographs from the car with a kinematograph. The main object of the experiments was to discover in what measure the intensity of sound is influenced by altitude, by the presence of clouds, &c. The ascents will be repeated at intervals, so far as funds will go, and the following are the photographic items of the programme: To look for alleged markings on the surface of Venus; to note any darkening of the sky in ascending; in regard to refraction, to take snap-shots of the sun disappearing below sea horizon at known times and altitudes, with simultaneous temperature measurements; to observe and photograph the spectrum below and aloft, determining the proportion of telluric lines, &c.; to investigate by photography the relative actual qualities of the atmosphere at different elevations; to attempt to photograph the solar corona from high altitudes; to make certain meteorological observations.

IN the forty-fifth report of the Department of Science and Art, it is stated that, during the decennial period from 1888 to 1897 there was a considerable increase in the number of schools, of classes, and of pupils under instruction in science; but, as compared with 1896, the number of schools decreased in 1897 by 159, while the number of pupils increased by 3442—from 194,354 to 197,796—and the number of classes in different branches of science decreased by 1398—from 10,500 to 9102. These last figures, the report states, are of no significance as a means of comparison, owing to the increase in the number of schools of science—formerly termed organized science schools—the separate classes in which are not counted as separate classes in the above figures. The decrease in the number of schools is, no doubt, largely due to the absorption of the smaller schools in the larger and better-equipped schools maintained or established by local authorities under the Technical Instruction Acts. But the increase in the number of students under instruction—the really important factor—is a satisfactory indication that the value of the instruction given in these schools continues to be appreciated notwithstanding the great increase of classes in more specially technical instruction. The number of individual students examined was 101,526, against 99,818 in the previous year; the number of papers worked was 151,212, against 152,630; the number of papers passed was 62,261, against 62,886; and the number of first classes in the elementary and advanced stages was 43,073, against 41,419. The payments to science schools on results and attendances amounted in 1897 to 172,495*l.*, and in 1896 to 157,916*l.* In the art division during 1897, in 20,493 elementary day schools, 2,286,431 scholars were taught drawing and examined—an increase of 332 schools and of 36,361 scholars. There were also 17,841 pupil-teachers and ex-standard scholars examined. The grants amounted in 1897 to 181,065*l.*, and in 1896 to 176,224*l.* In 1083 evening continuation schools 51,633 scholars were taught drawing, the grants earned amounting to 2702*l.* In the previous year the figures were 873 schools, 40,459 scholars, and grant 2105*l.* Classes for manual instruction in connexion with 1271 elementary day schools were examined and earned 25,781*l.*, on account of 106,423 scholars—a large increase. The number of art schools examined was 1849, against 1851 in 1896, and the number of students was 146,720, against 146,193. Of the 146,720 students, 142,293 were of the industrial class. The expenditure of the Science and Art Department during the year 1897–98 was 814,862*l.*

Patent News.

THE following applications for Patents were made between July 25 and July 30, 1898:—

APPARATUS.—No. 16,212. "An Improved Photographic Apparatus." P. DONNY.

MEMORIAL TABLET.—No. 16,237. "The Photo-memorial Tablet." B. BULL.

CAMERAS AND ROLL-HOLDERS.—No. 16,250. "Improvements in Photographic Cameras and Roll-holders therefor." N. CARMICHAEL.

CAMERAS.—No. 16,256. "Improvements in or relating to Photographic Cameras." Complete specification. Communicated by the Kozy Camera Company. A. J. BOLT.

COLOURED PHOTOGRAPHS.—No. 16,537. "A Process for Production of Coloured Photographs." F. S. LAW.

PRINTING FRAMES.—No. 16,619. "Improvements in Photographic Printing Frames." Complete specification. J. WILKINSON and A. WILKINSON.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

August.	Name of Society.	Subject.
15.....	**North Middlesex**	*Lantern Slides by Reduction.* S. E. Wall.
16.....	**Hackney**	*Sins of Omission and Commission.* W. Rawlings.
17.....	**Borough Polytechnic**	Platinum Printing.
17.....	**Photographic Club**	Discussion: *On the Influence of the Small Camera upon Pictorial Results.*
20.....	**Borough Polytechnic**	Excursion: Hampton Court to Sunbury.
20.....	**Hackney**	Excursion: Kenley. Leader, J. O. Grant.
20.....	**Leytonstone**	Excursion: Sail from Grays to Southend.
20.....	**North Middlesex**	Excursion: Cheshunt. Leader, Mr. Barton.
20.....	**South London**	Excursion: Jersey.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 4,—Mr. E. J. Wall in the chair.

The SECRETARY passed round a book which had been sent him, entitled *A Simple Guide to the Choice of a Photographic Lens*, by Dallmeyer.

The CHAIRMAN said he had seen it before it was published, and it would be found a very interesting and useful book. Referring to the recent discussion on ortol, he stated that he had used it lately and was very pleased with it; it keeps well, and is adjustable to various exposures. He got decent results with good density, and it is more inclined to pyro than any other developer; the only disadvantage he found was that it stained very much—a bright red. He had tried many methods of removing the stain, but failed to remove it. He had no fault to find with the developer; it gave good gradation and density, the only fault being, in his opinion, the stain.

Mr. WELFORD said the gentleman he referred to last week would not go in for any new developer without good reason. He found that the advantage with use of ortol was, he got a negative similar to one developed with pyro but with less trouble.

The CHAIRMAN said it was a mechanical developer, and, used with care, all the results of pyro could be obtained—good density or soft negatives; but the stain of ortol was more persistent and could not be removed, whereas pyro stain could be removed.

The SECRETARY put a question as to the washing of films.

Mr. WELFORD replied that it was a good method to pin the films close together upon a board and then wash, and the same in washing plates; place a board or slab at an angle, and put the plates side by side upon it so that the water runs from one plate over another, and leave washing all night.

The CHAIRMAN related an instance of washing some Convention pictures all night, when he found pin points all over the negatives; the gelatine at these parts upon examination was found to be absolutely dissolved. And a former experience he related of some negatives of interiors of Chichester Cathedral requiring some three to four hours' exposure; after washing them all night found they were absolutely spoilt and had to be done over again.

The SECRETARY said he invariably puts his negatives upright in a rack, and leaves them under running water all night.

Mr. KELLOW suggested the use of corks, slit and fastened to each corner of the film, and float in washing bath.

Mr. WELFORD said he once washed some negatives in a stream, using an Allen's gauze protector, and left them all night, and, although the water in the stream was red with iron, the negatives were good.

The paper down for discussion was

RELATIVE VALUES OF PRINTING UNDER VARIOUS COLOURED GLASSES.

The SECRETARY said that the member who was to have started the subject was unfortunately not present, and, no doubt, was away upon his holidays.

Mr. E. HUMAN, in answer to the Chairman as to his experiences, said he once started to use coloured glass for printing, but the glass was so full of bubbles that he did not continue, and he could say nothing upon the subject.

The CHAIRMAN said this was a very interesting subject, and explained at length the uses of coloured glasses by the aid of diagrams upon the blackboard, and, in reply to Mr. Welford as to whether it would be advisable to use a coloured screen in making the negative or use coloured glass in printing, said that coloured glass would give better contrast in printing, but he did not intend to convey that coloured glass was equivalent to a colour screen used with the negative. If a colour screen was used in making the negative, a correct exposure must be given. The use of coloured glass in printing is practically a "fake," or could be used to get a special tone. He also referred to Golledge's method of uranium nitrate, chloride of gold, and an alkali with matt paper and green glass, also that it would be absolutely the same with a pyro-stained negative. A clean and a "mud" pyro negative would give totally different tones. The Chairman said he had made some enlargements on paper made by himself from some negatives he made last year; there was no faking with them. The negatives were pyro-developed, and he promised to bring them at the next meeting.

A discussion ensued upon the comparison of pyro and the newer developers, and, in answer to query as to their not being so good as pyro, the CHAIRMAN

said the newer developers had not been experimented enough with to give a definite opinion.

The SECRETARY spoke of a gentleman he knew who always used ferrous-oxalate developer, and a finer lot of negatives he never saw.

The CHAIRMAN was of opinion that ferrous oxalate was not so good as pyro, but perhaps he did not know enough as to its printing qualities.

Mr. WELFORD said the only advantage with ferrous oxalate was that hypo could be used as an accelerator.

The CHAIRMAN thought that was over-rated, and that fog would result.

Mr. WELFORD said that, if two plates were taken and one developed with more hypo as an accelerator than the other, that negative would show more detail and develop in shorter time than the other.

The CHAIRMAN agreed as to the developing quicker, but not as to detail.

Mr. WELFORD, referring to the paper read before the Association recently on Velox paper, said the advantages claimed for it were speed of development and velvety blacks. He showed two prints on Barnet (Elliott's) bromide paper developed with hydroquinone and metol; each print developed up in one minute, and he used double the quantity of water the instructions gave. One negative was clean and dense, and the other one was a soft negative but fogged, and, in answer to the Chairman as to whether both prints were exposed the same distance from the light, said they were; but with negatives, one dense and clean and the other soft but fogged, such as those mentioned, the distance from the light in exposure made very little difference.

A short discussion took place as to the impossibility of defining a perfect negative.

Mr. Welford will open a discussion at the next meeting on whether a subject requires a longer exposure in brilliant sunshine to bring out the detail in shadow than in a diffused light, say, with the sun just hidden by a cloud, for the same subject.

PHOTOGRAPHIC CLUB.

AUGUST 3,—Mr. Franklin T. Barrett in the chair.

A discussion took place on the best way of reducing over-intensified negatives, and Mr. FOXLEE advised to put them back into the mercuric chloride solution, omitting the ammonia bath afterwards. For negatives requiring a slight intensification, only a very short immersion in the mercury bath was recommended, the plate being taken out before bleaching sets in, and then thoroughly washed.

On the subject of uranium as an intensifier Mr. BRIDGE said that the solution had a tendency to attack the edges of the plate more than the rest. This could, however, be overcome to a great extent by the use of a dish that would just hold the negative.

A discussion then took place on the advantages and disadvantages of the new developers, in which Messrs. Bridge, Foxlee, Mackie, Nesbit, Stretton, and Welford took part.

Herefordshire Photographic Society.—On Friday, July 29, Mr. Alfred Watkins gave a demonstration of the Ives process of colour photography. In his introductory remarks Mr. Watkins explained that attempts at colour photography might be classified in three divisions: First, Direct methods of obtaining the colours on the plate exposed to the lens image in the camera. Promising results had been obtained in this direction many years ago, but no further advance had been made. Second, The beautiful method of Professor Lippmann, in which the principle of interference of light was utilised to obtain colours similar to the iridescent colours in mother-of-pearl. The disadvantages of this method were its great difficulty (the number of sucessful pictures yet produced being small), and the fact that the colours could only be seen at a certain angle of light, and that only one colour picture resulted from each exposure in the camera. Third, The indirect method generally known as the "Three-Colour Process," worked out most perfectly by Professor Ives (late of Philadelphia, now of London), in the process now demonstrated. Maxwell had long ago pointed out that white light could be built up of three pure primary colours—red, green, and blue-violet, and that every possible shade of colour, and even grey, could be produced by a combination of two or all of these colours in different proportions. In the Ives process three negatives were taken, one for the red impression, in which both green and blue-violet were cut off by a red transparent screen in front of the plate; a second for the green impression (the other two colours being cut off in a similar way); and a third negative for the blue-violet impression. If three prints from these negatives could be made each in its correct colour, perfectly transparent and correctly superimposed on the same sheet of paper, a photograph in natural colours would result. At present these was no convenient process available for doing this by printing direct from the negatives, although, curiously enough, printers were able to produce blocks from the three negatives, and print excellent colour pictures in transparent inks. To the ordinary skilled photographer, however, the only means at present available for showing photographs in natural colours were by lantern slides (requiring special apparatus), and by an ingenious instrument—the kromskop—invented by Mr. Ives, in which the three pictures, each illuminated by its proper colour light, were combined by reflectors. Mr. Watkin showed in the kromskop a considerable number of photographs taken by himself, consisting of scenes on the Wye at Symonds Yat and Tintern, flower gardens, sunset skies, &c., all with the colours of nature, even to the shades of purple or grey on the distant hills—reproduced in a comparatively perfect way. He pointed out that although the selection of colour in different parts of the picture was determined by the colour actually reflected by the object, the accuracy of the relative shades and their contrast depended largely upon the technical skill of the photographer, and that probably studies of still life and groups of garden flowers were the most suitable to reproduce in colour. In landscape work the exact shades of green, &c., were so familiar to most observers that a reproduction must be exceptionally perfect to escape criticism. As regards technical particulars the plate used was Lumière's panchromatic, the screens being specially fitted by the Photo-chromoscope Syndicate. The exposure was estimated by the Watkins exposure meter, the speed of plate through blue screen being P 10. The ratio of exposure through the set of screens used was found by trial to be red 22, green 20, blue 1, this giving equal density with the three negatives for a white object. Probably other sets of screens would not have the same ratio. The plates were developed entirely in the dark with metol-hydroquinone (no bromide), the time being for six times the appearance of a trial slip previously dipped in the developer. This slip (of the same brand of plate) had been exposed through a grating to a light impression equal to the inertia of the plate. In this way the plate was developed to exactly the degree of contrast required without risk of fog.

FORTHCOMING EXHIBITIONS.

1898.

August 23–28 ..... Royal Cornwall Polytechnic Society. Hon. Secretary, Edward Kitto, The Observatory, Falmouth.

Sept. 26–Nov. 12 ... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.

„ 30–Nov. 5 ..... Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.

November 15–18 ..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.

„ 15–Dec. 15 Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.

„ 23–26 ..... Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

STEREOSCOPIC LANTERN PROJECTION.

To the EDITORS.

GENTLEMEN,—Your note following my letter in your last issue would seem to imply either that I am the victim of illusion and cannot trust my eyesight, or else that we are not in agreement as to where mere relief ends and true stereoscopic vision begins. As my eyesight is perfectly sound and normal, and I have long been trained to scientific methods, it would seem that the latter alternative is the only one open for discussion; and, as this subject is rather an interesting one, I should like, with your permission, to put forward what may be new ideas on this question of stereoscopic vision.

Without admitting in the least that what I saw (not once only but many times) was not true stereoscopic relief, I think it is the fact that this relief is much more strongly marked in some pictures than in others, and there are good reasons for this in the pictures themselves. But, I conclude that you draw a line somewhere between true stereoscopic roundness and mere apparent relief, a line which is probably very difficult to locate and purely imaginary, the difference, in my opinion, depending solely on the quality of the pictures.

Any one can assure himself, by a few trials of his eyes on drawings, paintings, prints, and photographs of different degrees of merit, that the graduation from slight relief to decided roundness is without any distinct break, and that the perfection of the relief is proportional to the realism in perspective, light and shade, colour and atmosphere of the picture, and necessarily is most perfect in a good coloured photograph. (I don't mean a photochrome, however.)

The theory that binocular vision is the cause of stereoscopic relief altogether fails to account for the facts. For instance, it is supposed that to this is due our strong perception of roundness and solidity in viewing things around us; but the fact is that, if we shut one eye, the view is still just as stereoscopic, the only difference being that the illumination is only half as great as with two eyes. This fact, admitted and to some extent accounted for by Sir Howard Grubb in his article in your issue of June 3, entirely upsets the binocular theory.

But, again, take any ordinary good photograph; look at it with both eyes, there is very little relief apparent, if any; but shut one eye, and it becomes as stereoscopic as in a stereoscope, only differing, as before, in the amount of illumination due to monocular vision. The idea that the parallax of two eyes two and a half inches apart gives two different views of objects more than a few feet distant is too absurd for argument.

The fact is that the eyes, singly and in unison, take years of training to see stereoscopically, and that such vision is due entirely to the trained perception of accurate perspective and atmosphere in nature with its gradations of colour. When these normal conditions become abnormal,

as in fog or exceptionally clear atmosphere, then the eye is at fault and estimates wrongly. For instance, I was recently photographing on the Gornergrat, on, I think, the finest day I ever remember, the air extremely clear and the sky deep blue. My eyes told me that Monte Rosa was about a quarter of a mile off and about 500 feet above the glacier, and that I could throw a stone to the foot of it; but, at the same time, I knew that the glacier was one and a quarter miles wide, Monte Rosa three miles off and not less than 6000 feet high, and I am daily accustomed to the estimation of heights and distances. If atmosphere was absent, we should have only perspective to guide the eye in the estimation of distances and proportions, and every view would be as flat as a photograph. This is evident from the steplike gradations in colour seen in any landscape from hedge to hedge, or hill after hill, to the extreme distance.

But, as to the strong relief apparent in the pictures in the electrorama, I am satisfied that, if photographs could be taken accurately, representing what the eye sees in all respects, and such photographs were projected on a screen on a sufficient scale and free from surroundings tending to distract the eye from the illusion, then such pictures would be perfectly stereoscopic. Though, of course, we don't yet fully realise these exacting conditions, we are able to approximate them, so that a good deal of this ideal effect is actually realised.

Sir Howard Grubb incidentally mentions that the roundness of a photograph is dependent, to a great extent, upon the use of a large aperture, though he gives no explanation of this; but it may, to some extent, account for my results in the electrorama, where I use the full aperture of the projection lenses, while in the ordinary lantern, as is well known, only the central part of the lenses is employed.

Your printer spoiled the point of my fourth paragraph by putting *no* for *the* in the fourth line.—I am, yours, &c., T. W. Barber.

[We may refer to this subject next week.—Eds.]

ACTION OF PRINTED MATTER ON UNDEVELOPED PLATES.

To the Editors.

Gentlemen,—The rough print herewith is from a plate which was exposed on a landscape and afterwards wrapped in paper with the printing matter on as shown. On developing there was not the slightest trace of the view, the printing matter coming out at once. The plate was packed between a dozen, the eighth down, and, although the others were wrapped in paper taken from the same book, this is the only one showing markings of printing, the others are good printing negatives.—I am, yours, &c., John H. Coath.

Liskeard, August 4, 1898.

[There is no trace of the landscape in the print. We should be inclined to think that the plate was not exposed in the first instance, as it is doubtful whether printers' ink has the effect of totally destroying the latent image.—Eds.]

MARKINGS ON PLATES.

To the Editors.

Gentlemen,—I enclose a negative for your inspection. You will see that at the upper margin it is pitted all over with small holes of an irregular shape. I have been much troubled during the last two months with this defect. They are not pinholes, nor in any way due to dust; this I have ascertained by careful experiment. What they are it is impossible to say. At first I was of opinion that they were caused by the plate rubbing against the rebate of the slide, as the defect seemed to occur only in those plates which had been carried about for some time; but I found that the marks extended considerably beyond the rebate, though, strange to say, never more than half an inch from the margin. The marks occur quite indiscriminately, whether the plate is developed for two or three minutes or for a longer period.—I am, yours, &c.,

Puzzled.

[We ourselves have been troubled with the same defect, and have ascribed it to friction between the plates packed face to face after exposure and not tightly secured.—Eds.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries, must be addressed to* "The Editors, The British Journal of Photography," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 24, *Wellington-street, Strand, London, W.C.*

A. Birkhauser.—Call upon us some morning about eleven o'clock.

Anxious.—Sorry we have no means of obtaining the information. You must consult a French directory.

La Rose.—It is clearly a case for a County Court summons. We do not answer questions through the post.

Abacus.—1. No 12=*f*-11; 24=*f*-15·5; 48=*f* 21·9; 96=*f*-31; 192=*f*-43 8. 2. Either A or B. If you are familiar with the working of A, that for choice. The omission you note will be remedied in the forthcoming Almanac.

Marked Negatives.—S. Colyer. The marks are caused by emanations from the material forming the hinges of the dark slides. The only remedy is to send the slides to the maker to replace the present material by an inert one.

Mottled Negatives.—Septimus. The mottled or wavelike markings on the negative, which, by the way, arrived in fragments owing to the way it was packed, are caused by the dish not being kept in motion while the plate was being developed. There is no possible means of removing the stains.

Cyanine.—Ortho. There is no difficulty in obtaining cyanine. It may be had from Hopkin & Williams and suchlike houses. We are not surprised that you have failed to get it at the pharmaceutical chemists', even where they sell photographic goods. The majority of them have probably never heard of it.

Copyright.—S. Beal. It is not at all necessary that a copyright photograph be marked with the word "copyright;" therefore you must not assume that, because the one you desire to copy is not so marked, you run no risk in copying it. We have very little doubt that the picture in question *is* copyright.

Fixing-bath Economy writes: "Is it safe to use the solution in which a few plates have been fixed the next day for fixing prints?" Certainly not. The fixing bath for prints should be made specially for the purpose, and then not used a second time. Surely hyposulphite of soda is cheap enough nowadays to be used fresh each time.

Studio.—T. H. B. By all means erect the studio on the first floor. If put on the ground floor, the plans show that it will be lighted almost entirely by direct top light only. Even on the first floor there will be very little direct side light. We quite appreciate your ideas about "stairs and sitters," but then there are not many to a first floor.

Building Laws.—Vexatious. If the town surveyor has condemned the building, you certainly are unwise in proceeding with the work, as you are almost sure to have to take it down when finished. The better thing will be to alter the structure to bring it in conformity with the requirements of the local authorities. Probably very little will do that.

Enlarging.—H. Dunham asks if it is necessary to put ground glass before the negative when working with a direct north light, and, if so, how far should the glass be from the negative? It is usual with most workers to use the ground glass. The distance is of no importance, provided it is far enough away to be well out of the focus of the lens. Six or eight inches is a good distance.

Gelatine and Alcohol.—S. W. wants to know how to dissolve gelatine in methylated spirit for the purpose of making an emulsion. That is not possible, because gelatine is quite insoluble in spirit. The gelatine may be dissolved in water, and a certain proportion of spirit added to the solution. If the solution, however, is a strong one, very little spirit can be added without precipitating the gelatine.

Varnish.—Hants. Yes.* You appear to have proceeded rightly. Shellac will not wholly dissolve in spirit, there will always be a sediment, which must be filtered out, or it may be allowed to subside and the clear solution decanted off. The subsidence may be hastened by warmth. Place the bottle in the sun for a few days. The colour, if pale orange lac be used, will not practically retard the printing, the film of varnish being so very thin.

Assistants and Specimens.—Printer writes: "I think of shortly leaving my situation to seek another. Can you tell me the rule with regard to specimens? Am I entitled to have specimens of my work to show? I am told my employer refused to let my predecessor have any at all when he left?"—You are not entitled to any. If your employer lets you have any, it will be a matter of courtesy, not of right. A polite request for a few will, no doubt, be met with a favourable response.

Vignetting.—Lieut.-Col. Forbes asks: "Can you tell me—1, Of any method of vignetting portions of landscapes by painting on the negative? Also, 2 Is there any adjustable vignetter suitable for showing only the desired portion of plate?"—1. Landscapes are vignetted in the same way as portraits are usually by placing a mask, with an opening the shape desired, on the printing frame, a short distance from the negative. 2. Yes. Salmon's adjustable vignetter, Marion & Co., Soho-square.

Silver Bath.—Old Collodion writes: "I want to make some negatives by the wet-collodion process, by which I have, in days gone by, made thousands. Where I am situated, I find it is impossible to get distilled water, and when the nitrate of silver is added to the tap water, even after it has been boiled, it goes quite milky from the chalk it contains. What shall I do?"—Put the turbid solution in the sun for a few days, then filter and acidify. It will then be as good as if made with distilled water; indeed, better than if made with *some* distilled water.

Double Tones.—Constant Subscriber (Grimsby) asks: "Will you kindly tell me the cause of the nasty pink shade round enclosed vignette? All the vignettes are the same, some a little worse than enclosed. I use a sulphocyanide of ammonia bath and P.O.P. I should be greatly obliged to you if you could put me right to stop this nasty tint."—Double tones are by no means uncommon with some, indeed most gelatine papers. In your case we think the evil has been exaggerated by the free silver not being completely removed before the print was toned. Try more thorough washing before toning.

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Contents.

	PAGE
Ex Cathedrâ	529
Persulphate of Ammonia for Over-printed Proofs	531
On the Action of Light on the Salts of Cobalt.—III.	532
Leaderettes:— Official Neglect of Photographic Aid—Curious Property of Chromium Salts — Lunar Photographs - Cathode Rays from the Sun—What is a Perfect Negative?—Art in the Workshop—The South Kensington Museums—Such is Fame	533
The Action of High Temperature on the Latent Image. By J. Gaedicke	534
Foreign News and Notes:— A Photographic Art Museum—Chassagne's Process—Invisible Solar Rays — Absorption of Light—Sky-blue Tones on Collodio-chloride Paper—A substitute for Card Mounts—Absorption of Light by Soot—New Developers (?)	535
Gelatino-chloride Printing. By C. Brangwin Barnes	536
Collodio-chloride Printing. By C. F. Sutton	536
Calculating Exposure and Exposure Meters.—II. By John A. Rancall	537
The Antarctic Expedition	538
Photographic Economy. By T. N. Armstrong	538
Joly's Changing Back for Colour Screen Photography	539
Wood's Plate-changing System	539
A New Studio Camera and Stand	540
Our Editorial Table:— The "Fram" Hand Camera—The Adams de Luxe Hand Cameras	540
News and Notes	541
Patent News	542
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club	542
Forthcoming Exhibitions	543
Correspondence:— Stereoscopic Lantern Projection—Exposure Meters—Spots on Opalines and Prints—Action of Potassium Oxalate on Glycerine	543
Answers to Correspondents	544

EX CATHEDRÂ.

The late Mr. J. Traill Taylor paid the usual penalty of popularity, and was much photographed. We wonder if there are any profile portraits of him in existence—full and three-quarter face views of him abound in profusion, we know. Of the former kind of photograph—the profile—we are anxious to have the loan of two or three good examples, and shall be obliged to any of our readers who can help us in the matter. The utmost care will be taken of the photographs, which are required for the purpose of preparing the Taylor Memorial Medal.

* * *

We understand that on the conclusion of his present year of office, in February next, the Earl of Crawford, K.T., President of the Royal Photographic Society, will not stand for re-election. Lord Crawford has rendered the Society eminent services during the last two years, and it will not be an easy matter to find a successor to him with as much enthusiasm for the work and corresponding disposition to devote so much time to the growing requirements of the Society. Lord Crawford's attendances at Council, Committee, and General Meetings have been extremely numerous for so busy a man, and the interest he took in the Crystal Palace Exhibition involved an amount of hard work and attention to matters of detail such as is rarely looked for or obtainable from one in his position. We are sorry the Society is to lose Lord Crawford as President, but the influence of his fine example will, it is to be hoped, not be lost on his successor, whoever he may be.

* * *

Writing on the subject of sham science, a contemporary rightly remarks that the attitude of the public towards science has become the exact opposite of what it used to be. In the old days people would none of it. Now they greedily swallow everything they see in print. Some see in this a subject for congratulation, but, as a matter of fact, the former frame of mind is not more mistaken than the latter. The confidence of the public is the natural result of the immense practical results reached by science, and unattainable without it, but its existence should make those to whom the public looks for instruction very careful not to publish speculations and theories before good foundations in fact for the same can be shown to have been laid. These considerations have nothing whatever to do with the truth or falsehood of the said theories. Even if they have no reliable basis, they may turn out to be true, although the odds are against them, but that fact affords no excuse for putting them forward without due caution. Exactly; but, so long as the daily newspaper press preserves its present predilection for "sensationalism at any price," so long, we fear, will the dissemination of untrustworthy science proceed. Fortunately, as the world grows older, it has a tendency to increase in scepticism, and we may therefore look for the growth of an attitude of caution in receiving the statements of sham scientists from America and elsewhere.

* * *

The British Pharmaceutical Conference held a successful three days' meeting at Belfast last week. The papers read, or taken as read, occupy, without the discussion, about thirty-four pages of our contemporary, the *Pharmaceutical Journal*, which remarks that it was physically impossible to consider them satisfactorily in the limited time at disposal, and with so many other inducements to occupy that. A certain lack of consideration was also shown by the authors of some papers, our contemporary adds, in deferring the delivery of their

manuscripts until the last minute. If the subject of a paper is worth discussing at the Conference, the paper should be worth finishing, and should be delivered at a reasonable time in advance; on the other hand, rubbishy papers of a type sometimes submitted are not worthy of consideration at the Annual Meeting on any terms. "A fellow-feeling makes us wondrous kind." We can sympathise with our contemporary in its outburst, for something of the sort of which complaint is here made is a not altogether unknown feature of the annual Photographic Convention of the United Kingdom.

* * *

It is officially announced that Her Majesty's Principal Secretary of State for Foreign Affairs has received a dispatch from Her Majesty's Chargé-d'Affaires at Rome, reporting that a regulation has been issued by the Prefect of Turin, forbidding tourists and others to approach within one kilometre of the fortifications on the Italian frontier without special permission from the military authorities. Without such permission the use of photographic apparatus is forbidden within a radius of ten kilometres from the advanced posts, and persons having such apparatus in their possession, and intending to travel in the frontier zone, are required to deposit the apparatus in the Custom House, if they come from abroad, or outside the radius of ten kilometres if coming from other parts of Italy.

* * *

The "One and All" Flower Show, to be opened at the Crystal Palace on Saturday next, in connexion with the National Co-operative Festival, promises this year to exceed even the gigantic proportions of previous years More room has had to be found for the growing Photographic Section, which will move across from the Italian Court to the larger Egyptian Court, near the main entrance. The hints which this pictorial exhibition enables one horticulturist to convey to another as to the arrangement of small town or country gardens, the greenhouse, the window box, hanging basket, rockery, or other objects not readily movable, form a feature entirely lacking in the usual exhibitions confined to the more portable flowers, fruit, and vegetables.

* * *

We have already announced that the Yorkshire Photographic Exhibition, under the auspices of the Yorkshire Affiliated Photographic Societies, will be held at the City Art Gallery, Bradford, from November 15 to December 15 next. The Exhibition is under the patronage of the Right Hon. the Earl of Crawford, K.T., F.R.S., &c., President of the Royal Photographic Society. The Jury of Selection consists of Messrs. Godfrey Bingley, A. Horsley Hinton, and Alex. Keighley, F.R.P.S.; and the Committee of Invitation (Loan Section), Messrs. Keighley and Percy Lund.

* * *

Our contemporary, the *Daily Telegraph*, on Tuesday last preached the following little discourse on a very ancient text: It is curious to notice how the same old tricks continue to find fresh victims in spite of constant exposures. There are still simple souls who are taken in by plausible scoundrels who live on their wits, and a popular device in summer time is that of pretending to be a travelling photographer with a keen eye for beauty. The fellow makes his way to pretty suburban villas, and, when he sees a proud paterfamilias sunning himself in his garden or carefully tending his plants, he unlatches the gate with charming diffidence, and blandly suggests that the house is such a picture that his artistic sense moves him to desire to take a photograph of it. Vanity is a suburban failing, and the householder often falls a victim to the trap. He inquires the cost. It is low, surprisingly low, and he consents, on the understanding that the photographs shall be sent on in the course of a few days. Of course, prepayment is insisted upon, and then, as the days slip by and no parcel comes, the owner of the villa wakes to the fact that he has been had. A case, in which a similar trick was successfully played, was brought up at Bromley Petty Sessions on Monday last. The prosecutor was a schoolmaster, and the defendant had asked his permission to photograph the premises. It was granted, and the man then went through the usual performance with what purported to be a camera, after which he asked for threepence to cover the cost of postage, saying that he only wanted to advertise his patent camera. The schoolmaster paid it, and then discovered that the appliance was merely an empty box, of which the sun would scorn to take the slightest notice.

* * *

One of the best-produced illustrated papers that has recently come under our notice is the *World of Sport*, now in its sixteenth number. It is conducted on similar lines to *Country Life*, and it concerns itself with yachting, cricket, fishing, and other outdoor sports. It is well printed, and the half-tone blocks are of remarkably good quality. Most of the photographs which the *World of Sport* publishes are by Mr. W. A. Rouch, whose racing views are always first-rate. Mr. Rouch is, perhaps, the cleverest professional user of a hand camera that we have, and the *World of Sport* is to be congratulated on having secured his services for its illustration department. We wish our young contemporary long life and success.

* * *

In the pages of an American contemporary, Mr. Ellerslie Wallace makes the following excellent suggestion with reference to the use of an atomiser in development: "A few days ago, in a talk with my friend Mr. J. C. Browne, who has been identified with photography in Philadelphia since the earliest days of the art, he spoke of an improvement in developing plates which was at once practical and ingenious. It is well known that great good can be effected by methods of 'local development,' as the phrase goes. A dark spot of shadow that refuses to show any detail before the lights are in danger of being overdone is a vexation to the operator; so are dark foregrounds that hang back while a fine sky full of clouds above is growing too dense and losing detail every instant. Mr. Browne's plan of getting over the trouble is to continue the development, after starting as usual, by putting a portion of developer in an ordinary *atomiser*, and directing the spray on to the undertimed parts of the plate. A most ingenious idea! Not so much because of the ease with which the fluid can be accurately directed to any part of the film as from the fact that a full portion of atmospheric air mixed with the developer is thus applied just where it is wanted, *i.e.*, to the undertimed portions. How much better this than pouring off repeatedly and blowing from the mouth on the slow parts, but I have also seen this done. The new plan is more efficient, quick, clean, and convenient. The oxygen in the air is a great help to development."

PERSULPHATE OF AMMONIA FOR OVER-PRINTED PROOFS.

When writing last week on persulphate of ammonia we alluded riefly to the fact, that by virtue of its action upon a film ontaining silver it becomes itself a solution of that metal, and s such can scarcely be looked upon as a perfectly safe appli- ation either to negative films or, more particularly perhaps, o proofs on paper.

It may be urged, and will probably, that any reducing olution, either directly or indirectly, brings the film under he influence of a silver salt in solution, and that in fact the rdinary fixing solution comes under that category, and yet hat we have no reason to doubt the permanence of a horoughly well-washed either print or negative that has ndergone fixing with hypo. We shall, however, meet any uch objection by pointing out that the soluble double hypo- ulphite of sodium and silver is practically, if not in fact, bsolutely insensitive to light, and the same remark will apply o the double sulphocyanide formed in the course of reducing r clearing a film by the Howard-Farmer method. It has, we now, been stated in years gone by that films remain more or ess sensitive to the action of light even after fixing until horoughly freed from the fixing salts; but, if we are not istaken, it has been definitely proved that, where such has hanced to be the case, it has been owing to imperfect fixation nd the presence of the insoluble form of double salt, in which he proportion of silver is much larger.

Be this as it may, if a silver salt be dissolved in excess of ypo, cyanide, or sulphocyanide, the condition which should xist in perfect fixation, and the solution thus formed spread pon paper, the latter will exhibit a sensitiveness to the action f light, and, if any change should occur in the course of time, is only what may be expected from the natural decomposi- on of the double salt. But, as this is perfectly soluble, it is ear that it may be completely removed by simple washing, nd therefore the tendency to change totally eliminated.

But the case is altogether different when we have to deal ith such soluble salts of silver as the nitrate or the sulphate vhich is the compound formed by the action of persulphate of mmonia) and others of the same kind. These, though possibly hemselves insensitive to light, in contact with organic matter stantly form combinations that are not only very sensitive to ght, but are also impossible of removal by simple washing ven though no exposure to light is made. Paper or other xtile material or gelatine submitted to the action of silver trate and afterwards well washed in the dark will, it is only o well known, sooner or later discolour in consequence of the ontaneous reduction of the silver compound formed; and we ink scarcely any one who has dabbled in silver solutions will e ignorant of the fact that no amount of simple washing will event ultimate staining of the fingers when silver has once uched them, even though it be performed instantly and before e light has been allowed to act.

We make this explanation in order to remove an apparent nomaly, since it has been put to us that, if a negative can be duced with the Howard-Farmer solution, or a large batch of ints fixed in hypo without causing them to subsequently scolour, there is no reason why persulphate of ammonia ould behave differently. Perhaps, however, these few re- arks will suffice to show that there really is a certain amount danger; indeed, as we mentioned last week, it is only neces- sary to expose a print for a short time to strong light, after the persulphate has acted upon it, to prove beyond a doubt that it is sensitive to light at least at that stage. It is, of course, quite possible, nay, even probable, that, considering the very small quantity of silver present, and the chance that the excess of persulphate may exercise a favourable or preventive action, no permanent compound may remain to undergo spontaneous reduction if the proofs be well washed before exposure to light; but, until time has permitted the question to be practically tested, it will be as well to guard against a possible danger.

But, as in various other photographic processes where similar conditions exist, it is extremely easy to avoid all danger by means of a second fixing operation, or, where possible, by carrying out the reduction previous to fixing. In the case of negatives, the latter method is scarcely advisable, because it is not until after fixing that the exact character of the image can be judged; but, when prints are in question, it seems to us that it is the preferable plan, where over-printing has occurred, to submit the proof to the reducing process before toning and fixing, instead of after. There is then, at any rate, far less risk of uncertainty or want of uniformity of tone, which is the invariable accompaniment of all methods of heating the prints *after* toning. On the other hand, there is the possibility that the reducing process may, in some cases, interfere with the toning capabilities, though, so far as our experience has gone with two or three different sorts of paper, beyond perhaps slightly slowing the process, the toning is not in the least interfered with. In the case of developed prints, we think that reduction before fixing is in every way to be preferred, though, of course, the prints must be very thoroughly washed, or the oxidation of any developing solution remaining on the film would prove detrimental to the purity of the whites.

Applied to prints in the same manner as recommended by MM. Lumière for negatives, but in weaker solution, say, half the strength, or two and a half per cent., the persulphate acts with great regularity either on toned or untoned proofs. In the case of the former there is a gradual and general "cooling" of the tone, but even when carried to an excessive extent, if proper care has been taken, the colour is a pleasing grey, such as many operators strive in vain to get by ordinary means, while the lights are perfectly free from any symptom of yellowness, the almost invariable objection to other modes of reduction. If the untoned prints are treated, they should be first very thoroughly washed as if for ordinary toning, and then immersed in the reducing solution, by the action of which the colour is gradually changed to a very pretty violet or purple, the reduction taking place concurrently. The relatively greater action on the shadows of the positive is always, we think, more marked than in the case of the negative deposit, and this more noticeably so where the over-printing has been excessive.

For this reason we are rather inclined to favour a modification of the process, which consists in adding a small quantity of common salt to the persulphate solution, when its action becomes practically identical with that of any of the ordinary bleaching solutions, except that the image is converted into pure silver chloride with only the perfectly harmless sulphate of ammonia to wash away. To some extent this, of course, does away with the peculiar action of the persulphate in attacking the shadows first, but not altogether, and, if the quantity of salt used be kept within bounds, the image appears to undergo conversion into chloride and solution simultaneously

By this means we find it practicable to considerably modify the relative action of the persulphate on the different gradations of the image. The change that occurs in the colour of the image is similar to that already mentioned, but a rather bluer tone is given, and the subsequent action of the toning solution is slower.

We have said that the whites are perfectly free from yellowness if proper care is taken, and that proper care consists in thorough washing at every stage, or at least at such stages as are requisite to keep the persulphate and the hypo clear of one another. Any attempt to utilise the "hypo-eliminating" capabilities of the persulphate will inevitably cause yellowness. We may quote an experiment in explanation. In order to test the effect of decomposition of the hyposulphite in the film, a small pool of old negative fixing bath was poured on to the dry surface of a P.O.P. print and allowed to soak in for a few minutes and the surplus blotted off. Submitted to the action of the persulphate, we expected that a distinct local yellow stain would be formed; to our surprise not the faintest trace of the local application was visible, but the whole print was uniformly tinted yellow. Subsequent experiments showed that, though plain hypo only undergoes decomposition without producing any appreciable result on the print, hypo containing silver, *i.e.* old fixing solution, is similarly reduced and the sulphide of silver thrown down equally over the whole surface treated.

ON THE ACTION OF LIGHT ON THE SALTS OF COBALT.

III.

The next experiment was equally instructive and still more satisfactory. A sheet of unsized paper was sensitised in three separate aqueous solutions, the sensitising salts being cobaltic citrate, potassium bichromate, and sodium carbonate. The bichromate solution, it may be added, was a saturated one. Dried in the dark for fifteen hours, and thereafter exposed in the printing frame in a good light, a very vigorous image of a rich blue colour made its appearance in from two to three minutes' time. The addition of a carbonate to the sensitising solutions would therefore seem both to accelerate the rate of printing and to increase the depth of the tones of the resultant print.

The blue picture obtained in the last-mentioned experiment was next cut through the middle, one half being immersed in calcium hypochlorite solution, and the other in a solution of disodic orthophosphate. The paper was bleached and the blue image speedily and utterly destroyed by the hypochlorite, but the phosphate did not produce so marked an effect, merely weakening the depth of the picture, and leaving almost in its original vigour the yellow colour due to the free bichromate.

Another sheet of paper, sensitised in the three solutions last employed, was dried and exposed as before to the action of light, but now for a much longer period. The blue picture formed at first was again destroyed, but seemingly less rapidly than in the absence of the carbonate. It was also noticed as an interesting fact that the deepest blue shadows acquired, ere their extinction, a fine purple colour, which later on changed to a pure violet. This colour may have been due to a secondary action resulting in the partial conversion of the blue colouring matter into cobaltous carbonate, or perhaps even into normal cobaltous hydrate.

In the next experiment of the series an aqueous solution of ammonium chloride was substituted for that of sodium carbonate, and with this the bichromate-citrate paper was re-sensitised. The image obtained on exposing the dried paper to light was less vivid than the foregoing, and did not seem to differ either in hue or intensity from that produced upon paper sensitised with the citrate and bichromate alone.

For the sake of settling a point on which a slight doubt had arisen, it was next decided to test whether a cobaltous salt could be substituted for cobaltic citrate. With this object an aqueous solution of cobaltous chloride (of a strength of about fifteen grains per fluid ounce) was substituted for the usual solution of cobaltic citrate, and a sheet of paper having been sensitised therewith and dried was treated with potassium bichromate solution as usual. Dried in the dark, and exposed in sunlight under a negative, an image was produced in the course of a few minutes. The picture, however, was of a very different character from those obtained with cobaltic citrate, being, in fact, a carbon print, if such a term may, with propriety, be applied to one in which both gelatine and pigment were omitted. It was brown in colour, the oxide of chromium having to all appearances alone been deposited by exposure to light. On holding this print before a strong fire, the image was considerably blurred in its details, and the colour changed to greenish-brown, do doubt owing to the formation of a hydrous cobaltous chloride.

This experiment, though it served to show the difference between the cobaltous and the cobaltic salts in regard to sensitiveness to actinic action, raised in its turn a further question, to which an offhand answer could not well be given. Why, it was asked, is the brown oxide of chromium deposited when a cobaltous salt is employed for sensitising purposes, seeing that it is not deposited when the sensitiser is a cobaltic salt? To answer this, further experiments were necessary. As the result of these, it was found that, by means of a variation in the order of the manipulations, or in the strength of the sensitising solutions, a brown carbon print could be produced instead of a blue cobaltotype, *even in the presence of a cobaltic salt.*

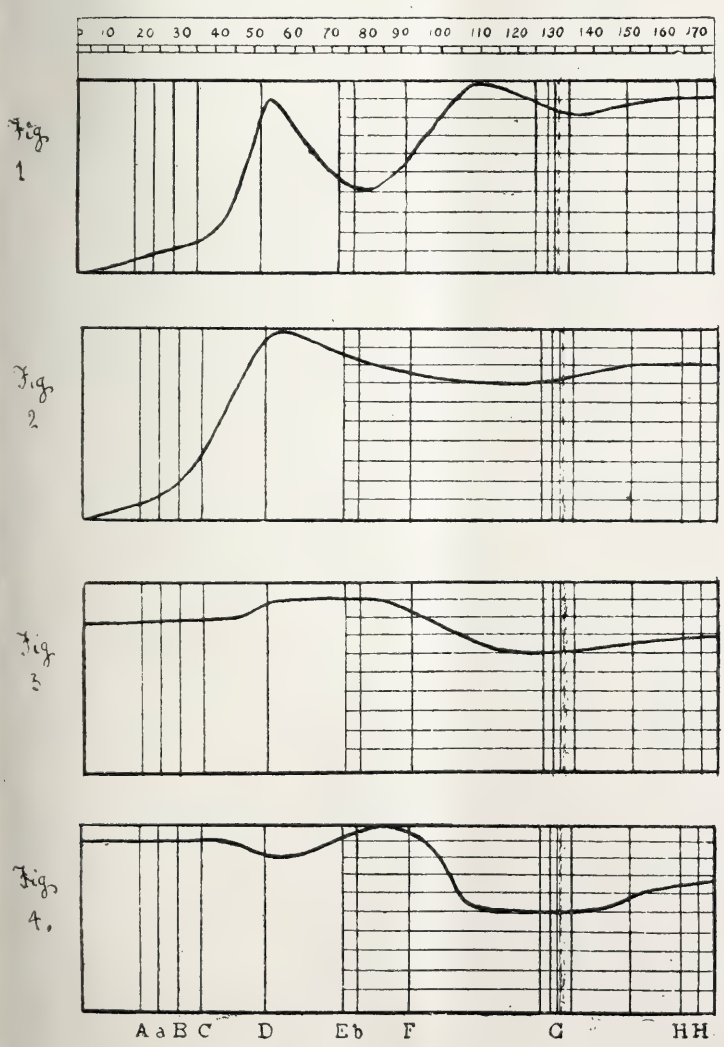
If instead of sensitising with a solution of cobaltic citrate, and then with one of potassium dichromate, the order of these operations be reversed, a brown picture will be produced, provided the paper be allowed to dry thoroughly in the dark between the two operations. This simple modification of the original experiment was tried repeatedly, using a solution of cobaltic citrate that had been kept for some weeks, and in no case was a blue picture produced, though in one or two it required a somewhat lengthy exposure to light to produce any image at all. As a general rule, however, the brown image was formed readily enough.

It was also found that by sensitising firstly with a weak solution (say, one-half or one-third the usual concentration) of cobaltic citrate, and afterwards with a saturated solution of potassium dichromate, and exposing after drying in the usual manner, no blue image, or at best a very feeble one, was produced, and that subsequently, at the stage at which in ordinary circumstances bleaching would have ensued, a brown image was formed.

It is difficult to frame a satisfactory explanation of these curious phenomena. Seeing, however, that, when a print is produced by the action of light on a dichromate, an alteration is at the same time effected in the constitution of the organic

matter present, it may well be that the initial stages of this change are brought about, not in light, but in darkness. We may, on such a view of the case, assume that, during the drying operations, the dichromate enters into direct combination with the organic matter of the paper, and so, once and for all, determines the final character of the print that is to be produced by light; for, being already a step on the road to reduction to the state of oxide, it is for that reason incapable of thereafter combining with the cobaltic sensitiser, at least in so far as is necessary to the deposition of a cobaltous image. On the other hand, when the cobaltic sensitiser is already present in the pores of the paper, the conditions will, of course, be favourable to the latter form of combination, and accordingly the image will be blue instead of brown. Further evidence in support of this hypothesis might be advanced, but, as it is scarcely relevant to the study of the cobaltic compounds, but rather to those of chromium, it may be omitted with advantage.

In the course of the above experiments it was also discovered that the richest and purest blue tones were those produced upon paper that had been sensitised with a solution of cobaltic citrate freshly prepared. When an old solution was



employed, the blue was both weaker and inferior in quality, and the printing proceeded somewhat more slowly.

The record furnished by the spectroscope of the successive changes undergone by this paper on exposure to sunlight is of a valuable and interesting character. A strip of the sensitised paper was exposed for five minutes to the action of the spectrum, and a well-defined and strong blue picture was obtained, representing the primary actinic action. A reference to fig. 1 of the appended diagrams (which represents the intensity curve for this exposure) will render plainer than words can the nature of this action. The maximum effect is here shown to be due to the blue rays, and the minimum to the red. The violet and the indigo rays are also productive of considerable chemical action. The green rays have a comparatively feeble effect; but, curiously, the less refrangible yellow are found to exercise an influence equal in intensity to that due to the violet and second only to that exerted by the blue rays. The orange rays, notwithstanding, produce but little effect.

Fig. 2 represents the change noted in the above after an exposure of thirty minutes' duration. Bleaching had now commenced, on account of which circumstance the interrelation of the wave ratios as exhibited in the diagram must be computed in an inverted form, that is to say, the maximum secondary action must ultimately be located at the point of minimum chemical intensity as shown by the curve, and *vice versâ*. The same remark will apply with increasing force to figs. 3 and 4, which represent the bleaching action of the rays of the solar spectrum after an exposure of one and two hours' duration respectively.

It must also be taken into account that the intensities exhibited in these three diagrams representing the secondary action are merely relative, whereas those shown in fig. 1 are the true or absolute intensities representing a normal exposure. Being thus absolute, these latter intensities, it is evident, cannot be increased by any secondary, *i.e.*, bleaching, action, although such a change might well be inferred from an examination of the diagrams as they stand.

These figures show that the bleaching action is due mainly to the blue, the indigo, and the violet rays, though the yellow rays also exert a slight decolourising effect. In fact, the same rays that produce the blue picture are found to be operative in destroying it. From this we are fairly entitled to infer that the chemical action, in whatever it may consist, is at least not one due to oxidation, that phenomenon being, as Dr. Eder has demonstrated, almost invariably the work of the rays at the less refrangible end of the spectrum.

Official Neglect of Photographic Aid.—Our contemporary, *Fairplay*, is the mouthpiece of complaining builders who make out an excellent case for the introduction of photographic methods in connexion with Admiralty contracts. As matters now stand, when the Admiralty ask for tenders, they notify that the conditions and specifications may be seen at the Admiralty. It follows that, as copies of these are a necessity if tenders are to be sent in, every firm tendering has to go to the expense of sending their own draughtsmen and clerks to take copies, at an aggregate cost representing several hundreds of pounds. The reasonable and very proper suggestion is made that copies by a photographic process should be made of the plans sent out with the specifications.

Curious Property of Chromium Salts.—M. A. Recoura shows in a paper to be found in the Paris Academy of Sciences' *Bulletin* that with the addition of sulphite of soda in large excess to a solution of a chromic salt—the sulphate was used by him—the usual precipitate that follows upon the addition of ammonia, carbonate of soda, &c., does not, in this case, form. The frilling of photographic films is fortunately far less common now than was formerly the case;

but cases do still occur, and it would seem that a valuable anti-friller may be found in a combination of so-called chrome alum and sulphite of soda, a solution which might be poured directly on to the plate, before washing, without fear of a precipitate taking place upon the film, chrome alum being, as is well known, a most powerful preventive of frilling.

Lunar Photographs.—Views of the moon in her various phases have always had attractions for those of astronomical bent, and among the best of the kind is one by MM. Loewy & Puiseux, illustrating the recently published annual report on the state of the Paris Observatory. The subject of lunar photography has been treated at length in the *Bulletin* of the French Astronomical Society by these observers, whose article is well illustrated. We have on previous occasions pointed out that excellent, if small, instantaneous views of our satellite can be obtained by any ordinary portrait lens, and afterwards enlarged to a size sufficiently large to give a very interesting picture. It has been suggested to us that the tele-photographic lens could with advantage be used for this purpose, and we see no reason why it should not be useful for the purpose. We doubt whether the exposure would be sufficiently brief to avoid blurring, through the moon's apparent motion, the chief interest in portrait-lens views lying in the fact that no driving clock is needed, as, of course, it is well known that the portrait lens in conjunction with such a clock is a recognised part of the photo-astronomical outfit.

Cathode Rays from the Sun.—Mr. F. S. Woodward, of New York, is responsible for what is termed "a new theory regarding the sun." He has been experimenting upon the nature of the sun's rays, and has come to the conclusion that the solar radiations are cathode rays. The leading idea of his theory is that the space between the earth and the sun is quite dark, the rays only becoming luminous when they reach the atmosphere, at which point they become luminous, just as does the fluorescent screen when Röntgen rays fall upon them. We are inclined to wonder whether any one but Mr. F. L. Woodward considers that the rays are anything but invisible. The "visibility of the rays" is nothing but the illumination of the dust in their paths, as Professor Tyndall showed in a most beautiful experiment years ago, and as portrait photographers know to their sorrow when the sun shines athwart the path between lens and sitter.

What is a Perfect Negative?—We notice in a recent report of the London and Provincial Photographic Association that "a short discussion took place as to the impossibility of defining a perfect negative." A long discussion on such a subject would be as wearisome and abortive as one on such threadbare subjects as "depth of focus," "art in photography" and suchlike hackneyed topics that crop up periodically. Practically, the most perfect negative is one that will yield a print of the character that the user of it most desires, and suits his purpose best, whatever that may be. The theoretically perfect negative has been defined as one that will not yield a print at all.

Art in the Workshop.—This is evidently an "art" age. We have art paper hangings, art fabrics, art furniture, art tailoring, art dress-making, art millinery, &c., and, we had nearly said, art photography, *ad nauseam*. All this should tend towards the beautiful, or, at least, to the suppression of the ugly—and that should be encouraged in every direction. Last week a Kingston dressmaker was summoned for neglecting to affix an abstract of the Factory and Workshop Act in a conspicuous place in her workshop. The reason assigned by the defendant for this infringement of the law was a novel one, and one we have never, even in this art age, heard given before. She said she objected to having a lot of ugly printed notices stuck up on the walls. To this one of the magistrates suggested that "she could have them put into nice frames if she liked." Eventually the summons was dismissed, on condition that the defendant paid the costs. Photographers employing a number of hands come within the Factory and Workshop Act and have before now been proceeded against for its infringement, but we have not heard any objection from them of the ugliness of the printed notices of the Abstract. The most ugly part of them, to some owners of photographic workshops we wot of, is the regulations they contain.

The South Kensington Museums.—On Friday last the second report from the Select Committee on Museums of the Science and Art Department was issued. It is somewhat noteworthy that it was only issued the day that Parliament was prorogued. The report fully substantiates most of the main charges that are made against the Department, and the Committee have come to the conclusion that "reforms of a far-reaching character are needed in almost every branch." One of the recommendations is that "the Directors of the Science Department should possess some scientific attainments, and the Director of the Art Department like qualifications in regard to art." One of our evening contemporaries deals with the subject under the heading of "Humours of South Kensington," and quotes some extraordinary things from the library, such as Deel being given as an author, the word being the Dutch for volume, and the ingenious transformation of a title of a book on the annals of Queen Mary's reign, *Mariana Fasti*, into the Christian and surname of the author; also, that Ballantyne became the friend of Sir Walter Scott in 1873, and in the same year Sir David Baird took the Cape of Good Hope from the Dutch. Mr. Swinburne's lively retort upon his critics, entitled *Under the Microscope*, has been found in a list of popular works of science.

Such is Fame.—Equally remarkable is the catalogue of National Engraved Portraits. In the biographical paragraphs, Jackson, a publican and pugilist, has eleven lines of description, while Lord Beaconsfield is dismissed in three lines as a "Conservative politician." Pugin, the architect, is said to have "cruised about the channel, collecting archæological and natural curiosities.' The compiler of the catalogue, it appears, was paid two guineas a day for correcting the proofs. "Cardinal Wolseley's chair" is now admitted to be a Singalese work of the eighteenth century, and the agate cup, bought at Hamilton Palace for 535*l.*, is a modern "make-up," worth, at the outside, 50*l.*

It has frequently been said that "the South Kensington lot" are a nice little family party. The report says that twenty per cent. of the persons employed have some sort of family connexion with each other. It is to be hoped that the report of the Select Committee will, and there is little doubt it will, bring about the much-needed reforms in our Science and Art Department, which, for years past, has been little less than a public scandal, considering what it costs the country.

THE ACTION OF HIGH TEMPERATURE ON THE LATENT IMAGE.

[Eder's *Jahrbuch.*]

According to Abney, a dry plate heated in the dark to 90° C. gives an even blackening. This appears to confirm the view that higher temperatures exercise the same action on dry plates as light. In order to test the soundness of these views, several experiments were made.

If a higher temperature exerted a similar action to that of very faint light, it must also have an intensifying action on the latent image, if the temperature was not driven so high as to cause fogging, and this intensification should be observed with the faintest impression. The actuality of this intensification must be first confirmed for light, and then tested for heat.

The action of a preliminary exposure with dry plates is known, as, from the experiments of Dr. Eder, a plate of 15° Warnerke, which has been exposed close behind a sheet of ruby glass for two minutes to the action of a candle flame, showed 19° Warnerke.

It is further known that the impression of light on a dry plate must attain a certain amount before it can attain any action that can be made visible, that is to say, before it will give an image in the developer

This first opposition which has to be overcome has been called the "inertia" of the plate.

The preliminary exposure thus exposes the plate only for the inertia, and, if it is now exposed under a sensitometer, the faintest impressions of light, which would otherwise lie below the inertia, are now capable of being developed as they are added to the preliminary exposure. There will thus appear several more numbers in the sensitometer image.

A similar result may be deduced *à priori* from a supplementary exposure, only with this difference, that no new number can appear, but only that the most delicate impressions of light which have already overcome the inertia will be strengthened. The same will take place with the stronger impression of light, only, on account of the depth of the tones, it will no longer be recognisable.

The following experiments were made to confirm these conclusions:—

A plate was cut up into small squares, measuring 6 × 6 cm., which filled a paper sensitometer, the field of which was covered with from one to sixteen layers of tissue paper. Three plates were always used, which were called I., II., and III. Nos. I. and II. were exposed under the sensitometer at a distance of one metre from a candle for sixty seconds, so that the quantity of light was sixty C.M.S. No. III. was unexposed, and was therefore used as a control plate, so that, in the supplementary exposure, the inertia was not over-stepped. The exposed plate, No. I., was kept in the dark, whilst Nos. II. and III. were placed in a printing frame, and given a supplementary exposure of one minute, at a distance of the metre to a petroleum lamp behind a red glass cylinder. Plate III. was in part covered with black paper, so that it would show whether the inertia had been overcome. All three plates were now developed together in one dish.

The result was that the control plate was absolutely clean; on the supplementary exposed plate No. II., the last visible numbers, 9, 10, and 11 were more vigorous than those on No. I., which did not receive the supplemental exposure.

The same result was obtained when the supplementary exposure was made for four minutes at a distance of two metres from the lamp.

Use may be made in practice of the action of this supplementary exposure for under-exposed plates.

It will be seen from these experiments that a faint light which remains below the inertia acts as an intensifier on the most delicate light impressions, without prejudice to the cleanness of the plate. If, now, a high temperature acts in a similar manner to light, it must also similarly intensify the lightest tones of the latent image. In order to test this, a similar test was made, that is to say, two plates, I. and II., were exposed under a sensitometer for sixty C.M.S., and III., not exposed. No. I. was kept in the dark, and II. and III. subjected to a higher temperature. By this means, III. gave the action of temperature on the unexposed plate, and II., by comparison with I., the action of heat on the latent image, when they were all developed in one dish.

The arrangement for heating was a square drying chamber which was surrounded on five sides with warm water, and had a door in front, an apparatus which is in frequent use in the laboratory. In this box the plates were laid whilst the water was kept at a definite temperature, which was taken by a thermometer. In order to ensure the absolute exclusion of light, the plates were also enclosed in a flat zinc box. As, however, according to Colson's researches, the vapours from zinc, especially at high temperatures, are apt to fog dry plates, but as, according to Russell, glass is impervious to such fumes, the box, both inside and out, was given a coating of water glass, which proved quite effectual in its action.

The impression of light was such that on the developed plates the numbers, 9, 10, and 11 were still legible.

1. By heating to 60° C. for one hour the plates remained quite clean, but the numbers 9 and 10 were somewhat weakened, and 11 no longer legible.

2. One hour's heating to 90 to 93° C. produced a strong reduction of the numbers, 9 and 10, and a disappearance of 11, whilst the plates remained quite clear.

3. They were heated for three hours from 80 to 85° C.—Result as in 2.

4. They were heated for twelve hours to from 70 to 85° C., and fog was caused, and the whole image became weaker.

5. Repetition of 4.—Fog, the whole image was weaker and less contracted. No. 11 had disappeared.

6. Repetition of 4.—The plates were not developed, however, immediately, but after the lapse of twelve hours. In this case the fog was less than in 4 and 5. The whole image was flatter, that is to say, had gone back and 11 had disappeared.

In all these cases there was thus a reduction of the latent image by the high temperature. It cannot be said that this number in experiments 4, 5, and 6 had gone into fog, for, if the fogged plate III. was laid on plate I., the number 11 was not covered by the fog, but was still plainly legible.

The action of a temperature of about 90° C. on the latent image is thus the opposite to that of weak light, which still remains below the inertia.

Now, since heat only produces fog with continued action, it must be due to indirect action, and may be ascribed to a secondary action on the gelatine or on the moisture absorbed by the same. This explanation was further strengthened by some secondary observations in the above-described experiments.

The plates used were very old, and showed therefore already grey edges. These, which in the plates which were kept cool were scarcely noticeable, were much broader and stronger in the heated plates, so that they gave one the impression that they were caused by a strong exposure. The small plates were bounded by fresh-cut edges, and one or two old edges of the larger plates from which they were cut. Only the last-named edges showed the strong blackening, whilst the former did not show it. This fact leads one to think with regard to the formation of these grey edges, and makes it probable that the cause ought not to be looked for in exposure, which might be produced by prolonged action through the box, since heat would otherwise produce a strong reduction and not a considerable intensification. It is much more likely that the gelatine at the edges had absorbed any damp which had been given out by the cardboard or had penetrated the same, and had acted at a high temperature on the gelatine, or possibly by means of the gelatine.

Another secondary observation was the following: In experiment 2, plate III., which had not been exposed, was heated, covered with an apparently clean glass plate which had been exposed for some time to the air. On development the plate generally remained clean, but showed in one place in the middle a peculiar stripe of fog. When the glass plate which was used to cover it was breathed upon, a breath image showed itself of the form of the strip of fog. The glass plate had thus absorbed some damp or vapour on its surface, which had acted on the dry plate at a high temperature. As a result the glass plate was always freshly polished, and then the phenomena did not appear. A further phenomenon was also observed, for which, up to to the present, no acceptable explanation is wanting. If a smaller glass plate was laid on the film of a larger dry plate, and then together exposed to a high temperature, there was found on development that the edges of the smaller plate had formed black but not continuous lines on the dry plate, whilst the surface of the glass was without action. Exactly why the edges should exert an action is difficult to see. These phenomena must be more closely studied by experiments under different conditions to give results which shall be of practical value for the handling and keeping of dry plates.

J. GAEDICKE.

FOREIGN NEWS AND NOTES.

A Photographic Art Museum.—The Committee of the Musée de l'Art Moderne at Brussels recently recommended to the Government that it should acquire some of the leading pictures lately exhibited at the third Exhibition held by the Association Belge de Photographie, and sixty-four pictures in all have been obtained, of which twenty-three are by the following English workers: E. R. Ashton, Craig Annan, Carine Cadby, E. Calland, W. Crooke, G. Davison, H. E. Davis, John H. Gear, Karl Greger, F. Hollyer, A. Horsley Hinton, F. C. Lambert, H. P. Robinson, R. W. Robinson, F. M. Sutcliffe, and W. D. Welford.

Chassagne's Process.—Dr. E. Vogel states in the *Photographische Mittheilungen* that excellent results in the colouring of prints can be obtained by the use of three solutions, as in Chassagne's process, and he suggests for the colourless medium a two per cent. solution of dry albumen in water with two per cent. of ammonia added, the advantage of the ammonia being to enable the solution to penetrate any greasy places. This solution soon spoils, but its keeping power may be increased by the addition of some carbolic acid. For the colours he suggests the use in diluted solutions of ammonium picrate for yellow, safranine G for red and methylene blue for the blue.

Invisible Solar Rays.—According to the *Wiener Photographische Blatter*, Dr. Gaster states that, if a glass or metal plate be placed inside a camera, and the lens be pointed to the sun so that

a sharp image is formed on the plate, and the plate thus exposed be taken into a dark room and laid on a dry plate or piece of bromide paper for several hours, there will be obtained on development in the ordinary way a picture of the solar corona, although the surface of the sun itself gives no trace of an image.

Absorption of Light.—In the *Photographische Correspondenz* appeared lately the following table, showing the loss of light by absorption and reflection by lenses :—

Thicknesss of the lens in centimetres.	Intensity of light transmitted. The incident light = 1.	
	Optical Rays.	Chemical Rays.
4	0·93	0 84
6	0·90	0·77
8	0·87	0·71
10	0·84	0·65
20	0·71	0 43
30	0 60	0·28
40	0·50	0·18
	Total loss by Absorption and Reflection.	
4	0 77	0 69
6	0 75	0.63
8	0·72	0 58
10	0·70	0·53
20	0·59	0·35
30	0 50	0·23
40	0·42	0·15

Sky-blue Tones on Collodio-Chloride Paper.—According to *Helios* bright sky-blue tones may be obtained on collodio-chloride paper by printing deeply and then washing for ten minutes in seven or eight changes of water, then fixing for about ten minutes, washing for ten minutes and then toning in a bath of

Lead nitrate	75	grammes.
Ammonium sulphocyanide	40	,,
Chloride of gold and potassium	0·5	,,
Water	1000	c.c.

In this the prints should be allowed to remain till the desired tone is obtained and then washed for about fifteen minutes.

A Substitute for Card Mounts.—Dr. Hesekiel, the well-known dealer of Berlin, has introduced a substitute for the ordinary card mount in the shape of linen, the surface of which is coated with a thin film of indiarubber. The print should be perfectly dry and placed on a smooth, flat surface, face downwards, over it the linen is placed and then a hot iron passsed over the back of the linen when the print will at once adhere.

Absorption of Light by Soot.—M. Dufour, of Geneva, has proved that a deposit of soot $\frac{1}{10000}$ of a millimetre thick stops a very appreciable amount of light, and that a thickness of $\frac{1}{692}$ mm. can completely stop the light of the sun. This should be a warning to professional photographers to keep their studio glass clean.

New Developers (?).—M. Mercier, a well-known chemist and writer on photographic matters, has been experimenting practically with the contents of a chemist's shop, for he has been plunging plates both before exposure and before development in various mixtures, and has found that the use of a two to three per cent. solution of emetine allows considerable latitude in exposure, and that enormous over-exposure may be given without harm. Morphia, apomorphine, coorine, eserine, &c., have no effect. The reporter in the French journal from which we extract the above particularly wishes to know what would be the effect of Vichy water on plates; so do we.

GELATINO-CHLORIDE PRINTING.

When gelatino-chloride paper, or, as it is more familiarly called, P.O.P., was first introduced, it was much admired for the beauty of its results, but it did not make the rapid headway that would have been expected, owing to the difficulties of working it as compared to albumen paper. "Slow and sure" is a good old axiom, and in the case of P.O.P. its truth has been exemplified. At the present time there are very few firms, in comparison, that still use the old albumen paper, and even they would follow the general run could they but be brought to see the ease with which gelatino-chloride paper can be manipulated. The wordy warfare which has been raging for the past year or two as to separate or combined baths and the constituents of the same has had the effect of frightening some of the profession from introducing the new paper. It has been asserted, on the one hand, that prints toned in the combined bath are evanescent in the extreme, while, on the other side, it has been alleged that the separate bath is a fertile source of double toning and yellowed whites, especially in vignettes. The Albumenophile accepts both statements, and adds thereto the facts (*sic*) that P.O.P. is sticky and easily marked by the fingers in washing and toning, and that it is very difficult to mount, and so makes up his mind to stick to his old love at the expence af his business; for, let the charmer charm never so well, there is no gainsaying the fact that the public swear by P.O.P.; the surface suits their taste, and the greater range of tone is more to their liking. In giving my own experience in working gelatine paper I know I am going over old ground, but let my excuse be that it may be the means of bringing one or two waverers into the fold, and at the same time, by creating a greater demand for the paper, by that means gradually bringing the cost to less than that of albumen.

It would be invidious in an article of this description to recommend any special brand of paper, therefore I will merely say, Try two or three makes to commence with, and when you find one that suits you stick to it. As regards colour, I strongly recommend mauve for portraiture, pink or white for views. The cut sizes, cabinet and *carte*, are a saving of time, and the cost is materially the same as buying in sheets. Never underprint, as a light P.O.P. print always looks poor, whereas one a shade dark is still rich and plucky if not over-toned. For some years I stuck to the combined bath, without lead or alum, but have of late discarded it for the separate, which I make up as follows :—

Water	100 ounces.
Sulphocyanide of ammonium	130 grains.
Chloride of gold	15 ,,

The sulphocyanide should be thoroughly dissolved before adding the gold, and the bath, after mixing, should stand at least six hours to digest.

Into this bath I put my prints direct, *without any previous washing*; they will be found to tone very rapidly and very evenly, without any sign of the objectionable double tone. Immediately they show the tint I desire—a surface tint I mean, for if examined by transmitted light they still appear red—I plunge them into a bath of water, to which may be added a trace of common salt. It is advisable not to have too many prints in the toning bath at one time or overtoning is sure to occur. Just a change or two of water and the prints are ready for fixing, the bath for which is composed as follows :—

Water	1 quart.
Hypo	8 ounces.
Liquid ammonia	6 drops.

Ten minutes in this bath suffices, and then, after a few more changes of water, they should be immersed for five minutes in a solution of one ounce of alum to the quart of water, or, if preferred, in a one per cent. solution of chloride of aluminium. Half an hour's washing, with constant change, finishes the process, and the prints are then ready for mounting, which is executed in exactly the same manner as for albumen prints. They are taken from the water and laid face downwards in a pile upon a sheet of glass, the surplus water squeegeed out, brushed over with ordinary starch paste and affixed to the cards, stood up to dry, and as soon as dry are ready for burnishing, but *not* with a bar burnisher. I find in practice that prints treated in this manner stand almost any heat without melting, and I am confident of their permanence.

A word as to the manufacture of the starch paste. Use the *very best* white starch, mix with cold water in a gallipot, stand the gallipot in a saucepan of water kept boiling, stir until the mass thickens properly, and then let it boil on for another five or ten minutes, until it is thoroughly turned. When cold, skim and use. Prints mounted with this never, "well hardly ever," come up, and, on the whole, I think, as I have explained it and as I daily work it, gelatino-chloride printing is no more difficult than albumen. The toning bath may be used three or four times with the addition of fresh gold. If, however, on adding gold, it turns yellow or milky instead of blood red, it is deficient in sulphocyanide and overcharged with silver, and should not be used.

C. Brangwin Barnes.

COLLODIO-CHLORIDE PRINTING.

Collodio-chloride seems so little understood by many professionals and most amateurs, that a few remarks upon it may be useful.

Its advantages include rapid printing, more especially in dull weather, economy of gold, pure whites, great vigour and detail, permanence, no double tones or blisters; the prints may be taken from the water and mounted at once; mounting is easy, and, if burnished, they have a splendid gloss, which is unaffected either by mounting or atmospheric changes.

Unfortunately, like most papers, it has some disadvantages, though these are few, the fatal ones having been the tendency to curl and crack; but I find there is now an English brand upon the market which is free from these defects, and the only fault left is that, being

more sensitive than the other papers, slightly more care is required in working it. The principal causes of failure in toning are an acid toning bath or a bath too strong in gold, the result being that the prints are very much reduced in intensity and the tone is an unpleasant slaty blue. Another great cause of failure is insufficient washing before toning, for, collodion being to a large extent impervious to water, a very thorough washing is necessary to remove the free acids and salts which, unless eliminated, are bound to contaminate the toning bath.

Alum, which is recommended by several makers either in the toning bath or to prevent cracking, is sometimes a source of trouble. If photographers realised that alum is largely composed of sulphur, and that sulphur and permanence do not go hand in hand, I think alum would be largely relegated to oblivion, photographically.

One of the greatest arguments in favour of collodio-chloride is its permanence, more particularly the latter, a matter of importance to the professional who takes an interest in turning out good and lasting work, and to the customer who wishes to have a permanent record of faces, places, and incidents, many of which can never be recalled, except by the photograph. The question of permanence was forcibly brought to my mind recently, by one of some photos taken about three years ago, printed upon albumenised paper; it had been enclosed in the thin envelope which photographers pack photos in, and which I presume is of pure paper, and had lain in a drawer excluded from light; it was very much faded. I had another copy in an album, and, on comparing them, found that in the album in fairly good condition, the different modes of keeping may have affected the results; but, if not, this shows the unreliability of albumen, as they were both off the same negative, and presumably produced under the same conditions. In contrast to this, C.C. prints have been exposed to strong sunlight, with variations of heat and moisture for months, and practically no change has been apparent. By a very thorough washing, albumen prints may be made fairly stable; but there is no comparison with the ease of washing C.C., where the sensitive film is entirely upon the surface, and the saving of time in washing and mounting it is enormous.

Collodion is a definite chemical compound, unaffected by climatic variations of heat and moisture, while albumen is an indefinite organic compound, and is liable to be affected and decomposed by such variations; this seems to prove that collodion is a much more suitable vehicle to hold the sensitive silver salts.

Now that the difficulty of keeping the collodion film securely upon the paper has been overcome, the many advantages it possesses should establish it in popular favour, but careless photographers should not attempt to use it.

Collodio-chloride may be worked exactly the same as albumen or gelatine, with the exception that, as it loses, or should lose, very little in toning and fixing, it does not require printing quite so deeply; also it dries slightly bluer than it looks when in the bath.

C. F. Sutton.

CALCULATING EXPOSURE AND EXPOSURE METERS.

II.

From the foregoing account I hope to have made clear what is the problem of calculating exposure, and the two methods of solving it: Platts, followed by Hurter & Driffield, and the actinometer plan used by Mr. Watkins. We see that the three chief data are: Actinism, diaphragm, plate, and by these alone the exposure can be given, not perhaps with scientific exactitude, but sufficiently near for the demands of the case. The only questionable element is the actinism, and it is in estimating its value that judgment must be exercised. Perplexity in the interpretation of this factor will speedily arise, the light may change between making the test and the exposure, the colour sensitiveness of the plate and actinometer differ; near and distant objects vary in brightness, one half of the subject is in sunshine, the other in shadow, and for all such accidental variations the operator must make allowance.

The adaptation of the slide rule to the calculation of exposure being of great utility, and also the one thing that has been least explained, I shall devote the remaining space at my disposal to a practical description of a slide-rule meter.

It is first necessary to obtain four logarithmetic scales, that is, copied from the A scale on the carpenter's slide rule. This scale, it will be found, is divided unequally, and numbered from one to ten, twice repeated. These divisions must be retained in the same proportion, but for our purpose numbered from one to one hundred, as shown in the scales marked D and E (fig 1). One scale is allotted to each of the four factors, actinism = A, diaphragm = D, plate = S, exposure = E. These are arranged as shown in fig. 1. A and S are fixed, whilst D, and E, are on one piece, and made to slide between the other two. Each scale is divided the same, but the two fixed scales, A, and S, are reversed. This is done because we have a case of inverse proportion. The above arrangement is similar to that of the actinograph, only, in place of the H. & D. light diagrams there is a scale of actinism. Watkins's meters are fitted differently, and several schemes are possible. The numerical values of each scale are fixed upon as under:—

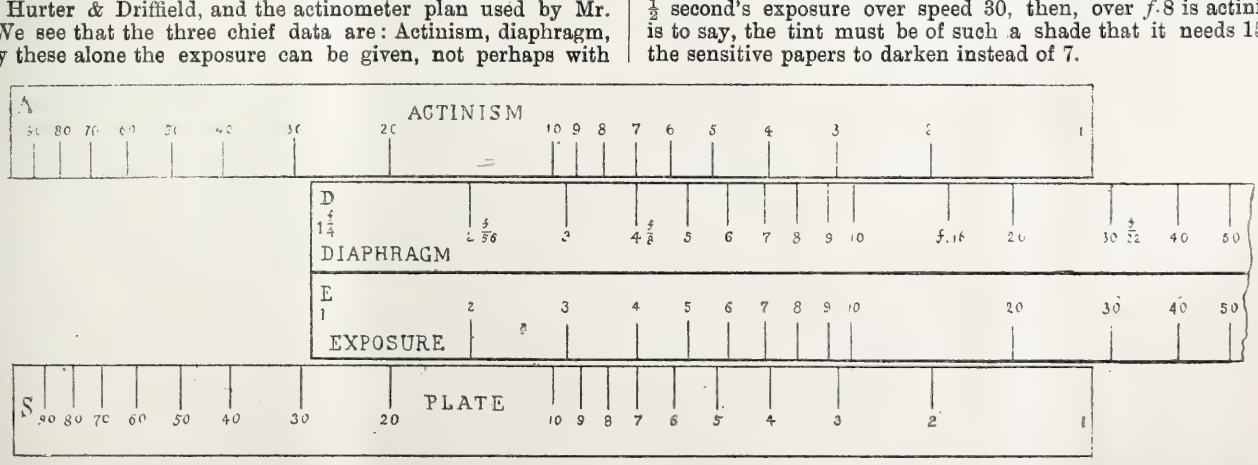
Actinism Scale.—These numbers indicate seconds, *i.e.*, the length of time the sensitive paper of any actinometer takes to darken to the standard tint. Of course, they may be made to represent minutes or any other unit of light that can be used as a measure of the light intensities at work in the camera during exposure.

Diaphragm Scale.—This might be read as the relative values of any series of stops, 1, 2, 3-100; but, as the uniform system gives the relative values of diaphragms, this is adapted to the figures starting with *f*-4 as unit, *f*-5·6 = 2, *f*-8 = 4, and so on at the various distances until we reach *f*-40 = 100.

The Plate Scale.—The numbers here are equivalent to the relative speed of plates, 1 being the slowest and 100 the quickest. A list of plate speeds can be adapted to the scale by making the slowest equal to 1, reducing all others to the same denomination, and marking them at their respective points.

The Exposure Scale.—The exposure scale can only be valued after a trial exposure; in fact, all the scales are merely relative, and the meter has to be finally set or given an absolute value. Before this can be done, the rule of working the instrument must be stated, namely, to calculate an exposure, put the diaphragm number under the light number, and then opposite the plate speed find exposure. In fig. 1, *f*-8 is set to actinism 7, and over speed 30 is found 1; let this indicate 1 second, and the exposure scale can be regarded as correct, the instrument being ready for working. Supposing, however, on taking *f*-8, a plate speed 30, it is discovered by experiment that with actinism 7 the required exposure is not 1 second, but $\frac{1}{10}$ second, in this event we may consider the exposure scale as starting from ·1 and rising to 10 seconds. Lastly, under the same conditions, the exposure may be 2, 3, 5, or any number of seconds. Should this occur, two courses can be taken to secure the right adjustment: the speed scale can be changed or the standard tint modified. Say 2 seconds is the given exposure, then the plate of speed, 30, must be numbered 15, and all other speeds brought to the same scale. If ½ second's exposure was correct by trial, then a plate of 30 must be increased to a speed of 60. This is evident on examining the figure, since, with *f*-8 and *a*-7, the 2 seconds' exposure is above speed 15; therefore the plate found to give this result must be numbered 15.

The standard tint may be made lighter or darker to agree with experimental evidence. To do this, in the instance under consideration, bring ½ second's exposure over speed 30, then, over *f*-8 is actinism 15; that is to say, the tint must be of such a shade that it needs 15 seconds for the sensitive papers to darken instead of 7.



Whatever plan is adopted, the meter cannot be used until there exists an identity between an actual experiment and the setting of the slides. Thus, if with A = 7 D = *f*-8 = 4 S = 30 E = 1, the meter must show,—

$$\frac{A \times D}{S} = E = \frac{7 \times 4}{30} = \frac{28}{30} = 1 \text{ second nearly,}$$

and similarly for other values of A, D, S, and E.

To give data not shown in fig. 1, *i.e.*, diaphragms smaller than *f*-40, higher speed and actinism numbers, shorter exposures, the scales may be extended in either direction by keeping the sequence of notation.

John A. Randall.

THE ANTARCTIC EXPEDITION.

On Saturday next the *Southern Cross* leaves London for the Antarctic regions. The Expedition, which is under the command of Mr. Borchgrevink, is of a scientific character, and is so fully equipped with instruments for taking and recording observations, that we may not unreasonably look, upon its return, for a vast and useful mass of knowledge regarding the natural phenomena of the Southern ice-fields. We have already stated that photography is to be largely availed of by the expedition, and that department falls within the sphere of Mr. Louis Bernacchi, late of Melbourne University. Sir George Newnes, who is defraying the cost of the Expedition, practically gave Messrs. Ross, Limited, of 31, Cockspur-street, *carte blanche* in the supply of the photographic and scientific instruments, and the latter, which are of the utmost possible variety consistent with the scheme of observation that is to be taken in hand, have been submitted to the Kew authorities for verification. The photographic outfit has been collected upon a scale of completeness perhaps not hitherto adopted in an expedition. It was laid down as a condition by Sir George Newnes that the selected apparatus and material should be tested by Mr. James A. Sinclair, the manager of Messrs. Ross's Cockspur-street branch, and it is obvious that such a commission could not have been intrusted to more expert hands. It is needless to state that special precautions have been taken in the packing of the sensitive materials. Barnet and Ilford plates have been included, while the Ilford printing papers have been selected for use. A supply of Fitch's films also figures in the list. A Ross half-plate brass-bound set, fitted with Goerz and Dallmeyer tele-photographic lenses; a Stigmatic lens; a Kodak fitted with a Ross rapid symmetrical lens and a Bausch & Lomb shutter; a Newman & Guardia hand camera, fitted with a Ross-Goerz lens, and a Newman & Guardia cinematographic apparatus, with objectives of long and short foci, are among the principal items of apparatus in the outfit. Development is to be conducted *en route*, and there is a lavish supply of materials for this, for printing, and for other operations. A glance through the photographic stores reveals the fact that nothing likely to be required by the photographer during the long voyage has been omitted; even flashlight work and its possibilities have not been overlooked.

All will wish the *Southern Cross* and its crew a successful voyage and a plentiful crop of Antarctic discoveries. To photographers the nature of the results obtainable and the behaviour of the sensitive materials in their long journey will be matters of permanent interest, to which the closest attention will, doubtless, be given on the return of the Expedition. Certainly for photographic work in the ice fields of the South it would appear that the Expedition could not have been more suitably fitted out.

PHOTOGRAPHIC ECONOMY.

"This half-plate outfit up to the present moment has cost sixty-four pounds eleven shillings and threepence, and it is not complete yet!" Such was the remark made to the writer by one of our leading opticians and photographic-apparatus manufacturers, on looking over the workmanship and fittings of what to all outward appearances seemed to be a mere ordinary half-plate long-extension mahogany camera, and seeing that, at the present time, good sound half-plate outfits can be acquired from almost every dealer for the modest sum of three pounds ten shillings, some of those who read these lines may wonder what sort of extravagance was being perpetrated in the apparatus in question whereby it could be run up to such a figure. Well, at the very outset, when looked at from a fair and practical standpoint, it cannot be said that any one item was overcharged, or that the specification included in the outfit anything beyond what was necessary for the particular class of work it was intended to undertake, but was just one of those cases in which a gentleman possessed of considerable means, and who was, for the time being at least, deeply interested in photography, was therefore quite justified in gratifying his desire to be the possessor of a really sound and efficient photographic set of apparatus.

It would manifestly be improper to give any minute details of this instance, where a high price was being paid to a first-class house for a first-class outfit. The chief items of expense, doubtless, lay in the lenses, of which there were a very complete set, including a tele-photo objective for long-distance working. The purchaser in this case knew exactly what he wanted, and was able to pay for the same, and therefore it would be unfair to single out such as an instance of want of economy, for, no doubt, the camera in question was capable of producing results that a cheap outfit would be incapable of doing.

On the other hand, how many instances are there happening daily in which people are found acquiring outfits the use of which is entirely unknown to them, and who in future years will most likely, when looking back upon such transactions, say, "Well, what a fool I was, to be sure; but I have learned wisdom and sense since then."

What constitutes sound economy in the purchase of a photographic outfit and material is a question that is very often asked and but seldom answered satisfactorily, for it by no means follows that a high-priced set is not in the long run more economical than a cheap one. As I write these lines my eyes rest upon a whole-plate camera that has for over twenty years been a faithful companion indoors, as well as having accompanied me in my travels here, there, and everywhere, and for all purposes it is just as good to-day as when it left the late John Percy's hand (George Mason's foreman then) twenty years ago. But this was not a cheap article at the start, and many at the time might have thought a cheaper article would have been more economical, but in the long run the old horse wins. This box has worked wet collodion and taken stereoscopic views, and, were all the plates that it has exposed used as flagstones, they would pave the space that intervenes between Glasgow and London, and I have no doubt will do as many more before it is placed aside. In my opinion sound economy lies in the knowing exactly what you want, and then getting the best of it, rather than in purchasing or acquiring by swapping this, that, or the other, for no other reason than just because it seemed cheap.

It is not, however, so much in the acquiring of photographic outfits and useless apparatus that there is a strong liability to practise extravagance or lack of economy, as there is in the ignorance of being able to use such without much loss, and which very often need never happen were a thorough knowledge possessed of how the various manipulations that are required from the exposure of the plate down to the finished print. Failures certainly will fall to the door of every operator, but how many failures are there, I wonder, that are clearly traceable to the want of a practical knowledge of the best means of placing things right when they appear to be going wrong, or the making of them right when they have gone wrong?

Take, for instance, an every-day occurrence in the printing of negatives. How many cases are there where, very probably from careless attention, prints are neglected and over-printed to such an extent as to cause strong language and an immediate crushing of the picture and its consignment to the fire or waste-paper basket? Such is, perhaps, one of the most common circumstances, and is, in thousands of cases, happening every day; where, in point of fact, such over-printed proofs might be economically utilised, and all this simply through a want of knowledge of how they should be practically treated to make them suitable to the most fastidious.

It has been well said that there is no more important branch in a photographic business than the printing department, and that an experienced and clever printer is a treasure. Certain it is that in the printing room there lies the opportunity for much extravagance and loss, and that a highly-paid printer will, in the long run, more than save his wages by the economical method of his working; and, if this is true of the professional who has from hour to hour constantly before him a similarity of negatives and work, how much more so is there need for such as amateurs, who are more liable to err from not just being so much in touch with the work they are performing.

There is no doubt, in the printing of negatives alone, much greater economy may be practised by a knowledge of how an over-printed proof may be saved, or a print in which some eyesore exists, the removal of which would make the same perfect.

A few instances of such may be given. In the first place, one of the most common printing processes at the present time, with amateurs at least, is that of gelatino-chloride, and, in all cases where over-printing has occurred, it is safe to say, with ordinary care every print may be saved. Say, at the close of a day, a dozen or so of prints have to be toned and finished; these are taken out of the box, and very likely will contain some that are just about right for depth, and others that would be discarded in the ordinary way of working; but, when all of such prints are washed, toned, and fixed in the usual manner, an economical worker will think about reducing those that have been over-printed, and this he will proceed to do in the simplest and quickest manner possible. Say, after the prints have been washed for half an hour or so, they are judged in their best condition for this treatment, which merely consists in dipping them in and out of a very weak solution of ferricyanide of potassium. One small crystal of about the size of a pea dissolved in thirty to forty ounces of water will be quite energetic enough, and soon the over-printed proofs will be seen to come to their proper appearance without injuring their tone, *if the proper toning* formula has been used and well washed. In this item alone thousands of prints may be saved every day.

Then again, dirt, or matter in the wrong place, very often caused by hot or sweaty hands, causes eyesores and spots in some parts of a print, the removal of which would be all that is desired.

In the case of a print having a clear sky line, the same treatment with a slightly stronger solution applied with the soft pad of the finger, the print resting in the bottom of a dish that is held in a sloping position—or on clean glass—so that none of the solution will run over the face of the print. This treatment, carefully performed, will remove the worst spot or eyesore that ever appeared upon the sky part of a print.

Another very important saving may be made in the treatment of vignetted prints in which metallic spots appear or other equally disagreeable eyesores. All these may be removed by similarly treating the prints after being toned and fixed.

To attempt to describe in detail every instance in which faulty prints may be doctored or economically treated would be impossible in a paper of this kind; it is a subject that would fill a fair-sized manual in itself. Suffice it to say that such treatment is applicable to bromide prints and

others as well as that of gelatino-chloride, and, although such treatment is not advocated, on the score of engendering a slipshod or careless manner of printing, it is well that a knowledge of what resource a printer has in the event of common errors being made, and the power he has of rectifying the same.

With the professional who has to earn his bread and cheese, the question of economy in working is one that is sure to merit his closest attention, and but few well-appointed studios or businesses can be found where the strictest rules are not in operation, with the view of not only studying economy, but at the same time ensuring the turn out of the most perfect pictures possible. With casual workers, however, the matter is quite different, and in many instances a routine or method of working that may prove economical and beneficial to a professional might, in the case of those who only expose a few plates now and again, prove quite the reverse.

Take, for instance, some of the common formulæ given for development. One case will suffice, such, say, as where a whole ounce of pyro is recommended to be dissolved at one time in a solution of sulphite of soda or other preservative. How often does it happen that, owing probably to the faulty condition of the chemicals, a rapid deterioration sets in, and after an interval, it may be, that varies as much as from weeks to months before any development has to be performed again, the entire ounce of pyro is absolutely useless, or, if used, does more harm than good.

On the other hand, there are developing formulæ more particularly suited for amateurs, in which no liability to deterioration will be found, such as the keeping of pyro, or whatever other reducing agent be employed, in a dry or undissolved state. One of the best formulæ in this respect is that where dry pyro is added, at the moment of being used, to a solution of sulphite of soda, freshly prepared for the purpose, in sufficient quantity as may be required.

This may appear a matter of but slight moment to some, but the writer has gone into more dark rooms than one, which were most extravagantly fitted up, and in which the loss from deterioration of chemicals alone must have amounted to pounds in value, not to speak of the annoyance experienced in there not being a single solution in a fit state for use when needed, although they were prepared with this end in view.

Then, again, in the storage of unused plates, we have another item of loss, which at the end of a season, or rather at the beginning of a new one, offers an object-lesson in economy that many would do well to study more closely.

T. N. Armstrong.

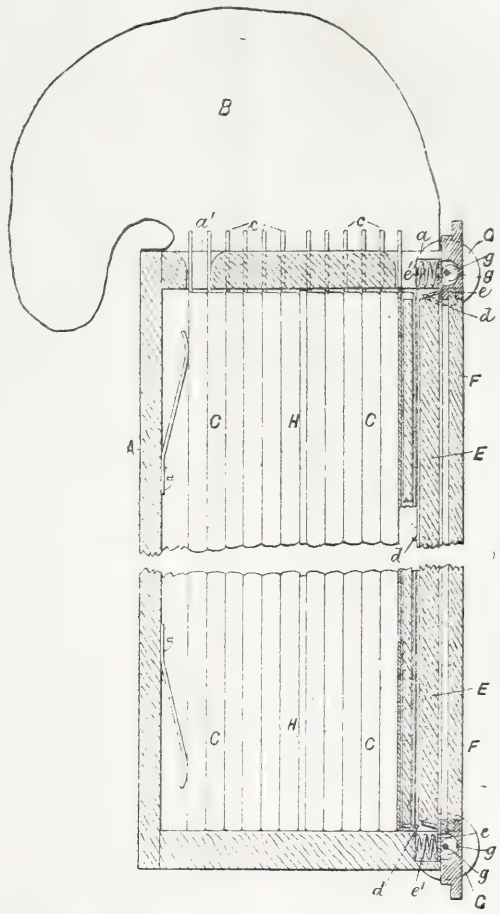
JOLY'S CHANGING BACK FOR COLOUR SCREEN PHOTOGRAPHY.

In the Joly process, as is well known, it is necessary to expose the sensitive plate immediately behind, and in close contact with, a screen ruled with fine lines of certain alternating colours.

The new changing back facilitates the exposure of several such sensitive plates behind, and in close contact with, the same screen without having recourse to manipulation in the dark room. For this purpose the ruled screen is mounted in a changing back immediately behind the shutter thereof, and provision is made whereby the sensitive plate and screen may be brought into close contact, and so maintained during exposure of the plate, and may be separated after exposure, so that during the operation of moving the sensitive plate into, or away from, the exposure position, the plate shall not be subject to sliding contact with the screen. This approximation and separation of the screen and sensitive plate may be effected either by moving the plate (which has, by the ordinary operation of the changing back, been brought forward and placed behind the screen, but not in contact with it) forward, or by moving the screen backward, until plate and screen are in close contact, the operation in either case being performed by the aid of levers or springs manipulated from the outside of the changing back or camera, the reverse movement being effected after exposure, in order to separate the plate and screen sufficiently to avoid the scratching which would result from sliding contact of the plate with the screen when the plate is moved in its own plane.

In the drawing, A is the body of the changing back, having transverse slots, a, a^1, in the top towards the front and back, and enclosed at top by a leather changing bag, B. Each plate is enclosed in a sheet metal sheath, C, having a central projecting tongue, c, on top, the tongues emerging through a slot connecting the slots, a, a^1, in the top of the changing back, in order that they may be gripped through the bag for the purpose of changing the plates. The plates are pressed forward by springs, and the front plate of the series rests by the flanges of its sheath against projecting ledges, d, at the sides of the box, by which the plate is restrained from moving forward beyond the position shown. E is the taking screen supported in a metal mount, e, and is so much smaller than the sensitive plate as to clear the flanges of the sheath when pressed backwards, as hereafter described, in order that the ruled surface of the screen may come into close contact with the sensitive plate. The screen, E, is supported within the changing back immediately behind the light-tight slide, F, and is normally pressed forwards by springs, e^1, of any suitable form, bearing against the flange of its mount, e, so that the screen will be then separated by a sufficient interval from the foremost plate which rests against the ledges, d, to admit of said plate being slid through the slot, a, in the top of the box, A, into or out of position for exposure, as the case may be.

Upon transverse shafts, g, mounted on the front of the changing box, are pairs of eccentric cams, g^1, adapted to bear against the mount, e, of the screen, so that, when turned by milled heads, G, the cams will force



the screen backwards until it is in contact with the foremost plate, the throw of the cams being sufficient to ensure this by slightly forcing the plate back from the ledges, d, against the pressure of the springs.

The changing back is shown as holding twelve plates, the exposed and unexposed plates being separated by a travelling partition, H.

The changing back is adapted to slide in the grooves of the camera body in the usual way, and it is opened for removing the plates and recharging by removing either the front carrying the light-tight slide, F, and the taking screen, or preferably by removing the back of the box.

WOOD'S PLATE-CHANGING SYSTEM.

The plates are arranged in a chamber at the back of the camera in two rows, one above the other, the top row having a partition in front, whilst the bottom one is exposed.

Upon one side of this chamber is fitted a vertical slide or pusher, consisting of a plate formed with flanges on its sides, between which the plates for exposure are held. The upper end of the rear flange is formed with a lip, which engages with the rearward plate of the top row to draw it down to position behind the plates in the bottom row, and the lower end of the front flange is likewise formed with a lip for feeding or carrying the front or exposed plate up to and in front of the top row of non-exposed plates.

This slide is is operated by means of a stud passing through a vertical slot in the side of the case or outer box of the camera. Curved flat springs are fixed to the partition in front of the top row of plates, and similar springs are fixed to the back cover behind the lower row of plates for the purpose of keeping the said row of plates in proper working position.

One side of the outer box is also provided with an indicator for showing the number of plates that have been exposed.

This indicator consists of a dial plate fitting into a recess in the side of the box, and marked on its outer face with numerals separately exposed to view through an aperture in the said side as the dial is revolved.

In order to operate the said dial a curved lever is pivoted in a recess

behind the same, and provided with a spring arm or pawl, which engages with teeth or pins on the back of the dial.

The end of this lever is provided with a pin passing through a slot in the side of the box and acted upon by the slide or pusher, so that, as the latter is raised, it also raises the end of the lever, causing the same to turn the dial a distance equal to the space between two of the figures thereon.

When the pusher is lowered, the lever is brought down to its normal position by means of a spring connected thereto.

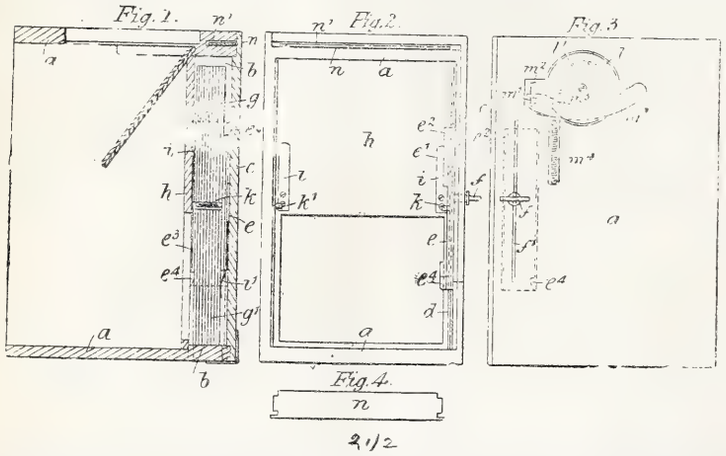
The top row of plates rests upon ledges or projections upon the sides of the chamber, which permit of the rear plate only being drawn down, and the front or exposed plate of the bottom row being forced up in front of the top row.

The said ledges are formed with slots into which are fitted the notched ends of a plate or bridge piece serving as a support for thin film sheaths, but which is removed when ordinary plates are used and placed in a slit or recess in the top of the box.

Fig. 1 is a longitudinal vertical section of the outer case or box of a camera fitted with the improvements. Fig. 2 is an end elevation thereof, and fig. 3 is a side elevation showing the indicator. Fig. 4 is a detail.

a is the outer case or box of a twin-lens camera, and *b* is the chamber at the back provided with the hinged door, *c*.

To one side of this chamber is fixed a plate, *d*, behind which is fitted the vertical slide or pusher, *e*. The outer side of the said slide is formed



2 1/2

with the flange or ridge, e^1, the upper end of which is provided with the lip, e^2, and the inner side is formed with the flange, e^3, provided with the lip, e^4.

The slide, *e*, is provided with a stud, *f*, passing through the slot, f^1; in the side of the box, *g*, is the top row of plates, in front of which is the partition, *h*, and g^1 is the bottom row of plates in position for exposure, *i* are the flat springs fixed to the partition, *h*, for keeping the plates, *g*, in position, and i^1 are similar springs fixed to the door, *c*, for pressing the plates, g^1, forward; *k*, k^1 are the ledges fixed to the sides of the chamber, *b*, for supporting the upper row of plates, *g*.

l is the indicator dial centrally pivoted in the side of the box and marked with numerals, and *m* is the lever for operating the same, provided with a pin, m^1, passing through a slot, m^2, in the box, the said pin being acted upon by the upper end of the slide, *e*, for raising the end of the lever and causing the spring pawl, m^3, thereon to engage with one of the teeth or pins, l^1, on the back of the dial for turning the latter so as to bring one of the numerals opposite an opening in front of the dial, the lever, *m*, being brought back to its normal position by the spring, m^4, when the slide is lowered.

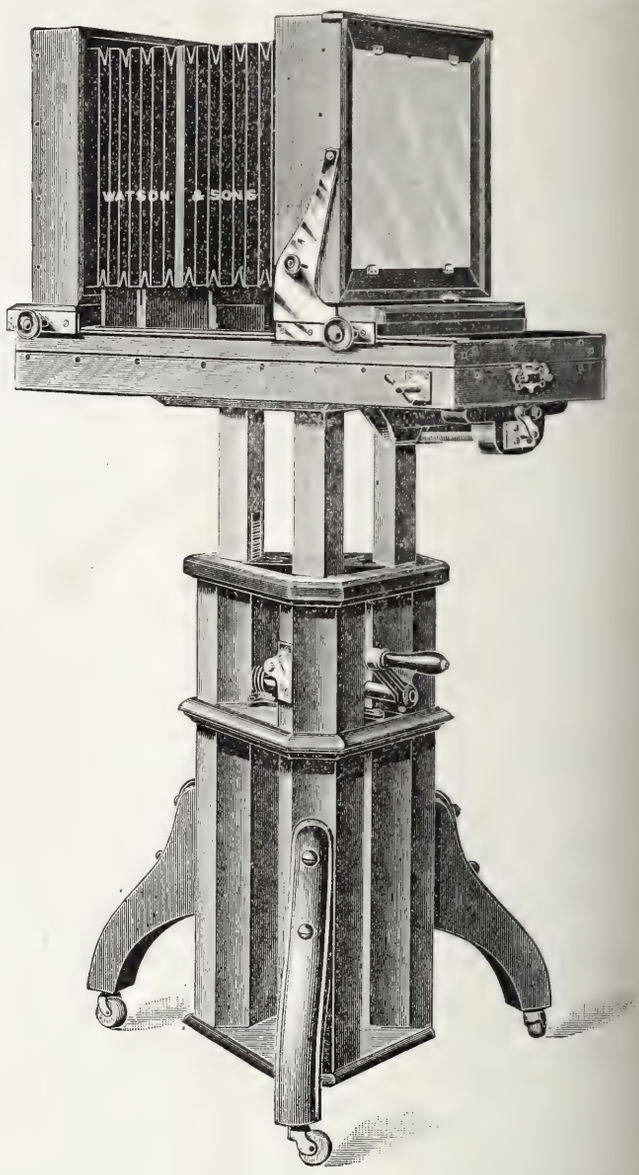
The ledges, *k*, k^1, are slotted for receiving the notched ends of the plate, *n*, shown separately in fig. 4, for the purpose of supporting film sheaths, the said plate being removed and placed in a recess, n^1, in the upper part of the box when using ordinary plates.

In order to change an exposed plate, the slide, *e*, is raised, the lip, e^4, carrying up the said plate into position in front of the upper row of plates, *g*. The slide is then forced down, thus causing the lip, e^2, to force down the rear plate of the upper row, as shown in fig. 1, to fill up the vacant space in the bottom row left by the raising of the exposed plate, the same number of plates being provided in the top and bottom rows.

The door, *c*, is fastened by spring or other catches, and, when opened, permits of the ready removal or replacement of the plates without scratching or handling the film side.

A NEW STUDIO CAMERA AND STAND.

One of the handsomest and most serviceable combined studio cameras and stands, constructed for professional use, which we have seen is that recently brought out by Messrs. W. Watson & Sons, of 313, High Holborn, W.C., and shown in the annexed illustration. It is British-made throughout, the workmanship is perfect, and the apparatus, notwithstanding its great strength and rigidity, works with ideal smoothness and ease of movement. The professional photographer could not desire a more effective studio adjunct. Made almost entirely of the best Spanish mahogany and beautifully finished, the base of the camera and the top of the stand are screwed permanently in contact, thus assuring rigidity and freedom from vibration. The camera extends at both back and front, thus giving a great range of focus. The design of the fine adjustment obviates backlash. The raising and lowering gearing has the teeth of the racks and spindles machine-cut, and it therefore works exceedingly



sweetly. The top of the stand has a tilting motion worked by an endless screw. The bellows is supported by an expanding arm which prevents sagging. The principal features of the camera include a rising and falling front, horizontal and vertical swing to the back, fine focussing adjustment, &c. A single slide with adjustable carrier for smaller sizes than 12 × 10, or a repeating holder, is supplied. The focal length of the camera is 5 ft. 4 in.; the full height of the stand when extended 4 ft. 5 in., and, when racked down, 2 ft. 9 in. From personal inspection we can strongly recommend this splendid and perfect-working bit of apparatus to our readers.

Our Editorial Table.

Messrs. F. York & Son, of 67, Lancaster-road, Notting-hill, W., have sent us their twenty-ninth annual supplemental catalogue of lantern slides, lecture sets, &c. The subjects of the sets comprise *The Life of Mr. Gladstone; From Barcelona to the Pyrenees; The Rhine Tour; Switzerland; Norway*, &c., and many educational, life-model, and religious themes. We note that a complete set illustrative of the Spanish-American War is in progress. We congratulate this old-established house on being well abreast of the times.

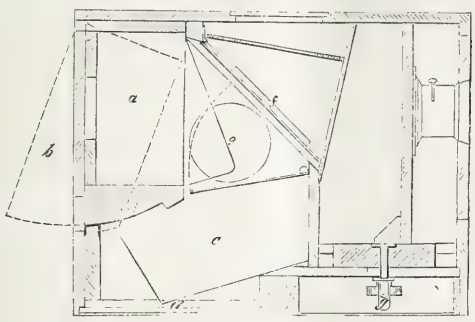
The "Fram" Hand Camera.

W. Watson & Sons, 313 High Holborn, W.C.

The word Fram is, we are informed, Norwegian for "forward," and its application to the very ingenious hand camera that we are now noticing is distinctly apposite. As a simple and effective film camera controlled by automatic changing, the Fram is certainly a step in advance. We recently made a careful examination of the instrument, and in particular tested the changing system. This we found to work without a hitch. Films will always be popular with many photographers, and any hand camera that allows of the exposed film being changed with certainty is sure of appreciation. The Fram completely fulfils this important condition.

The diagram shows the internal construction of the camera; *a* is the magazine; *b*, the same when swung to change a film; *c*, the reservoir into which the exposed film falls; *d*, the door through which exposed films are taken out of the camera; *e*, the revolving disc, indicating the number of exposures made; *f*, the mirror attached to the shutter, which reflects the image on to the ground glass of the finder in top of camera; *g*, the lever and clamping nut, fixing the focus at any desired point.

In use the camera is loaded with cut films, behind each of which a backing piece is placed. Each backing piece is numbered. The



changing is a very simple operation, the camera is held firmly against the body with the left hand, and the right grasps a metal ring on the back of the instrument. The camera is pointed slightly down and the magazine pulled out into the position shown in the illustration, this action causing the exposed film to fall with its backing into the reservoir. The magazine back is pushed back into its normal position, and another film is in position on the focal plane. The principle of the changing system is that, when the back is released and the magazine swung out of the perpendicular, it causes two projecting lips at the front of the magazine, and on which the films rest, to disappear, allowing the front film, which has been exposed, and its backing, to fall forward into the reservoir. This action at the same time throws out two other projecting lips which engage the film next to the one exposed, and thus prevent it falling into the reservoir. When the magazine is swung back to the vertical and normal position the second set of projections retire, and the whole of the remaining films are pressed forward to the front of the magazine, and there supported again by the projections first mentioned. The system is extremely simple and it works with perfect accuracy.

There is no loss of margin on the films, the whole of which are utilised in exposure. The camera is fitted with one of Messrs. Watson's well-known R.R. lenses, with iris diaphragms.

The shutter gives time and instantaneous exposures of varying duration, and the camera is fitted with a silvered mirror, by which the picture is reflected on to a finder measuring $2\frac{1}{2}$ inches by $1\frac{7}{8}$ inches. Objects are therefore shown the same size as in the photograph.

The camera measures $8\frac{1}{2}$ inches by $6\frac{3}{4}$ inches by $5\frac{1}{4}$ inches, and weighs, with twenty-four films, 3 pounds 8 ounces. It is a capital instrument.

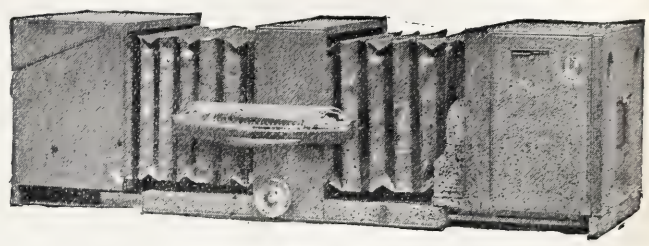
The Adams de Luxe Hand Cameras.

Adams & Co., 26, Charing-cross-road, W.C.

We perceive in this series of hand cameras, which is not inappropriately termed the "de Luxe," an attempt on the part of Messrs. Adams to concentrate in those instruments the highest form of constructive skill and the utmost efficiency of movement; and a very careful examination and trial of one of the cameras that was recently submitted to us persuades us that the makers have been thoroughly successful in their twofold object. Happily there is always a large class in the community which insists upon having articles of very high quality, and we imagine that the needs of that class have been kept in view by Messrs. Adams in the design of the de Luxe cameras. These instruments are admirable specimens of fine photographic cabinet work, and they combine with excellence of finish practical universality of movement, and may thus be considered to accomplish all which a first-rate hand camera can be expected to do.

Naturally we turn to that very vital part of a hand camera, the changing system. In the de Luxe lifters are dispensed with; sheaths contained in a changing box of the now familiar form are used, and, by a clever system of "alternates," the projections at the top of the sheaths being perceptible to the touch alternately, the box changing principle is put into practice with remarkable simplicity, so that it is virtually impossible for it to go wrong. An indicator tells the number of exposures made, the changing box is readily detachable, and a focussing screen appears in position if it is desirable to focus the view.

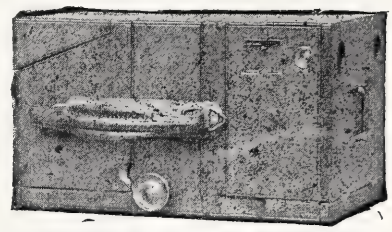
"Brilliant" finders, giving a real image and the identical view, are fitted to the de Luxe cameras, and they are arranged to show the correct



view when the rising front is being used. Satz-Zeiss lenses having two or three foci are employed with the camera, and here again a nice refinement steps in, sliding metal masks being used to ensure the exact amount of view as given by each lens.

The principle of having at command two or three foci—which the Satz-Zeiss lens affords—necessitates two or three focussing scales, which are placed on the cameras, and the correct estimation of the diaphragm values as the focus is varied is shown. This information is engraved on extra scales. The use of a de Luxe camera, having a range of three foci, is thus reduced to an affair of the greatest ease and simplicity, and the photographer is entirely saved the trouble of making any calculations.

The mere enumeration of some of the minor features of the de Luxe



camera will serve to show the care and thoughtfulness which have been brought to bear in its construction. The whole of the shutter and lens are removable from the camera by releasing a small spring catch on the right-hand side of the camera; a light protector works behind the lens; the method of setting the shutter simply consists of pulling out a button and allowing it to return; and either combination of the lens is easily removable without light having access to the plate; while a rising front, working vertically and horizontally, the rise being more than a quarter of the plate, is not the least valuable practical convenience which this excellent camera affords. In fine, the de Luxe, handsomely built throughout, is a really fine and serviceable instrument which a photographer should be proud to possess.

News and Notes.

Messrs. Coleberd & Co., Limited, chemists, of Sidmouth, have a dark room for the use of amateurs, available for developing and plate-changing.

Photographic Club.—Wednesday evening, August 24, at eight o'clock. Discussion: "Mercury Compared with Silver and Uranium as Intensifiers."

The Austin-Edwards Monthly Film Negative Competition.—The prize camera for the current month has been awarded to Mr. G. W. Harkes, City Surveyor's Office, Bradford, for his negative, *Bull-dog Dressed in Costume.*

The names of the prize-winners in the Warwick Monthly Competition for August are: First prize, 20*l.*, Mr. A. Waterall, Brighton Grove, Flixton, Manchester; second prize, 10*l.*, Mrs. E. Stuart Williams, 2, Mill Bank Villas, Rhyl; third prize, 5*l.*, Mr. E. Calland, care of Dr. Richardson, Hill Side, Putney Hill, S.W.

"Tixit."—The Vanguard Manufacturing Company, of Maidenhead, write to point out that this word, which was invented by them for a specific purpose, viz., as a mnemonic aid to "Sticks it," in connexion with their "Tixit" mountant and office paste, has recently been wrongfully used in connexion with a missing-letter competition.

Waterproof Gelatine Paper. — The paper is coated on both sides with a solution consisting of 1 part gelatine, 4 parts water, and 1 part glycerine. Coagulate the gelatine and immerse the paper in a solution of 750 c. c. of formol in 5 litres of water. The paper thus treated is, after drying, impervious even to steam.—*Nueste Erfindungen u. E.*

A Glasgow correspondent writes: "The next big thing in Glasgow will be Lizar's Competition and Exhibition, which will be held in October at the same place as the Convention met. There will be limelight lectures nightly. Large crowds are expected. Every one here speaks well of the Convention meeting and wishes it were to come again next year."

Mr. Charles Grayson, of Leeds, has patented the following improvement in cameras for kinematography. In order to exclude light from surrounding objects, he mounts the lens in the back of a box open at the front and recessed into the camera. This box is preferably made adjustable to bring the object being photographed into focus on the film. At the back of the camera an opening is made through which the image in the film can be seen, and a frame is fitted to this opening glazed with red or other suitable glass. This frame is introduced when very sensitive films are employed. An opening is made through the bottom of the camera for the exposed film to pass through. This opening is surrounded by a flange to which a light-proof bag is secured to receive the film.

Testing Commercial Albumen.—Gelatine, dextrine, and mucilage are generally used for adulterating the dry commercial albumen. Again, the albumen may also be worthless through partial coagulation. For testing a sample, two grammes are stirred into a small quantity of distilled water, by which a sophistication with flour may be recognised. The mass is next diluted with water to make 200 c.c.; if the albumen contains no coagulated admixture, the solution remains clear. To 100 c. c. of the solution are next added 35 c. c. of a one per cent. tannin solution and about 0·2 gramme of a pure commercial tartar. This mixture is agitated and filtered. One half the filtrate is mixed with a 0·5 per cent. gelatine solution (of which 25 c. c. correspond to about 0 1 gramme of pure commercial tannin). If the sample is pure albumen, there must in no case be a precipitate. Should the gelatine cause a precipitation, then an excess of tannin is present; the albumen contains in this case either adulterants or else it is coagulated in part. If a precipitate is caused at the second addition of tannin to the albumen solution, the albumen is adulterated with gelatine or similar substances. From the quantity of tannin required for the second precipitation may be determined approximately the gelatine present, as the latter is capable of precipitating about four times as much as the same weight of dry albumen.

Messrs. C. M. Higgins & Co., of New York and 106, Charing Cross-road, W.C., announce that they have had an infringement suit pending in the United States Circuit Court for the Southern District of New York since December, 1896, on one of their patents of December 29, 1891. The particular articles against which this suit was brought are Stafford's "Concentrated White Paste," and Stafford's "Invincible Liquid Gum," which are alleged to be imitations, respectively, of Higgins' Photo-mounter and Higgins' Taurine Mucilage, covered by the said patent. Messrs. Higgins brought this suit against dealers in New York City—customers of Mr. Stafford—who, after full notice from them, refused to discontinue the sale of these infringements, and combined with Mr. Stafford to defy their legal rights. Mr. Stafford made statements to the trade, in his circulars and catalogues, to the effect that his paste and mucilage did not infringe Messrs. Higgins' patent, and did not have the same composition. After a full refutation of these misstatements, and after legally proving their case and getting one decision from the Court in favour on a motion upon a minor point, an offer was received from the counsel for Mr. Stafford and the aforesaid dealers to settle the case before going to a final issue in the Court. They have now admitted the validity of Messrs. Higgins' patent, the fact of their infringement, and that they have proved their case, and have paid the sum demanded by Messrs. Higgins to cover costs, damages, and royalties, and consented to the issue of a decree and injunction of the Court in their favour.

Patent News.

The following applications for Patents were made between August 2 and August 6, 1898 :—

Cinematographs.—No. 16,812. "Improvements in Means or Apparatus for Obtaining and Projecting Chrono-photographic Images." Communicated by A. Lumière and L. Lumière. B. J. B. Mills.

Wrapping Films.—No. 16,821. "Improved Means of Enveloping Sensitive Photographic Films and Plates for Transport and Exposure in the Camera." G. C. Whitfield.

Photographic Pictures.—No. 16,959. "Improved Method of Producing Photographic Pictures." Communicated by E. Goldschmidt. A. J. Boult.

View-finders.—No. 17,006. "Improvements in Photographic View-finders." C. Beck and H. C. Beck.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

August.	Name of Society.	Subject.
20	West London	Excursion: Benfleet.
22	Birmingham Photo. Society	Excursion: Eckington, Woollas Hall, &c. Leader, C. S. Baynton.
22	North Middlesex	Technical Meeting.
23	Hackney	*Figures in Landscapes.* Roland Whiting.
24	Photographic Club	Discussion: *Mercury Compared with Silver and Uranium as Intensifiers.*
27	Birmingham Photo. Society	Excursion: Meriden, Walsh Hall, and Packington Park. Leader, T. Taylor.
27	Hackney	Excursion: Sewardstone. Leader, H. W. Dunkley.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 11,—Mr. E. H. Bayston in the chair.

Mr. W. D. Welford, following on the discussion at the last meeting on the comparison of Barnet bromide paper and Velox paper, showed a number of prints.

The Secretary handed round some exposure books by Messrs. Mawson & Swan, which had been sent him for distribution.

A question was next read from the box: "What is the best method of diffusing the light in enlarging by means of a condenser, with gas as the illuminant?"

Mr. Welford said he had tried moving the gas light during exposure, but found that did not answer.

The Secretary said that in using gas there would be an image of the flame, more or less, and suggested the use of ground glass as a diffuser.

Mr. E. J. Wall said a thin piece of ground glass or glass coated with matt varnish, placed between the condensers, would diffuse the light.

The Chairman said he used a three-wick lamp in the lantern for enlarging, and placed ground glass between the condenser and negative.

Mr. H. C. Rapson said, in using light direct from a gas flame, one thickness of tissue paper and a second thickness oiled would be found effective.

The subject for discussion was,

Does a Subject require a Longer Exposure in Brilliant Sunshine than in Diffused Light,

say, when the sun is hidden by a cloud, "to bring out the detail in the shadows?"

Mr. Welford was of opinion that an object in shadow, in bright sunshine, is darker than in subdued light, and that it would require longer exposure.

Mr. Rapson and others agreed with Mr. Welford.

The Secretary said it was practically the same thing with gas and electric light in comparison, the shadows with the electric light were much more intense.

Mr. Burnand said the rule for wet plates was to expose for the shadows and let the high lights take care of themselves. He would expose for the shadows in sunshine, otherwise the detail in shadow would have to be forced.

The Secretary showed prints bearing upon the subject.

Mr. E. J. Wall said he did not know if it was to be taken absolutely, but he did not agree with the opinion as to the shadows being denser in sunshine, it was a case of contrast, and would require, he thought, shorter exposure. He said it had been optically tested, and tables were published by a man in Vienna on the actinic quality of light, and, according to those tables, blue sky = 33 and sunlight = 118 and the combined power of the two = about 150, and he could not see that shadows in brilliant sunshine were darker, it was simply a matter of contrast. He proposed a way to test this, viz., examine the shadows through a long tube, shutting out the high lights. But he was inclined to favour the tables.

Mr. Burnand said he had recently noticed, in photographing some granite buildings in sunlight in the north, there were no details in the shadows. Had he given more exposure, the high lights would have suffered. He thought a great deal depended on the quality of the light.

Mr. Welford suggested, as an instance, taking a building in a street in shadow, and one of the same subject in diffused light.

Mr. Wall said in the first case the reflection in sunshine would be thrown upon the subject from the lighted side of the street.

Mr. H. C. Rapson said that would depend largely on the subject, the sun might be shining on a bright building, which would reflect on the shaded side of the street more brilliantly than if the sun were shining upon a dull building. Some amusement was caused when Mr. Wall asked for the blackboard, on which he sketched a diagram of two sides of a street, and indicating the direction of light with a diffused sky, and also with the sun shining from one side of the street, and showing the lines of reflection on the shaded side of the street.

Messrs. Welford and Rapson made sketches also, showing their views upon the subject.

The matter was finally adjourned until the next meeting. Several members, among others Messrs. Wall, Welford, Freshwater, and Bayston, promised to make exposures in shadow and in diffused light, and bring up their results for discussion.

PHOTOGRAPHIC CLUB.

August 10,—Mr. E. A. Newell in the chair.

A discussion took place on the best way of spotting negatives.

Mr. Foxlee said the chief thing to avoid was the overlapping of the opaque medium; he recommended the application of a very small dot of indigo in the middle of the transparent spot. This would generally be sufficient, for, even if the opacity obtained deviated slightly from the immediate surroundings, it would not show.

Mr. Welford did not agree with this; his method was to make the spot abolutely opaque, so as to print white, and then to remedy the defect in the print.

On the subject of making up solutions, Mr. Nesbit referred to the great importance of adding the various chemicals in a certain definite order. When recently mixing a metol-hydroquinone developer, he had dissolved the hydroquinone first and had added the metol immediately afterwards, with the result that the solution turned purple, some chemical combination having evidently taken place.

Mr. Welford observed that, even when properly made up and well corked, this developer will always turn purple after a time and become very weak in its action.

A discussion then took place on the best way of keeping solutions, in which Messrs. Foxlee, Nesbit, Stretton, Welford, and Williams took part.

FORTHCOMING EXHIBITIONS.

1898.

August 23–28 ..... Royal Cornwall Polytechnic Society. Hon. Secretary, Edward Kitto, The Observatory, Falmouth.

Sept. 26–Nov. 12 ... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.

,, 30–Nov. 5 ..... Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.

November 15–18 ..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.

,, [15–Dec. 15 Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.

, 23–26 ..... Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice s taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

STEREOSCOPIC LANTERN PROJECTION.

To the EDITORS.

GENTLEMEN,—As I notice you intend referring again to Mr. Barber's claim that his magic-lantern pictures are stereoscopic—they certainly struck me as giving the effect of distance very well—I should be obliged if, for the information of those who are not deeply versed in such matters (of which number I am one), you would state the grounds of your contention that *two* pictures are necessary to get stereoscopic relief. In nature we only see one picture, and yet we get effects of solidity as well as distance, do we not?—I am, yours, &c. J. E. HARVEY.

Stratford, E., August 13, 1898.

[Our correspondent had better consult a primer on the subject of stereoscopic photography. As to the reason why single plane pictures never can, and never will, show true stereoscopic relief, the matter is not put with greater terseness and clearness than by Sir David Brewster in the introduction to his book on the stereoscope. Brewster says: "When the artist represents living objects or groups of them, delineates buildings or landscapes, or when he copies from statues or models, *he produces apparent solidity and difference of distance from the eye*" (our italics, ED. B.J.P.) "by light and shade, by the diminished size of known objects as regulated by the principles of geometrical perspective, and by those variations in distinctness and colour which constitute what has been called aerial perspective. But, when all these appliances have been used in the most skilful manner, and art has exhausted its powers, we seldom, if ever, mistake the plane picture for the solid which it represents. The two eyes scan its surface, and by their distance-giving power indicate to the observer that every point of the picture is nearly at the same distance from the eye. . . . The effects of stereoscopic representation are of a very different kind and are produced by a very different cause. The singular relief which it imparts is independent of light and shade, and of geometrical as well as of aerial perspective. . . . The stereoscopic creation is due solely to the superposition of the two plane pictures by the optical apparatus employed, and to the distinct and instantaneous perception of distance by the convergence of the optic axes upon the similar points of the two pictures which the stereoscope has united."

The claim that a projected lantern slide can show true stereoscopic relief is too absurd for serious discussion.—ED.]

EXPOSURE METERS.

To the EDITORS.

GENTLEMEN,—Mr. John A. Randall's article on this subject in THE BRITISH JOURNAL OF PHOTOGRAPHY of August 5 contains the following accusation against all inventors of and traders in exposure meters at present before the public, the actinograph only being excepted: "It is to be regretted that these instruments have been captured by the trader and the patentee, men who do not concern themselves with giving instruction beyond the bare working details of their own particular instrument. As a consequence, there has not been published since 1888, when Hurter & Driffield patented the actinograph, and, forming an honourable exception, gave full details of its working and principles, any publication of information respecting instruments for calculating exposure."

As the inventor and patentee of the Watkins' exposure meter (one of the instruments obviously alluded to), and, as one who has written much on the subject of exposure, I have to show that these charges are, as regards the "trader and patentee" of the instrument (separate individuals), absolutely untrue.

Take the second paragraph. No one will deny to any of the work of Messrs. Hurter & Driffield the term honourable, but it is untrue that in giving full details of the working and principles of their instrument they formed an exception.

I introduced my own instrument in a somewhat lengthy paper explaining how its principles differed from methods which had preceded it, touching upon the history of the subject, and giving credit by name to Ackland, Abney, Burn, Burton, Hurter & Driffield, Scott, and Stanley.

This paper is published in full in THE BRITISH JOURNAL OF PHOTOGRAPHY of April 18 and 25, 1890, and is referred to by the Editor a few weeks later as follows: "For an explanation of the principles underlying this exposure meter, we refer the reader to the able paper read by Mr. Alfred Watkins before the Hereford Photographic Society."

Now for another item of this accusation, "these instruments have been captured by the trader and the patentee." A thing must exist before it can be captured. No exposure meter (in the sense of an actinometer and slide rules combined in one instrument) existed before my invention. Not only so, but its principle was new. The Scott light tables and Burton subject tables, which formed the main feature of the Platt system, were entirely abandoned, and the actinometer test was connected with the time of exposure in quite a different way to that adopted by Mr. Ackland in his cardboard slide rules.

A third item, "Men who do not concern themselves with giving instruction beyond the bare working details of their own particular instrument."

This, again, is untrue. A paper, "The Elements of Photographic Exposure," which deals with principles only, is furnished in addition to the instructions with the Watkins' meter. The heavy work which I have undertaken in testing speed of all commercial plates, and trying to keep in touch with changes by printing frequent editions of the speed card, has a wider scope than my particular instrument. Editors use it in answering voluminous and exacting queries. It is used (with acknowledgment) by the Editor of the *Photo-Beacon* in compiling exposure tables for use with American plates. The pocket volume, *Exposure Notes*, now in its fourth edition, goes far beyond "bare working details of its own particular instrument," and in the many articles I have written since 1890 on various points of exposure (the last instance in the July number of the *Photographer's Record*) I have not kept within such narrow limits as Mr. Randall asserts.

I regret that this letter contains so much *ego*, but the nature of the accusation makes it unavoidable.—I am, yours, &c.,

Hereford, August 13. ALFRED WATKINS.

SPOTS ON OPALINES AND PRINTS.

To the EDITORS.

GENTLEMEN,—Some few weeks ago a correspondent asked you about spotted opalines, which he had then unfortunately produced, and, seeing that no one else with experience in such matters has sent you a line, I purpose stating how we also lost a batch of over a hundred 8 × 6 opalines some years ago. Yellowish-grey spots and streaks appeared within a week after the views had been put on the glasses, the lights and skies showing them conspicuously. Inquiry and further trials with the same and other gelatine revealed the origin of the fault—the assistant, while working up the batch alluded to, kept the gelatine steaming hot, and so produced decomposition. He had been unaware of the fact that the gelatine required to be *melted only*. Up till then we had been working expensive gelatine, but a series of trials and tests told us that table-leaf gelatine (a French make), at 1*s.* 6*d.* a lb., was as good as any.

And while on Spots I may notice one of your leaders last week, in second last paragraph, attributes many spots to the mounts; no doubt, but the most prolific source of spots in photos is the result of bad washing after fixing. Let any one examine his photos after the changes of water, and he will find innumerable little air bells, and so, unless these are cleared away by *hand washing*, the spotting of his photos is only a matter of time. That is the experience at least of our half century of photographic work.—I am, yours, &c., J. P.

Edinburgh, August 18, 1898.

ACTION OF POTASSIUM OXALATE ON GLYCERINE.

To the EDITORS.

GENTLEMEN,—Can some of your chemical experts explain what has puzzled me a good deal? I have been in the habit of developing platinotype prints with a mixture of equal parts of a saturated solution

of potassium oxalate and glycerine, using a brush for applying it. Some two months ago I mixed this, as usual, in a bottle; but, having been prevented from making the prints at once, it lay by in a locked cupboard till a few days ago. I found that the developer dissolved the iron salt from the paper, but thought that probably the paper had got damp. I, however, convinced myself that this was not the case, and then, on examining the bottle, I found that at the bottom were tabular crystals of some salt. Moreover, the solution remaining was far more limpid than it should have been. Throwing it away, I found that the crystals dissolved at once in water; and, as a final proof that the developing solution had changed, I found a freshly made mixture act well, though the potassium oxalate was taken from the same bottle used before. It would seem that the salt had in some way acted on the glycerine, but that has always been considered perfectly neutral.—I am, yours, &c.,

August 13, 1898. J. F. T.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

M. H. G. In our next.

F. WILLIS.—The address is Walworth-road, S.E.

DRINKWATER BUTT.—We will bear the matter in mind.

PHOTO-MICROGRAPHY.—S. REED. With the most modern microscopic objectives of short foci the chemical focus is practically *nil*, and may be quite disregarded.

FRILLING.—A. C. Simply a matter of the hot weather and the omission of the alum bath. Although it is not, with the brand of plates in question, a necessity, as a rule with the tropical weather we have recently had the case is different.

TRAY FOR SILVER SOLUTIONS.—T. COX asks for some material for coating the inside of wooden trays with that which will not hurt silver solutions, and will itself not be acted upon by the silver. There is nothing better for the purpose than paraffin wax.

WINTON says: "Can you inform me whether photographers are employed in any Government Department; and, if so, how the appointments are made, and where to obtain all particulars?"—In reply: To the best of our knowledge there are no such appointments.

KEEPING P.O.P.—R. C. (Amateur).—There is no objection to keeping the paper in a tin case, provided it does not come in contact with the metal. Roll up a piece of blotting-paper loosely, and put into the case; it will then unroll, and the silver paper can be put inside that.

CARBON PRINTING.—T. RHODES. Galvanised-iron trays will do quite well for the carbon process. They must not, however, be used for the alum solution, as that will act upon the zinc and destroy the coating. A wooden tray, lined with lead, will be the best for that.

MEMBERSHIP OF THE R.P.S.—AMBITIOUS says: "I should be glad if you will let me know the necessary qualifications to become a member of the Royal Photographic Society?"—In reply: Obtain a form from the Secretary of the Society, 12, Hanover-square, W. The principal qualification is a desire for membership.

EARLY PHOTOGRAPHY.—LECTURE. You will find a description of the very early photographic processes in Hunt's *Manual of Photography*. It is unfortunately out of print, and has been for many years. A copy may sometimes be met with at second-hand book shops, though not often. It may, however, be seen at the reading-room at the British Museum.

GOLD TONING.—G. BRIGGS. The quantity of gold required to tone a sheet of paper depends entirely upon the tone desired. The deeper the prints are toned, the more will be the gold consumed. For red-brown tones not half the gold is necessary, that is, if the toning is carried to the black or purple stage. Moreover, some papers require more gold to yield a given tone than others.

COPYRIGHT.—REVIEW. If you have a valid copyright—and you have if the facts be as stated—you can certainly recover damages. Write to the paper politely, and make an immediate claim for moderate damages, and intimate that, if it is not at once met, proceedings will be taken. If you are a member of the Photograpic Copyright Union, you might put the matter in its hands.

CARBON PRINTING.—T. BLAKE. The reason of the tissue being too soft to handle while being sensitised is that the solution was too warm. This would be a common trouble, with the hot weather we have had lately, unless the solution were artificially cooled. It should not exceed 60° to 65° Fahr. A piece of ice in the solution will quickly bring it down to that temperature; then no trouble will be met with.

COLLOTYPE.—R. W. We have very little doubt that your trouble is due to the plates not being quite level in the drying box, and for two reasons. First, you say it is not provided with proper levelling screws, but "only an extemporary arrangement." Second, the unevenness in the prints proceeds gradually from one end to the other.—Unless the plates are accurately level when drying, an evenly printing plate will not be obtained.

PHOTOGRAVURE.—T. RYLEY. Photogravurists do not work according to grains of the perchloride of iron per ounce for the etching solution. The usual method is to make up a saturated solution of the iron salt in water, and then dilute it to the different strengths desired, judging the strength by the hydrometer. The Beaumé is the one that is generally employed. It may be had from any of the scientific-instrument makers at a small cost.

FAULTY LIGHTING.—S. W. We quite agree with you that the portraits *are* badly lighted. They lack proper chiaroscuro. This is due to the use of direct front light, which gives the "map-like" appearance of the faces. The remedy is to shut out the direct front light, and use only a more or less front side light or a high side light. The sketch of the studio shows that in it the most perfect portraiture can be obtained. We should suggest no alteration in it whatever.

CLEARING SILVER BATH.—S. A. H. There is nothing wrong in the silver solution, upon which albumenised paper has been sensitised, turning a dark brown; it is the usual thing. Add an ounce or two of kaolin to it and shake vigorously for a minute or two, and in a few hours the solution will be decolourised. The kaolin should be allowed to remain in the bottle, and the solution returned to it after it is next used. In this way the bath will be kept free from colour. There are other ways of decolourising the bath, but this is the simplest.

CAREER says: "I wish to give my daughter, age 17, a career as a professional photographer, and am desirous of securing the best plan of instruction, a plan that can be, if required, extended over some years. She has no present knowledge whatever of photography, and will be for the next six months at a boarding-school in London. W. What is the ideal plan of training to adopt? If there are any classes she could attend during this next six months in London, this could be arranged."—In reply: Our correspondent's best plan will be to send his daughter to the classes at the Polytechnic School of Photography, 309, Regent-street, W. These classes are held in the autumn and winter months, and a prospectus may be obtained of the Secretary at the address given.

ENLARGING.—T. A. ROUSE writes: "In making enlargements from half-plate negatives by diffused daylight, without a condenser, which would be the best lens to use? I have three: a half-plate wide-angle, four-inches focus, a half-plate rapid rectilinear eight and a quarter inches focus, and another of ten inches focus."—We should use the latter. Theoretically, a lens that will take a negative the size of that to be enlarged will suffice for its enlargement. But, in practice, one a size larger is preferable, as with it the illumination is better at the margins, and better definition, with a large aperture, is secured than when a lens of shorter focus is employed. For this reason professional enlargers usually use a lens capable of taking a negative a size, or two sizes, larger than that to be enlarged.

MEALY ALBUMEN PRINTS.—ASSISTANT writes: "Can you render me any assistance? My trouble is that I cannot get purple or dark tones. I use ——'s ready-sensitised paper and tone with the acetate or the borax bath, both of which are recommended by the makers. I hope you will be able to help me, as, unless I can get better prints, I shall have to leave in a fortnight?"—As no data are supplied, we are afraid we can render but little assistance. Usually the ready-sensitised papers are acid, and this should be got rid of before the prints are put into the toning bath by immersing them in a weak solution of washing soda, say, a crystal the size of a nut, in a quart of water before toning. Also, see that the pads and backs of the printing frames are not too dry, as the presence of a slight amount of moisture is beneficial while printing.

STAINED PRINTS.—J. J. SOUTHWOOD sends us some stained prints and writes as follows: "I enclose to you herewith some photographs stained, the origins of which I cannot trace. I shall be glad if you would let me know how same are caused, or have you any idea of their nature? Recently I have had a large number go wrong like specimens sent."—It is quite impossible for us, or any one else, to answer such queries as this by simply seeing a few prints. No data whatever are given upon which to form even an idea; not even the paper used, or the toning bath employed, is mentioned, or anything said as to the manipulations, or when the yellowness first makes its appearance. We must ask our correspondent and others, when seeking information as to their troubles, to supply us with such details as will enable us to form some accurate opinion as to their origin. In this case we can only say that the stains are due to the manipulations.

DOUBLE TONES.—TONING writes: "Would you be so kind as to answer the following questions. (1) Using the separate toning bath (gold, ammonia, sulphocyanide and water) I find some of the prints (vignettes) are yellow at the edge of the vignette, and then blue nearer the centre, and brownish at the centre. Would you kindly state the cause of this? (2) The bath has a red-purple tinge. Does this matter? (3) Small bubbles or blisters, the size of pins' heads on carbons. What is the cause? Many thanks for answering the other questions I have asked."—1. Double tones are very prevalent with some gelatine papers. In some instances they are due to the free silver not being removed from the prints before they are put into the toning solution. 2. The toning bath should be colourless, though we have experienced no ill effects from its being slightly tinted. 3. Doubtless, small air bubbles imprisoned between the transfer paper and the tissue.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1999. Vol. XLV.—AUGUST 26, 1898.

Contents.

	PAGE
Ex Cathedrâ	545
Pyro Acetone	547
The Care and Preservation of Photographic Lenses	548
Leaderettes:— Energy of Light and Chemical Energy — Photographs *versus* Samples—"A Message from the Sky – Release of Mr. Halstead...	549
The Correction of the Distortion Produced by Tilting the Camera. By C. Welborne Piper	550
Photographic Engraving in Intaglio. By Colonel J. Waterhouse	552
The Gum-bichromate Process in America	554
Gold from the Sea	555
Scheve's Plate-changing System	555
The Ilford Every-day Book	556
The "Cooke" Casket	557
A Cinematograph Show on Fire	557
Royal Cornwall Polytechnic Society's Exhibition	557
Our Editorial Table:— *Exposure Notes for Use with the Watkins' Exposure Meter* — *The Art of Retouching* — Catalogue Received	557
News and Notes	558
Patent News	558
Meetings of Societies:— London and Provincial Photographic Association — Photographic Club — Hackney Photographic Society — Ashton Photographic Society	558
Forthcoming Exhibitions	559
Correspondence:— Fluid Gelatine—Exposure Meters	559
Answers to Correspondents	560

EX CATHEDRA.

The Convention of the Photographers' Association of America met at Celeron, on Chautauqua Lake, last month. Some details of the principal proceedings may interest our readers. The official report that has been published in two or three of our American contemporaries is a lengthy tribute to the industry of the stenographer employed to do the work, but, like all *verbatim* accounts, it is terribly overloaded with unilluminating conventional remarks and redundancies which it is mere waste of space to print. We should say from this that American photographers in Convention assembled somewhat resemble the parrot of blessed memory in that they suffer from excessive talkativeness. If, however, we are doing our trans-Atlantic brethren an injustice in this respect, we must refer them to the official stenographer, who has credited them with a volume and minuteness of utterance such as would scarcely be tolerated at a British Convention, or, if tolerated, would not find its way into print.

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The total attendance at the American Convention is said to have been between 350 and 400—a smaller number than hitherto. The magnitude of the professional exhibition (there do not appear to have been any amateur photographers at Celeron) may be partly estimated from the fact that seventy-nine awards were made. In some of the classes, however, the medals and diplomas were withheld. The trade appears to have strongly supported the exhibition, about fifty firms of plate and paper-makers, apparatus-manufacturers and dealers having been represented. The Convention lasted five days. Judging by the reproductions that have been published, some extremely fine pictorial work was exhibited, but it also appears that many photographs of exceedingly poor quality were shown. Socially, the meeting seems to have been enjoyable, and, although there were some excursions, this feature was not made so much of as at the British Convention. The business meetings of the American Convention afforded the opportunity of getting through a great deal of routine work, and, on the whole, what with the informal nature of the discussions and the interest attaching to the exhibitions, we should say that the American professional photographer derives far more instruction and benefit from a visit to that gathering than a British photographer does by attending a home Convention. The former, at his Convention, lives in an atmosphere charged with matters vitally affecting professional photography, he is throughout of one mind with his associates and *confrères*, while here at home the professional photographer and his interests are mere incidents of the gathering.

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They do not have set papers at the American Convention. The President read an address which at least had the merit of brevity inasmuch as it only occupied about forty lines of print. A Professor Griffith, who appears to be very popular with the American Conventioners, delivered two or three speeches on art and kindred topics. We give a brief extract from one of the Professor's deliverances: "They tell me that I am usually in a good humour, but, if I am a little bit trying this morning and disposed to give an extra stab, remember that I am suffering with a boil in the middle of my back. They say that Job had boils, but he did not live in 1898 and have other things to contend with as well. There is nothing new under the sun. That was said a thousand years ago or more, and it is equally true to-day. Men have been thinking, and writing, and speaking for the last three thousand years, and you can find it in the books of the libraries. Now, I would not waste time or a single cent in trying to think out anything new for myself. I would simply steal the thunder of other people, and you will

find in those old books more things that have been forgotten than you will ever dream of in the next ten thousand years. We are simply moving in a revolution. We reach a certain standard of height and then we take a decline. This is the history of every nation and every people, of every invention, of every improvement, and of every particle of civilisation in the world. The American people are now on the upward move, and there is before you the whole world to conquer, in art, science and literature, and in every human achievement, and then we will reach a climax and go down, but that downward movement is yet hundreds of years away from us. It is so in photography, and you may prove it by the work that is stretched out through the galleries. The work of this year is superior to that of last year, as that of last year was immeasurably superior to that of the year before. There is yet an immense achievement before you. The thing is to put brains into your work, to know what a picture is, to know what makes a picture, and to put more poetry and human sentiment and human pathos in it, and then it will live."

* * *

Mr. G. G. Rockwood, who is the Vice-President of the American Copyright League, spoke on the subject of copyright, particularly in relation to the attempt of Congress to deprive photographers of all copyright interest in their productions. Alluding to the Bills dealing therewith lately before the American legislature, Mr. Rockwood said that the Shofroth Bill provides that a photograph, as such, made of any object not a work of the fine arts, and not an illustration in any regular publication which is duly entered at the post office at its place of publication, shall not be the subject of copyright at all. The Hicks Bill provides that a line photograph in the daily papers, not the work of the fine arts, shall not be considered a violation of the copyright laws. Mr. Hicks was not responsible for that Bill; he is the Chairman of the Copyright Committee in Congress, and his constituents or any body of men send a Bill to him and ask him to introduce it, and he is in duty bound to bring that before Congress or before his Committee. He very quickly saw what this Bill was, and turned it down, and said he would not endorse it. The Shofroth Bill says the photograph shall not be subject of copyright, but gives such right to publishers who are not the owners, and without the consent of the owners. The Hicks Bill seeks to give to the daily newspapers the right to reproduce and print copyrighted photographs without credit or payment to the photographer who makes them.

* * *

It appears that the Copyright League have been energetically agitating in the matter, and hope to prevent the passage of the obnoxious Bills. A demand was made upon the League for a fair and equitable Bill, and such a one has been prepared, which it is hoped will be adopted. According to Mr. Rockwood, this Bill provides, in the first place, that everything in the photographic line shall be protected. If it is published without consent, without payment, or without recognition of the copyright, for all the plates of which the same shall be copied, and every copy thereof, one dollar shall be forfeited for every copy of the same sold or exposed for sale. The next point is, the sum to be recovered in any action to be brought under the provisions of this section shall be not less than one hundred dollars or more than five thousand dollars.

One of the attractions of the American Convention was Mr. Hollinger, of New York, who, although only established in that city for about two years, has made a great reputation for very fine portraits of a kind with which perhaps the work of Mr. Crooke, of Edinburgh, is only comparable. Mr. Hollinger had one or two lengthy chats with his brother Conventioners, and we append some brief but pregnant extracts from his remarks, which seem to show that his methods, as well as his work, are original:—"I attribute a great deal of the success I have now to the fact that I quit knowing anything. I just stopped knowing anything, I went round trying to see what people were feeling in art. I went to reading art literature and studying pictures everywhere, and everything in the photographic line. I have just tried to fill up with the idea of pictures, and not with the idea of criticism; but to see what people enjoyed, and why they enjoyed it, and what they saw in it. I just fill up with that idea. . . . . The greatest things come from doing what comes before you every minute, without fixing anything. I never light, I never pose, I never fuss with my sitter, raise the head or the hand, or fool with them in any way, and I get the simplicity of every subject in my pictures. No one ever saw a picture come from my studio that was posed in the least. We do not do any dozen business. I get more from one little carbon picture than the best of you get for a dozen. I got $10 for a dozen in Drayton; I get $10 now for the smallest picture I make, if it is but an inch square. I get $5 for every platinum print, and I do not show any proof.

* * *

I am just a common fellow from Ohio, and I do not know any more than you do, but I had the courage to go there and do it. I had to do something, and I just went to the highest place I could get, and did it. Let me tell you: You go home and make something of every customer different from anything you ever made of him. If you make a fine negative, do not show them but one print, and that the best you can make, and tell them it is a special thing at a special price, and don't you sell it unless you get the special price. Charge for it, and make the people pay it, as the artist does. An artist would be considered a fool who would sell a dozen pictures at the same time because they were good ones. Another thing, we never disappoint a customer. We say, Come the day after to-morrow for your work finished. They come in, and we make it a point to have the picture ready for them. I have been in New York two years, and I have the first customer yet to come in and not get their work when we promised it. I will be glad to see you in New York. It is the commonest, simplest, homeliest place you have ever seen, where I am. There is no photographic background in it; there is no retouching frame in it, or nothing of the kind. It will not take you any time to look around. I have a skylight, and it is an east light. Mr. Rockwood said to me, 'I do not see how you can work an east light,' but I do work it, and the sun shines in every day, but I make pictures there. I am the retoucher of the place myself. I made eighty-five negatives one day and the next morning myself, and the next day they were all finished, and the people came in and got their work. We haven't a retouching frame in the place. We hold them up in our hands and take out the bad spots, and the people like it all right; it is so different from the rest, you know. We use platinum paper. That is the easiest for us. We print by daylight. There is never a day that we cannot print one picture, and you can

tell your customers that it will be ready the day after to-morrow. Christmas time we make single pictures, and we have all finished by Christmas. After Christmas we had to employ new help to do the work that had been put off by other photographers. A year ago I did the work myself; to-day there are seven of us. After Christmas we had a chance to pick out the other fellows the other photographers turn off. We never say anything about money to our customers. We ask no pay in advance. We do not bore our customers about money We put it on a strictly artistic basis. You do not have to pay for it if you do not like it, and you do have to pay for it if you do."

* * *

At a subsequent meeting Mr. Hollinger said: "If any of you come to New York to see me, I will take you into the operating room, the print room, the dark room, and anywhere; but not you or any one else, not even the boy who carries the plates for me, can go into the operating room when I make a sitting. I do not have any one in there but myself and my sitter. The mother has to go out; I take the children in with me. I kick the ball in the operating room, and I get in there and get acquainted with the children, and the mother stays out unless it is a little bit of a baby I cannot hold myself, and that is the only time I allow it. Frequently they want to go in. I have a nice way of telling I do not like to have them watch me. I want to concentrate the attention of that sitter. I never asked anybody to smile. I never say, Smile. I never tell anybody to look cross; they generally do that, any how, and I take them just as they are, without any suggestion of an assumed expression. I just take the people, and if the expression does not suit me I throw it away, and if the picture does not suit them they have to throw it away. The assumed expression is often a smile in one feature, perhaps the mouth, and the eyes another expression, and there you have a composite expression. An expression called up for the mouth has no business in a picture whatever. See people as their friends see them, and take their pictures that way. The more negatives I have the richer I am. We have to have expense. I had a young lady come in with her mother not long ago, and she wanted a sitting, and her mother was bound to go in and see her daughter pose. Afterwards the daughter went out of the operating room, and the mother said, 'Well, how did he pose you?' The daughter said, 'Pose you? pose you?' She said 'pose you' three times. 'Why, he did not pose me; he just stood me up there and took me just as stiff as he could,' and I got along splendid with it, and they were surprised. The old lady wanted to come in and tell me how to pose her. I want to tell you something about Hollinger. He does not imitate anybody. I do not follow. I just do things I see. I never go into the operating room with my mind made up what I am going to make. Do not try to make any two pictures alike. Make a variety, and you will enjoy the business. Those are points that are worth knowing. Make a great variety. Do not make too many pictures of the same kind. Remember that."

* * *

Our extracts have been sufficient to show that the American Convention is ahead of its British prototype in direct usefulness to the professional man. One thing above all others excites our admiration, and that is the freedom and lack of reserve with which such a prominent photographer as Mr. Hollinger talked to an assembly of his brethren, and fully exposed his business and technical methods for their information and profit. It would be a decidedly novel experience to witness an English photographer taking his competitors so thoroughly into his confidence as Mr. Hollinger took his brethren at the American Convention. We have observed, not without amusement, some recent references to the desirability of improving the British Convention, and, as far as we have been able to discern, the idea seems to be to import the patronage of the Society element with an accompaniment of "tone," whatever that may be. This sort of thing might please the superior person, but we can scarcely imagine that it would meet the taste of professional photographers, who, if they were catered for more on the lines of the American Convention, would, we do not doubt, more largely support the P.C.U.K. than they do at present, and thus give that institution the opportunity of accomplishing greater good than it has so far been able to.

PYRO ACETONE.

It would be only a repetition of a truism that finds expression in print, or at one meeting or another almost every week, if we said that pyro ammonia remains the favourite developer above all others, but such seems to be undoubtedly the case. Of course, every now and then we hear complaints about its staining proclivities on plates and fingers, but, nevertheless, its power and elasticity and wide range of control render it the sheet anchor of the careful photographer.

In thus referring to pyro ammonia, it must not be supposed that we are overlooking the rival claims of pyro soda, which perhaps, numerically speaking, enjoys more extensive use. On the contrary, for mere convenience under tolerably fixed conditions, in fact as an "automatic" developer, and one which, at the same time, is free from most of the staining proclivities of its rival, pyro soda is bad to beat. But, as has more than once been pointed out, it possesses none of the elasticity and range of power of the other combination, but requires a fairly close adherence to correctness of exposure. Though it is true that a considerable amount of over-exposure may be successfully met, and that to a more limited degree under-exposure may be dealt with, if known or suspected, at the commencement of development, it is practically impossible to effectively control the action as it proceeds. The weak point of soda development lies in the absence of capability for progressive or "tentative" development, and the inability to accelerate its action, except to a very limited extent, in case of under-exposure. In fact, the action commences with the full power of the solution, while its progress is marked by a continuously increasing degree of restraint, whereas, in the case of ammonia, a weak developer to commence with may be gradually strengthened to meet either under-exposure or the exigencies of the natural increase of restraint.

The substitution of acetone for the alkalies in previous use therefore, appeared to us likely to meet the objections against the use of either ammonia, or soda, or of caustic alkalies or their carbonates; since it is at the same time entirely devoid of tendency to stain like pyro ammonia, and of the excessive restraining action that accompanies the use of the carbonates and limits their developing power. In other words, it seemed probable that, by using acetone in the same manner as ammonia solution in successive quantities as required, the ideal developer would be attained, combining the power and characteristics of

pyro with the cleanness of the newer kinds of reducing agents. Whether this will eventually prove the case we shall not at present venture to say; but, after a considerable amount of work with the new developer during the past few weeks, we are inclined to regard the prospect as most promising.

By the kindness of Messrs. Fuerst Bros. we have been in a position to try the solutions issued by MM. Lumière Frères, which we presume is prepared according to the formulæ published by them; that, in fact, the ordinary pyro and sulphite of soda solution is supplemented by plain acetone solution of such a degree of purity as to be free from excessive restraining action. At any rate, in addition to MM. Lumière's solution we have obtained identical results with pyro and neutral sulphite, but not with metabisulphite; in fact, with the latter, a largely increased proportion of acetone produces an inferior result.

This result is, perhaps, not surprising if we look at the probable action of the acetone. According to *Watts' Dictionary of Chemistry*, acetone forms definite compounds with the alkaline bisulphites, and, taking this into account as well as MM. Lumière's remarks on the same subject, it seems likely that the acetone, acting upon the neutral sulphite of soda, forms the bisulphite compound referred to, at the same time liberating sodium hydrate. So that, in fact, the developer consists actually of pyro and caustic soda, with the bisulphite compound as a stain-preventive and mild restrainer. In the case of the metabisulphite, the combination takes place without the liberation of any active alkali, and the developing action, such as it is, is dependent on other causes which seem more obscure.

For a fixed developer, under normal conditions, the proportions given by them can scarcely be improved upon, namely, one part of their concentrated pyro solution, diluted with three parts of water, as a stock solution, to which one-tenth of its volume of acetone is added for use. Or, to two ounces of an ordinary three-grain pyro solution, with sulphite of soda, we have added a drachm and a half of acetone. This, as has been said, forms a capital developer for ordinary or normal circumstances, though, except with plates that are naturally inclined to thinness, a slightly reduced proportion of acetone appears to act as well, and at the same time more slowly. It will be observed that no restraining bromide is used or required. Development commences and proceeds under these conditions, very quickly during the present hot weather, being often complete in three or four minutes. Unlike hydroquinone, metol, glycin, and other of the new agents, the image, though clean and free from stain, is deceptive in character if judged on the same lines as those agents, as it comes down far less in fixing, and if development be pushed as far as would be the case with, say, metol, the result would be over-density.

This is, perhaps, the most noticeable feature in connexion with pyro acetone; the deposit, though clean and free from stain, altogether lacks that transparent thinness that so frequently distinguishes films developed with metol, for instance. The image possesses more "stopping power," and we think is capable, under similar conditions, of rendering better gradation than any of the newer agents, including even metol and hydroquinone in conjunction, which, in our experience, comes nearer to pyro ammonia than any other.

But another point we desire to emphasise is that in cases of unknown exposure the acetone may be added a little at a time, precisely as was formerly invariably done with ammonia, and also that it may be used in larger proportion than that given, if necessary, without green fog or any of the evil effects that would follow an overdose of ammonia. Further, if needful, bromide may be used in case of over-exposure, or in order to increase contrast, but it must be borne in mind that its action is very energetic.

This brings us to the final question of the possibility of repeated use. So far as developing power is concerned, the solution can be used apparently over and over again. We have developed as many as four half-plates in the same two ounces of solution. But the "morality" of that course of procedure is always, we think, open to doubt. Thus, in the case of acetone, the first negative will be the densest, and each succeeding one, no matter what addition of acetone or of bromide be made, will be softer and softer. The acetone, though volatile, does ot appear to escape so quickly as ammonia under similar conditions, but even largely augmenting the quantity after each development does not appear to get over the tendency to increasing softness, while, if no further addition be made, the image will be *thinner*, in addition to softer.

We may conclude by expressing the opinion that this is one of the most important additions to our developing formulæ that has been made.

THE CARE AND PRESERVATION OF PHOTOGRAPHIC LENSES.

Reverting to the subject of the article in the issue of the 5th inst., wherein it was pointed out that careless treatment often led to lenses of the highest class becoming reduced to second or third-rate ones: then only the glasses were dealt with. Here we shall refer more particularly to the mounts, for as much, sometimes more, impairment of the performance of the instrument arises from the mount as from the glasses themselves. In these circumstances, fortunately, the evil is easy of remedy, whereas that proceeding from the glasses is not, without invoking the aid of a skilled optician. Here is a case in point that came under our notice quite recently, which serves to show what trouble may be caused by the mount of the lens.

A professional friend, acting on the suggestion we made a little while back on stereoscopic portraiture, determined to make some practical experiments in that direction. To that end a disused bi-lens *carte* camera, of early date, was unearthed. One lens had been *in situ*, the other had been removed and brought into pretty frequent use for other purposes. This was now replaced on the camera as at first. It was found, however, that the two halves of the negatives taken with them were unequal; one seemed to be brighter and crisper than the other. The one taken by that which had been in use appeared to have received more exposure, or, rather, was flat and fogged, while the other was crisp and brilliant, and seemed to have been taken by a better instrument. As the lenses were by one of the leading makers, and they were originally supplied as a pair, some old negatives, taken with them years ago on wet collodion, were looked out, and they all appeared identical in the two halves. Light in the camera was at first suspected, but a close inspection failed to reveal it, and little or no difference could be detected between the images on the focussing screen. However, on our removing the ground glass, and with our head sheltered with

the focussing cloth, we found, on looking through the lenses, that the cause of the trouble was at once apparent. It was due to reflections and flare from the inside of the mount of the lens that had been in use. It had become polished, and a great deal of the blacking worn off by frequent cleaning, as well as from the stops. The insides of both mounts and the stops were sent to be reblacked, and it was then found that the two instruments worked in perfect unison.

Although the lens with the defective mount had been in pretty constant use, no fault was noticed with it, and it was only when it was again put to work with its twin brother that its shortcomings were discovered. This incident serves to show how the gradual deterioration of an instrument may remain undetected, though, of course, the negatives taken with it are not so good as they might have been. In the case just cited the lenses were portrait combinations, and were only used in the studio, but the same thing applies, and in an enhanced degree, to lenses used out of doors, as they are worked in a stronger light, and the effect would be the greater. We have seen lenses of the rectilinear type constantly being used, the stops of which have been little better than naked brass, while the insides of the mounts, and particularly the hoods, were almost devoid of blacking. All this, of course, means impaired brilliancy in the negatives.

Many lenses are now mounted in aluminium, and it will be obvious that with them still greater care is necessary than in the case of brass, as any removal of the blacking is a far more serious matter, inasmuch as it exposes a white metal instead of a yellow one. Stops in constant use become in time little better than bare metal, especially at the edges of the apertures, and thus by their reflections cause more or less loss of brilliancy in the image. The iris form of diaphragm is a great sinner in this direction, as, by reason of its construction, the leaves or vanes are in constant friction while being set, and thus quickly become bright polished and reflective. For this reason, we know, several photographers, notwithstanding the convenience, will not have iris diaphragms in their lenses.

In the days of wet collodion, when the deepest shadows in the negative were represented by bare glass, any lack of brilliancy was more quickly observed than is the case with gelatine plates, though it may be present all the same; therefore those who aim at obtaining the best work their lenses will yield should periodically examine them and the mounts, particularly as any shortcomings in the latter can be remedied by themselves and with little trouble. This is best done by focussing some well-illumined subject and then removing the ground-glass screen, covering the head with the focussing cloth, and then looking through the lens to see if any light is reflected from the inside of the mount or stops, or from the edges of the glasses. If so, the evil should at once be remedied, as this light reaches the plate, and, as a consequence, more or less impairs the brilliancy and crispness of the image.

While examining the lens in this way it will often be noticed that the inside of the camera has become to an extent polished and reflective. The light so reflected reaching the plate militates against the brilliancy of the negative, and sometimes is an unsuspected source of fog. This, of course, is easy of remedy.

As we have already said, much of the perfection of results depends upon the "tools," *i.e.*, the lenses, with which they are produced; therefore it is to the interest of every one who pays a high price to obtain the best instrument for his work to take the greatest care to retain it in its original and, consequently, best condition, and to see that it is in that whenever it is employed. A lens, however excellent, is only used at its best when the glasses are perfectly clean and the inside of the mount and fittings are as dead a black as black can make them. The same also applies to the camera.

Energy of Light and Chemical Energy.—The *Revue Scientifique* for July 30 contains a summary of M. Berthelot's recent researches on the relations existing between the energy of light and chemical energy. M. Berthelot's leading idea is that the true chemical equivalent of light energy can only be measured by means of an endothermic irreversible reaction—that is to say, by a reaction which progresses with absorption of energy, and with the formation of products which cannot recombine spontaneously under the circumstances of the experiment. These conditions exclude many actinometric methods hitherto used. Thus a mixture of hydrogen and chlorine cannot be employed, for in this case the action induced by light is exothermic; the energy liberated is not that which has been received as light, but is almost wholly due to the chemical energy pre-existing in the uncombined hydrogen and chlorine. Photographic actinometers are also excluded for the same kind of reason, as well as from the fact that in some cases the products of the reaction tend to recombine. Thus metallic silver or silver subchloride and free chlorine, produced by the action of light on silver chloride, can recombine spontaneously. The reactions studied by M. Berthelot are the decomposition of nitric acid into nitrogen peroxide, oxygen and water, and the decomposition of iodic acid, hydriodic acid, and oxide of mercury respectively into their elements. It was observed incidentally that the more refrangible rays only are effective in the cases of nitric and hydriodic acid, and that in the decomposition of hydriodic acid a periodide of hydrogen is formed intermediately. Carbon dioxide, and a mixture of carbon monoxide and oxygen were not affected by exposure to sunlight. M. Berthelot is engaged in a deeper study of the energy relationships.

Photographs *versus* Samples.—A correspondent favours us with the following extract from a provincial morning contemporary: "The application of photography to the matter of mercantile samples has wrought a marvellous economy in scores of wholesale trades. The loss upon samples is thousands of pounds annually. Hundreds of thousands of sample hats are sold at absurd prices in London. A successful retail trade in shoes has been built up by a concern that began by buying samples brought in by commercial travellers at the end of each season. What is true of hats and shoes is equally true of a hundred other articles of merchandise. Photography has made it possible to sell to advantage by sample bulky articles that cannot be carted all over the country by travelling salesmen. Furniture, iron, and brass-work, massive clocks, and a hundred-and-one other such articles, are thus sold. Cut glass and china are among the samples most successfully photographed. The art of commercial photography is one requiring considerable technical skill, and, in a certain way, a knowledge of posing. The essential thing in the pose of a sample is that it shall result in producing a faithful picture of the original, and the chief advantage that photography has over many cheaper pictorial processes is its truthfulness."

"A Message from the Sky."—"This," says the *Daily Chronicle*, "is a new variant of the flotsam and jetsam of the seashore. Yesterday (Monday, August 22) we received a post card as follows: 'Dropped from balloon, 20/8/98. Third voyage, all well. Will send MS. in day or two. J. M. Bacon. This card was picked up at,' and then in another handwriting, 'Rainham,' from which place it was posted to this office by some obliging wayfarer. Our readers will be gratified to learn that Mr. Bacon, who ascended from the Crystal Palace on Saturday, is pursuing his series of important aërial researches, and they will share with us the hope that

the third expedition will prove at least as successful as the first. We shall shortly furnish them with an account of the scientific results of the ascent from Mr. Bacon's pen."

Release of Mr. Halstead.—A Foreign Office communication, published in the press on Tuesday last, states that Mr. Balfour has received a telegram from the acting British Consul at San Juan de Puerto Rico, reporting that the Governor-General had granted a free pardon to Mr. Freeman Halstead, and that he was set at liberty on the 16th inst. Mr. Halstead, who is a native of Canada, was acting in Cuba as the special correspondent of the *New York Herald*. He was arrested at San Juan in the early part of the year for photographing the fortifications of San Juan de Puerto Rico, but was released on its being ascertained that he was a British subject. A short time after he was again discovered photographing the forts and guns, and was rearrested, tried by court-martial, and sentenced to nine years' imprisonment.

THE CORRECTON OF THE DISTORTION PRODUCED BY TILTING THE CAMERA.

Part I.

The nature of the problems I have endeavoured to solve may be briefly described as follows. Assuming that the distortion produced by tilting the camera, without using the swing back, can be corrected by copying in the camera with negative and copy inclined to certain angles, the following questions arise:—

1. What are the respective angles to which negative and copy are to be inclined? *
2. From what data should these angles be determined?
3. Will these angles permit sharp focus to be secured in all parts of the copy?
4. What limitations, if any, are there to the process of correction?

With regard to the first three questions I have arrived at certain definite results which will be explained in the course of this article. With respect to the fourth question, the investigations are not yet complete, though, to some extent, the nature of the limitations can be indicated.

The first matter for consideration is the precise nature of the distortion produced by tilting the camera.

Fig. 1 shows diagrammatically in section the relative positions of object, *d G e*; image, *b F c*; and lens, *a*. For convenience the axis of

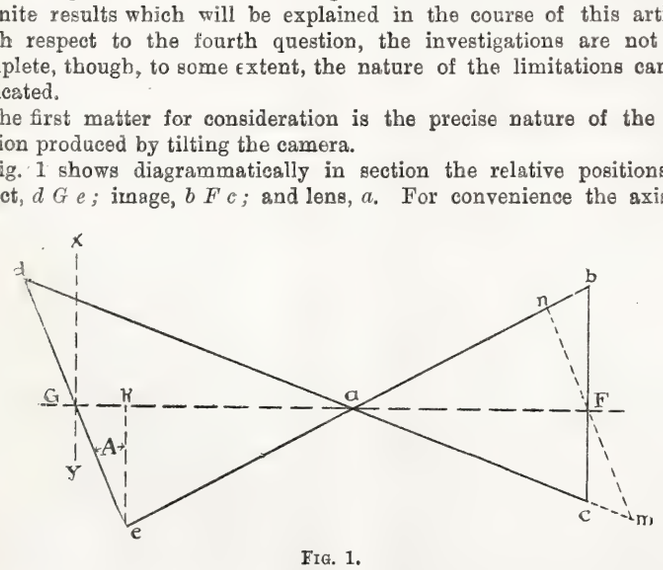


Fig. 1.

the lens (*G F*) is placed horizontally, and the object is shown as if inclined; but, if the diagram is turned so that the line, *d e*, becomes vertical, it will at once be seen that the diagram correctly represents the condition of things produced by simply tilting the camera, and also that the angle, *d G x*, or *G e k*, is equal to the inclination of the camera back from the vertical, or to the tilt of the camera baseboard from the horizontal. This angle will be defined throughout as the angle *A*.

In fig. 2, the object (which is assumed to be rectangular) and the image are shown on plan, and from the plan and section the distorted image is determined and shown in fig. 3 by solid lines.

If the swing back had been employed, the plate would have been inclined forward, as shown in section by the dotted line, *m F n*, parallel with the object, and the image would then have been exactly similar in proportion to the object, though on a different scale. This correct image is not shown on plan, but is dotted over the distorted image in fig. 3, so that the two may be compared.

The diagram represents a typical case of distortion, but it is only one case out of many possible ones, and it possesses certain features peculiar to the conditions under which it has been formed, which features must not be mistaken for universal characteristics. With regard to the horizontal distortion, as shown by the convergence of the sides, the bottom of the image (which corresponds to the top of the object, the image

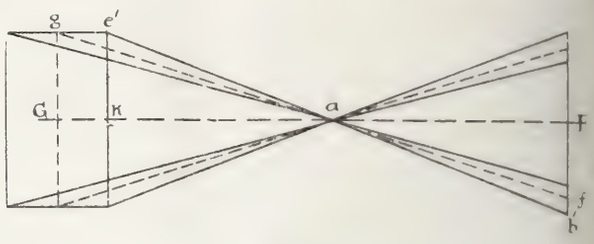


Fig. 2.

being inverted) is reduced in width, while the top is increased; this is a universal characteristic. Again, the vertical distortions of the upper and lower parts of the image, above and below the line, *f f*, are similar to the horizontal distortions. This is accidental, for, though the bottom part is always reduced both in height and width, yet the top will be reduced, instead of being increased in height, if the distance, *a G*, is extended. Hence we cannot correctly describe vertical distortion as either an increase or diminution of height, but we can express both it and the horizontal distortion as ratios. In fig. 3 consider the image to

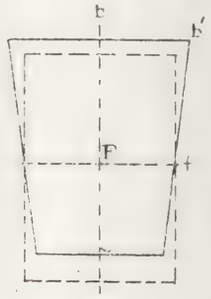


Fig. 3.

be divided into four portions by the vertical and horizontal lines passing through the point, *F*. Then the vertical distortion of, say, the upper right-hand portion can be described by the ratio $\frac{b\,F}{F\,f}$, and the horizontal distortion by $\frac{b\,b^1}{F\,f}$. In both cases the width, *F f*, being taken on a line passing through the point where the axis of the lens intersects the image, and also corresponding to the width of the correct image produced by using the swing back.

The ratios of distortion of the other three portions of the image can be expressed similarly, but it is unnecessary to take them into consideration, for, if we confine our attention to one portion only, and succeed in correcting its distortions, the other portions will also be corrected as a natural consequence.

These ratios of vertical and horizontal distortion will, in the formula, be simply expressed by $\frac{h}{w}$ and r; h representing the height, *b F*; w the width, *F f*; and r standing for the ratio of horizontal distortion, or $\frac{b\,b}{F\,f}$. It will be found that these ratios will appear in the form of the combined ratio $\frac{h}{w\,r}$, which fully expresses, or symbolises, the distortion present in the portion of the image under consideration.

The correct proportions of the object must also be considered, and these can be expressed in a similar way by the ratio $\frac{G\,e}{G\,g}$ or $\frac{H}{W}$. As we are dealing with a parallel-sided figure, W represents the width at any part.

With regard to the distorted image, it is obvious that the ratio $\frac{h}{w\,r}$ will not have the same value during the process of correction unless the axis of the lens still intersects the image at the point *F*. It is, however,

* It will eventually appear that another adjustment, of a different nature, is also necessary.

bsolutely essential that these ratios should remain constant, otherwise e shall not be able to establish any relationship between the equations unded upon them. The position of the point F must therefore be corded when the negative is taken, and this can be easily done if the ns and plate are truly central. If they are not, their relative positions ust be determined and recorded in some way. Notches on the edges of ie rebates of the dark slides would, perhaps, be the best means of arking this essential datum, which, as will be seen presently, is nportant from another point of view.

Having settled on a method of expressing the nature of the distortion hich exists in the image, the next point is, What are the factors that etermine its amount, or, in other words, that fix the value of the ratios distortion? Considering that the process of correction involves a versal of the conditions under which the distortion was produced, it is vident that these factors must form the data that have to be determined answer to question 2.

A very obviously important factor is the angle of inclination or tilt of ie camera (the angle A); this must therefore be recorded. Another ctor is the distance of the lens from the object, for, if this be varied, all her conditions remaining the same, we find that the ratios of distortion ry; as the distance increases, the ratios diminish. Then there is a ird factor, the size of the object, for if that were smaller than shown, t of the same proportions (*i.e.* $\frac{H}{W}$ remaining constant), the ratios would less. Furthermore, we may note that in this case they would correond exactly with those of a larger similar object at a certain greater stance; that is to say, if we double the distance, $a\,G$, the ratios of the age will agree exactly with those of an image produced at the distance, G, from an object of half the size but of the same proportions. These o factors, distance and size, have therefore to be considered gether.

A fourth factor is the position of the lens axis relative to the object. If is is varied, the other factors being undisturbed, the ratio $\frac{H}{W}$ is altered, d, consequently, also the ratios of distortion. The point F records the lative position of the lens axis; and the importance of fixing this point s already been sufficiently insisted upon.

The three last factors mentioned may be expressed as one, and that is gle of view; and, as we have the distorted image, and know the posin of the point, F, the angle of view can be recorded and reproduced if e simply note the distance, $a\,F$, which, as it is one of a pair of congates, may be denoted by v.

These factors of distortion, and the data by which they are recorded, ay be briefly summed up as follows:—

The relative amount of distortion present in the quarter image, or ie value of the compound ratio which expresses that distortion, depends on tilt of camera and angle of view. The data to be recorded are—gle of tilt, distance at $a\,F$ (or v), and position of the point F.

Knowing the conditions under which the distorted image was formed, reproducing those conditions exactly the distortion can, of course, be rrected so far as proportions are concerned. There is, however, a actical difficulty in the way of restoring all the conditions, inasmuch the preservation of the exact distance, v, involves the use of a lens of certain definite focus to produce a copy to a particular scale; or, if we ve no choice in the matter of lenses, we can then only produce a copy a certain size. The question therefore is, how is a variation in the ngth, $a\,F$, to be compensated for in the copying process, or, in other ords, how are the only other variable factors, viz., the angles of inclinaon of negative and copy, to be adjusted to compensate for an alteration $a\,F$?

Referring again to figs. 1 and 2, we can from them establish an uation showing the relationship between the angle of tilt of the mera, the proportions of the object, and the ratios of distortion, us:—

From section—$a\,k : k\,e :: a\,F : b\,F$

From plan— $a\,k : k\,e^1 :: a\,F : F\,b^1$

$$\therefore \frac{G\,e \cos.\, A}{k\,e^1} = \frac{b\,F}{F\,b^1}$$

but $\frac{k\,e^1}{F\,b^1} = \frac{G\,g}{b\,b^1}$ (compare figs. 2 and 3)

$$\therefore \cos.\, A = \frac{b\,F}{b\,b^1} \times \frac{G\,g}{G\,e} = \frac{h}{r\,w} \times \frac{W}{H} \quad \ldots\ldots\ldots 1$$

We can next similarly establish the relationship which exists in the peration of copying between the ratios of distortion, the angles of inclination of negative and copy, and the proportions of the latter, which can be indicated by $\frac{H^1}{W^1}$

Figs. 4 and 5 represent in a similar manner to figs. 1 and 2 the positions in section and plan of negative, copy, and lens when both the

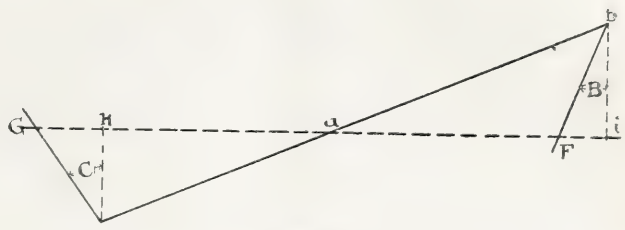


FIG. 4.

former are inclined, for the present assuming that they *must* be inclined in opposite directions, as tentative experiments with the camera would appear to indicate.

The top portion of negative above lens axis and the lower corresponding part of the copy only are shown, the rest being omitted for

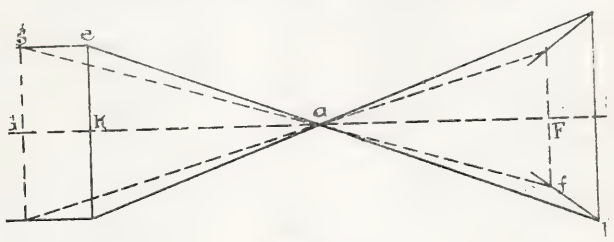


FIG. 5.

the sake of clearness. The quarter image only is actually considered. The point F corresponds with F in figs. 1 and 2, and the negative being supposed to be the same (though, to avoid increasing the length of the image, it is not actually drawn to correspond), $\frac{h}{w\,r}$ *remains a constant value*. The angle of inclination of the negative from the vertical is denoted by B, and that of the copy by C. It is assumed that these angles are so adjusted as to correct the horizontal distortion and produce a parallel-sided figure, the proportions of which are represented by the ratio $\frac{G\,e}{G\,g}$ or $\frac{H^1}{W^1}$, *which may, or may not, equal* $\frac{H}{W}$, or the proportions of the original object. The sides being parallel, $k\,e^1$, of course, equals $G\,g$, or W^1.

From section—$a\,k : a\,i :: k\,e : b\,i$

From plan— $a\,k : a\,i :: k\,e^1 : i\,b^1$

$$\therefore k\,e : b\,i :: k\,e^1 : i\,b^1$$

$$:: G\,g : b\,b^1$$

$$\therefore \frac{G\,e}{b\,F} \frac{\cos.\, C}{\cos.\, B} = \frac{G\,g}{b\,b_1}$$

$$\therefore \frac{\cos.\, C}{\cos.\, B} = \frac{G\,g}{b\,b^1} \times \frac{b\,F}{G\,e} = \frac{h}{r\,w} \times \frac{W^1}{H^1} \quad \ldots\ldots\ldots 2$$

Comparing this result with equation 1, it is at once evident that, as $\frac{h}{r\,w}$ has a constant value, if $\frac{W^1}{H^1} = \frac{W}{H}$, that is to say, if the correct proportions of the image are restored and both horizontal and vertical distortion eliminated, then

$$\frac{\text{Cos. } C}{\text{Cos. } B} = \cos.\, A \quad \ldots\ldots\ldots 3$$

This equation is of great importance, as it establishes a definite ratio which must always exist between the angles C and B when the distortion of the image is perfectly corrected in both directions. It is not, however, sufficient for our purpose, as it does not in any way indicate the values of C and B. The important value of $a\,F$ is not taken into account, and it is therefore evident that variations in this length do not affect the ratio of the angles, but only their individual values. All the data that we before saw must be essential are included, excepting only this one dimension; but, with the help of equation 3, we can construct a geometrical figure that will indicate the relationship between the angles and this distance.

C. WELBORNE PIPER.

PHOTOGRAPHIC ENGRAVING IN INTAGLIO.

[Abstract of paper read before the Camera Club.]

The intaglio processes of photo-engraving are naturally intimately bound up with the kindred processes for photo-block printing, and, indeed, for line work and for certain methods of half-tone work they are identical; but in the more recent developments of half-tone work the processes for the two purposes diverge so completely that they require separate treatment, and therefore in this paper I propose to confine myself to the intaglio processes, with which I am best acquainted. The story I shall have to tell will be for the most part an old one, and go over well-trodden ground, but I think it is well, from time to time, to look back to those early workers who have gone before, with the object of keeping their memory fresh among us, and still finding, perchance, some instruction and guidance from their labours and experience.

In 1813, Joseph Nicephore Niépce, a landowner of Chalons-sur-Saône, a man of many experiences as priest and soldier, and of a highly experimental turn of mind, took up the new art of lithography, but, finding some difficulty in procuring a suitable stone for the purpose, bethought himself of trying polished metal as a substitute, and tried to obtain impressions from drawings in lithographic chalk on pewter plates. He also covered his metal plates with solutions of guaiacum and other resins, as well as with engravers' varnishes, and, though the steps which led to it are not very clear, he seems to have discovered that asphaltum, or bitumen, which is the basis of most of these varnishes, was changed under the influence of light, and became insoluble in its ordinary solvents in the parts acted on by light. As a solvent for making his varnish, he seems to have used essential oil of lavender, and also the oil of Dippel, bone oil, which in its purified form is said to be a pale, limpid, fragrant, volatile oil, discoloured by exposure to light. For developing the images after exposure to light, he seems to have generally used a mixture of oil of lavender and oil of white petroleum. He placed his varnished plates under drawings and sheets of music, and exposed them to light, and thus obtained plates which could be etched, and from which impressions could be taken. From these early steps he was led to the idea of obtaining on his metal plates the representation of outside objects by the action of light alone. He made up a rough camera with the scanty and imperfect materials he had at hand, and prosecuted his researches with energy for several years. As we can well understand now, they were not crowned with the success they well deserved, but they incontestably secured a place for the new art of sun printing among the graphic arts. It is most unfortunate that there are no detailed accounts of Niépce's early experiments and results. The only information we can gain about them is very fragmentary, and contained in letters to his brother, Claude. In 1827 he presented a paper to the Royal Society, accompanied by specimens of his plates and prints, but, as he was unwilling to publish the details of his process until it was perfected, the paper could not be received.

By following up his uncle's work under more favourable circumstances, Niépce's nephew, the Commandant Niépce de St. Victor, in concert with the engraver, Lemaitre, who had been associated with his uncle, was able to produce really practical results both in line and half-tone, and published a practical treatise on the subject.*

In the first chapter of this treatise a note by Niépce himself on his work will be found, and, although the question is not directly connected with photographic engraving, it will, I think, be very interesting and novel to most of us to know that Niépce seems to have anticipated the latest discoveries of Lippmann in colour photography.

He says: "Two attempts at landscapes, on glass, taken in the camera obscura, have given me results which, although defective, seem to me deserving of being recorded, because this mode of application may be more easily perfected, and come to possess quite a special interest.

"In one of these attempts, the light having acted with less intensity has removed the varnish in such a way as to make the gradations of tints more strongly marked, so that the impression, viewed by *transmission*, reproduces to a certain extent the known effects of the *diorama*.

"In the other attempt, on the contrary, in which the action of the luminous fluid had been stronger, the most exposed parts, not having been attacked by the solvent, remained transparent, and the difference of colours results solely from the relative thickness of the more or less opaque layers of the varnish. If the impression is viewed by *reflection* in a mirror from the varnished side, and under a fixed angle, it produces a great deal of effect, whilst, viewed by *transmission*, it only presents a confused and colourless image, and what is most astonishing is that it seems to imitate the colours of certain objects. In thinking over this remarkable fact, I believed it possible to draw conclusions from it which might allow it to be connected with Newton's theory on the phenomenon of coloured rings.

"It would suffice for this to suppose that a certain prismatic ray, say, for example, the *green* ray, in acting on the substance of the varnish, and combining itself with it, gives it the degree of solubility necessary for the resulting layer after development and washing to *reflect the colour green*. However, observation alone can prove the truth of this hypothesis, and the thing appears to me sufficiently interesting in itself to encourage new researches, and give rise to a closer and fuller examination."

Until the introduction of improved collochromate methods, the bitumen process was fairly extensively used for photo-engraving and photo-lithography, both in line and half-tone. In the hands of Nègre, Baldus, Amand Durand, Delessert, Leffmann, and other French and German photo-engravers it yielded exceedingly fine results, as you will see from the specimens I have brought. I believe it is still used for photo-block work in line, because it gives such a delicate sharp image. The great drawback to the use of bitumen is its comparative insensitiveness to light, except in very thin films; but this has been largely overcome by separating the insensitive and more or less soft and oily constituents of the bitumen, which are soluble in alcohol and ether, from the sensitive constituents which are insoluble in those liquids, and are of a dry, hard, and brittle nature. They also contain a large proportion of sulphur, on which much of the sensitiveness of the asphaltum to light appears to depend. I may mention to those interested in the subject that some very interesting researches on asphaltum have lately been published in the *Journal of the Society of Chemical Industry*, especially a very interesting paper by Mr. Clifford Richardson, on the Trinidad asphaltum.

Niépce continued his researches unaided till 1827, but with little success. He then met Daguerre, who had also been working at photography, and after a time entered into partnership with him and imparted to him the results of his researches, among which was the darkening action of iodine upon the silvered plates on which some of his bitumen images were produced. This seems to have turned Daguerre's attention to iodised silver as a photographic agent, and in 1839 the wonderfully beautiful process since known as Daguerreotype was published, almost contemporaneously with the processes of Talbot and Bayard for producing negative pictures in the camera on iodised paper.

The new process was no sooner fairly started than attempts were made to produce printing plates by etching the developed image. Dr. Donné seems to have been the first to publish results. He found that nitric acid, diluted with four parts of water, attacked the silver forming the dark parts of the image, while it had no action on the mercury in the lighter parts. After a few minutes' biting the plate was washed, inked up, and proofs pulled. As may be imagined, the results were very imperfect, and the plates did not stand printing owing to the softness of the silver.

Krasner, Berres, and Grove proposed methods of etching the Daguerreotype plates by means of a galvanic current. In Grove's method the plate to be etched was made the anode attached to the positive pole of the battery, and plunged into a weak solution of hydrochloric acid, which, under the influence of the current, attacked the mercury and not the silver. After washing and clearing off the deposited chloride with weak ammonia, the plate was ready to be printed, and the process had the advantage that the proofs obtained were positive, showing objects as they were seen in nature. These plates also were defective as printing plates.

Fizeau first etched the plates as deeply as possible with a mixture of nitric, nitrous, and hydrochloric acids, which attacked the silver and left the mercury, the etching being repeated as often as seemed desirable, though never very deep. In order to obtain more depth, the plate was oiled with linseed oil, and wiped off in the same way as the ink in copperplate printing, leaving a certain amount of oil in the hollows which, when dry, became hard and resistant. The etched plates were then placed in a gilding bath attached to a battery, and gold deposited on the higher parts. After cleaning away the oil, and applying an aquatint grain, they were again bitten with nitric acid, which acted on the silver, leaving the gold untouched. In order to render the silver plate more capable of withstanding the wear and tear of printing, it was faced with a thin film of copper, which could easily be removed when required. In this way fairly good results seem to have been obtained.

Various methods of etching Daguerreotype plates were put forward by Beuvière, Chevalier, Heller, Piil, and others, but none of them have survived. Many other ingenious and interesting processes of chemical engraving in intaglio applicable to photography have been proposed by Poitevin, Garnier and Salmon, Vial, Dulos, but do not appear to have come into practical use. Mention may, however, be made of one of Garnier and Salmon's processes, which might possibly still be found useful for the direct etching of plates produced in the camera through a fine cross-line screen. A brass plate is exposed in the dark to the vapour of iodine, then submitted to the action of light behind a negative, and rubbed with a tuft of cotton dipped in mercury, which only attaches itself to the parts unaltered by the light. An inking roller charged with printing ink being now passed over the plate will only ink up those parts left untouched by the mercury, and produces a black and white image which is capable of being etched in many ways. It is doubtful, however, whether such a method would have any practical advantage over those now in use.

I have already mentioned that Fox Talbot brought out, in 1839, a process of photography in the camera, in which he used paper sensitised with silver iodide, and developed the image with gallic acid, contemporaneously with Daguerre's process. In the same year Mungo Ponton brought to notice the photographic properties of the bichromate of potash, and although he does not appear to have understood the rationale of its action, which was afterwards explained by Becquerel, and still more fully by Swan and Eder, he laid the foundations of a most important series of valuable processes of reproduction, and especially of

* *Traité pratique de Gravure Héliographique sur Acier et sur Verre.* Paris, 1856.

photographic engraving in intaglio. Based on the imperfect work of Talbot, Pretsch, and Poitevin, improved by many subsequent workers, they have undoubtedly taken the lead as practical methods of reproduction for all classes of subjects, and, so far as we can see, until something very much better is brought forward, they will continue to keep it.

As you all probably know, a mixture of gelatine and bichromate of potash, spread on glass or paper, or any other suitable support, and exposed to light, has many very valuable properties which can be taken advantage of by the photographic engraver or process worker in various ways.

(1.) The gelatine becomes more or less insoluble in hot water.

(2.) It also becomes unabsorbent of water in the parts exposed to light, and in proportion to the action of light; and by placing in cold water a film which has been exposed under a photographic negative, moulds or reliefs may be formed from which casts can be made in plaster or by electrotyping.

(3.) If a film of gelatine and bichromate be exposed to light under a photographic negative, and then moistened with water, like a lithographic stone, and a roller charged with printing ink be passed over it, it will be found that the ink will be taken up by the film in proportion to the action of light in rendering the film of gelatine unabsorbent of water.

(4.) A film exposed as above will become impermeable to solutions of certain metallic salts, among them perchloride of iron, in proportion to the action of light.

By taking advantage of one or other of these properties of bichromated gelatine, Fox Talbot, Pretsch, and Poitevin, all working about the same time, in the early fifties, were able to bring out fairly practical methods of photographic engraving which, with very few modifications, are still current.

The first to publish an engraving process founded on the use of gelatine and bichromate of potash was H. Fox Talbot, who, in 1852, brought forward his process of "photoglyphy." He found that, by the action of light, a film of gelatine and bichromate of potash exposed to light became impermeable to certain etching fluids, in proportion to the intensity of the action of light upon it. In his first process, patented in 1852, of which a full account will be found in Vol. I. of the *Journal of the Photographic Society*, he coated steel plates with a thin solution of isinglass or gelatine mixed with bichromate of potash. After drying with heat, he exposed the plate to light in a printing frame under some suitable object, such as black lace or leaves, also under engravings or photographic prints. After a short exposure to sunshine, the plate was placed in cold water, which dissolved out the bichromate and most of the gelatine from the unexposed parts of the film. The plate was then placed in a bath of alcohol and dried. For etching he used a strong solution of bichloride of platinum. When copying half-tone subjects he found that he obtained better results by putting what he called a *photographic veil* over the plate. This veil was composed of two folds of fine black crape or gauze laid across each other obliquely, and was placed over the prepared plate and exposed to the sun for two or three minutes. The leaf or other object to be copied was then substituted for the crape, and the plate exposed again for the same time. When etched, the crape gave the engraved image the appearance as if it had been worked with an engraver's tool. This method was rather imperfect, and he suggested the use of glass plates ruled with fine lines, or covered with opaque specks or dots. From this it would appear that Talbot was the first to use a screen grain.

In 1858 Talbot patented a modification of his original process, under the name of "Photoglyphic Engraving." In this he used plates of steel, copper, or zinc, coated with gelatine and bichromate, and exposed as before. Instead, however, of removing the unaltered gelatine from the exposed plate before etching, he first of all covered it with a very even coating of finely powdered gum, copal, or resin. It was then heated to melt the copal. For etching he used perchloride of iron in solutions of three different strengths:—

(1.) A saturated solution in water.

(2.) Five or six parts of (1) and one part of water.

(3.) Equal parts of (1) and water.

The etching was commenced with No. 1, which was left on for one or two minutes, and hardened the gelatine. No. 2 was then applied, and etched the image, but, if parts did not come up, a brush dipped in No. 3 was applied to them.

The results obtained by Talbot were very deficient in half-tone and gradation. The process had two very great defects—the want of a resinous grain in contact with the plate, and the presence of a more or less complete layer of soluble gelatine immediately in contact with the plate, which made it very difficult indeed to obtain true gradation in the various parts of a delicate half-tone subject or landscape from nature. On this account the process, as published by Fox Talbot, never came into extended practical use, though it may possibly have been worked by Dujardin, Garnier, and other of the Continental photo-engravers in a modified form.

About the year 1884, paragraphs appeared in all the photographic journals about a new secret process of photographic engraving, worked out by Herr Karl Klič, a painter, of Vienna, which, from the accounts published, appeared to be based upon Fox Talbot's process just described, but improved in respect to the two most important particulars I have alluded to, *i.e.*, the resinous grain was first of all applied to the surface of the copper, or other metal plate, so as to form a slightly rough and acid-resisting coating on the plate, and thus, on the one hand, it held down the gelatine film firmly to the plate and prevented the spreading of the etching solution underneath the film, and on the other offered a large number of points all over the plate which were quite impenetrable by the etching solution passing through the thinner parts of the film forming the shadows, and so produced a grain or ink-holding surface graduated in strength according to the depth of the hollows forming the different parts of the picture.

The other improvement, and perhaps the principal one, was the adoption of Swan's process of pigment printing for the preparation of the negative resists, which were thus transferred and developed upon the grained copper plates, while all the useless soluble gelatine was removed, so that the etching solution could act directly on the plate through the resinous grain in exact proportion to the overlying thickness of gelatine. The adoption of this principle of exposing on one side of the bichromated gelatine film, and developing on the other, which was proposed by Burnett, Laborde, Fargier, Blair, but carried to a really practical issue by Swan, has resulted, as it did when applied to pigment printing, in making photographic engraving a simple, reliable, and thoroughly practical process, as is evidenced by the beautiful results produced in this way by many workers in all parts of the world.

It is not my intention, nor have I time, to enter into the working details of the process; it is now fairly well known, and there are several excellent little manuals about it available. The only point on which I may remark is the relative merit of biting with one solution, as followed by Huson, or the method with several solutions adopted by most workers.

When we first started the process in Calcutta, in 1884, taking the meagre details published in the *Photographic News* for our guidance, we started with a one-solution system, and I can show you some exceedingly good results produced in that manner, particularly one very difficult subject representing two pieces of ivory carving, in which, as you will see, the most delicate details in the carving are very perfectly brought out, and there is a richness and vigour about the whole which is particularly pleasing. As it happens, there is a copy of a similar plate reproduced by photo-electrotype, which you will see is much flatter. We found, however, that there was a want of gradation in ordinary subjects, and, not only so, the plates were deficient in depth in the middle tints, and soon wore out in printing, and certainly with us the adoption of the system of several etching baths, which was part of Klič's process, and which I learnt in Vienna, was a great advantage. However, both systems have their value, and one or other can be used as best suits the subject. I have brought with me a collection of prints done in Calcutta by both methods, and you will be able to compare their merits.

We have now to consider another important class of methods of photographic engraving in intaglio, which Pretsch and Poitevin were the first to work, and which were based upon the property, already noticed, of a bichromated gelatine film exposed to light swelling up unevenly in water, and forming a mould or relief. They may be classed generally as "photo-galvano-graphic"—to use Pretsch's early term—or photo electrotype. In all these processes the printing plate is obtained by depositing copper on a chrome-gelatine relief obtained by the agency of light, or on a cast in plaster, or other suitable moulding material, taken from such a gelatine relief, either wet or dry, according to the amount of relief required. The processes dependent on swelling of the gelatine have not been very successful for half-tone work, and are more suitable for line work, and especially for photo-block work.

There are three ways in which suitable reliefs can be obtained: 1. By coating a glass or metal plate with a film of gelatine and bichromate, and exposing it when dry to light under a photographic negative, then washing it in hot water, which removes all the soluble gelatine, leaving an image in high relief, formed of insoluble gelatine, from which a cast or electrotype in intaglio can be obtained. This method, which was the one followed by Pretsch, has the inherent defect of all the early collochromate printing methods, the underlying coat of soluble gelatine, which, being removed by the hot water, breaks up the half-tones and destroys all delicate gradation. The early plates published by Pretsch show this defect, and required a great deal of touching up by hand to make them presentable. At best the process is only suitable for strong line work.

In the second method the plate, prepared and exposed as before, is plunged into cold water. The gelatine will now be found to absorb water, and swell up in the parts protected from the light, while in the parts acted on by the light it will only slightly absorb water, and these parts will thus form hollows. The power of absorbing water will also be found to be in exact proportion to the degree of protection from the light. In this case an image in high or low relief, according to the thickness of the film, is obtained, which may either be moulded from or electrotyped. In principle, this seems to be a great improvement on the first method for half-tone work, but here again the underlying soluble or unaltered gelatine is a source of difficulty and irregular action. This was the basis of Poitevin's process of *Helioplastie*, and was adopted by Pretsch, Placet, and others with some success, but has been superseded by improved and more certain methods. I have some of Placet's proofs with me, and,

though they are very good in their way, you will see traces of the irregular swelling of the gelatine, and there is not the brilliancy and relief of the modern processes.

The third method is based on the principle of the carbon or pigment process of exposing on one side and developing on the other, and then electrotyping the resulting relief. This method was, I believe, originally proposed and worked by Swan himself. In July 1865 he patented three methods of photo-mechanical printing. Among them was one for "photo-engraving," in which an image in relief was obtained on a glass plate or other suitable surface by means of the pigment printing process, the tissue used for the purpose containing sufficient colouring matter to control the height of the resulting relief. After development with hot water in the usual way, the gelatine relief was hardened and rendered conducting, and then a deposit of copper was made upon it by electrotyping. He provided means for giving the surface of the gelatine relief an ink-holding, trenched, or cellular structure by using ruled screens in printing, or by dusting the negative with granular opaque powdery matter, applied either dry or in gelatinous solution. The electrotyped plate was used as an ordinary printing plate, but printed with rather a weakly coloured ink so as to give prints with the proper gradation of light and shade.

Just about the same time Colonel Avet patented another method, in which the negative itself was coated with gelatine and bichromate, exposed from the back, and then washed to remove the soluble gelatine. The resulting relief was metallised and electrotyped. Various methods of giving a ruled grain surface are given in the patent.

Many other processes of the kind were patented about the same time, though none of them seem to have come into practical use.

It is not easy to trace the progress of Swan's method, or whether the similar methods followed on the Continent were adopted from him or worked out independently; but in 1870 a little treatise by Geymet and Alker was published, in which the method of working was described very fully. They, however, claim no originality in the process, which they say had been exhibited before the French Photographic Society by M. Audra. They, however, recommend the use of copper, in place of glass plates, as a basis for the gelatine relief, and they give a method of obtaining a grain by taking a print from a ruled tint plate on collodion, and interposing it between the negative and the tissue during exposure to light.

From Colonel Volkmer's book on *Photo-galvanography* it appears that a similar process was worked by Mariot, of Graz, about 1868, and was shortly afterwards introduced into the Military Geographical Institute at Vienna for the reproduction of the special map of the Austrian-Hungarian Empire; but I can find no record of the process ever having been published by Mariot, and I knew nothing of his method till I visited Vienna in 1880, and saw it in work at the Military Geographical Institute. It was much the same as I had been working in Calcutta. My own experiments with the process were not made until 1877, and I was entirely guided by Geymet's book, though I began by using plates of silvered copper as a support for the gelatine relief, because I knew the value of the silvering in allowing the easy separation of the deposited copper from the matrix when the latter was silvered, and it was also much easier to electrotype from than glass.

In my early experiments in half-tone photo-electrotype, I found that the autotype tissue I was using gave me quite sufficient grain for printing purposes when the developed reliefs were treated with a solution of tannin—and a very nice grain it was—but with the later tissues this method did not answer, and while in England on furlough, in 1880, I was, with the kind assistance of Mr. Alfred Dawson, who was for a long time almost the only English worker in this direction, and the Autotype Company, fortunate enough to be able to find and work out another method of obtaining a suitable grain by powdering the wet reliefs with fine sand, glass, or emery powder, which had been previously treated with stearine or wax to prevent its adhesion to the gelatine. As these powders sank in to different depths in the gelatine surface, according to the thickness of the gelatine, they produced a graduated grain, coarser in the shadows than in the lights. This method gave fairly good results for half-tone work, as you will see from the specimens on the wall. Mr. Foxlee suggested the use of powdered resin instead of the waxed sand, and the Autotype Company brought out a special tissue for the process containing a granular material which gave a relief with a grained surface. None of these methods, though useful in their time, are, however, nearly so simple and convenient as the Talbot-Klič method, which has, I believe, almost superseded all the photo-electrotype methods, though the latter may still be used for line work in some of the large map-producing establishments. The great advantage is the saving of time and the fact that very little time need be lost over a bad result, whereas with the electrotyping methods weeks may be spent in gaining a plate which, after all, is a failure. I found, too, that the photo-electrotypes always require a great deal of hand retouching, which the photo etched plates do not, and this is also an important advantage.

There are two other special methods of photo-galvanography which seem worthy of mention, Woodbury's and Scamoni's.

In Woodbury's method, which is specially suitable for half-tone work, and has yielded excellent results, a plate of glass is waxed and coated with a thin film of collodion, and a mixture of gelatine and bichromate of potash, containing a quantity of fine emery, powdered glass, or charcoal, is poured over it and allowed to "set." When dry, the film is taken from the glass and the collodion side exposed beneath a negative. After exposure, it is temporarily attached on the collodion side with indiarubber solution to a sheet of glass, and washed with warm water. The resulting granular image is then pressed into a sheet of soft metal by hydraulic pressure. The soft metal plate is then electrotyped in copper, and another plate, subsequently steel-faced, is again made from this to serve as the printing plate, the first copper plate being kept in reserve.

The beautiful process of photogravure, so long worked by Messrs. Goupil & Co., and their successors in Paris, was, I believe, very similar in principle to the above; but it was always worked as a secret process. The plates produced were very shallow, and generally required an immense amount of touching by hand.

Some most beautiful results in line have been produced by Scamoni, of St. Petersburg. After having obtained a suitable negative of a drawing, or other line subject, he makes a positive copy of it in the camera by the wet-collodion process, and, after fixing, treats this positive with various successive intensifying solutions, so as to give it a very sensible relief. After drying, the plate is varnished with a thin varnish and electrotyped.

There are many other methods and processes I might mention; among them, Obernetter's ingenious method of etching copper by means of silver chloride, but time will not allow of it; and in a short paper of this kind it is impossible to do more than I have done in trying to give you a short sketch of the rise and progress of the principal photo-engraving processes in actual use. What the future of the processes is to be one cannot tell, but copper-plate engraving has always been associated with work of the very highest class, which should well repay the labour and care required to produce the best results; and it will, I think, be very greatly to be regretted if these beautiful processes become too much vulgarised, and reduced to the level of the ordinary process block, as seems only too likely.

COLONEL J. WATERHOUSE.

THE GUM-BICHROMATE PROCESS IN AMERICA.

WRITING on this subject in the *Professional Photographer*, Mr. G. Hanmer Croughton says that, standing behind a group of old-time professional photographers at Celoron, he was greatly amused at their comments on the awards. "It is nothing but a freak convention," said one. "Freak lighting, freak posing, and" (pointing to the exhibit of the winner of the second prize in the Grand Portrait Class, Mr. Mock, of Rochester, N.Y.) "freak printing." "Well, how is it done?" said another. "I never saw anything like it before. It is not silver and it is not carbon." "No," growled the first speaker, "it is freak, that's what it is, freak, and very few of the awards have gone to anything else but freaks."

It is not to be wondered at if our old-time photographers, men who know nothing but camera, lens, and process, to whom the talk of tone values, concentration, harmony, and feeling is like one of the dead languages, should turn from the awards made at Celoron this year and cry freak. To them anything but the smooth, retouched, technically perfect photograph would be a freak. But times have changed, and the younger generation of photographers with it. They have begun to put picture qualities into their photographs, and they find the public ready to recognise the fact, and, to the surprise of the technical photographer, they buy these freaks.

With this desire for picture quality comes dissatisfaction with the more mechanical of the printing processes. With the gelatino or collodio-chloride papers no modifications can be made. Carbon allows some considerable latitude by the manipulator, but the various gum-bichromate processes allow such a wide range of results, according to the artistic ability of the printer, that these freak photographers have taken up these freak processes to produce freak pictures, which not only please the artistically educated public, but, most of all, secure the medals at the Convention.

Up to the present the printing process which could produce mechanically perfect prints, all alike, was the most called for, but these bi-gum processes go exactly in the opposite direction; you can, if you wish, get a dozen different effects from the same negative, that, in fact, if you have the know how, you can get almost any effect you wish for.

The first suggestion of the process was due to Mr. Pouncy, of England, over forty years ago; in fact, it was the earliest foreshadowing of the carbon process. It was carried along by various workers till made a commercial success by the late Mr. Johnson, of the London Autotype Company. It is based on the same principle as all the carbon processes, the fact that bichromate of potash or ammonia renders all gelatinous substances insoluble when exposed to light. Gelatine or gum containing colour being sensitised by bichromate of potash when exposed under a negative retains the colour in more or less proportion as the light has acted upon it; therefore, when a solution of gum, colour, and bichromate is spread upon the white paper, exposed under a negative for a sufficient time, and placed into lukewarm water, the parts protected by the negative, *i.e.*, the lights, wash out, and the shadows remain in various densities in proportion to the amount of light passing through the thin parts of the negative.

That, you will see, is the same as the ordinary carbon process, but this gum process is different in the fact that there is no transfer made, the gum and colour remaining upon the base you put it, be it paper, opal, or celluloid; therefore, unlike the single-transfer carbon process, you obtain a *non-reversed* image.

The first I saw of these pictures were made upon paper prepared in Paris, France, continues Mr. Croughton. The paper was coated with the gum solution and placed while wet at the bottom of a box; finely powdered pigment of the colour desired was blown into the top of the box and allowed to settle into the moist gum, giving, in this way, a fine velvety surface. When dry, this had to be sensitised with bichromate of potassium, either by immersion or from the back by brushing. The surface of the paper is easily damaged, and great care must be exercised in the manipulation. After exposure under a negative the exposed paper is placed in a dish of lukewarm water with very fine hard-wood sawdust, and rocked gently till the sawdust and water loosens the colour and gum and develops the printed image. This general development is followed by local development with soft and hard brushes, to take off the colour wherever the effect demands it, and according to the taste of the operator.

It will be readily seen that this process, while more difficult than the ordinary carbon process, has two distinct advantages. The prints are not reversed, and, the colour being so loosely attached to the paper, any amount of manipulation with water and brush can be resorted to to gain effect. It is here where the knowledge of what to do and what to leave undone comes in.

Another method, a modification of the same principles, is the one I have experimented with myself and succeeded with satisfactorily. This is the bi-gum process, as it is called on the other side. One difference I have made, I buy the tube colours, as it saves the trouble and bother of grinding, and you can get any of the water colours in tubes ready for mixing with the gums. I use the bichromate with the gum and colour as the simplest method—two ounces of Turkey gum in tears to five ounces of water, and enough colour from the tube to make a drop of the colour gum solution opaque when dropped on white paper. This, mixed with an equal quantity of the bichromate solution, made by dissolving half an ounce of bichromate of potassium in five ounces of water, joins both the sensitiser and colouring matter. All colours are open to the operator, except, of course, those made with any of the chromes, which would not act. The development is made in lukewarm or even cold water, *face down*, till all the pigment and gum that will come out has left the print. Then, face up, upon a slab of glass resting on the edge of the dish, with a constant supply of clear water, the manipulation with the brush commences. With soft sable pencils the high lights can be cleared, and with the broad, flat, fitch tools, broad effects upon backgrounds or sky and distance can be obtained; in fact, as I have said before, there is scarcely any limit to the modifications which can be made by one who knows what he wants to get. The operations are finished by clearing and fixing in a solution of alum and sulphite of soda, one ounce of each to forty ounces of water.

GOLD FROM THE SEA.

The lust for gold has always been a marked characteristic of the human race, and in the nineteenth century it has been greatly aggravated by the discoveries of gold in California, Australia, Africa, and in the Klondike. Besides the men who bravely battle for gold in the mining camps, there are others, fortunately very few in number, who aim to arrive at affluence by an easy path. It is strange that in the present century, with all our scientific knowledge, says *The Scientific American*, there are those who still cling to the old belief of the alchemist that they can transmute a base metal into gold, and in their endeavour they waste their lives, their substance, and even the substance of credulous friends. There are still others who spend their time in imposing bogus experiments on gullible dupes who allow themselves to invest their money in the most crack-brained schemes.

We have now to relate the most extraordinary story connected with the production of gold, which should be a warning to all who do not see in such affairs the specious combination of science and the wily swindler. We refer to the Electrolytic Marine Salts Company, which has recently attempted to extract gold from the sea, though the resulting gold, in reality, came from the pockets of the shareholders. The sensational *débâcle* of the principal promoters of the Company has produced considerable comment.

In 1872 Sonstadt discovered the minute presence of gold in sea water, and this was confirmed by Professor Liversidge, of the University of Sydney, who found that in the sea water of New South Wales there was from one half to one grain of gold to one ton of sea water, or 130 to 260 tons per cubic mile. Professor Liversedge estimated the bulk of the oceans of the world as 308,710,679 cubic miles; and, if each ton of sea water produced one grain of gold, the aggregate amount would be $48,000,000,000,000, being 23·22 grains fine to the dollar. After this discovery, it is, of course, natural that scientists should have made attempts to secure the precious metal by treating the sea water chemically and electrically, but it was soon discovered that such processes would be wholly impracticable, owing to the great expense attending the extraction of the gold from the enormous bulk of liquid. The matter should have ended here, but it got to be pretty well understood by the public that sea water contained gold. This fact afforded an ideal chance for the alleged inventor to devise a process for extracting the gold. A few months ago the Electrolytic Marine Salts Company was formed, and the good people of New England were asked to become shareholders, and soon nearly $1,100,000 of the $10,000,000 capital stock was subscribed. The enterprise belongs to the class which depends for success upon a secret process, which is in itself often a suspicious circumstance. Moreover, the men who devised the scheme for the extraction of the gold did not belong to the class from whom we are wont to expect great things in processes which require scientific attainments. Experiments were conducted near Providence, and a New York daily paper has been enabled to give a full outline of the ingenious trick. The capitalists were allowed to see the workings of the alleged invention. They were taken to a shed built on an old dock, and they were allowed to bring their own mercury and put it into the submarine tank, which was brought up to the surface by a winch. After the tank was properly arranged, it was lowered to the bottom and the current was turned on, and the investors sat around to await results. A diver, who has now fled the country, walked on the bottom of the sea at this point, and substituted mercury specially prepared with gold for the mercury which the gentlemen had furnished. When the tank was brought up to the surface, the mercury was given to an assayer and $4·50 worth of gold was found, which was considered a very good sum for a single "accumulator." Capital now came easy after this, so that a large plant was erected at North Lubec, Me., so as to get "fresh" sea water. One plant had 240 accumulators at work. They are so located that the tide water passes through them, and it is treated with chemicals and electricity, that never-failing aid to bolster up secret processes. It was claimed that gold and silver, one part of the former to two of the latter, were extracted from the water, and that these metals were removed from time to time, about once a week. It was held as a theory that a ton of sea water contained four cents' worth of gold. It was claimed as a practice by the Company that four mills' worth was taken from each ton of water, and that each accumulator earns on an average $1 net a day. Each accumulator separated and used about twenty tons of sea water an hour for sixteen hours out of every twenty-four. It was claimed that the consumption of chemicals was very small. The machines appeared to do their work miraculously well, and each week a gold brick worth nearly $2000 was sent to the city. The weekly gold brick was about the same weight and value, which showed that the machinery was working remarkably well and that the amount of gold in the water was a constant quantity, and the sixteen consignments netted $23,000. Finally the vice-president and general manager's financial operations in New York aroused the suspicions of the banks, which led to his flight and the discovery of the swindle, and both he and his diver sailed for Europe; and the deluded members of the Company, who believed that the scheme was feasible and went into the business in good faith, are now going to work the plant themselves before they decide to admit that they have been deceived by, perhaps, the most astonishing and picturesque swindle of modern times. The moral to be drawn from this is that persons should not invest in any electrical or chemical process which they do not understand, until they have asked the opinion of some expert, and for whose opinion they can well afford to pay.

SCHEVE'S PLATE-CHANGING SYSTEM.

In this, the film instead of being lifted by a frame, protecting it only on three sides, is lifted by a special transport frame, protecting it on four sides, and is changed by means of a plurality of claws, taking it successively near its edge and being disengaged afterwards.

Fig. 1 is a longitudinal section (on the line 1—1 of fig. 2) of the rear end of the chamber, with an elevated view of the claws arranged above the chamber and serving to change the films.

Fig. 2 is a section on the line 2—2 of fig. 1.

Fig. 3 is a plan view of the chamber.

Fig. 4 is a front view of the arrangement of the claws, shown in double full size.

Fig. 5 shows the transport frame seen from the interior of the chamber.

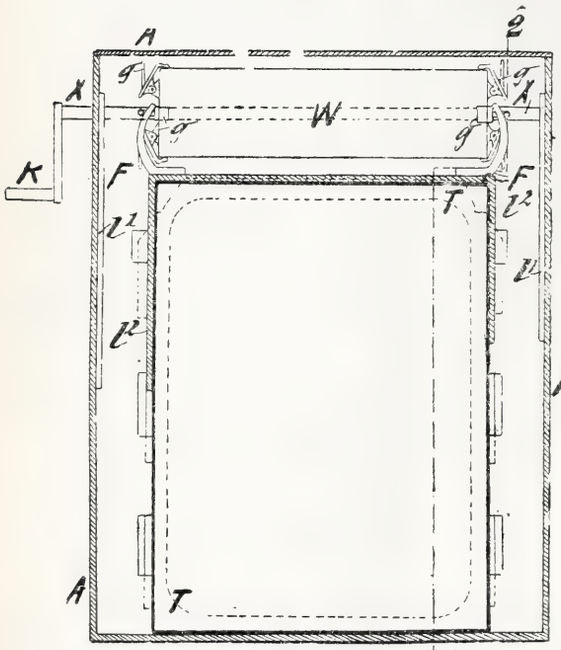
A is the outside casing of the photographic camera, B the frame forming the chamber, C the false plate (shown in figs. 2 and 3), which forms the separation between the impressed films and those non-impressed; D is the space in front of this separation, and which serves to receive the non-impressed films, and the interposed opaque leaves of black cardboard, of the same thickness as the celluloid plates, preventing the premature impression of the following film.

Above the chamber is arranged a carrying drum, W, which can be turned conjointly with the claws secured to this drum, by means of a crank, K, around the axle, X (only in one direction); l^1 and l^2 are plates, in which journal the axles of a gearing (not shown in drawing) to be connected with the axle of the crank, the said gearing causing the transport frame, T, to rise, the said frame being then provided with a rack, and, moreover, actuating a counting apparatus, to indicate the number of the changed films.

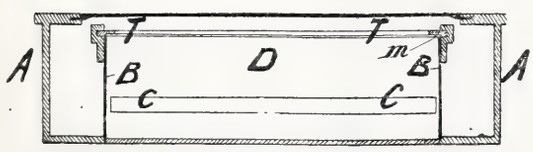
This gearing may also be arranged to allow the transport-frame to be raised alone.

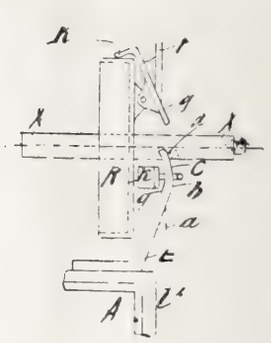
The drum may also be substituted by two discs in the shape of a wheel, mounted on the axle, x, of the crank, at the place of the ends of the drum. Fig. 4 shows such a disc, R. At the ends of the carrying drum, W, or at the outer sides of the discs, R, are arranged a number of pair of claws, *g g*, in such a way that the clamps (*k*, in fig. 4) of each claw can be pressed by a spring against the periphery of the drum or disc, but can also be periodically removed from it.

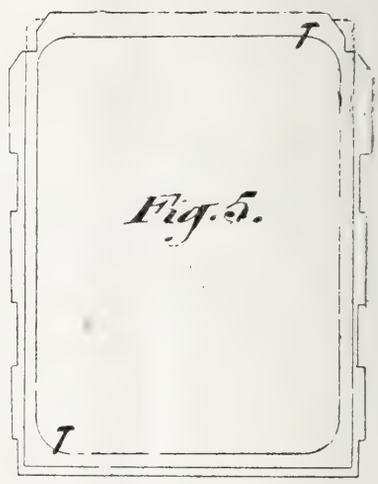
To better fix the films having a less flexibility, not only can the clamps











of the claws be provided with projections and the corresponding places on the periphery of the disc with a recess, but, if necessary, the films can also be made at the corresponding places with a recess or small holes to prevent them detaching.

In order to seize the claw, to lift it, the said claw is provided at its back with an operating rod (*t* in fig. 4). Above the lid of the chamber are arranged curved parts on each side thereof, the two front ones, E, of which engaging the claws, and the two back ones, F, disengaging them. In the annexed drawing is shown, in fig. 2 on the right, and in fig. 4, a front curved piece, E, in fig. 2 on the left, one back curved piece, and, in fig. 1, the two back curved pieces, F.

The transport frame, T, shown in fig. 5, has, on the chamber side, a small recess receiving the front film. The rounded shape on the inside allows of the chamfering of the upper corners of this frame and to slope them for as much as the edge of the film surpasses sufficiently, so as to allow the film to be seized and removed at the desired moment.

The changing of the fims is operated as follows:—

The film which is in front of the chamber, owing to the pressure of the partition, C, in the interior of the recess of the frame, T, is removed by lifting the transporting frame (fig. 2, in the direction of the arrow) above the axle, X, of the carrying drum. By turning the crank, K, in the direction of the arrow, a claw, *g*, which until now was below, comes from each side with its operating rod on the front curved piece, E, first acting as an inclined plane, and by the sliding of the operating rod from *a* above *b* towards *c*, as shown in fig. 4, the clamp, *k*, of the claw is sufficiently lifted from the disc, R, and removed sideways to come above the film. The operating rod passing from *c* to *d* arrives at the head of the curved part, slides downwards, and, by the pressure of the claw spring, presses the film, which is brought to it by the transport frame, on both sides, against the periphery of the disc or drum, and holds it stationary during half a revolution. By continuing to turn the crank the following pairs of claws are engaged in the same way by the front curved piece, and seize a part of the film, whilst the pair of claws, actuated in the first place, comes with the part of the film engaged with the two hind curved parts, F (fig. 1), and, sliding there obliquely with the operating rod, removes the clamp of the claw on both sides, when the disengaged part of the film is displaced by 180° or a little more. A guide part, arranged on the sides in a corresponding way, prevents the disengaged film from slipping backward. By the continual rotation of the crank, the pairs of claws operate one after the other with the part of the film engaged at the two hind curved parts, F, and are successively disengaged, whilst the part of the pellicule already conveyed (in the direction of the line 1—1, fig. 2) descends to the back of the chamber, and, when the last part of the film is entirely disengaged, slips to the bottom. The opaque leaves may be changed in the same manner. The engaging and disengaging of the claws may also be effected by wedges, inclined planes, or movable pins.

THE ILFORD EVERY-DAY BOOK.

THE issue of *Photographic Scraps* for September is a specially compiled and illustrated little book, treating of some of the common faults in negative-making and printing—their causes and prevention. First of all, pinholes are dealt with; next air bubbles, which are illustrated by two half-tone reproductions of negatives having the defect. The uneven flow of the developer; the setting off of printed matter on the sensitive films; stray dark-room light; mottling; and "leathery" films are also subjected to illustration, the causes being plainly indicated and the means of prevention suggested. Some useful hints on fogged negatives, prints sticking to the glass, and frilling and blisters, complete the book, the issue of which is a happy inspiration on the part of the Company.

The little book only extends to about a dozen pages, but its value is in the inverse ratio of its size, for it skilfully condenses the record of a good many years' experience of the errors in manipulation into which careless photographers are only too liable to fall. The illustrations are of especial value, for they enable the photographer to recognise the appearance of a defect with greater readiness than he would by a description in words. We can recommend every photographer to keep the *Ilford Every-day Book* at hand for constant reference. It tersely warns

him of the principal failures he is likely to meet with in development, and tells him how to avoid them. This useful little nutshell *vade mecum* is admirably produced and printed, and it may be had gratis of the Britannia Works Company, Limited, Ilford, E.

THE "COOKE" CASKET.

Messrs. Taylor, Taylor, & Hobson, of Leicester, are issuing the Cooke lens in casket form. A Cooke lens of 7·5 inches focus (*f*·6·5) and a single lens of longer focus, 10·5, *f*-11, are contained in a silk-lined morocco-covered casket, and are designed for use on half-plates.



Each lens has its own iris diaphragm, and, being complete in itself, is ready for immediate use; they each fit the same standard flange as the other, and their hoods each receive the same shutter or cap. The dimensions of the casket are $5\frac{3}{8} \times 2\frac{3}{8} \times 2\frac{1}{4}$ inches, and the weight 15 ounces.

A CINEMATOGRAPH SHOW ON FIRE.

According to a daily contemporary, a fire, which caused great excitement, amounting almost to a panic, occurred on Monday night in a cinematograph exhibition, erected on a piece of waste ground in Southey-street, Beckenham-road, Penge.

The structure in which the accident happened was composed of match-board shutters bolted together, and had a double canvas roof. The ground space occupied was some 60 feet by 30 feet. There were two entrances, one from the elaborately gilded and decorated front, the ascent to which was by steps, and the other by an opening at the side.

Just before half-past eight on Monday evening, whilst the operator was showing a seaside scene to an audience of some 200 persons, chiefly children, a paraffin lamp, suspended from the top of the booth, fell on to the screen, where the man was at work, and set it on fire. The audience at once became alarmed, and rushed for the exits.

A terrible struggle ensued, which was terminated by several portions of a framework at the entrance to the booth being pushed away. Happily, in spite of this excitement, nobody was seriously injured except the operator, William Cunaird, who was found lying near his apparatus, badly burned about the face and arms. He was immediately attended to by some members of the fire brigade who had been summoned, and removed to a house near by, where his injuries were bandaged.

The fire did not spread through the tent, but did serious damage to the cinematograph films, which were practically destroyed, the damage done being estimated at nearly 400*l*. At an early hour on Tuesday the tent was removed to Sydenham Fair Grounds, where Mr. Ball is giving other entertainments.

An eye witness supplies the following account: "Suddenly, while the delights of Yarmouth beach on a summer's day were being unfolded, a strong, fierce, and brilliant flame sprang up from the curtained stand where the limelight was being worked, and seemed to touch the roof.

"A general cry of surprise issued from the closely packed audience, followed in almost the same breath by another of keen alarm.

"Then came the inevitable panic and struggle for life. Screaming and crying the frightened crowd made a rush for the two exits, pushing and struggling with frenzied energy. Those standing near the screen which concealed the operator scrambled up the few steps leading to the front entrance and escaped easily, while others got out by the side. The exits, however, were insufficient to relieve the pressure of the terror-stricken people, and by sheer weight of numbers they pushed down a portion of the framework and staggered into the open air.

"Marvellous to say, in all this excitement and turmoil no one was trampled under foot, the terrified people were packed too closely to allow that.

"Only a few were at all hurt, and their injuries consisted of scratchings and abrasions."

Information of the occurrence reached the fire station in Beckenham-road within half a minute, and Fireman W. Welch arrived in time to see the last of the audience rushing out, and the crowd which had assembled cutting the ropes fastening the canvas roof and pulling down the woodwork to prevent what they believed would be a conflagration.

ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION.

The following are the Judges' awards in the Photographic Section; a report will appear in our next:—

Professional Photography.—First silver medal: Mr. W. J. Byrne. Second silver medals: Messrs. G. Lafayette, J. H. Coath, W. Norrie. First bronze medal: Messrs. H. Ward, W. Illingworth, C. M. Wane, W. H. Harrison, R. Pratchett, C. J. King.

Amateur Section.—Second silver medal: Mr. W. S. Aston. First bronze medals. Messrs. A. J. Loughton, A. Old, J. Kearney, Dr. Ferguson, E. H. Lamb, E. R. Bull. Second bronze medal: Mrs. Annie Blamey.

Our Editorial Table.

Exposure Notes for Use with the Watkins' Exposure Meter.

Published by R. Field & Co., 142, Suffolk-street, Birmingham.

A new edition of this useful little book has just been issued. There have been some slight additions and alterations since the last edition, but the main features of the compilation remain unaltered, chief among these being copious notes on the elements of photographic exposure, timing, development, shutter speeds, enlarging, and so forth. There are spaces for recording the data of exposures, and much information is given which, if properly digested, should enable the amateur photographer to expose and develop his plate accurately in the majority of instances, if not in all.

The Art of Retouching.

By Robert Johnson. Fourth Edition. 210 pp., price 2s. London: Marion & Co., Soho-square, W.

This book is now in its eighth thousand, and we imagine that its sale will not for a considerable time be exhausted. The instructions in retouching negatives are clear and full, but they by no means occupy the whole or indeed the chief part of the book. Much space is devoted to directions how to finish and colour photographs, finishing in water and oil colours and crayons being fully dealt with. There are also chapters on working up carbon enlargements; accessories, perspective in backgrounds, and many other subjects of perennial interest. There is something in the book calculated to be serviceable to all photographers, particularly young ones and those just entering the profession.

From Messrs. H. C. Stephens, the well-known writing-ink manufacturers, of Aldersgate-street, E.C., we have received an album of views of the firm's premises, &c. Portraits of the principals, and a brief history of the firm precede the views, which show the new City house, the works at Finsbury-park, the vat rooms, packing halls, laboratories, and other departments of this interesting manufactory. The photographs, to the number of about twenty-five, have been exceedingly well taken, and their reproduction and printing in half-tone are all that the most fastidious could desire.

Catalogue Received.

Mr. James Bamforth, of Station-road, Holmfirth, Yorkshire, sends us his 1898–99 supplementary list of life-model lantern slides. Some very interesting sets are catalogued in the twenty odd pages of the list, and several small half-tone reproductions indicate that the photographs have been very cleverly executed.

News and Notes.

THE HACKNEY EXHIBITION.—Entry forms for the Hackney Photographic Society's Exhibition will be ready next week.

PHOTOGRAPHIC CLUB.—August 31. Discussion: "The Best Method of Illumination of the Negative for Enlargement or Reduction."

IT is understood that the Ben Nevis Observatories will be carried on for at least another year, as Mr. J. Mackay Bernard, of Kippenross, has promised to give 500*l.* for the purpose. It is probable that before long the whole meteorological business of the kingdom will be put on a proper footing.

MR. HEINEMANN has in preparation a life of Thomas Gainsborough by Mr. Walter Armstrong, the Director of the Irish National Gallery. It will contain between fifty and sixty photogravure plates, most of them from photographs of Gainsborough's pictures specially taken for the book; also there will be coloured reproductions of his drawings.

THE SPECTACLE-MAKERS' COMPANY.—By permission of the Lord Mayor (Master of the Spectacle-makers' Company), an Optical Exhibition will be held in the Ball-room at the Mansion House during the week commencing October 3, and, as the Exhibition is to be for astronomical, mathematical, and scientific, in addition to optical instruments, there is every prospect of its attracting considerable attention. Mr. H. C. Kemp has, by desire of the Court, undertaken all the details in connexion with the Exhibition, and particulars can be obtained upon application to him at 7, Thavies-inn.

THE dulness of the advertising pages in some English magazines is proverbial. They do these things better in America, and we have heard that even Mr. Gladstone bought his *Cosmopolitan* in order to examine the advertisements. In this connexion it is interesting to learn that a technical magazine, *Process Work and the Printer*, has offered the sum of 2*l.* 2*s.* for the best transformation of any non-illustrated or badly illustrated advertisement appearing in the columns of any magazine, to a beautiful eye-catching pictorial announcement. Since photography plays an important part in connexion with the illustration of advertisements, this matter may be of some interest to photographers.

THE German monopoly in aniline patents, so long upheld by the Patent Law of England, has, according to the *Times*, been overthrown by the Board of Trade, which has granted Messrs. Levinstein, Limited, of Manchester, an order calling upon the patentees to issue a licence to the petitioners to "make, use, exercise, and vend" in the United Kingdom the inventions which the patentees have hitherto refused to exercise here or allow any one else to exercise. A minimum royalty of 250*l.* a year is specified. Messrs. W. P. Thompson & Co., of High Holborn, patent agents, point out that this is the first time the Board of Trade has exercised its powers under the Patents, Designs, and Trade Marks Act, 1883.

RECENTLY, in delivering an address at a prize distribution at the Diocesan College, Feldhausen, Dr. Gill, F.R.S., Her Majesty's Astronomer at the Cape, uncovered a portrait of Sir John Herschel, presented to the school by Mr. Gordon, and in the course of his remarks said that "Herschel was an accomplished chemist, but to many present it was probably unknown that this great quondam occupant of Feldhausen was one of the fathers of photography, and was certainly the first to produce a photographic picture on glass. I have brought with me, for exhibition to-day, a copy from what I understand is the first photographic picture ever taken on glass. It was presented to the Cape Observatory by the Herschel family. It is framed in a portion of the woodwork of the stand of Sir William Herschel's forty-foot reflecting telescope, and represents that instrument as photographed by Sir John Herschel in the year 1839."

Patent News.

THE following applications for Patents were made between August 8 and August 13, 1898:—

SHUTTERS.—No. 17,035. "Improvements in Shutters for Cameras." W. GRIFFITHS.

COLOURED PHOTOGRAPHS.—No. 17,167. "Improvements in and relating to the Production of Coloured Photographs." C. DICKER.

DARK SLIDES.—No. 17,274. "Improved Dark Slides or Holders for Photographic Films or Plates." G. C. WHITFIELD.

"APPARATUS."—No. 17,287. "Improvements in or relating to Apparatus for Use in Taking and Exhibiting Photographic Views." E. A. G. STREET.

BRACKET STAND.—No. 17,326. "A Bracket Stand for Photographic Cameras to Replace Tripod or Ordinary Stand." E. M. M. SMITH.

PHOTOGRAPH-HOLDERS.—No. 17,375. "Improvements in Combined Stands and Holders for Photographs, Menu Cards, and the like." G. E. LANCELOTT.

ROCKER.—No. 17,402. "An Improved Photographic Rocker and Washer." Communicated by J. G. Jones. E. H. JONES.

"PHOTOGRAPHS IN NATURAL COLOURS."—No. 17,437. "Improvements in the Production of Photographs in Natural Colours." G. SELLE.

CAMERAS.—No. 17,511. "Improvements in Photographic Cameras." W. H. PHILLIPS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

August.	Name of Society.	Subject.
29	North Middlesex	Informal Meeting
30	Birmingham Photo. Society	Presentation of Medals, &c., awarded at the Thirteenth Annual Exhibition.
30	Hackney	*Halation: Suggestions for its Prevention, and their Effectiveness.* Chas. H. Oakden
31	Photographic Club	Discussion: *The Best Method of Illumination of the Negative for Enlargement or Reduction.*
September.		
3	Ashton-under-Lyne	Excursion: Trentham. Leader, Dr. Hamilton.
3	Borough Polytechnic	Excursion: Southgate to Hadley Woods.
3	North Middlesex	Excursion: Wanstead Park and the Roding. Leader, Mr. Meen.
3	Southsea	Excursion: Petworth and District.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 18,—Mr. J. E. Hodd in the chair.

Mr. W. D. Welford handed round two or three metal cigar cases and match boxes with glass fronts. Photographic prints were placed under the glasses, and Mr. Welford's object in showing the boxes was to draw attention to a probable means of increasing business by the stocking and display of such fancy goods. The suggestion raised some remarks as to whether it would not be derogatory for other than the smallest of professional photographers to enter the fancy trade in this way, opinions both for and against being expressed. Mr. Welford showed two gum-bichromate prints, and recalled the fact that, at the time Mr. James demonstrated his commercial paper, he said that it would keep well for two or three weeks, and longer if kept under pressure. Mr. Welford obtained the paper on June 18, upon which the prints shown on this occasion were made, and now brought up these two prints, recently made, to show that the makers of the paper were over-careful in their statement of the life of the paper. Although printed upon paper then which was two months old, the results were by no means inferior to prints made upon freshly prepared material.

The CHAIRMAN drew attention to a case of ortol staining. He passed round a film negative developed a fortnight before with ortol and acetone, which had since assumed a glorious red tint. This had only taken place since the completion of the negative, its behaviour up to the drying stage being quite usual. A pyro acetone negative had not altered in this way, so that the acetone was not to blame. Was it a characteristic stain of ortol?

Mr. E. J. WALL said the colour was much like the colour of his fingers after using ortol. He handed round a number of enlargements on bromide paper developed with ortol and carbonate of potash. Ortol was as nearly like pyrogallol in its action as any developer could be.

The question as to whether the shadow side of a sunlit street required a longer exposure when the sun was shining than it would in diffused light was reopened. Some argument took place regarding the statement that it was all a question of contrast, and the blackboard was freely used by several speakers. The majority were of opinion that a longer exposure was necessary in sunlight than in diffused light, but all were not convinced.

The CHAIRMAN detailed his experiences with acetone in place of the alkali in development. Although there was nothing to complain about at first, he had found that the solution soon became useless and failed to produce an image. This was in conjunction with pyro and metabisulphite. The addition of sulphite of soda restored its reducing powers, however.

Mr. WALL had found no difficulty with pyro acetone, or any deterioration in developing power, but this was in combination with sulphite instead of metabisulphite.

Mr. BANKS stated that acetone was a stable product, liable, however, to evaporation, and no explanation was offered.

The CHAIRMAN added that there was a crystalline formation round the mouth of the bottle as the stuff was put up for sale.

PHOTOGRAPHIC CLUB.

AUGUST 17,—Mr. A. Mackie in the chair.

Mr. JOHN NESBIT showed a means of remedying distortion arising when photographing a picture hanging upon the wall. He passed round two prints, one from the original negative, showing a noticeable amount of distortion at the top of the frame, and an enlargement in which the error had been corrected and the thing squared up, by copying it at an angle.

A discussion took place as to the effect of the small camera upon pictorial results.

Mr. C. WALLIS mentioned the case of a man who set out with a camera carrying films, giving an image of half-quarter plate size. He exposed on everything he met, and on his return had the films developed, getting back an album of 500 pictures, which were most unsatisfactory productions. He was of opinion that the pictures were too small; trees, &c., were rendered as mere clumps and masses without detail; whereas, with a plate of larger size, a man had no difficulty in getting light and shade, and the detail which went to make a satisfactory picture.

The CHAIRMAN could not agree with the inference that photographs of the size mentioned could not be pictorial results. The case was of a man entirely ignorant of photography, and the badness of the results was not to be ascribed to the smallness of the camera.

Mr. FOXLEE was inclined to the view that, with the increase of users of hand cameras and small plates, there was an accompanying tendency to blaze away at all and sundry without an instant's consideration. Contrasted with this, the man who carried a camera of fair size with half a dozen plates was in the habit of giving some thought to his work, and for this reason Mr. FOXLEE thought that a greater proportion of good results attended the use of larger cameras, simply from the greater care taken with them, although it was quite possible to get equally good results of small size.

Mr. WALLIS saw a bad influence in the fact, that many looked at the question from a financial point of view, saying it is only so much for so many exposures, therefore we will not trouble.

Mr. W. THOMAS held that size of camera had nothing whatever to do with pictorial possibilities. During the last three years he had noticed that a large proportion of medalled work had been done on quarter and other small plates. The first necessity for the pictorial photographer was to fully understand the work to be attempted. He may find that a small plate has an advantage over a large one in particular instances, and *vice versâ*, and acts accordingly. The question of pictorial result was one quite irrespective of size of plate.

Mr. W. R. STRETTON agreed that size was out of the question where a skilled workman was concerned; but it was well known that many an artist in an amateur way, who could produce a good composition of small size, would be quite at a loss to do as well on a larger scale, and the same applied to photography. Many photographers found it easier to arrange a composition on a quarter-plate than on a half-plate or larger size.

Mr. THOMAS thought more skill was required with the smaller plate. There was an unmistakable tendency to go back from large to small work and enlarge afterwards; but at the same time it was not reasonable to suppose that people so doing would sacrifice quality, if they could get better results with larger plates, simply for the sake of saving in weight and expense.

Mr. WELFORD spoke to the effect that the small camera had led to a better appreciation of diffusion of focus in photography. The small camera had compelled a man to compress in a small area something which often he wishes to show larger, so that he has recourse to enlargement, the ultimate result being that extreme sharpness was less looked for. He also spoke in favour of enlarged clouds, his best effects being invariably from these as distinguished from direct negatives. He thought sharpness in big pictures became a bore, and showed the same off to less advantage. His best pictures were, as a rule, enlargements from a small size to 12 × 10, the clouds also being enlarged in like manner. In conclusion, he said a few words, pointing out that everybody did not expose necessarily for pictorial results. There were many photographs, taken solely as mementoes and so forth, which were excellent, but never pretended to be "pictures."

Hackney Photographic Society.—August 16, Mr. J. O. Grant presiding.—Mr. W. RAWLINGS gave an address on the subject of

SINS OF OMISSION AND COMMISSION,

in the course of which he said that the greater number of such sins were familiar to all photographic workers, but he would endeavour to call attention to a few of them. A most important one was that of a general carelessness and slovenliness in our work, and from this a large proportion of our failures proceeded. One should try to get into a regular and consistent method of working, for it would be found that the successful worker was generally a careful and methodical one. To start with good methods was especially necessary for a beginner. When one became advanced, one might sometimes, with advantage, depart from fixed rules of procedure in order to get special results; but the beginner should be content to go through the fixed routine before attempting any modification. In starting on a photographic expedition, it was well to see that all necessary articles were in the bag, and in this connexion the worker should endeavour to have the camera and its fittings in as few separate parts as possible. It was a good plan to keep the tripod head always screwed to the camera. If one or more nights were to be spent away from home, it would be found useful to take some string and Le Page's glue to repair the results of accidental damage. As a considerable amount of time was spent in the dark room, the latter should be arranged with a due regard to comfort in working, and, above all, there should be a good light. There were many people who spent a large amount of money on expensive cameras and fittings, and were yet content to work in a stuffy and badly lighted dark room. On the question of selection of subject in the field, Mr. Rawlings said that there was a great temptation to include too much in the subject. The more one studied simplicity the greater would be the success and corresponding pleasure. It was this fact of the success of a simple subject which furnished the reason why, in such districts as the Essex marshes, so much good work was done. On the other hand, in mountainous districts, so great a variety of subject was included in one point of view, that simplicity was lost, and picture-making suffered accordingly.

Ashton Photographic Society.—August 13.—Several members visited Liverpool under the leadership of the Secretary (Mr. R. T. Marsland), who had previously arranged with the Cunard Company for the party to go through and inspect one of their large passenger boats. Mr. Marsland, accompanied by Major Bradly, went down in advance, and the former, on arrival, at once called at the shipping offices for the purpose of making assurance doubly sure; in other words, to make quite certain that no hitch should arise to waste the time of those coming later on. They reached Liverpool at 2.45 p.m. Orders were granted for admission to the reserved portion of the landing stage from which the *Umbria* was to leave at 5 p.m., and instructions were also issued to the authorities on board that the party was to be permitted to go over the vessel. This in itself was a great concession, because visitors are, as a rule, excluded from the vessels during the time saloon passengers are embarking. The Cunard officials, both at the offices and on the *Umbria*, were extremely courteous. Seemingly quite anxious that the party should be well looked after, a steward was specially detailed to show the photographers over the boat, who, after inspecting berth, saloons, kitchens, &c., and partaking of the Cunarders' hospitality, were allowed the free run of the vessel, and to use their cameras when, where, and how they felt disposed. On the bell ringing for visitors, &c., to "clear out," the photographers were taken to the dock station to see the special corridor train which had brought passengers for the *Umbria* from the Continent and London. They were also shown the very ingenious arrangement for carrying the luggage from the train to the landing-stage. When the *Umbria* was about to leave her berth, the photographers took up various positions on an elevated portion of the river-wall near to the Prince's Dock, and, as the vessel slowly steamed past, several shots were made at her. Saturday's work was essentially for the hand camera, and with this, as with cricket, there are "glorious uncertainties." One member, who on board had photographed something quite near to him—focussed, in fact, for six yards distant—forgot all about this until he had made a shot at the *Umbria* some 600 yards distant. Then he cussed without the "fo," knowing how phuzzy-wuzzy that picture was likely to turn out. Another member had ——but, as Rudyard Kipling would say, "this is quite another story," which may possibly be told later on at the rooms. After more shots about the docks and landing stages, kaleidoscopically interesting, together with the taking of the inevitable group, the party adjourned for refreshments, and finally entrained at Lime-street at 7, reaching Ashton about 8.30 p.m. The weather was delightfully fine, though hot, and all enjoyed themselves immensely. There were seven cameras worked, fifty-two plates were exposed, and some very good results obtained.

FORTHCOMING EXHIBITIONS.

1898.

August 26–28 ..... Royal Cornwall Polytechnic Society. Hon. Secretary, Edward Kitto, The Observatory, Falmouth.

Sept. 26–Nov. 12 ... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.

,, 30–Nov. 5 ..... Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.

November 15–18 ..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.

, 15–Dec. 15 Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.

,, 23–26 ..... Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FLUID GELATINE.

To the EDITORS.

GENTLEMEN,—Refering to your notice of the granting of a German patent for gelatine rendered fluid by the addition of chloral hydrate (BRITISH JOURNAL OF PHOTOGRAPHY, p. 519), may we, in view of the many foreigners who apply for English letters patent for preparations that have long been well known and in common use, point out the fact that Valenta published the use of this preparation in 1895, and his article was reproduced in British periodicals early in 1896.—I am, yours, &c.,

Maidenhead, August 20, 1898. W. ETHELBERT HENRY.
Vanguard Manufacturing Co.

EXPOSURE METERS.

To the EDITORS.

GENTLEMEN,—I am not inclined to accept Mr. Watkins' version of the history of the exposure meter, nor his term "accusation," if that imply moral censure. The statements of mine were not made hastily, nor without careful examination, and I am prepared to show that they do not go beyond what the facts admit; if anything, they err on the side of moderation. With respect to Mr. Watkins' meter, I have read the specifications of his three patents, his paper of 1890, and other writings, but find nothing in them that can be rightly called information, *i.e.*, something not already known. Hurter & Driffield claim the use of an actinometer in place of light scales, and, both in 1885 and 1886, workers were using the actinometer for the purpose of calculating exposure. What Mr. Watkins claims as especially his own is the combination in one instrument of an actinometer and slide rules, although instruments making a similar claim were already on the market. Granting his invention as new, it is obvious that information about the instrument would tell in what manner the slides were divided, why they were so divided, what the numerals indicated, how the numerical values were

obtained, how the slides were arranged, and why they were so arranged, what modification had been made in the ordinary slide rule for this photographic purpose. For all this the inquirer seeks in vain. Mr. Watkins dismisses it as "known to photographers." I don't know it, and apparently nobody does except Mr. Watkins. If he has ever imparted the information, I shall be pleased to know where it can be found. Turn to the actinograph specification, and we see no trouble was spared by the authors in order to make clear the minutest detail of that instrument.

Mr. Watkins next asserts that, his instrument being original, there could have been in no sense a capture of the exposure meter. Mr. Ackland admittedly suggested, and partially worked out, some kind of a slide-rule exposure meter, Platts and others had laid down the principles of calculation, for I don't admit the main feature of Mr. Platts' system was merely Scott and Burton's tables. All this, however, counted for nothing; two patents appear—the Actinograph and Watkins—and, as against the remainder of photographers, the exposure meter is captured, it becomes a strict monopoly, with penalties attached to its use and manufacture, unless purchased from one or the other of these patentees. Any one putting Ackland's scales on the market would be even now liable to a legal action.

In his third item, Mr. Watkins simply illustrates my contention that the exposure meter has been captured by the trader and patentee. His speed lists, elements of photographic exposure, &c., are available by paying for them. He may call that publishing information, I call it trading in information. Of course Mr. Watkins has a perfect right to retain and use what secret knowledge he possesses for his own advantage, in any way he may think fit, but he can hardly expect that in taking this course he will rank with men of science. In conclusion, I venture to assert—an assertion based on a long acquaintance with matters photographic—that few men with as thorough a knowledge of photography as Mr. Watkins possesses have ever been so chary of imparting that information for the benefit of others less fortunately situated. Mr. Watkins either knows more than he cares to tell, or he cannot tell that what he knows.—I am, yours, &c.,

JOHN A. RANDALL.

August 19, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

SNAP-SHOT.—In our next.

C. C.—Probably the Paget paper is alluded to.

J. HUGHES.—Verfasser's book, published by Percy Lund & Co , Bradford.

SAT.—A common phenomenon due to reversing action of light.—We do not answer questions through the post.

SOMERSET.—Difficult to say, but most probably the water is contaminated. The spots looked as if caused by iron. Have the water tested.

OPTICAL.—B. FULLERTON. If you read the article on another page, you will probably be able to trace the source of the evil. If not, send the lens on to us. It is scarcely likely that either of the glasses have been changed as suggested.

CHANGING TROUBLE.—J. CROSLEY.—We have heard no complaints of the hand camera in question. If you examine the apparatus carefully, you will probably find that the trouble proceeds from one or more of the sheaths being somewhat bent.

MOUNTANT.—A. BROWWOOD. We do not advise the addition of antiseptics to starch, or any other mountant, with a view to keeping it. We prefer to make it up fresh the day it is used—particularly this hot weather. In winter it may be used the second or third day with tolerable safety.

BUILDING STUDIO.—H. H. H. It is quite an idle threat. Your neighbour, as his house has only been built a few years, cannot prevent you erecting the studio. He can, however, if he chooses, put up a hoarding on *his* premises, so as to stop off your side light, and you cannot prevent him doing that any more than he can stop your building on your property.

FORMALIN.—OTHELLO says: "I have been trying Schering's photographic formalin for hardening gelatine prints, but find that, although the gelatine is rendered insoluble by the solution, yet the stickiness of surface is not removed as by the use of alum, and, therefore, many prints get damaged and spoilt in the process of mounting, by adhering to the paper used in rubbing down."—If the prints are dried before they are mounted, no difficulty will be met with provided the formalin be used as directed.

HALATION.—T. B. It is a bad case of halation; if you had had much experience in photographing interiors, you would not have attempted such a subject as that without previously backing the plates. We should recommend you to take fresh negatives on backed plates, as you may rely upon it that your customer will reject the work—and he would be quite justified in doing so.

FLASHLIGHT.—C. C. C. The formula quoted is very good, and gives a very brilliant and actinic light; but we strongly advise you to keep the ingredients separately, and to only mix them in the quantity required for a single flash immediately before the powder is used, for fear of accident. The mixture should be made on a sheet of paper, using a strip of thin cardboard as a spatula, and with as little friction as possible. Powders containing chlorate of potash and similar substances are apt to "play tricks" when least expected, *i.e.*, go off spontaneously.

PRICE FOR NEGATIVES.—ORGANUM writes: "Will and can you give me some guide as to the price to charge for whole-plate negatives, the end of which are to produce blocks for a book of local views? Would four shillings each be about the figure? The question is, whether I, as the local man, or rather one of them, am to do the work or the publishing firm who will carry it out?"—The price mentioned seems to us ridiculously low. We should say that four or five times that price would be a more proper figure, particularly as you are to give up the negatives, and, of course, the copyright in them.

SPOTS ON PRINTS.—M. H. G. writes: "Could you please tell me the cause of the spots on enclosed print, I have been much troubled with them of late? They make their appearance during the first washing, and sometimes after toning. I use the ordinary sulphocyanide bath and perfectly clean dishes. If you can help me, I shall be extremely obliged."—The black spots are due to particles of foreign matter, but what it is impossible for us to say, coming into contact with the prints while in a wet state. Probably dust of some kind. In addition to the black spots we notice that there are some yellow stains on the print. This points to want of general care in the manipulation.

COLLOTYPE PRINTING.—MIDLANDER asks: "Can you please tell me the probable cost of a collotype outfit for up to, say, 18×15. Of course, I have all the photographic apparatus; also, do you advise a photographer to try and work it? It seems a shame to let a purely photographic trade slip away into lithographers' hands (who have to employ a skilled photographer), when one wants work."—Better write to Messrs. Penrose & Co. for a price-list of collotype materials. From that you will see the prices of such apparatus as you do not already possess. Schnaus's work on collotype may also be had from Penrose's. We have on several occasions called attention to the fact that photographers have allowed a, to them, valuable process to drift into the hands of lithographers and such like trades, which ought, and would have been, solely their own if they had taken it up.

ENAMELLING PRINTS.—F. C. asks: "1. What can you safely recommend to add to the gelatine solutions used in collodion enamelling to keep them from smelling and, this weather, developing fungoid growth? 2. What gelatine is best for the purpose, and what price ought I to pay? 3. Can you suggest anything better than dextrine for mounting collodion-enamelled prints? I find the mounting at edge in time shows slightly, the centre having a tendency to raise. 4. What is the best for thinning collodion?"—1. We should not recommend the addition of anything at all, but to make a fresh solution as required, that is, if the permanence of the work is the chief consideration. Carbolic acid is a good antiseptic, so is oil of cloves. 2. Nelson's "No. 2 soluble." Its price, we think, is about one and sixpence or two shillings a pound. 3. A solution of gelatine. 4. Two parts ether to one part alcohol.

RESIDUES, TONING.—HUGH ROSS says: "1. I have a considerable quantity of old toning baths, all mixed through other (sulphocyanide and gold, acetate and gold, combined toning and fixing). Will you kindly say if I can recover the gold from this mixture, also the best method to do so? 2. I do all my printing on gelatine P.O.P., and get fair tones, but I prefer a tone I have seen other photographers get, which I cannot. Perhaps you can assist me by giving me a formula that will produce the following tones (I use mauve paper): high lights, clear and pearly; shadows, a very rich reddish chocolate?"—In reply: 1. The gold may be precipitated with a solution of *proto*sulphate of iron, or by adding to it a small quantity of sulphite of soda, and afterwards a little hydrochloric acid till the bath smells strongly of sulphurous acid. Collect the precipitate and send to the refiner. 2. On pp. 1019–25 of the ALMANAC are various toning formulæ, one or other of which will, doubtless, give the tones desired. All brands of gelatine papers do not yield the same tones with a given bath.

RESIDUES.—RESIDUE writes: "Would you be so kind as to inform me on the following? 1. Is it worth while saving residues when under-mentioned chemicals are mixed with the nitrate—potassium cyanide, iodine, sodium hyposulphate, copper sulphate, and iron developer? 2. If the answer to above is in the affirmative, would a wooden tank of twenty gallons (strongly charged with salt or other precipitate) be sufficient to catch the nitrate from three or four sinks where wet-plate process is used? Of course, the excess water would be constantly flowing from overflow pipe in tank. 3. Do you know of any method of removing the copper from iron perchloride that has become impregnated by etching copper plates?"—1. Not unless a large quantity has to be dealt with, at the present price of silver. The developing and fixing solution should not be mixed. 2. Salt will do to throw down the silver from the developing solution, but not if the fixing solutions are mixed with it. Better have two tanks, so that the contents of one may subside while the other is filling. 3. Not worth the trouble.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
The British Journal Photographic Almanac for 1899	561
Ex Cathedrâ	561
The Alleged Staining Properties of Ortol	563
A Crying Want	564
Leaderettes:— The Action of Alcohol and Acetone on Various Dyes—Photography and Ballooning—Sensitive Thermometers—Another New Gas—Photography and Royalty—Ordnance Maps—The Guildhall Art Gallery—Water Famines	564
The Correction of the Distortion Produced by Tilting the Camera. By C. Welborne Piper	565
More Turkish Delight. By Richard Penlake	567
South London Photographic Society's Continental Excursion to Rotterdam	568
A New Goerz Lens	570
The Science and Art Department Report	571
Royal Cornwall Polytechnic Society, Falmouth, 1898	571
Eastman Photographic Materials Company	572
The "One and All" Photographic Competition	573
A New Developing Sink	573
The Bivex Dark-room Lamp	573
Our Editorial Table	573
News and Notes	574
Patent News	574
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Hackney Photographic Society	574
Forthcoming Exhibitions	575
Correspondence:— Exposure Meters—The Yorkshire Photographic Exhibition—Photographing Lightning	575
Answers to Correspondents	576

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to the notice of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRÂ.

If the readers of this week's British Journal of Photography will look at the line that is immediately under the title on this page, they will see that the present is our two-thousandth number. Originally the Journal was issued as a monthly, subsequently as a fortnightly, and finally as a weekly. It has entered the forty-fifth year of its age, and thus ranks as the oldest photographic journal in existence. We are sure our readers will join us in our feelings of pleasure at being able to chronicle the publication of our two-thousandth number, a sufficiently uncommon occurrence in the technical press to merit public notice. As for the future, the unimpaired vitality of the Journal and the great cordiality of its relations with its world-wide circle of friends and readers justifies us in the belief that its career of usefulness to the photographic world will know neither obstacle nor interruption, and that, just as we have recorded the publication of its two-thousandth number, so do we confidently look forward to performing a like agreeable office for its three-thousandth.

* * *

We are asked to announce that Wednesday, September 7, is the last date for receiving exhibits in packing cases for the Royal Photographic Society's Exhibition, but exhibits sent by hand may be left at 12, Hanover-square at any time up to 9 p.m. on Thursday, September 8. Full particulars can be obtained on application to the Assistant Secretary at the Society's rooms, to which address all exhibits have to be sent.

* * *

According to the *Scientific American*, H. N. Toply, of the Department of the Interior, in Ottawa, Canada, has discovered

that the printing of photographs is not dependent on nitrate of silver. Heretofore the nitrate has had to be used in all prints, but Mr. Toply says that the juices of certain fruits are equally as good, if not better than the nitrate, for photographic printing purposes. By means of this discovery a photograph can be printed upon anything—wood, pulp, and paper—which can absorb these juices. The juice is not used just as it comes from the fruit, but it is subjected to a process which Mr. Toply, of course, desires to keep to himself at present. He has been engaged in the development of the process for five years. His attention was first directed to the possibility of "herbaceous photography," as he calls it, by the withering of the white pine, which becomes a very dark grey under sunlight. A piece of planed pine was placed under the negative and exposed to sunlight without treatment and a permanent print on wood was obtained. Mr. Toply followed up this discovery by a series of experiments with the juices of fruits, which he found could not only turn dark grey, but would become jet black in sunlight. The process is so simple that, were it brought into general use, the price of photographs would be reduced to a minimum.

* * *

For the first time in our recollection we have met with a firm of photographers calling themselves "pictorial photographers." "Art photographers," "photographic artists," "artists and photographers," and even "high art photographers," make up a charming variety of descriptions, to which additions could easily be made, that are used for business purposes by professional photographers; but the term we have first quoted has the appearance, in our eyes, of being the most novel of the series. It may have been used before; but, if so, it has escaped our notice. Consequently, when one day last week, during a brief stay at Brighton, we saw the words in question on a door-plate, they instantly arrested our attention, the more especially as "pictorial photography," which is in reality a descriptive phrase of considerable antiquity, has recently been given an amount of prominence verging towards excess. It is the old-established and historical house of Mayall, now known as Mayall & Newman, in the King's-road, Brighton, to which we are alluding.

* * *

Messrs. Mayall & Newman's premises occupy a commanding position facing the West Pier and in the midst of the group of magnificent hotels for which Brighton is justly renowned. The reception, dressing and work rooms, and the studio are large and handsome. The whole of the premises have recently undergone extensive alterations, and when the graceful canopied structure that is to lead up from the pavement to the entrance of the house has been completed a very striking addition to the frontage of King's-road will have been made. It is intended to impart to this forecourt a refined and artistic appearance, and with a judicious selection of well-displayed specimens it will undoubtedly attract the close attention of the best class of Brighton visitors.

* * *

Mr. Newman, the present head of the firm of Mayall & Newman, is an Australian photographer whose experiences "down under" extended over fifteen years. In conversation with him we learned many interesting facts relating to the condition of photography at the Antipodes. Portrait and enlarging work appears just now to be subjected to even keener cutting than is the case here at home. The view trade, however, is in a healthy condition. Mr. Newman adds to his long photographic experiences. The possession of great all-round ability and the firm's portrait work is invariably of a high order of merit. But, more than that, he is imbued with the most modern ideas, and is ready to take advantage of present-day tendencies in photographic portraiture, so that among South Coast businesses Messrs. Mayall's has every chance of meeting with the success that should reward the attempt to conduct the practice of photography on lines that parallelise with the advance of public taste.

* * *

We have received from Messrs. Whittaker & Co., of Paternoster-square, the programme of Technological Examinations held under the auspices of the City and Guilds of London Institute for the session 1898-99. This is a book of over 400 pages, and it may be obtained of Messrs. Whittaker. Those young photographers who are studying photography with the view of entering for the examinations held on the subject by the Institute should procure a copy of the work, as in the proper section full information with regard to those examinations is given. We note that the consultative examiners in photography are Captain Abney and Mr. Lyonel Clark, and the acting examiners Mr. C. H. Bothamley (pure photography) and Mr. J. D. Geddes (photo-mechanical). At pp. 49 to 54 are given details of the examinations in both sections, each of which is divided into the ordinary and the honours grade. The lines upon which questions are propounded in the written and practical examinations are indicated, and there is a list of the books recommended for reference. The date upon which the written examinations will be held is April 26, and the honours on April 29, 1899. At pp. 240-242 will be found the questions set in the 1898 examinations.

* * *

We are again compelled to ask our correspondents to note that we cannot undertake to answer questions through the post. A notification to this effect appears in the Journal each week. We are always glad to be of assistance to our readers whenever the opportunity offers; but we expect in return that our rules will be complied with. We have recently been taken to task for failing to reply to some very trivial and unimportant questions by post; hence this reminder that we decline to be responsible for any disappointment that it felt in the matter.

* * *

Those photographers who are interested in the optics of the modern lens should peruse a little pamplet on *The Achievements in the Construction of Photographic Lenses by the Optical Works of Carl Zeiss of Jena*, which has been prepared by Dr. M. Von Rohr, who is associated with Dr. Rudolph in the scientific department of Messrs. Zeiss' establishment. This pamphlet traces the successive introduction of the various types of Zeiss lenses from the year 1890, when the aprochromatic triplet was producted, down to the Planar, the most recent outcome of Dr. Rudolph's mathematical labours. There are fourteen diagrammatic illustrations, and the brief data given of the characteristics of each objective enable the reader to understand the particular uses for which the lens is suited. It is estimated that the number of Zeiss anastigmats manufactured from 1890 to January, 1898, exceeds 60,000. Copies of the pamphlet may be obtained from Messrs. Zeiss' London branch, 29, Margaret-street, Regent-street.

THE ALLEGED STAINING PROPERTIES OF ORTOL.

One of the chief advantages claimed in favour of the newest addition to our list of developing agents, is that it behaves in much the same manner as pyro, as far as its image is concerned, but without the disagreeable staining tendency of the latter, and, so far as our own experience is concerned and of most of those who have reported upon the behaviour of ortol, the claim is substantiated in practice. Recently, however, it will have been noticed that, in more than one discussion that has arisen on the subject, ortol is stated to be peculiarly liable to produce a bright red stain, which is so far worse than pyro stain in that the latter is removable, while that resulting from ortol is not.

We may at once say that in the course of some rather extensive experiments with ortol, under all sorts of conditions, we have never met with this stain when working according to the formula issued by the maker *or under anything like similar conditions;* but by departing from those conditions it is perfectly easy to produce the bright red stain complained of at will, and when produced we believe it is quite possible to remove it, although the process is a rather tedious one. This, in fact, appears to be another instance of the unwisdom of attempting to improve upon formulæ that have, no doubt, been thoroughly tried before publication, or of, from one motive or another, varying the minor details and then condemning the original process.

The first time we experienced this red stain was in trying ortol in conjunction with acetone; it is produced also in less degree when ammonia is substituted for sodium carbonate in the original formula, and far more when the further modification is made of substituting ordinary neutral sulphite for the metabisulphite that formula includes. In fact, it would appear to be due to some peculiar action of caustic alkali, that action being partly held in check by full doses of alkaline sulphite, or, what amounts to the same thing, the use of metabisulphite. Taking the view we expressed last week with regard to acetone in the developer, namely, that it liberates caustic alkali, this would fully explain the production of the red stain in a most pronounced form when ortol and acetone are used in conjunction.

Again, if the original formula be varied by adding hydrate of lime to liberate caustic soda, we have a result very closely approaching that obtained with acetone, from which it seems tolerably certain that it is some action of the caustic alkali that is alone to blame. It may be remarked, though without any immediate connexion with ortol, that, if the pyro-acetone developer be left after use in an open vessel, a very similar coloured stain or pigment is formed round the sides of the glass at the surface of the liquid as it undergoes oxidation, and a plate which has been left for an hour in such a spent solution, in order to try if it possessed any useful developing power, was found to be deeply stained a clear deep yellow.

In order to produce the colouration in its most intense form it is necessary, as already stated, to substitute the neutral for the metabisulphite and to use either ammonia solution or acetone. For ordinary developing purposes, however, the neutral sulphite, in conjunction with ortol, is distinctly and markedly inferior, and we have little doubt that where these complaints have been made they have arisen from the apparently trivial modification alluded to. But, in order to describe the stain, we shall confine ourselves to the developing compound of ortol with sulphite of soda and either ammonia or acetone with or without bromide.

Under such conditions the development is rapid and the image flat, those two peculiarities decreasing as the quantity of bromide increases; but a comparatively small quantity of bromide exerts a far stronger retarding action, without corresponding increase of contrast, than would be the case with pyro. Beyond a tendency to flatness there is nothing specially noticeable in the development, except perhaps a much warmer or redder tone of image immediately after fixing; but this is not always very apparent. However, as washing proceeds, a very large quantity of a deep red pigment washes out of the film, and the image itself and film assume a deep red colour, varying from claret to a tawny port-wine tinge, and this goes on for a very considerable period as if a continuous process of oxidation was proceeding. Gradually the action lessens and the colour of the film begins to revert to its original state as the oxidised compound is removed, but during the recent hot weather it has been impossible to wash gelatine films long enough to thoroughly remove it.

For this reason we turned our attention to collodion films, which under the same methods of treatment yield the red stain in an even more intense form than gelatine, and exhibit to still greater degree the progress of the oxidation during washing. For all ordinary purposes, under normal conditions a minute's washing under a tap after fixing will suffice with a collodion film, but, with the ortol-acetone mixture a quarter of an hour's soaking in fresh waters interspersed with four or five rinses under the tap failed to discharge the red colour from the image, and fresh water continued to be discoloured by the matter extracted, though the shadows were nearly colourless.

At this stage it seemed that the deep claret or port-wine colour belonged to the silver deposit, that in the shadows being due to some slight veil, and, as the image was rather a remarkable one, we proceeded to dry and varnish it. The drying still further altered it to a rich purple-red, somewhat resembling the neutral chromate of silver; but when the varnish was poured on—an ordinary spirit varnish—the colouring matter dissolved instantly and flowed to the edges of the plate with the varnish, which, when poured off into a clean test glass, was found to be coloured to a deep, clear red. For the sake of experiment, the plate was soaked in methylated alcohol, and, finally, by pouring fresh alcohol over it, and at the finish every trace of red had disappeared and the image remained a rather weak greyish black, such as might have been produced by metol or hydroquinone.

We may, therefore, assume that the stain is due, in the first place, to the use or action of caustic alkali, and that, while it is partially or slowly soluble in water, it is far more so in alcohol. Whether the latter possesses sufficient penetrating power on a gelatine film to ensure the complete removal of the stain we have not tried, but it will certainly effect that end with collodion.

In conclusion, let us repeat that, when using the original formula published, or in varying the proportions without altering the ingredients, we have never yet met with the stain, and we believe this is the experience of others. Those who have met with it, we have little doubt, have done so in consequence of changing one or other of the ingredients of the developer, most probably the metabisulphite.

A CRYING WANT.

THE marvellous ingenuity displayed in the construction of a modern camera, its compactness, its portability, its light weight, and, lastly, its comparative cheapness, might be considered as pointing to its having now arrived at a point as nearly approaching perfection as possible, were it not that each year sees some new departure that adds to its completeness. And we hope to show that there still remains one point to which attention needs being directed, one singular deficiency which amply justifies our description of it as a crying want. Let any one take up the illustrated price-lists or the picture advertisements of the most eminent camera-builders or the most eminent manufacturers of the day, and in how many of them will he see any illustration or any written description showing them to be provided with a simple accessory without which we unhesitatingly assert no camera can be considered complete—that is, a sky shade? We go further than this, and we ask, if any representative gathering of experienced workers be watched at work, say, at a society's excursion or similar occasion, how many of the cameras set up will be provided with this accessory? We reply, Not five per cent! What is most singular about the matter is that it is not through ignorance of its advantages in every case that such an arrangement is not provided. Many workers are aware of its advantages, yet are content to work without such provision being made. The average snap-shotter—the common you-press-the-button-we-do-the-rest worker—may be excused through ignorance, but what is to be said of the expert worker who either "lets things take their chance," or, at best, takes off his hat to the work when the evil is rampant, when the sun shines into his lens. It ought not to need pointing out to any thoughtful worker that, though the sun's direct rays are quite out of reach of the front glass of the lens, the mere fact of the presence of a bright sky in front of the camera must inevitably degrade the brilliancy of the negative unless as much as is possible of the bright area is hidden from the lens by a screen of some kind. Some few old hands know all this very well, and never take out a camera unprovided with a sky shade of some sort; but such cases are few and far between, and serve to accentuate this incredible deficiency in the majority of cases, and the evil is the greater as modern lenses are improved. When landscape lenses were mostly to the fore, and rectilinear and other forms of doublets were the exception, the use of a sky shade was not often indicated; but nowadays, when the majority of workers use a doublet of some kind, when quick-acting anastigmatic lenses of such angular aperture as necessarily leads to the virtual extinction of the once familiar long "hood" are daily becoming more general, the use of the arrangement we refer to becomes imperative in all outdoor work, yet is in effect not catered for by the manufacturer. The old lens-makers were wiser. When the new *régime* was inaugurated by the introduction of the once-famous Ross's "actinic doublet" each instrument was sent out with a metallic flap provided with a tightening screw to set it at any desired angle, the exposure being made, not by a cap, but by a metallic slide working between the lenses. When these lenses were followed by Steinheil's aplanat, they also were provided with a sky shade; but it did not form a constituent part of the lens, as with the actinic doublet, as there was a separate price for the shade and the lens. After these, as new forms of lenses were brought forward, the addition fell into desuetude, and we believe that no modern lens is sent out with a sky shade. We are aware that, from time to time, portable shades have been introduced by one maker or another, but they have not been taken up, and virtually they are out of the market. Our collaborateur, Mr. Watmough Webster, has been endeavouring to interest the camera-makers in the subject, but he finds them indifferent; they seem to desire in this direction to follow rather than lead the public taste. No doubt they know their own business. He tells us, however, that one well-known manufacturer of specialities is considering the matter, and may eventually bring out an apparatus to his suggestions. Meanwhile the public taste needs stimulating; if some simple contrivance of this kind, easily used and portable, be brought out, its success will be assured by its own merits, gradually and perhaps slowly, but all the more quickly, if camera-workers are educated up to the point of seeing the necessity for something of the kind; and, with the desire to further such education, we would conclude our remarks by saying that to do good work in the open air a sky shade of some kind is absolutely essential, whether for the humble hand camera or those of larger build; and the absence of such a shade is a crying want of the most rampant description.

The Action of Alcohol and Acetone on Various Dyes.—Mr. J. Waddell, in a recent number of the *Chemical News*, describes some action in this direction which may possibly prove to have a practical bearing on the colour sensitising of gelatine plates. That the particular solvent for the dye employed for this purpose has an important bearing upon the specific sensitising action is well known; it will suffice to instance the action of ammonia solutions on the eosines when so employed. Mr. Waddell draws attention to the change of colour brought about by alcohol and acetone on the colourless solution of cyanine in acetic acid; the effect is to cause the solution to turn blue. The red colour of a solution of methyl-orange in the same solvent is changed to yellow. Again, a solution of coralline in concentrated ammonia is red; the addition of acetone converts it to yellow. When water is added, the original colour is restored again, to be changed by the addition of further quantities of acetone or alcohol. Ammoniacal solution of paranitrophenol is green, but is rendered lighter by adding strong ammonia solution and acetone, while, if ether be added, the colour disappears entirely, to be restored once more if alcohol, or more especially water, be added. Phenol-phthalein in acetone in concentrated solution scarcely changes colour when strong ammonia is added, but the well-known red colour is at once seen upon the addition of water.

Photography and Ballooning.—At the International Aeronautical Conference, held in the spring at Strasbourg, M. Cailletet described an apparatus he had devised for photographing in one exposure from time to time the earth vertically beneath the balloon and the face of an aneroid barometer. With the help of a map the direction the balloon is travelling and also its exact height can be deduced. Although the balloon travelled at times at the rate of about a mile a minute at an altitude of 7000 feet, a number of photographs were taken, and it was estimated that the exactitude of the results came within 0·4 per cent. of the height. It is proposed to photograph a mercurial barometer in a similar manner.

Sensitive Thermometers.—At the Conference the same experimenter described some new thermometers he had designed for quickly taking the temperature—fifteen seconds only being needed to get a correct reading. The thermometer bulb was made of a spiral tube of silver soldered to the glass tube, the liquid being toluene. In a similarly short time M. Tesserenc de Bort's self-recording thermometer, consisting of a thin blade of German silver fixed in a framework of Guillaume's invariable steel, was said to act.

Another New Gas.—Still they come. At the last meeting ? the American Association for the Advancement of Science, ac-ording to the New York correspondent of the *Standard*, Mr. harles Brush announced that he had discovered a new gas as a nstituent of the atmosphere. Its chief characteristics, he finds, e low tension and conductivity of heat. The discovery, he says, sulted from a search for occluded hydrogen. This new gas Mr. rush has named "Etherion," because its attributes forbid its being nfined to the earth's atmosphere, and indicate its interstellar dis-ibution and relation to ether filling space. Its density the dis-verer gives as one-thousandth that of hydrogen, and its specific at six thousand that of hydrogen. Mr. Brush thinks this new as is analysable into several gases, forming a periodic group of new ements. With all these new discoveries, where will the list of ements end? As to the "air we breathe," the question seems to e of what does it consist when it is pure? a still wider question of what does it consist as breathed in some neighbourhoods in ur large towns, particularly during a "water famine?"

Photography and Royalty.—Photographers in this and ther countries have little to complain of in the matter of the cognition of their art by Royalty. On Thursday, last week, when e Duchess of York visited the *Crescent*, the crew were mustered on e deck, and the Duke read to them a complimentary report. After is, Commander Campbell presented to the Duchess a handsome lbum of photographs, taken during the cruise, in the name of the fficers and men. The Duchess, in return, thanked the Commander, d then handed to each officer an autograph portrait of the Duke. he previous day the Duke had ordered a cinematograph display of ictures taken on board, and of the channel, for the entertainment the officers and crew. Next day we read that the Emperor Villiam had forty photographs of himself taken on Thursday, at assel, in his tropical uniform. Forty portraits in one outfit seems pretty good number, but the German Emperor is not conspicuous r modesty, and so much the better for German photographers.

Ordnance Maps. — This country probably possesses the rgest and most complete map in the world. The ordnance map mprises some 100,000 and more sheets. In the town maps, on e largest scale, even the lamp-posts are depicted in their right aces as well as buildings of any import-nce according to their size. All the maps e reproduced from the originals by pho-graphy, the work being carried out by e military, as well as the greater portion the surveying. This map has taken mething like twenty years to compile, d is not yet complete. The sheets, are sued to the public, and may be had for shilling each. They are all printed by oto-zincography, and by power machines. he Indian ordnance maps, on the contrary, are produced by photo-thography. The two processes are analogous, except that in the e case zinc is used in place of stone. Such care is taken as to e accuracy of the sheets that any number of them may be joined gether and the lines will coincide as if they were printed on a single eet of paper. It is, it may be mentioned, from the ordnance maps at all district and road maps for cyclists and others are now made.

The Guildhall Art Gallery.—Sunday last was the last unday that the loan collection of paintings by French artists was en to the public. The exhibition, like its predecessors, has at-acted a large number of visitors, particularly while they have been en on the Sunday. It will be remembered that, a few years ago, ere was a great opposition on the part of a certain section of the ommon Council to the Sunday opening of these loan exhibitions, d it was only by the steady perseverance of a few members that ey were ever opened on the Sunday. Now, however, there is very little question that all future exhibitions will be open to the public on that day. It is not so generally known as it should be that the City Corporation have a permanent collection of pictures that is open to the public daily, and the admission is free. The collection is not a large one, but it contains some very fine paintings. It is the intention of the Corporation to add to it, and eventually to make the Guildhall Art Gallery worthy of the greatest City in the world.

Water Famines.—Just now the East of London, and some other places, are suffering from a restricted water supply, and many photographers—professional and amateur—who rely upon running water for washing their negatives and prints are suffering some inconvenience, and probably will do so for some little time to come. Many who consider that several hours' soaking in running water are essential to the perfect washing of negatives or prints, are not aware that as perfect elimination of the hyposulphite can be effected in an hour or less in a comparatively small quantity of water, provided that the washing is carefully done, that is that several changes are made, and the prints are well drained between each change so that the prints, or negatives, are freed from the previous water as much as possible before they are put into the next. When care is taken in this matter, many will be surprised how little water is really necessary for effectual washing. One thing, however, as we have frequently pointed out before, is necessary, namely, that is, the prints should be thoroughly fixed if short washing is to be effectual, and for the reason that has so frequently been alluded to.

THE CORRECTION OF THE DISTORTION PRODUCED BY TILTING THE CAMERA.

Part II.

In fig. 6 the lines, $G\,e$ and $b\,F$, show respectively in section the positions of object and image during the production of the original negative (compare with corresponding portions of fig. 1). Draw $F\,n$ parallel with $G\,e$. The angle, $n\,F\,b$, is then equal to the angle, A, or tilt of the camera, and the plane, a section of which is shown by $n\,F$, is precisely similar to the plane object, $G\,e$. Draw $n\,o$ parallel to the lens axis and from the centre, F, strike the three arcs, $b\,s$, $o\,r$, and $n\,m$, each of indefinite length. Anywhere between o and F draw the horizontal line, $m\,p\,r$, intersecting the two arcs and the vertical, $b\,F$, as shown. Join $m\,F$ and $F\,r$ and mark the angle, $o\,F\,r$, as B, and the angle, $m\,F\,o$, as C.

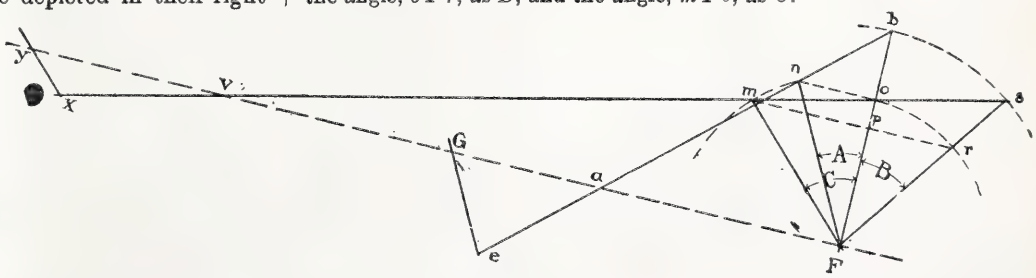


Fig. 6.

From the method of construction, the three angles, A, B, and C are in the ratio expressed in equation 3 for—

$$\frac{\text{Cos. } C}{\text{Cos. } B} = \frac{p\,F}{m\,F} \times \frac{F\,r}{p\,F} = \frac{o\,F}{n\,F} = \text{cos. } A.$$

Produce $F\,r$ to s in the arc $b\,s$, and draw the line, $s\,m\,v$, cutting the axial line of the lens at v.

The distance, $v\,F$, now represents the altered value of $a\,F$, to which the particular angles, B and C, relate. Instead of finding the angles necessitated by an alteration in $a\,F$, we have reversed the proceeding. If $s\,m\,v$ is produced, the line, $x\,y$, parallel to $m\,F$, will have a relationship to $m\,F$ similar to that between $G\,e$ and $n\,F$, and, as the angles of inclination of negative and copy will be in accordance with equation 3, an image produced at $x\,y$ will bear exactly the proportions of the original object. (By an unfortunate coincidence, the line, $s\,m\,v$, passes through the point o; this is only accidental, as the point and the line have nothing in common.)

The distances, $a\,F$ and $a\,G$, being conjugates, may be represented by the usual letters v and u. Similarly, the new conjugate distances, $v\,F$ and $v\,y$, may be denoted by V and U. The distances, V and v, are the ones with

which at present we have to deal, and in both cases they represent the distance from lens to the distorted image, the new distance being distinguished by the capital letter.

Now, from the diagram, it is evident that

$$n\,o : a\,F :: b\,o : b\,F$$
$$\text{and } m\,r : v\,F :: s\,r : s\,F$$
$$\text{and as } s\,r = b\,o, \text{ and } s\,F = b\,F$$
$$\therefore V : v :: m\,r : n\,o$$
$$:: \frac{m\,r}{p\,F} : \frac{n\,o}{p\,F} \times \frac{o\,F}{o\,F}$$
$$:: \tan B + \tan C : \frac{\tan A}{\cos B}$$
$$\therefore \frac{V}{v}\tan A = \cos B\,(\tan B + \tan C) \ldots . \quad 4.$$

In this equation the distance from lens to negative occurs expressed as a ratio, and this ratio in the succeeding equations will be denoted by a.

We can now easily determine the values of angles B and C in terms of the angle A and ratio a.

From equation 4 :—

$$a \tan A = \sin B + \cos B \tan C$$
$$\therefore a \tan A - \sin B = \cos B \frac{\sqrt{(1-\cos^2 C)}}{\cos C}$$

From equation 3 :—Cos. C = cos. A cos. B; substituting this value and squaring both sides, we get

$$a^2 \tan^2 A - 2a \tan A \sin B + \sin^2 B = \frac{1-\cos^2 A \cos^2 B}{\cos^2 A}$$
$$= \tan^2 A + \sin^2 B$$
$$\therefore 2a \tan A \sin B = \tan^2 A\,(a^2 - 1)$$
$$\therefore \sin B = \tan A \frac{a^2-1}{2a} \ldots . \quad 5.$$

To find the value of the angle, C, substitute $\frac{\cos C}{\cos A}$ for cos. B in equation 4, and proceed as before. We then get :—

$$a \sin A = \cos C \tan B + \sin C$$
$$\therefore a \sin A - \sin C = \cos C \frac{\sqrt{(1-\cos^2 B)}}{\cos B}$$
$$= \sqrt{(\cos^2 A - \cos^2 C)}$$
$$\therefore a^2 \sin^2 A - 2a \sin A \sin C = \cos^2 A - 1$$
$$\therefore 2a \sin A \sin C = \sin^2 A\,(a^2+1)$$
$$\therefore \sin C = \sin A \frac{a^2+1}{2a} \ldots \quad 6.$$

From these two equations, 5 and 6, it is evident that

$$\sin B + \sin C = a \sin A \ldots \quad 7.$$

Having, by means of equation 6, found sin. C, sin. B can be quickly found from equation 7, thus avoiding the necessity of employing tan. A.

These formulæ can be readily applied with the assistance of a table of natural sines, and, under ordinary circumstances, the angles can be found with very approximate accuracy if the trigonometrical ratios are abolished, for with moderate angles the tangent does not differ greatly from the sine, and the sines vary very nearly as the angles. Bearing this in mind, and also the fact that the necessary data are not likely to be recorded with extreme accuracy, we can simplify the formula as follows :—

Inclination of negative =

$$\text{The angle } B = \text{the angle } A \times \frac{a^2-1}{2a} \ldots \quad 8.$$

Inclination of copy =

$$\text{The angle } C = \text{the angle } A \times \frac{a^2+1}{2a} \ldots \quad 9.$$

Sum of inclinations =

$$B + C = A\,a \ldots \quad 10.$$

If the tilt of the camera, or the angle A, does not exceed 15°, and a does not exceed 2, the results given by equations 8 and 9 err by less than one degree. Both angles are too small, the error being greater in B than in C.

If A is less than 15°, say 10°, then a may be increased to 3. If A is only 5°, then a may be increased to 5, a greater increase than is at all likely to be required.

If A exceeds 15°, and a is greater than 2, it would be best to employ the more accurate equations, 5 and 6, or 6 and 7.

When the scale to which the copy is to be made is settled, the distance from lens to negative can be calculated from the usual formula for conjugate foci, this being likely to give more accurate results than the process of measurement. Thus we find the distance, V, which, divided by the corresponding distance, v, which was recorded when the negative was made, gives the value of a. Having found this as accurately as possible, the angles, B and C, can be quickly arrived at.

If copying in the camera, it would probably be best to first set up the negative to the proper angle, and then adjust the camera with the lens exactly opposite the datum point, F.

It must here be again noted that the equations given relate solely to the simultaneous correction of both horizontal and vertical distortion. The question of securing sharp focus in all parts of the copy has not yet been dealt with.

In order to find out whether it is possible to completely correct distortion, and at the same time secure sharp focus all over the image, it will be necessary to again employ one of the earlier diagrams.

Fig. 7 is a repetition of fig. 4. From this diagram it is evident that, if

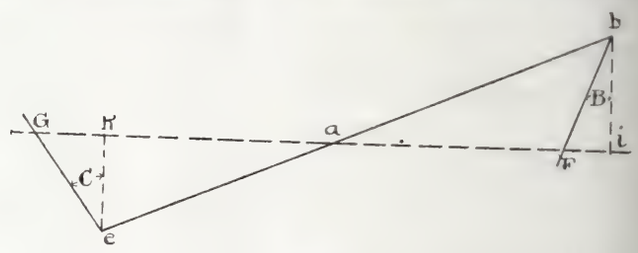


Fig. 7.

the point, e, in the copy is in sharp focus, then the distances, $a\,K$ and $a\,i$ must be conjugates. Let f represent the equivalent focus of the lens, then, by the laws of conjugate foci, $a\,k = f\frac{a\,i}{a\,i - f}$. The distances, $a\,F$ and $a\,G$, or V and U, are, of course, conjugates, for, in arranging the apparatus, we focus the point, F, sharply at G.

We want now to express the relationship of the angles B and C when the whole image is in focus.

$$\text{Tan. } C = \frac{G\,k}{k\,e} = \frac{U - a\,k}{k\,e}$$

Now, $k\,e : a\,k :: b\,i : a\,i$

$$\therefore k\,e = \frac{a\,k \times b\,i}{a\,i} = f\frac{b\,i}{a\,i - f}$$

$$\therefore \tan C = \left(U - f\frac{a\,i}{a\,i-f}\right) \times \frac{a\,i - f}{f \times b\,i}$$
$$= \frac{\frac{V}{V-f}(a\,i - f) - a\,i}{b\,i}$$
$$= \frac{f \times F\,i}{(V-f)\,b\,i} = \frac{U}{V}\tan B$$

$$\therefore \tan C : \tan B :: U : V$$

$$\text{or, } \frac{\tan C}{\tan B} = \frac{U}{V} \ldots \quad 11$$

From equations 3, 5, and 6, we can express the ratio of tan. C to tan. B when distortion is corrected.

Divide equation 6 by equation 5, then

$$\frac{\sin C}{\sin B} = \cos A \frac{a^2+1}{a^2-1}$$

Divide again by equation 3, then

$$\frac{\tan C}{\tan B} = \frac{a^2+1}{a^2-1} \ldots \quad 12$$

Compare equations 11 and 12, and it is at once obvious that we can only correct the distortion and secure universal sharp focus, when

$$\frac{U}{V} = \frac{a^2+1}{a^2-1} \ldots \quad 13$$

a condition that can *only be fulfilled when enlarging.*

This brings us to the last part of the subject, viz., the question of what limitations there are to the process of correction.

We have in equation 13 a very obvious limitation in the matter of securing sharp focus, and this operates in at least two directions. It involves stopping down the lens in all cases where the requirements of equation 13 cannot be very approximately fulfilled, and therefore the depth of focus given by the smallest stop limits the minimum size of the copy.

By studying equations 3, 5, 6 and 7, we can derive some further information.

From 3, which can be transposed into cos. C = cos. A, cos. B, it is vident that the angle C can never be less than either A or B. It may e equal to A when B equals 0°; but it can never be equal to B.

From 7—$\left(\text{sin. } C = \text{sin. } A \frac{a^2 + 1}{2\,a}\right)$—it is manifest, that only when = 1, or $V = v$, can $C = A$ and B disappear; also that, if a is greater han unity, then C must be greater than A.

Now, it is a peculiarity of the quantity $\frac{a^2 + 1}{2\,a}$ that it cannot be reduced elow unity, whatever value be assigned to a; hence, if a is less than nity, or V less than v, then C again becomes greater than A. Reference to quation 5—$\left(\text{sin. } B = \text{tan. } A \frac{a^2 - 1}{2\,a}\right)$—shows that in such a case sin. B ecomes a negative quantity, which implies that the negative is swung n a different direction, towards the lens instead of from it. Hence, we ee that, if a is less than unity, or V is less than v, *both negative and opy must be swung in the same direction in order to correct d stortion.* This may be a somewhat unexpected result, but its truth is confirmed y equation 7, which shows that the sum of the sines of the angles B nd C diminishes with a; and, as C can never be less than A, it follows, hat, in order to diminish the sum below sin. A the angle B must take a lifferent direction. Again, reference to fig. 6 will show that the angle B might have been drawn on the other side of the vertical $b\,F$ without listurbing the ratio of the angles. (The figure is too much exaggerated o permit of this being actually shown).

Here the question of focus again steps in, and, we may perhaps say, ractically prohibits the inclination of negative and copy in the same lirection; or, in other words, does not permit of the reduction of a below nity, and thus imposes a limit on the extent to which we may enlarge with a lens of very short focus.

Equation 7 also shows that a must not have too great a value, for, in heory, sin. C cannot exceed unity, and, in practice, it must stop con iderably short of it. Here, again, it is more or less the matter of ocussing that sets a maximum limit to the angle, C.

It will be noticed that these limitations all tend to affect the size of he image that can be produced with a lens of a certain focus. If the ocus is very short—say, equal to half v, we can copy the same size, or educe, but we cannot enlarge. If less than half v, we can only reduce. On the other hand, if the focus is too long, we might be compelled to nlarge, and perhaps to such a large scale that the lens would be ractically useless.

These limitations can, no doubt, be accurately defined, but I have not et been able to go into this branch of the subject in any detail. Pos ibly the most useful all-round lens for correcting purposes will prove to e either that with which the negative was taken or one of a slightly horter focus.

There is one other factor which appears, so far as I can at present udge, to have a considerable effect upon the extent of the limitations lready referred to. This is the distance of the object from the camera n the first instance. If this distance is great, the angle of view is very arrow, which means either that a very long-focus lens is employed, or a very small image is produced. We are in the one case restricted by he probably abnormal length of v; in the other, by the necessity for nlarging. In addition to this, in such an image the height is dwarfed almost to a minimum, and the horizontal distortion is very slight, so it appears probable that, under these circumstances, the methods of cor rection must be rather severely restricted. It may, however, be added that such a case is not likely to be often met with.

I trust at a later date to be able to investigate these limitations thoroughly enough to be able to define exactly what can be done, and what cannot be done, with a given case of distortion and a particular lens. In the mean time it is hoped that the results that have been arrived at, by treating the subject from a purely mathematical point of view, will have some practical value.

C. Welborne Piper.

MORE TURKISH DELIGHT.

Turkish procrastination is an old story. I remember hearing of it in my happy school days, when I had no thought of ever having any experience of it. At the conclusion of my previous article I wrote that I was going from Beyrout to Constantinople—out of the frying-pan into the fire; such proved to be correct, and a very big fire it was too. I was there for six long weeks. Now, however, that I am at a safe distance away from it, an account of my photographic work during my stay in the Sublime Porte may be of interest.

On my arrival I saw Cook's man on the quay, and engaged him to see my goods safely through the Custom House, which he did very well indeed by continually tipping numerous officials to the extent of a total outlay of about ten shillings. I happened to have very few plates with me, as a gross of boxes were awaiting me there. I got the latter through the customs a few days later, at a cost of fifty-nine francs. On opening the cases I found that twenty boxes had been opened, and of course spoilt by exposure to light. A photographer in the city told me that the officials have a dark room in the Custom House for the purpose of examining dry plates, &c., but they preferred to open mine in the open air. A week before my arrival several bombs had been found in some tubs of butter, whilst many others were found carefully hidden in a case of champagne. I must therefore consider myself very fortunate not to have had them all opened. Probably they were afraid to take my boxes in the dark room, as escape was easier in the open air.

My first act the next day was to call upon the Consul, to whom I had a note of introduction, having met a relative of his in Jericho. I explained to him that I was there for the purpose of illustrating a book on Byzantine art, and I should fill up odd time with street views. I learned from him that a permit was absolutely necessary for the interior of the mosques, but he thought no permit was necessary for street work; any way, he recommended me to try it, and if I was stopped he would at once get me the necessary permit. Permissions, however, took a long time to get, and it was quicker, he said, to work, if possible, without one. As I could not start work at once in the mosques, I, of course, commenced a little street work. One of the best panoramas of the city is obtained from a hill in the district of Eyub, and thither I went early the next morning and set up my camera and commenced focussing. Whilst my head was under the cloth, I heard footsteps approaching, and, thinking they were boys (as usual in such places), I took no notice. When, however, I withdrew my head from the focussing cloth, I found myself surrounded by a group of soldiers or police. I may here mention that none, except the secret police, go about alone, but always in companies of six—five men and an officer. One of these men was holding my camera case, whilst the officer was playing with my dark slides. I had taken a guide with me, but, unfortunately, he had left me for a few minutes for the purpose of having a cup of coffee with a friend near by. Here was a predicament! I asked them very kindly not to open any more dark slides; but what was the use, they understood me not? One of the men actually rubbed his fingers over the dry plate, and put them to his tongue; no doubt he thought they looked like ice cream, as such would have been very welcome at that particular moment, as it was exceptionally hot. I tried to take them away by force; but how stupid of me, for what was I against six soldiers? They simply replied by fixing their bayonets, and I sank into my shoes. At this stage of the proceedings my guide appeared on the scene, and after about an hour's wrangling I got back my spoilt plates and apparatus. I also got orders to get back to my hotel, and to never again venture out with a camera unless I had permission from the police.

I gave the Consul particulars of this adventure, and was asked to call again in two days, during which interval full inquiries, &c., would be made, and a permit obtained. When I next visited the Consul I was placed in the hands of the Vice-Consul, who sent me to the Turkish police officials with the chief dragoman. After sitting in the police office for nearly three hours, we were told that they had no power to grant permission, and that I must send particulars to the Porte. This was done, and I expect an answer in five years' time. Many other visits were paid to the Consul, who always told me he was doing his best for me. I was glad to hear that, but had he not done anything the result would have been the same.

I then tried the French Ambassador and Consul with the same result. I have every reason to believe that numerous official letters passed between Paris and Constantinople on the subject, but to no purpose. I must confess, however, that the French people made a better show than the English. This I have found to be the case, not only in Constantinople, but in all the East. The English consuls seem to have less power, and take less interest in their visitors, than consu's of other nations. I have indeed known Englishmen visit the American consuls because they have been so disgusted with their own. Photographers who are unfortunate enough to get into trouble at Jaffa have the pleasure of meeting an English Consul there who cannot speak English. This, however, is a digression, but, nevertheless, a fact that cannot be too widely known.

After waiting a month at Constantinople for my permit, which never came, I thought I would again venture out, and so, carefully wrapping up my camera in Turkish newspapers, I went with a guide to the Galata Tower. I got to the top unseen, and, what is more, I made sixteen exposures therefrom. The soldier fireman at the top got his eyes dazzled with a little silver that I placed in his hand, and the whole business was done before he had time to recover his normal power of sight. Encouraged by my success, I went, later on, to the Galata Bridge, but was soon ordered off when my little game was discovered. Altogether I was stopped about half a dozen times; I then thought it better to wait with patience for my permit. That was months ago, and I am still waiting—but not in Constantinople.

One little instance only I will give of Turkish suspicion. Unfortunately while there I had a few days' illness, and the doctor ordered

me a little whisky. This is a fact, not an excuse. Whisky at hotels, as some perhaps know, is very expensive, and I thought it better to go and buy a bottle elsewhere. I did so, and when returning to the hotel I very carefully put the bottle in my inside pocket. I naturally was very careful in doing so, and I happened to be passing the Ottoman Bank at the time I was giving my pocket a few finishing touches. Those who know anything of the Armenian affair will remember that it was at this spot that the Armenians threw their bombs, and since that time a dozen or two of soldiers are always to be seen there. They saw me, and thought, no doubt, they had a prize. I was seized by the arm and taken to the little hut, and there the interior of my pocket was explored; but it was not a bomb they found, simply the bottle containing medicine. Then they smiled; I smiled also, but was thirsting for revenge, and in dumb pantomime I made them understand that I wanted four glasses and water. These were brought; I then opened the bottle, put in the cork again at once, placed the bottle in my pocket, and walked out. They seemed too surprised to stop me; any way, I got back to the hotel, and I have heard no more of the matter.

Not only did I find trouble in photographic matters, but the large hotel at which I stayed went bankrupt, and I found one day that some one who failed to get money from the proprietor had walked off with the first thing he could lay hold of, and that happened to be some of my material that happened to be near the door. Fortunately I was able to trace it, and get it back again, but not without considerable expense.

I need not detail any more of my experiences in that grand old city; suffice it to say that I left no stone unturned in my endeavours to get permission to work with a stand camera. Hand camera work is fairly easy if one is very careful to keep it well out of sight when passing police offices, barracks, &c.

"But," some may say, "stand-camera work *has* been done, and surely there is a way of doing it again?" There is. There are, indeed, three ways of doing it. First, by waiting for the official permit; and, even when this is obtained, the operator is not allowed to use it unless accompanied by a soldier. Secondly, by tipping one of the "big guns" in the palace (certainly not less than 100*l.*), and so bribe him to get a permit from the Sultan without the bother of it going through the Government offices. This, by the way, is rather risky, as, after all, the Sultan may not grant it, and it's ten chances to one if the tip be returned. The third method is to ignore all red-tapeism, and risk your chances, and, when caught, "square" all those concerned; on the face of it, the latter method looks the cheapest, but I assure my readers it is not. I started it, but found that it would require a small fortune.

Richard Penlake.

SOUTH LONDON PHOTOGRAPHIC SOCIETY'S CONTINENTAL EXCURSION TO ROTTERDAM.

By One of the Party.

The second Continental excursion of the South London Photographic Society to Rotterdam, under the leadership of Mr. William F. Slater, F.R.P.S., has again been another success to be added to this Society's records. On Saturday, August 13, a party of twenty-six ladies and gentlemen started from Liverpool-street Station by the Continental express to Harwich, having four reserved compartments placed at our disposal by the Railway Company. On arriving at Harwich, we immediately boarded the Company's s.s. *Vienna*, where our party was increased to twenty-eight by two gentlemen who had travelled direct to Harwich from Fakenham. We found all our berths reserved, and, for those who were accompanied by their wives, special two berth-cabins. We were all impressed by the comfort, power, and speed of the s.s. *Vienna* and *Dresden* on which we travelled. Early on Sunday, most of the party were on deck to see the sunrise. Arriving at the Hook of Holland about five o'clock, most of the passengers left the boat. We, however, travelled to Rotterdam, which is situated on the River Maas, near its confluence with the Rotte; hence its name, "the dam of the Rotte." During our journey up the river our luggage was overhauled by the Customs officers, and most of us had to pay a small duty on our dry plates; they seemed to have no definite scale, as some paid 7*d.* on 12*s.* worth, while others paid 1*s.* on 8*s.* worth.

The boat arriving at its destination about eight o'clock, having handed our luggage over to the hotel porter, we boarded a tramcar and quite astonished the conductor; he had quite an arithmetical sum to work out as our leader paid all our fares in bulk, which was 7½ cents each. Arriving at our headquarters, the Grand Hotel Cormano, 12–22, Horfdsteg, our rooms were then allotted (twenty in all). We found the accommodation, food, and rooms exceedingly good and cheap. Everything on their part was done to make us comfortable. After breakfast, the party split up into small groups to look round Rotterdam. We did not find, as is usually said, that large parties are not successful photographically, and this was due to us breaking up into batches of two or three; it made one feel more at home in meeting friends as you turn corners, or, on seeing a crowd and being curious to know what is the matter, find out it is one of the party with his camera who is the attraction.

The weather was extremely hot and rather took the courage out of one for real hard photographic work. We found the town very picturesque, the canals, bridges, trees, and shipping make good materials for picture-making, there are also the quaint costumes of the women, and innumerable varieties of carts drawn by dogs. The fifteenth-century cathedral of St. Lawrence contains a fine organ as do most of the large churches we visited during the week. The Delftsche Poort on the north side of the town is the only old city gate left. Mr. C. E. Mögle, a photographer, had left word at the hotel that he would like to see the leader of our excursion, so with some of the party we visited his studio. Mr. Mögle treated us very kindly and showed us a lot of his work, which was excellent, not only his portraits but his figure studies and landscapes would certainly enter into keen competition with some of our best workers, and we strongly advised him to exhibit at the Royal Photographic Society and our exhibitions. We then went to the park, which has not had the hand of the spoiler, as some of our London parks; the afternoon being so excessively hot, we laid for some time on the grass to get cool, we then strolled to the band, and, making for a vacant seat, found two of our party already there; after listening to the band for some time we went to a kiosk for refreshment, and again met some of our party. We then turned our steps towards the hotel for dinner, and, in spite of the hot weather, all did justice to the same, every member of the party, whether photographers or not, changed their plates a good many times.

The evening was spent, strolling about the town which was rather noisy, as it was the beginning of fair week, and at times it represented a Bank holiday night in London. Early Monday morning several camerists were at work, and after breakfast we went by train to the Hague or 'S. Gravenhage, the Count's park, which is the Government town of Holland. We had been granted permission to travel on the lines of the Holland Railway Company at half fares for either single or return journeys; our leader had been furnished with a letter written in the Dutch language, authorising the booking clerk at any of their stations to supply us with ten or more tickets, any class, at half price during the month of August.

Our first day's experience caused a little consternation amongst our party, our leader having purchased the tickets before breakfast to save any delay at the last moment. On arriving at the Beurs station he waited below to see us all in. When we presented our tickets to the collector, he started talking to us in Dutch, took our tickets, and went away with them, but soon returned, giving us back our tickets. We then thought all was right, but, however, on arriving at the Hague, they would not give us back the return half, so we had to wait while our leader went to the station-master. After he explained and showed the official letter, they stamped our tickets on the back, and we thought our trouble ended; but, on getting back to Rotterdam in the evening, we were surprised to hear that we only had children's tickets, and they would not pass us out. However, our leader saw the station-master, explained to him in German, as he could not speak English, and our leader not speaking Dutch, and all was right.

The trouble was caused by the booking clerk giving us children's tickets instead of a paper pass for the whole party, which was done on subsequent occasions. On arriving at the Hague we split up, as usual, in small groups, and came across the sixteenth-century Stadhuis, or Town Hall, in the Old Dutch style. The Church of St. Jacob's, in the Gothic style, also of the same century, has a fine pulpit and melodious organ. The Nieuwe Kerk, or New Church, built in the seventeenth century, is considered a masterpiece of architecture, its roof being supported without a single column. There is also an old palace, and the Binnenhof, both of the thirteenth century. The Vijver, or fishpond, is one of the principal sights of the town. It was from this town that William III. of Orange left in 1682 for England to take up his crown, and become William III. of Great Britain.

Going on to Scheveningen, the Brighton of Holland, where with suitable weather some fine work could be done amongst the dunes and sandhills, the weather being so hot, the light so intensely bright, and the clear blue sky made it almost impossible for photographic work; so several of us engaged windstoels for the whole afternoon watching the novel way they carry passengers to and from the sailing boats, several men dressed in quaint costumes of blue jackets and red breeches rolled up to the knees carry gentlemen on their shoulders; but the ladies are carried by two men, who have a board with ropes which they place over their shoulders, the board forming the seat, thus the ladies have a living sedan chair; several snapshots of this mode of conveyance were secured. Bathing is one of the principal features here, and several of our party took this advantage for a cooler. It was off this coast that Admiral Tromp was killed in 1650; it was also on this beach that the Prince of Orange landed on November 30, 1813, from the English warship *Warrior;* he was accompanied by a large crowd to the Hague, whilst the golden ribbons of the House of Orange fluttered in the breeze, which is also strongly in evidence just now. Everywhere we went there were orange ribbons, favours, and decorations, for this month the coronation of the young Queen, Wilhelmina, takes place.

The shady ride back to the Hague through the Bosch on top of a tram was most enjoyable after the hot day and bright glare of the sun. Tuesday we visited Dordrecht, usually called Dort by the Dutch, one of

the most picturesque towns in Holland. It was another very hot day; the boat ride under the canvas was most enjoyable. Dordrecht, with its red-roofed houses, pointed gables, canals, and Groote Kerk, is a paradise for the photographer and painter. A week here with a large camera should give one a good number of pictures; but time and patience are required to get the best results with water pictures, as so much depends on getting a suitable boat or barge in a proper position for the foreground, and it would be unreasonable to expect much in such a hurried visit like ours, yet we believe luck has given us a good sprinkle of results, as all corners were searched and most made of the materials at hand.

The fourteenth-century Grootekerk in the Gothic style has some choice carved choir stalls of the sixteenth century in the Renaissance style; they are the most important work of this kind in Holland. It also possesses a handsome carved pulpit in white marble with carved black oak canopy, a splendid organ, and a massive solid brass screen. Photographing is not allowed inside, but, through the energy of Mr. Kelly, we obtained a special permission for our party, on the condition that none of the pictures should be sold; but, in all other churches we visited during the week, we paid our cents for admission and were allowed to photograph as we liked without permission. We here met a party of four photographers from Manchester, and three cyclists from London. At one time we noticed that every seat outside a café was occupied by Englishmen. The ride back on the boat was most refreshing in the cool of the evening.

Wednesday we visited Leyden, a town composed of fifty small islands joined together by 145 bridges. The weather being much cooler, photography was more in earnest. We started at ten o'clock on a small steamer along a canal, our party practically occupying the whole of the first-class portion. The most amusing feature of the trip was on passing under some of the bridges, which were so low we were compelled to fold our camp stools and lie flat on the deck. The canals and rivers are the real business highways of the country, and most of them lay higher than the land, the rail and roads being only of secondary importance. Its highest hills are sand mounds, and its horizon a fringe of windmills. The chief streets of the towns are on, or very close to, the canals. Therefore the best way to see the country is to make as much use as possible of the steamboats. We particularly noticed the quiet way they all seemed to do their business, which is quite a contrast to the bustle and hurry of London life.

We travelled up this canal, which abounds in picturesque bits, and a large number of snap-shots were taken from the boat. We were much amused to see the cattle with jackets made of sackcloth to protect them from the weather. We also noticed the cleanliness, especially of the peasants; even windows of cowsheds are frequently adorned with curtains, and some of the villages give one the impression that they had just been taken out of a toy-box. At Overschie we were amused to see the women washing and scrubbing the main street with brooms and sand. Going under another low bridge, we turn into the river Schie, and follow it as far as Delft. There is also plenty of work on the banks of this river. Arriving at Delft, we have ten minutes to catch the steam tram for the Hague, which takes forty minutes, and on our way we pass through Rijswijk, where the famous treaty of peace was concluded between England, Holland, Germany, and France, 1697.

On arriving at the Hague we make for the starting-place of the steam tram which is to take us to Leyden. Having half an hour to spare, we visit a small kiosk and clear them out of eatables, and nearly out of drinkables. The ride on the tram was pleasant and unique. We go along roads through fields, round back gardens, and it is quite a novel way for Englishmen to travel. In Leyden there are a quantity of old gabled houses in the Dutch Renissance style. The sixteenth-century Stadhuis, or Town Hall, with an outside double staircase, and a fine tower with carillon; the city Weigh-house of the seventeenth century; the Burg, an ancient tower in the centre of the town. The Church of St. Pancras contains the tomb of Burgomaster Van der Werf, who successfully held the town during the seige, which lasted from May 26 to October 3, 1574.

St. Peter's Church, opposite the Town Hall, contains a memorial tablet, which has the ship *Mayflower* for its heading, to the memory of the Rev. John Robinson, who died in 1625. He was the leader of the little band of Pilgrim Fathers who left this town for Plymouth, and thence to the new world 1620. This town was the birthplace of many celebrated painters, including Rembrandt, and Goldsmith walked its shady paths. The old Rhine runs through Leyden, and finally finds its way to the sea at Katwyk, a short journey from here. We return to Rotterdam at half fare without any consternation this time. After dinner we visit the fair, which is on an enormous scale; there are numerous massive and smart shows lighted by electricity, but what with the shouting, which we did not understand, the noise of the organs and other musical instruments, or instruments of torture to us, for all were playing different tunes at the same time, it was only a deafening discord on a large scale.

Thursday we visited Gouda, a quaint, quiet town situated on the confluence of the Yssel with the Gouwa. The day was warmer than yesterday, but not so inconveniently hot as Monday and Tuesday. Our trip up the Yssel was a pleasant and cheap ride, the time occupied for the journey by a good class steamer was three hours, the first-class fare being 6*d*. Nearly the whole of the way both banks would give pictures, the scenery being totally different to what we had on previous days—marsh land with rushes, windmills, trees, and everything to help composition along this river. We saw a solitary stork on its nest, built on a church roof. In Gouda there is plenty of work—canal scenes, old houses, &c. The Groote Kerk of St. John's, sixteenth century, has the finest collection of stained-glass windows in the world. There are over forty, and some are sixty feet in height. Most of them are by the Brothers Crabeth; we specially noted the superb quality of the colours. The quaint old Weighhouse of the seventeenth century. In this town, as in all others, the Englishmen with cameras were quite the centre of attraction, the children grouped all round one, and it was difficult to photograph what one required; in fact, we watched one gentleman thrust his hand in his pocket and fetch out a handful of cent pieces and throw them into the opposite direction to his subject. It proved successful, for, while the children were scrambling after them, he made his exposure.

We strolled away from the town along a country road for some distance, and found it abounded in good pictorial subjects. There is no doubt that Holland is a grand field for photography, both pictorial and otherwise. The polderland with the numerous canals, windmills, and quaint bridges, are far more suitable for the camera than woodland and mountain scenery, which depends so much on colour for its pictorial effect. Friday we visited Delft, which Pepys described as "a most sweet towne," it contains a river with bridges in every street, also a large number of buildings of the sixteenth and seventeenth century. We found this place run Dordrecht very close for its artistic subjects. The public buildings are mostly in the Groote Markt. The Nieuwe Kerk, or new church, which was built in the fourteenth century, contains the monument of William of Orange. The seventeenth century Town Hall is directly opposite this church. The Oude Kerk, or old church of the fifteenth century, in the Gothic style, with a leaning tower, contains the monument of Admiral Tromp, who, after defeating the English, fastened a broom to his mast-head as a sign that he had swept the seas of his enemies. In the Prinsenhof the Prince of Orange was assassinated, and the mark of the bullet is still shown on the wall of a room on the first floor. Oost Poort, Haagsche Poort, and Rotterdamsche Poort, the old gates of the town, are well worth a plate, especially the first-mentioned.

About a mile from Delft lies the Agneta Park, the creation of Mr. and Mrs. Van Marken, dating from 1882, and its equal is not to be found in the world. It is hardly possible to realise that this fine park, with its elegant laid-out ponds, its carefully conserved flower-pots and shubberies, is nothing more than a workman's colony. It is a social experiment in which relation between capital and labour has been settled on a new foundation, and its motto is, "From labour to labour." It has playgrounds, and a music kiosk, where the band is organized and supplied by the workmen. There are also reading and lecture-rooms, schools, &c. The boat trip being so enjoyable, and as every one preferred it, we returned by the same route, instead of rail.

After dinner a very pleasant incident took place. Mr. Fred Kelly, in a few well-chosen words, said he had a very pleasant duty to perform in a series of votes of thanks, firstly to the clerk of the weather for the exceptionally fine weather we have had, for we were told that in Holland it was unusual to have a week of fine weather, and he thought another was due to Father Neptune for the splendid smooth passage across the sea, and hoped he would favour us the same on our return journey. The Dutch people were also deserving of one for the polite and kind way they had treated us, but he specially rose to propose a hearty vote of thanks to our leader and organizer of the excursion for the able way he had carried out the whole arrangements, as it must have been an anxious time for him with so large a party. Mr. J. T. French, in seconding the vote of thanks, said he had a further pleasant duty to perform on behalf of the party in presenting Mrs. Slater with a bronze clock as a memento and small recognition for her part of the anxiety she must have shared with her husband. Mr. H. J. Godbold, a visitor from Hastings, and Mr. H. Newson, Secretary of the Fakenham Photographic Society, spoke in support of the vote of thanks. Mrs. Slater thanked the party for their kindness, and said it was a great surprise which she had not expected. Our leader, in responding, said he took a pleasure in the work, and felt well repaid in knowing everything was satisfactory and that every one had enjoyed himself.

It was decided to make a set of 100 lantern slides of this trip for the Society, also to make an album of all the prints which would go round to every member of the party, and to have a re-meeting during our next Exhibition.

Saturday was mostly occupied in settling up and buying presents for those at home, but several kept to camera work till the last moment. We having had lunch, our last meal at the hotel, which we cannot leave without emphasising the fact that they did everything to make us comfortable, and we can strongly advise any one staying in Rotterdam to put up at this hotel. On leaving, the ladies were each presented with a splendid spray of flowers. We now made our way to the ss. *Dresden*, had a quiet ride to the Hook, where we had five hours to wait. Several went ashore, but soon returned, as it came over very foggy. We had a calm passage, but the weather being foggy we arrived at Harwich four hours late, but safe, and finally arriving in London mid-day, Sunday, all agreed that we had spent a most enjoyable and happy holiday.

A NEW GOERZ LENS.

Messrs. C. P. Goerz and Emil von Hoegh have devised a new double objective for photographic purposes.

It is a well-known fact, they observe, that the anastigmatic flattening, and at the same time the neutralisation of the spherical aberration in a system of three lenses, is attained by two spherical contact surfaces of two succeeding mediums; one of them acts as a collector, the other as a disperser for the luminous rays.

Proceeding from the consideration that the efficiency of an objective of this kind depends on the value of the difference of refractive indexes between the two media in juxtaposition, they concluded that further improvements and especially a considerable increase in the sharpness of the picture would be obtained by replacing the contact surfaces between two different glasses by such between glass and air. By this arrangement the difference between the refractive indices will be increased six or seven times. Researches in this line led them to the construction of this objective, which is formed of two single lenses separated by a layer of air.

This two new-lens system consists of a biconcave lens, L^1, of low refractive index and of a biconvex lens, L^2, of a high refractive index as shown in fig. 1.

Fig. 1.

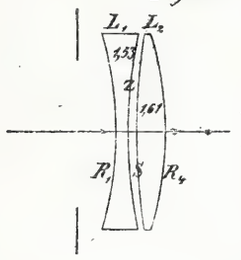
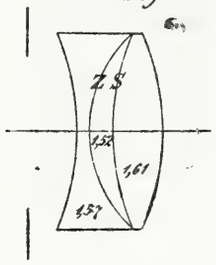


Fig. 2.



The present system is the final result of very careful scientific researches on the following plan:—

Equations were established for the elimination of the spherical aberration and for producing a constant proportion of the sines for axial rays. Different values were introduced for the focal length of the first negative lens, and for the distance of the two lenses from one another. The solution of the resulting equation of the fourth degree had as a product the respective focal lengths of the second lenses, and the forms for both lenses most apt for doing away with the two errors.

Subsequently all these forms were controlled by trigonometrically calculating a ray near the circumference, taking into account the suitably selected thickness of glass. These calculations showed that the calculation of the correct thickness of the glasses, which was originally left out of account, only slightly influenced the results necessary for the realisation of both conditions.

Each combination of lenses thus obtained was then examined for curvature of the image and astigmatism, by projecting mathematically a principal ray intersecting the axis of the system under an angle of 32°. The astigmatic points of the image were then calculated. The comparison of the relative situation of these points and of the plane of the image pointed to the way in which the problem was to be solved.

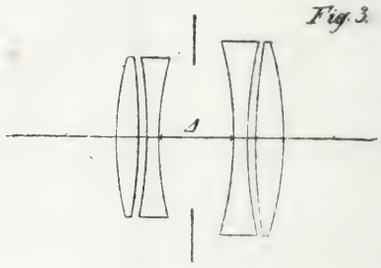
The systems studied in this manner all showed a considerable curvature of both astigmatic curves of the image. The conditions were the most favourable ones in that system in which the focal length of the first lens was smallest. Nevertheless, it would be necessary for a complete removal of this error to shorten the focal length still further. The result would have been a considerable decrease in illuminating power in consequence of the great curvature of each lens. It was therefore decided not to insist on the strict fulfilment of the sine conditions in the separate lens systems, and only bring the two astigmatic points of the image in the imaginary plane of the image to a coincidence, the spherical aberration on the axis being each time removed by trigonometric testing. This was carried out in the following way:—

From the objectives calculated in the manner previously described they selected one the curvature of whose lenses still admitted of a suitable aperture. By varying the constant values, radius of curvature, thickness of the glass, and distance of the lenses, they tried to approach their aims. This experiment succeeded completely, although the departure from the strict fulfilment of the sine combination was finally somewhat considerable.

Having found a kind of glass which approximately possessed the calculated amount of refraction and of dispersing power for the spectrum, and having made the correction necessary on account of the small difference between the refractive indices of the lenses obtained, and the values taken into calculation, the testing of the experimental objective in an apparatus specially constructed for that purpose showed that in the single system the want of sufficient consideration of the sine condition showed itself in a not quite precise sharpness.

On the other hand, the advantages of the new system appear clearly when two single systems are exactly centrally united to form a double objective, as shown in fig. 3. This new double objective is formed to possess the same excellent and astigmatic picture plane as the best double anastigmatic lenses hitherto known, and this, moreover, for a still larger opening. This is explained by the compact construction of the

Fig. 3.



composite system and the thinness of the lenses employed. Moreover, the considerably increased sharpness of the image of fine line objects is remarkable, both in the direction of the axis and in that of main rays intersecting it at any angle.

The constructional elements of a double objective of this kind are as follows:—

Radii $R^1 - 71{\cdot}973$ $d^1 - 2{\cdot}246$. Thickness of the lens L.
$R^2 - 88\,944$ $d^2 - 1{\cdot}813$. Air space of both lenses.
$R^3 - 130{\cdot}924$ $d^3 - 4{\cdot}934$. Thickness of the lens L^2.
$R^4 - 59{\cdot}309$.
$\Delta - 12{\cdot}043$. Air space between both single systems.

The glass employed has the following optical properties—

Refractive index for line D { Lens L^1 – 1·5356 / Lens L^2 – 1·6112

The relative dispersion, that is, the refractive index diminished by 1 divided by the dispersion between the lines C and F of the spectrum—

$$\gamma = \frac{n_D - 1}{n_C - n_F}$$ { Lens L^1 – 50·8 / Lens L^2 – 58·6

The focal length of the double objective is 240 mm., the effective aperture 32 mm., the effective angle of the image over 80°.

By comparing the system of two lenses as described above to a system composed of three lenses which form one single body, the advantages to the latter will be readily recognised. In figs. 1 and 2 there are two such systems illustrated side by side, that pattern of the well-known astigmatically corrected three lens systems has been chosen, which mostly resembles the object of the present application with regard to the direction of the radii of curvature. This system consists of a positive meniscus of low refractive index enclosed between two lenses of high refractive index. The figures inscribed on the separate lenses indicate in approximate numbers the refractive indices of the glass employed. As in all astigmatic three-lens systems, the astigmatic correction is obtained by a contact surface, z, which disperses the light and another, s, concentrating it.

The two-lens system also contains two such contact-surfaces z or s, acting in opposite sense, but these are not contact-surfaces between glass and glass, but between glass and air. It is obvious that, for a given aperture of a lens system, the distinctness of the image after correction of the spherical aberration for the peripheral ray increases with the increase of the difference between the refractive indices at the contact-surfaces. The smaller these differences, the deeper is the curvature of said surfaces and the more the intermediate errors increase, that is to say, the spherical deviation of the rays which pass between the centre and the periphery.

These differences of refractive indices consequently in the three-lens-system amount to—

On the surface z: 0·06.
On the surface s: 0·10.

In the case of two-lens system on the contrary

On the surface z: 0·53.
On the surface s: 0·61.

consequently nine or six times more respectively, and therefore the surfaces themselves will possess a considerable flattening as compared with those of the three-lens anastigmatics. The very considerably increased clearness of the image is fully explained by this circumstance.

The new two-lens system can therefore be regarded as a system derived from the three-lens system by decreasing the power of refraction of the enclosed lens until it becomes equal to the refraction of the air, *i.e.* = 1, and that it is no longer a glass lens, but an air lens, enclosed between a biconcave lens and a biconvex lens. Obviously the biconcave lens (fig. 4), or the biconvex lens (fig. 5), or both (fig 6) also can be composed of two or more lenses of equal or nearly equal refraction, cemented together. The condition *sine quâ-non* for getting, for the above-stated object, spherical, astigmatic, and chromatic corrections with

increase in the clearness of the image, is formed by the following criteria.

The back surface of the first biconcave lens of low refractive power has to receive a deeper curvature than the front surface of the biconvex lens of high refraction separated from it by a layer of air. If, for instance, the achromatism of the two systems of lenses can only be approximately attained with the available species of glass, they are able to cancel the still-remaining error without any difficulty by composing one of the lenses of two lenses of approximately equal refraction, but of different dispersion cemented together.

Fig 4 *Fig 5.* *Fig 6.*



THE SCIENCE AND ART DEPARTMENT REPORT.

As might have been expected, the well-known writer, "F.R.A.S.," of the *English Mechanic*, has some forcible comments on the recently issued Report of the Select Committee on the Museums of the Science and Art Department. "When upon former occasions I have attacked that hotbed of jobbery, robbery, and snobbery, South Kensington, in these columns," he says, "I have been accused by friends of individual members of the shameful ring there of being actuated by personal feelings, private spite, and the like. If it were consonant with my dignity to give the lie to such accusations, I do not think that I could do so much more effectually than by pointing to the Report of the Select Committee on Museums of the Science and Art Department, which has just been issued, and urging every one interested in the matter (which means every taxpayer in the United Kingdom) to carefully study this remarkable document for himself. Verily we are guilty of blank hypocrisy when we claim to pull the Tammany Hall mote out of the eye of our American brother and fail to behold the beam of the Science and Art Department that is in our own. Of course, an attempt has been made to burke the damning proofs of the grossest incompetence and dishonesty that have come to light during this investigation; but, thanks to that noble and worthy scion of a noble and worthy house, Lord Balcarres, this has been defeated, and that long-suffering ass, John Bull, at last may, if he chooses, know something of the fashion in which his money has been disposed of in this den of thieves at Brompton. But the matter must not be suffered to rest here. So far, the exposures have been largely confined to the Art Department, with its library containing twenty-two copies (!) of that so familiarly known and so extensively consulted work, Alciatus on 'Emblems;' the advertisements in the *Builder*, the *Garden*, and the *Queen*, bound in half morocco with gilt edges, and the catalogue of 'National Engraved Portraits,' *compiled by the cousin of the Secretary of the Department*, in which three lines are given to Lord Beaconsfield and eleven to Jackson the prizefighter; while Hobson is said to have died 'at the time of the plague' in 1630 (!), and Ballantyne to have become a friend of Sir Walter Scott's in 1873 (!). What sort of a thrashing, I wonder, would a charity-boy have got for such a travesty of history?

"I have just now said that the matter must not be suffered to rest here. In the interests of the British taxpayer, of British science, and of British public morality, a searching inquiry should be instituted into the doings of the Science and Art Department generally, and notably into the way in which public money is disposed of in the precious (so-called) 'Royal College of Science.' If I possess a knowledge of anything (though this is, of course, open to discussion), I do know a little of astronomy; and, on the principle of *ne sutor ultra crepidam*, I will confine myself to the expression of the firmest belief that a fearless and independent investigation of the inception and administration of that contemptible imposture, the Astronomical Physical Observatory ought to lead to such a sham being swept from the face of the earth. I do hope earnestly that the attention of Lord Balcarres will be directed to this. A glimmering of light has at last been let into the Augean stable at Brompton, and every true and patriotic man of science can only hope and pray that it may speedily be illuminated by the full light of day. All the abuses of the old Cole-hole have become not merely crystallised, but magnified and intensified. A beginning, and a good one, has been made. Let the investigation be fearlessly pursued, and action taken upon its results, regardless of any secret backing from the 'Albert the Good' party, who have so far successfully shielded the men who have been defrauding the nation. Nothing but gross apathy and ignorance on the part of the British public can then prevent a most thorough clean sweep of the Science and Art Department altogether."

ROYAL CORNWALL POLYTECHNIC SOCIETY, FALMOUTH, 1898.

(From our Special Correspondent.)

The Sixty-sixth Annual Exhibition of this Society was opened on Tuesday, August 23, at half past twelve, by the Bishop of Truro—there was a very large audience. The Bishop has been elected to hold the office of President for three years (the usual term). He gave a very brilliant address. On the platform and among the audience were Mrs. Gott, wife of the Bishop, The Earl of St. Germans, Lord Robarts, Sir Vyell Vivian, Sir Bradford Leslie, K.C.I., Lady Foljambe, Colonel and Mrs. Tremayne, Mr. Pendarves Vivian, Lady Jane Vivian, Mr. H. Dyke Acland, Professor Grylls Adams, F.R.S., Captain Targel, R.N.; there was also a large gathering of the country clergy, Mr. H. S. Hill, curator, Mr. W. Brooks of the Photographic Department, Mr. E. Kitto, F.M.S., Secretary of the Society, and many others.

The Bishop then referred to the Photographic Department in very high terms, and to several of the exhibits. He called special attention to the exhibit of Messrs. J. J. Griffin & Son, of London: "Velox" rapid-printing paper, which seemed a great attraction in the body of the hall. Messrs. Griffin & Son are to be congratulated upon securing the services of such a high-class and practical demonstrator (of "Velox") in the person of Mr. W. J. Belton, whose services were in great request the whole time of the Exhibition, and kept well busy by the crowds that were attracted by his lucid demonstrations, and we have no doubt that the Society would like to see Mr. Belton again.

On Wednesday and Thursday evenings Mr. Lynd gave two lectures to large audiences on Marconi's system of wireless telegraphy; each lecture was illustrated by the same apparatus that was used at Osborne.

On Friday night Mr. W. Brooks gave a lantern entertainment to a very large audience. The slides were by Mr. C. T. Dent, late President of the Alpine Club, of Alpine and Caucasian scenery, followed by a selection of Mr. Gambier Bolton's animal studies; these were followed by a large series of slides by Mr. W. Brooks of Reigate, after which the business of the drawing for the art union prizes brought the evening to a close. On Saturday the Exhibition closed.

On the Wednesday excursions were run by the Great Western Railway from Plymouth and all stations down to Falmouth, and from Penzance up to Falmouth. The Exhibition was largely attended by photographers, both amateur and professional, and there is no doubt that Messrs. Griffin & Son were benefitted by their attendance. It is a pity the other large firms do not avail themselves of the advantages more than they do, as it seems to be a key to the two counties of Devon and Cornwall.

Photographic Department.—The Judges' Report.

The Photographic Section of the Exhibition contains many pictures of great merit, well worthy of careful study. The generality of the pictures are somewhat smaller in size than hitherto. In portraiture, W. J. Byrne, of Richmond, and G. Lafayette, of Glasgow, show some very fine large pictures, in their well-known style, and there are many other exhibitors who show work of smaller size. J. H. Coath, of Liskeard, is represented largely in his well-known style. The Amateur Department is well represented.

The first picture in the catalogue, an enlargement from a cabinet negative, by Mr. Henry Ward, of Leicester, receives first bronze medal. In tone it is like a well-toned silver print; it appears to be quite a new departure in enlarging. The artist gives the name of the process "Auro." Mr. Edwin Mathews sends a picture in carbon, *Naomi*, which is pleasing; he also sends two others. Mr. W. Illingworth is represented by several examples. *Head of Old Man* has been awarded first bronze medal, being full of character. Mr. A Patterson shows one picture, *Herbert*, which shows careful work. Mr. A. Jane, of Bodmin, seems to have improved in his work, and there is still room for further improvement in technical detail. J. C. Douglas sends some good work in several classes. Lane scenes, by W. Mansfield, are pretty in their way, but a little more variety would have been better. C.M. Wane receives first bronze medal for some instantaneous work which is very clever. Mr. C. Court Cole contributes several specimens of his work, but the Judges have seen work of his in former years which they have liked better. Mr. G. Lafayette, of Glasgow, is represented by three examples. To *Harmony* is awarded a second silver medal. Mr. W. Norrie shows a frame of pictures representing the herring fishery. The series are fine examples of photographic art, and leave nothing to be desired. To these a second silver medal has been awarded. Mr. Percy Lankaster, of Tunbridge Wells, sends some pretty pictures of a peculiar style of the *genre* order, and also some small portrait studies. Mr. L. Baron Nansen contributes a portrait of a child. Mr. Luke Berry sends a picture, *A Wild Duck Sitting on Nest*, and also an enlargement of some swans of fair merit. Mr. Barton Graham contributes *The Rising Moon Began to Flow*—an artistic production. Mr. J. Milman Brown, of Shanklin, Isle of Wight, sends two small examples. Mr. J. H. Coath, of Liskeard, is strongly represented by pictures, mostly of the *genre* order. No. 591, *That's when I was Young*, takes second silver medal. It is an old man evidently telling a tale to some young girls which seems to amuse them, by the expressions on their faces. The same artist shows some very clever grouping of dogs, &c. Mr. W. J. Byrne, of Richmond, receives a well-merited award for a portrait of large size taken direct of Miss Whiting, No. 595, being well-modelled, graceful in

pose, and very perfect in treatment. He also has several groups and two frames of characteristic pictures of children in his well-known style of treatment. Mr. W. H. Harrison, of Falmouth, is awarded first bronze medal for landscape. The same artist sends several enlargements, &c. Mr. R. Pratchett, of Bristol, receives a first bronze medal for a very fine portrait enlargement, which is perfect in its way. Mr. C. J. King, of St. Mary's, Scilly, has been awarded a first bronze medal for wild birds in their natural haunts, the work being of a most difficult character, as the title implies. Messrs. Judge & Co., Croydon, send an enlargement about 60 in. by 40 in. The background is apparently all worked in, and, as far as photography is concerned, there is very little to be seen. Mr. W. H. Pugh sends some animal studies.

Amateur Section.

Mr. A. J. Loughton sends some very careful and effective work of architecture in Southwell Cathedral. All the examples are well treated. No. 665, *Spandrel in Chapter House*, is a very fine example of photography, to which has been awarded a first bronze medal. Mr. A. Old for twelve hand-camera studies takes first bronze medal, which are of very considerable merit. Mr. J. Kearney, jun., also receives a first bronze medal for instantaneous work; his hand-camera work is not so good. W. S. Aston takes a second silver medal for landscape, *An Autumn Evening*, which is of a very high order and full of atmosphere. His other subjects bear the stamp of the artist about them. Dr. G. B. Fergusson sends some very clever animal studies of cats to No. 679, a picture of two kittens, full of animation, and justly merits the award of a first bronze medal. The other five are in no way inferior.

Mr. S. M. Whiteman is represented by some small examples of architecture. Mr. W. F. Slater also contributes, and Mr. E. Lamb shows in several classes *The Choir, Ely Cathedral Looking West*. It is a very fine example of light and shade, and receives first bronze medal. Mr. C. H. Oakden shows some good architectural work. *Across the Choir, Winchester Cathedral*, is a good example Mr. E R. Bull, first bronze medal for *Great West Doorway Lincoln Cathedral;* a very fine example of exterior work, being bold and massive. Mr. A. J. Jeffreys is represented by examples showing good manipulation. Mr. C. Metcalfe contributes six frames of flower studies from negatives evidently of good quality, but being printed in a heavy greenish-blue very much mars the effect. Mr. E. G. Boon, T. A. Price, and S. E. Fisher send some small pictures of average quality.

Mr. G. Hepworth, of Brighouse, is represented by some excellent examples of interior architecture, but small in size; the Judges would like to see some larger work by the same gentleman. Mrs. Annie Blamey, of Penryn, who shows great perseverance, has greatly improved in her work since last year, enters in several classes; the Judges have awarded a second bronze medal as a special award for her hand-camera pictures. An enlargement of one of the subjects is very good.

Photographic Appliance Section.

Mr. C. Palmer shows a very ingenious hand camera, which shows very clever workmanship, which the Judges *highly commend*, the great drawback to it is its size and weight, which is fatal to all hand cameras.

EASTMAN PHOTOGRAPHIC MATERIALS COMPANY.

An Extraordinary General Meeting of the shareholders of the Eastman Photographic Materials Company, Limited, was held on August 23, at Winchester House, Old Broad-street, E.C., for the purpose of considering and, if thought expedient, passing a resolution for the sale of the undertaking and property of the Company to Mr. George Eastman, Rochester, New York. Mr. Andrew Pringle, J.P. (Chairman of the Company) presided.

The Secretary (Mr. J. M. W. Bennett) read the notice convening the meeting.

The Chairman said: Gentlemen, in view of the fact, which is well known to all of you, that last year the matter which is again before you was very considerably thrashed out at a meeting of the shareholders of the Company, and considering that no very material difference has been made on the suggestions then made before you, my task to-day will be simple and short. Although in certain details the suggested arrangements have been altered, still none of these alterations are material, the conditions of the whole scheme remaining, in the opinion of the Directors, practically as they were before. We are not aware of any element of material change having entered into the proposal, and we believe the conditions offered to us are in no way worse than they were when last we discussed the subject and when we were practically unanimous that the arrangement for transfer should be carried out. On account of the season of the year we could not expect to have a very large meeting of shareholders to-day, and we are exceedingly obliged to those shareholders who have shown sufficient interest in the scheme to take the trouble to attend this meeting. It is only right you should know that the shareholders, as a body, have not been inert in the matter; indeed, several have shown a lively and intelligent interest in it. You have had the circular as to the proposed change so long before you, that I take it there is no necessity for me to enter into the subject, or to describe or discuss the slight differences that I have already alluded to. But I want you to understand quite fully that the shareholders have taken a very proper interest in our scheme, and as a matter of fact, as you will see on the table, a very large number of proxies relating to the voting on this particular question have been received. Moreover, I wish you clearly to understand that we are not rushing the thing in any way, and that our shareholders have not only had the opportunity, but have taken opportunity of criticising the scheme. I shall, in proof of this, read two or three letters we have had from shareholders who have taken different views of the question. Here is one from Mr. Cook: "Dear Sir, I approved of the scheme whereby Mr. Eastman paid the shareholders in cash for their shares, but I do not approve of the new scheme by which he gives shares instead of cash in the new Company." Mr. J. W. Ryder writes: "I still wish to receive full cash payments on all my shares in accordance with the agreement of last year. It seems to me there must be a serious depreciation in the amount of dividends to the present shareholders under the proposed arrangements, both as to the profits already earned and in the new Company when formed." I do not fully understand, myself what that means, and is not the first time I have read Mr. Ryder's letter. I do not quite gather what he wishes to convey. There is another letter from Mr. Richardson. He writes: "I fear I cannot attend the Eastman meeting on the 23rd, but I feel I must write a few words to put on record my dissent to the new scheme. I cannot see what necessity there was for giving up cash payment. If the cash bonus is to be done away with, I can only regret the plan of selling was ever entertained, as I think it would have been much better to continue as we were. If I can come to the meeting, I shall certainly vote against the proposition." In passing, I may say there is a sentiment in that letter which I hear now not for the first time, and that is, that we are doing so well at present that we are perhaps giving ourselves away altogether by amalgamating the companies. I wish to take the bull right by the horns, as usual, and say that we have no certainty whatever, under our present conditions, we can continue to pay you twenty per cent per annum for an unlimited space of time. We depend so much upon the American side as to prices charged for goods, and there are many things which might alter, and it is far from certain we can promise, under present conditions, to pay you that dividend. It is a big dividend to pay, even on a commercial concern like this, but I personally firmly believe that by the amalgamation of all our forces we shall very much strengthen our position, and have a better chance of paying a sure and even a better dividend than we pay at the present time. I will now read you a letter from a gentleman who was present at the last meeting and took an active part in the discussion, Mr. Wotton: "I enclose you signed proxies, and, if it is worth your while to do so, you may say at the meeting that, having read your circulars very carefully, I am perfectly satisfied we as shareholders ought to put through unanimously the necessary resolutions. There are obvious reasons, which it may not be advisable to go into at a general meeting, for amalgamation, and I hope it will be completed as soon as possible." There is no need for me to say anything further on the subject, but, should any shareholders desire further information, I shall be happy to give it. I will now move the first resolution: "That this meeting of the shareholders of the Company hereby approves and sanctions the sale by the Directors to Mr. George Eastman, of Rochester, New York, of the undertaking and property of this Company upon the terms and subject to the conditions set forth in the draft contract contained in the printed document which is now submitted to, and is approved of by, this meeting, and which, for the purpose of identification, is subscribed by the Chairman thereof."

Mr. Spiller, in seconding the motion, said he had read very carefully the papers which had been sent to him, and had also made inquiries of the Directors, and he had no hesitation in saying that, as a shareholder, it would be to his interest to vote for the adoption of the resolution. He was satisfied on this ground that, as a purchaser of original shares at the price of 10*l.*, he was well content, for one, to have them now valued at the price of 20*l.* 10*s.*, the odd 10*s.* he imagined to be practically the counterpart of what Mr. Eastman himself promised, namely, five per cent. for the underwriting of the shares. As the resolution now before them was in accord with what they had previously decided, he thought they should adopt it.

Mr. Henry Verden, in reply to shareholders, said that 10*s.* per share added to the price was the equivalent of the commission offered to the members under the old scheme for exchanging cash for shares or underwriting, but it had nothing to do with commission on any additional applications. The matter was entirely a question of bargain between Mr. Eastman and individual shareholders outside the contract before the meeting. The new Company would be formed on the lines of the one contemplated earlier in the year, and the Directors who then consented to act would probably be on the Board of the new Company.

The Chairman, replying to a shareholder, said he believed the new Company would be equally as successful as the present one.

The resolution was then put to the meeting and carried.

Separate meetings of the preference and ordinary shareholders were then held, at which resolutions were unanimously passed approving of the agreement for varying the rights of the members, in order to carry out the amalgamation.

The Chairman: I have no doubt you will be glad to hear from me a

statement with regard to the general affairs of the Company. They are, as they have been for some time past, entirely satisfactory. We are doing well all round, and in every department that I know of we have cause for congratulation. All our old branches are doing well, while our new branches are showing themselves useful and profitable. You will not be very much disappointed to learn that to-day your Directors are going to sign dividend warrants for an interim dividend at the rate of twenty per cent. per annum. You will get these in a day or two, and the money as soon as you like.

Mr. JAY proposed a cordial vote of thanks to the Chairman.

Mr. GOSLETT seconded the motion, which was carried *nem. con.*

THE "ONE AND ALL" PHOTOGRAPHIC COMPETITION.

THE following is a list of the prize-winners in this competition:—

Class I. (Best Work man's Town Garden).—First prize, A. Powell, of Penge, S.E.; second prize, E. Treadwell, of Highbury Hill, N.; third prize, A. C. Firmin, of Walthamstow.

Class II. (Best Cottager's Country Garden).—First prize, E. Biswell, of Beckenham; second prize, A. Hawkins, of Oxford; third prize, D. Reid, of East Sheen, Mortlake.

Class III. (Best Window Garden).—First prize, Miss N. A. Jones, of Denbigh; second prize, A. Despledge, of Sawbridgeworth.

Class IV. (Best Floral Porch or Archway) – First prize, Miss M. Morriss, of Enfield; second prize, R. Wicks, of Brighton.

Class V. (Best Backyard or Corner rendered beautiful by Floral Adornment).—First prize, R. Wicks, of Brighton; second prize, W. Biswell, of Beckenham.

Class VI. (Best Example of Rockery or Grotto Prettily Planted).—First prize, Miss E. Mathew, of Beckenham; second prize, A. Bentley, of Durham.

Class VII. (Best Arbour Clothed with Creepers).—First prize, Miss M. Morris, of Enfield; second prize, O. Mead, of 11, Victoria Park, E.

Class VIII. (Best Hanging Basket grown in Window or Greenhouse).—First prize, A. Despledge, of Sawbridgeworth; second prize, Miss A. Harman, of Lewisham.

Class IX. (Prettiest Interior of Small Greenhouse or Conservatory).—First prize, H. Verrey, of Oxshott, Surrey; second prize, A. Despledge, of Sawbridgeworth; third prize, A. J. Day, of Ongar.

Class X. (Best Example of Greenhouse utilised for Tomatoes and Flowers).—First prize, E. Jones, of Surbiton; second prize, R. Wicks, of Brighton.

Class XI. (Best Collection of Garden Views).—First prize, C. Byrne, of Richmond; second prize, E. Downer, of Watford; third prize, F. Sills, of Berkhampstead.

Class XII. (Best Collection of Sylvan Scenes).—First prize, H. C. Wharton & Co., of Kilburn; second prize, F. Spalding, of Chelmsford; third prize, G. H. Sills, of Berkhampstead.

Special honourable awards added on recommendation of the Judges:—

Class XII.—Silver medal, G. E. Cousins, of Bury St. Edmunds. Bronze medals, Messrs. French & Co., of Wallington; F. Barnes, of Faversham; Duyshart & Co., of Chelmsford; R. W. Wilmot, of Forest Hill, S.E.

Class V.—Certificate, R. W. Wilmot, of Forest Hill, S.E.

Class XI.—Certificates, E. Edwards, of Worthing; F. Spalding, of Chelmsford.

Class XII.—Certificate, O. Mead, of Victoria Park, E.

A NEW DEVELOPING SINK.

THIS sink, which is being introduced by Messrs. R. & J. Beck, of 68, Cornhill, E.C., has been designed with a view to meeting the requirements of either the amateur or the professional photographer.

On the right and left above the sink are shelves for holding measures and bottles containing chemicals, leaving the centre of the back clear for the dark-room lamp, while further to the left and right are racks for carrying dishes.

Two platforms of shelves surmount the racks, and, if the user does not desire to have water laid on to the sink, these shelves can be used as supports for one or more tanks connected by a rubber tube to the swing tap over the sink.

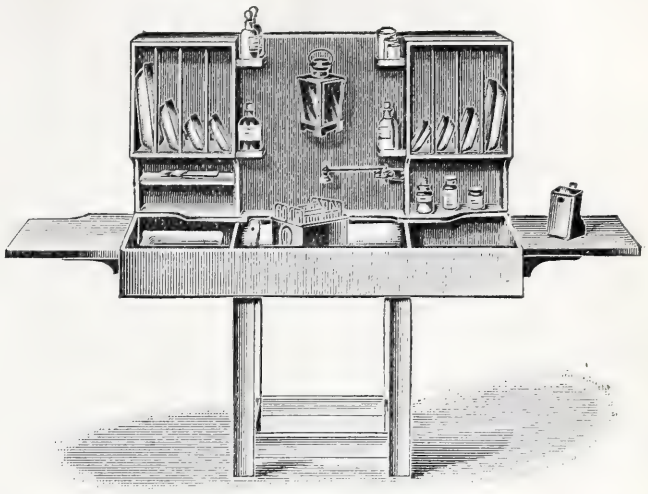
A support below the sink is provided, which can be used, if desired, to carry a tank to take the place of a drain.

On each side of the sink, and level with it, is a well for holding a dish containing hypo or any other dish which it is desired to place where it cannot get splashed or contaminated by chemicals which are being used.

These wells have hinged covers or flaps, and are useful for keeping plates or films away from the light during development, especially when isochromatic films or plates are being handled. The hinged covers form handy tables or benches, either when open or shut.

An indiarubber mat, to lie at the bottom of the sink to prevent breakages, can be supplied for a few shillings extra.

The dimensions are:—Length, closed, 4 ft. 6 in.; length, when flaps are open and used as shelves, 7 ft; width, 1 ft. 10 in.; height of sink from ground, 2 ft. 10 in.; height of back from ground, 5 ft. It is fitted

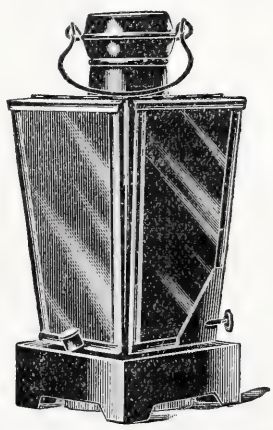


with earthenware vitrified sink, 24 × 17 in., and nickel-plated swing tap, having nozzle for filling bottles and a rose for spray, either of which can be used by turning it into position.

THE BIVEX DARK ROOM LAMP.

R. & J. Beck, 68, Cornhill, E.C.

THE special feature of this lamp is that it allows the whole of the dark room to be illuminated, It has two faces, meeting at an angle in the front and sloping inwards at the bottom, and glazed with two ruby or a



ruby and an orange frosted glass as desired, or extra interchangeable glasses can be supplied, so that the lamp can be used for bromide work and other purposes besides developing negatives. The illuminant is oil.

Our Editorial Table.

MESSRS. SOUTHALL BROTHERS & BARCLAY, 1 Broad-street, Birmingham send us a sample of a new printing frame which should be found useful by professional as well as amateur photographers. It is so made that the back does not take off, and therefore cannot be lost, and the whole of the print may be examined at once, with the exception of about half an inch.

To load the frame it is simply necessary to place it face downwards on the table, and apply pressure on the end where two studs project on the front. The negative and paper may then be easily inserted while they are clipped by the bottom of the frame, both of them being firmly fixed until the pressure is again applied on the studs, the object of which is to actuate the spring that gives the necessary pressure for holding negative and paper in position. It is an excellent printing frame, and the fact that having no detachable parts, it also allows of practically the whole of the print to be seen, should make it popular. It is very well made.

MESSRS. SHARP & HITCHMOUGH, 101, Dale-street, Liverpool, have kindly sent us a photograph, taken with their 30s. Aptus hand camera, of lightning during the storm on Sunday, August 21. The photograph is a remarkably good one, and shows what great excellence of result is obtainable with inexpensive apparatus.

MESSRS. ARCHER & SONS, 41 to 49, Lord-street, Liverpool, send us a recently issued list of second-hand cameras and lenses they have for sale. Some very good bargains appear to be obtainable, hand as well as stand cameras in considerable variety being offered.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, September 7, at eight o'clock. Discussion upon intensifiers, held over from August 24:—"Mercury compared with Silver and Uranium as Intensifiers."

HACKNEY PHOTOGRAPHIC SOCIETY'S ANNUAL EXHIBITION, November, 1898. —Entry forms are now ready and may be had on application to the Hon. Secretary, W. Fenton-Jones, 12, King Edward-road, Hackney, London, N.E.

THE next meeting of the Manchester Photographic Society will be held at the Rooms, 44, Mosley-street, Manchester, on Thursday, September 8. Subjects: "Sandell Plates," Mr. Grundy; "Pyro-acetone Developer," Mr. Harry Wade.

"TIXIT."—Recently, when referring to the piracy of this word by the organizer of a missing-word competition, we omitted to mention that it is the registered trade mark of the Vanguard Manufacturing Company of Maidenhead, whose excellent preparations are well known to our readers.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—On Monday next, September 5 Mr. E. J. Wall will lecture on "Some Optical Experiments," at Hanover Hall' Hanover square, Peckham, and to which friends are cordially invited. On September 10, an excursion to the backwaters of the River Lea, under the leadership of Mr. G. E. Marshall, will be held. Further details may be obtained of Mr. A. E. Allen, Hon. Secretary, 27 Prince's-square, Kennington-cross, S.E.

EARLY on Saturday morning an attempt was made to enter the premises of Messrs. Adams & Co. in Charing Cross-road and Cecil-court. A window was smashed, and the noise attracted the attention of a police constable. On going to the place he saw three men. Two escaped, but he arrested one after a desperate struggle. At the police-station he gave the name of George Smead, and stated that he was a carman residing in Bermondsey. In his possession were found some jemmies beautifully made. The police consider the arrest important. Several burglaries have recently been effected in the locality. Smead was charged at Marlborough-street and remanded.

THE State expenditure on education in Germany has increased during the last eight years (1890–97) by nearly 3,500,000*l*. Of this increase, religious expenditure accounted for 430,000*l*.; universities, 580,000*l*; higher education, 320,000*l*; elementary education, 1,470,000*l*.; art and science, 186,000*l*.; technical education, 107,000*l*.; religion and education, 150,000*l*.; medical expenditure figuring last and least with 43,000*l*. of an increase. The chief item of increase was elementary education. The charge to the State under this heading was only 225,000*l*. in 1871. In 1887–88 it had risen to 1,333,000*l*. In 1890–91 charges were transferred from the communes to the State, which then had to pay 2,900,000*l*. towards elementary education, a sum which has since risen to 3,300,000*l*. The State contributions are so organized, that, while it bears the greater part of the charges for schools in the country districts, the town schools are made more than self-supporting.

THE THORNTON-PICKARD MANUFACTURING COMPANY'S TRIP TO LLANDUDNO.—On the 23 ult. the *employés*, accompanied by the Managing Director and office staff of the above Company, took part in a day's excursion to the seaside. Leaving Broadheath Station by special train at 7 o'clock in the morning, a party numbering over three hundred arrived at Llandudno at 9.40. The weather being fine, the holiday-makers did their best to enjoy the many attractions of this beautiful watering-place. During the day two substantial meals were provided at Mr. Smith's restaurant, in Mostyn-street, and the good things there provided gave great satisfaction. At 7.20 p.m. the party collected at Llandudno Station, and the special train, which was again in waiting, carried them back to Altrincham, where they arrived at 10.30, without mishap of any kind, after having spent a most enjoyable outing which had been planned and carried out to the satisfaction of everybody.

AN ARTFUL DODGER.—Henry Freeman, a seedy-looking individual, of Lower Sydenham, was charged on remand at the Bromley (Kent) Petty Sessions, with obtaining 3*d*. by means of false pretences from Frederick William Bennett Hinde, a schoolmaster, of 56, Kent House-road, Beckenham, Kent. The prosecutor's evidence was to the effect that the prisoner called upon him and represented himself as a photographer from the Crystal Palace, and asked permission to take a photograph of witness's house. The permission was given, and the prisoner went through the process of taking a photograph. After he had finished, he told witness that he simply wanted to advertise his machine, meaning the camera, and that, if witness would give him 3*d*. to pay the postage, he would send him a photograph in colours of the house. Witness gave him the 3*d*., and prisoner added that for 6*d*. he would send him three photographs. Witness refused to give him any more money, and the prisoner went away. Afterwards a neighbour, who was detaining prisoner, told him that prisoner had six months before obtained 2*s*. from his servant by means of false pretences. A policeman was then called, and the prisoner was given into custody. A police constable stated that the camera was useless for photographic purposes. The charge was reduced to one of stealing 3*d*. by means of a trick, and the prisoner then said there was a plate in the camera, but that it got broken in the excitement. A previous conviction was proved against the prisoner for a precisely similar offence, for which he was sent to gaol for one month with hard labour in May last. The prisoner now pleaded guilty and was sent to prison for two months with hard labour.

Patent News.

THE following applications for Patents were made between August 15 and August 22, 1898:—

CINEMATOGRAPHS.—No. 17,805. "Improvements in Cinematographs and like Instruments for the Protection of Kinetoscopic Pictures." W. C. HUGHES.

CINEMATOGRAPHS.—No. 17,831. "Improvements in Apparatus for Animated Photography." J. A. PRESTWICH.

DAYLIGHT CHANGING.—No. 17,835. "Apparatus for Changing Plates in Photographic Cameras or Dark Backs in Daylight without the Use of a Dark Room or its Equivalent." C. L. HETT.

FLAT CAMERAS.—No. 17,857. "Improvements in Flat Cameras." R. KRÜGENER.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

September.	Name of Society.	Subject.
5	North Middlesex	Informal Meeting. Eighth Lantern-slide Competition.
5	South London	*Some Optical Experiments.* E. J. Wall.
6	Gospel Oak	*Architectural Photography.* C. Stone.
6	Hackney	*Architectural Photography.* H. W. Bennett.
6	Rotherham	*The Lantern: its Construction and Use.* Paper lent by R. Bourke, of Leeds.
7	Borough Polytechnic	Print and Negative Criticisms.
7	Photographic Club	Discussion: *Mercury Compared with Silver and Uranium as Intensifiers.*
8	Gospel Oak	Excursion: Hampstead Heath.
8	Manchester Photo. Society	*Sandell Plates.* Mr. Grundy.—*Pyro-acetone Developer.* Harry Wade.
10	Hackney	Excursion: Lea Valley (Chingford to Ponders End). Leader, W. Lee.
10	South London	Excursion: Backwaters of the River Lea. Leader, G. E. Marshall.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 25,—Mr. F. C. Kellow in the chair.

Mr. A. L. HENDERSON inquired for the experiences of those who had used acetone in conjunction with hydroquinone, and whether there was any attendant advantage, compared with alkali, as regards speed for instance.

Mr. J. E. HODD had experimented with it lately, using metol, ortol, and pyrogallol. He did not find it any quicker than alkali, and personally did not see where it was going to score. With the fresh solution of acetone he had worked successfully, but in his hands the solution quickly lost its power, the addition of sulphite, however, restoring activity. As a developer he liked it well enough; it went methodically on and got everything possible out of the negative, and, moreover, did not fog or frill. There appeared to be no advantages to be claimed in shortening exposure. He had not used acetone so far with hydroquinone.

The use of persulphate of ammonia for reducing was the subject of some remarks.

Mr. HENDERSON found it altered the colour and made the whites very yellow. He was anxious to know what was its action. Was it a dissolving of silver without alteration of the remaining metal, or was it an alteration of colour only without any removal of silver?

Mr. FRY thought it undoubtedly dissolved away the image, which became markedly thinner, with an accompanying milkiness of solution.

Mr. HENDERSON said he should be inclined to treat the negative or print again with hypo, to dispel any liability to change and render the photograph more permanent.

The discussion, which was of a conversational nature, gradually became one upon double tones, and the permanence of prints toned and fixed in the combined bath.

The CHAIRMAN spoke of having in his possession prints produced in this way which were done many years ago and were still in an excellent condition.

Mr. HENDERSON championed the combined bath. He severely criticised the statements of some makers of papers to the effect that such results were not permanent.

Mr. A. MACKIE remarked on the pink tint which often appeared in the

lighter tones in the toning bath, which was probably a deposition of gold resulting from the longer time necessary in a bath weak in gold, under which circumstances the thing most frequently occurred. He also made reference to the instructions for washing P.O.P. prints, which almost without exception prescribed the use of plain water for the preliminary washing. Mr. Mackie got the best results by using salt and water, and transferring the prints from this, without rinsing, into the toning bath, and invariably adopted this method.

Mr. HENDERSON added that an alternative course was the acetate of soda bath. The prints coming from this washing bath toned quicker and the whites retained their integrity.

A question was asked as follows: In printing contact bromide prints, does the use of ground glass in the printing frame soften the resulting prints, and is this effect independent of modification in development?

Was not this simply lengthening the exposure by reducing the light? inquired one speaker, whereupon there ensued a discussion as to whether slow printing did or did not have any effect on the print as compared with rapid printing.

Mr. WELFORD stated that the ground glass exercised a diffusing influence, and in a contact bromide print gave a flatter image than if the paper were exposed in the usual way.

Mr. HENDERSON asked, in connexion with this point, whether any printing-out process could be named which gave a true rendering of the tones of the negative as compared with a developed image.

Mr. WELFORD thought no paper came near bromide paper in its power of reproducing the tones in a negative. He would not say true gradation, but certainly for more gradation bromide was ahead.

The discussion concluded on the point whether gelatine and albumen paper were affected in the result by longer or shorter printing.

PHOTOGRAPHIC CLUB.

AUGUST 24.—Mr. G. W. Tottem in the chair.

Mr. W. D. Welford presented the fourth edition of *The Hand Camera and How to Use it* for the Club's library.

Mr. Edward H. Short, the official photographer to the Cape Government Railways, showed a comprehensive and very interesting series of slides descriptive of South African scenery and of the railway system with which he is connected. The large audience were able to observe the rapid growth of many of the towns during comparatively recent years, and of the advance of the railway into regions which not so long ago had to depend upon the slow-moving waggon for transport services.

Mr. MEDLAND and Mr. STRETTON both testified from personal acquaintance with the subjects of Mr. Short's slides to their appreciation of his work, and the meeting passed a hearty vote of thanks to the lecturer for his interesting remarks and display.

Hackney Photographic Society.—August 23, Mr. E. Farmer presiding.—The ordinary business having been transacted, Mr. ROLAND WHITING read a paper on

FIGURES IN LANDSCAPES.

He said that landscapes without animated objects were sometimes wanting in interest. Artists had, at all times, found the necessity of introducing figures into landscapes; but this was a more difficult matter to the photographer, by reason of the limitations imposed in shape of suitable models, costumes, &c. Still, much might be done with patience and determination. In discussing the rules governing the introduction of figures in general, he said that there must be a concordance of all items in the picture. Variety was especially necessary in a photograph, because colour was absent. Figures must have some apparent connexion with the subjects, but action must never appear violent, nor repose appear as deathlike rigidity. With the aid of the blackboard the lecturer gave directions as to grouping, and the management of light and shade in composition. He pointed out that the picture must not be overcrowded with figures, but only as many left in as were necessary. All figures whose presence was not necessary to the picture must be removed. In the discussion which followed, and, in answer to Mr. Fenton-Jones, Mr. Whiting said that the best place to put figures in a landscape would be at the point where one would naturally expect to see them. The choice would depend also on the nature of the picture. If the figures formed the subject, then they should be placed in a prominent position, and the landscape subordinated to them; if, on the other hand, the landscape formed the subject of the picture, the figures should be placed so as to be merely accessories to it.

FORTHCOMING EXHIBITIONS.

1898.		
Sept. 26–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
,, 30–Nov. 5	.....	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

EXPOSURE METERS.

To the EDITORS.

GENTLEMEN,—I think that Mr. Randall is rather hard on "the traders and patentees" in his papers on exposure meters, and in his letter in your issue of Friday last. What has been patented in each case is merely the form of the instrument for making the necessary calculations: all of these are necessarily forms of the slide rule, whose principles are well known, and can only be explained by mathematical considerations: I fail to see that the statement that they are logarithmic scales explains anything; it merely changes the difficulty.

All photographers owe a debt to Messrs. Hurter & Driffield for their mode of accurately determining the relative speed of plates; that is a great advance, and if plate-makers knew their own real interests, they would avail themselves of it in all cases and give as much information as possible on the properties of the plates they offer us. But the value of the actinograph is another question, though it professes to refer to a natural standard, the origin of its scale is in reality as arbitrary as that of either of the others in use. The great defect of the instrument is, however, that it practically assumes that the photographic energy of light depends only on the sun's altitude; a hypothesis which, so stated, seems too evidently erroneous to be adopted. The consequence is that it is necessary to estimate the variations from this assumption, and, moreover, to furnish separate cards for use in varying latitudes, since the sun's altitude is not the same in all places at the same hours.

Watkins' meter, on the other hand, gives the means of estimating the actinism at the time and place, and in this respect is, to my mind, far superior to the Actinograph, but it involves the use of four scales for calculating the exposure required.

There is, however, a meter (Wynne's Infallible) which only requires the use of two scales, and a single setting, to give an equivalent result: it is consequently much more simple than Watkins', and as far as I can see quite as trustworthy. Both require to be supplemented to some extent by estimations, such as of the effects of distance and colour in the object. The great difficulty, of course, in this, as in all actinometers, is to secure such an exposure for the sensitive surface involved as will give it a similar illumination as that of the shadows of the objects depicted in the camera. If this be done, and the exposure be regulated so as to give detail in the deepest shadows, I do not think that there is much to fear from a change in the light between its measurement and exposure.

I have said that I wished that the makers of plates would use Hurter & Driffield's mode of determining the speeds of their plates. This may be thought inconsistent with my recommending meters using a different scale, but, as a matter of fact, there is no difficulty in comparing the numbers on the different scales.

H. & D. and Watkins both measure the speed by the seconds of exposure required; hence one number should be, and is, a simple multiple of the other. I am sorry that I have mislaid the note I had of this ratio, but it can easily be ascertained by any one.

The case of Wynne's number is not so simple. It is n, the denominator of the fraction, f-n, which measures the aperture, which requires an exposure of the actinometer tissue to give a well-exposed picture of a suitable object with what is considered a standard light. Hence Wynne's number should be proportional to the square root of either of the other two I have mentioned. I have found that the relative numbers on Wynne's speed card are sufficiently expressed by

$$\text{Wynne's number (or F)} = 10\sqrt{\frac{\text{4 and D}}{1{\cdot}22}} \text{ or } \sqrt{82\ \text{H and D nearly}}$$

$$\text{or conversely, H and D} = 1{\cdot}22\left(\frac{\text{F}}{10}\right)^2 = \frac{\text{F}^2}{82} \text{ nearly}$$

but I need hardly tell any expert that the personalities of the estimators are liable to make changes in the figures. It is because the personality appears to me so much smaller in Hurter & Driffield's procedure that I recommend it for adoption generally, both the other numbers might also be given as derived from this, and if independent determinations were made the results would be a check on errors. The numbers are so given by the makers of the plates I have been in the habit of using, and I have found the correspondence fairly satisfactory.—I am, yours, &c.,

J. F. T.

THE YORKSHIRE PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Will you kindly permit us to correct a wrong impression prevalent with reference to the above Exhibition, in consequence of an

inaccurate report which has lately appeared in a contemporary. The report read as follows: "There will be two sections, *one for work by the Yorkshire Societies*, and another a loan collection of representative work." Our Committee decided at the outset (1), that there should be no grouping of societies' exhibits, (2) that it was not advisable to limit this section of the Exhibition to work from members of the Yorkshire Photographic Societies. We make no restriction; any person, resident in any part of the country, may send in photographic pictures to the Judges. It is not necessary that the exhibitor shall be a member of any photographic society. The invitation (loan section) pictures, of course, do not come within the jurisdiction of the Judges or jury of selection.

The object of our Committee is to get together a large collection of high-class pictures, in order to demonstrate to the Yorkshire public the artistic possibilities of photography.—We are, yours, &c.,

EZRA CLOUGH,
FRANK NICHOLSON, } Hon. Secs.

13, *Chesham-street, Bradford, August* 27, 1898.

PHOTOGRAPHING LIGHTNING.

To the EDITORS.

GENTLEMEN,—The enclosed photograph of a flash of lightning taken during the storm of Sunday, August 21st last, exhibits some characteristics which it would be interesting to have an explanation of. The negative was taken with a hand camera held against a wall, and the shutter was opened immediately before and closed immediately after the flash. As it is generally supposed the duration of lightning is rather less than the ten-thousandth of a second, it is rather incredible that the camera could have had an angular displacement sufficient to account for the doubling of the image through the whole length of the flash. You will also notice the double images of the flagstaff and buildings. It was raining during the exposure. Some of your readers may possibly be able to explain the phenomenon.—I am, yours, &c., R. C. HARRIS.

44, *Partridge-road, Roath, Cardiff.*

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Mr. H. Everett, 55, Locksley-street, Burdett-road, London, E.—*Photograph of Mrs. Eames, of Selworthy Green, Somerset.*

David Stickells, High-street, Cranbrook, Kent.—*Photograph of the Rev. Alban Henry Harrison, Rector of Great Chart, Kent.*

Mr. H. Bartholomew, Great Linford, Newport Pagnell.—*Two photographs of* 1st *Bucks Rifle Volunteers, taken at Aldershot, August* 4, 1898.

RECEIVED.—R. MCCONCHIE; F. C.; C. RICHARDSON; and others. In our next.

FORETHOUGHT.—Send our publishers three prints and one-and-sevenpence, and they will effect registration for you.

INQUIRER.—We do not give addresses of contributors. Send us a stamped letter, and we will forward it. Probably the Paget paper was meant.

STICKPHAST.—1. Against our rules to reply by post. Messrs. Penrose's address is 8, Upper Baker-street, Lloyd-square, E.C. 2. Messrs. Marion, Soho-square.

SNAP-SHOT.—If you address Messrs. A. E. Staley & Co., 35, Aldermanbury, E.C., they will probably meet your requirements. You will require two combinations.

ARTHUR WRIGHT.—The articles give all available information. However, there is a little book on the subject by Mr. W. J. Warren, published by Iliffe, Coventry, which we can recommend. Its price is 1*s.*

T. S. V. WILSON.—We can give no other advice in the matter than that you should threaten the firm with legal proceedings. This course usually has the desired effect. We do not answer questions through the post.

SITUATION ABROAD.—H. Phœnix wishes to know the best means of getting a situation in studio abroad.—"Abroad" is a vague term. If our correspondent will indicate the particular part of the world in which he is anxious to obtain employment, we will endeavour to help him.

COPYRIGHT.—OPTIC.—1. When you sold the negatives you also sold the right to use them; otherwise of what use would they be to the purchaser? Your subsequent registration of copyright does not affect them. 2. You can only recover the price you sold the negatives for, no matter to what use they are put.

LENS.—T. S. C. The lens is evidently an old portrait combination of French make. Its commercial value, is but a few shillings. It may, however, be a very useful instrument for all that.

LEAKY ROOF.—P.R.O. In all probability the putty has quite perished, and should all be cleared away and fresh substituted. Then two or three coats of paint will make the roof watertight. Now is a capital time for doing this work, as, with the summer heat, the wood is dry.

MIDGET PORTRAITS.—BEACH. The reason why the two portraits in each set are always unsharp, though there is nothing to complain of in the others, is that the two lenses with which they are taken are not of the same focus as the others, although they are all on one flange plate. The remedy is obvious.

PATENT.—J. H. B. It is not necessary to employ a patent agent to take out a patent, if you know how to do it yourself; the matter is very simple. But, if the patent is likely to be one of value, it may be well to employ a qualified agent, as often much depends upon the wording of it and the claims in the case of litigation.

COLLOTYPE.—W. PEEL. Your trouble with the plates is not in any way due to the fumes from the drying stove, although it may smell. The fumes from a paraffin oil stove are not injurious to the plates, though they may be unpleasant. If, however, the stove be kept clean, and the wick properly trimmed, there will be no unpleasant smell from it.

FACTORY REGULATIONS.—B. A. C. There is no question whatever that your printing and mounting establishment comes within the Factory Acts; and, from what you say, there is equally no question that you are infringing it daily. Photographic workshops are no more exempt from the Acts than any other when a number of hands are employed.

LENS.—HELIOS. We cannot give any idea as to what the lens may be expected to cover when the only datum is its diameter. Some Petzval combinations with three and a half inches diameter will cover 10×8, while others of equal diameter are only constructed to cover the *carte* size. All depends upon the focal length of the instrument—and its quality.

COPYRIGHT.—LANTERNIST. The reproductions named of the pictures are, without doubt, copyright, although the copyright in the originals has expired. If you were to make lantern slides from them there is very little question that you would find yourself in trouble. If you wish to issue slides of the National Gallery pictures, you will have to copy them yourself. Then you can make your copies copyright if you like; but you must not pirate another's work.

PANORAMIC PHOTOGRAPHY.—H. WALLIS asks if the Johnson-Harrison pantoscopic camera, for taking panoramic photographs on glass plates, is still made, and where it may be obtained? He says he has inquired at several dealers, and they reply there is no such thing, or that they have never heard of it.—The pantoscopic camera is not made now, and has not been for many years. Many are, however, in existence, and an advertisement might be the means of securing one.

CINEMATOGRAPH.—SALVATION CAPTAIN. If photography is not permitted in the grounds, it is very clear that you will not be allowed to take the pictures. What is a cinematographic apparatus but a camera? and what is a cinematographic picture but a photograph? As you have permission to have a day in the grounds, you may possibly obtain permission to photograph them. That, of course, rests with their owner. But do not attempt to take the pictures under the pretext that they are *not* photographs—it would be discreditable.

TONING.—S. GALER says: "To day, for the first time, I have tried the acetate toning bath, and it has been a miserable failure. The bath was made as follows: Acetate of soda, 1 drachm; water, 16 ounces; chloride of gold, 1 grain to the drachm of water—2 drachms. The prints went very mealy, and I could not get the tones that the acetate bath is said to yield, and what I desire. The bath was quite new, made just before use, and the paper was ——'s."—The failure was due to the bath being too new. The acetate bath must be made at least twenty-four hours before it is used to be worked at its best.

RETOUCHING.—RETOUCHING BEGINNER writes: "I have been practising retouching for some time, and have read all that I find has been published in the Journals. Some of my friends think the work is very good, but I shall feel obliged if you will kindly give me your opinion on the work herewith—prints from the untouched negatives accompany it; also, whether I could from that work obtain a situation as retoucher in a first-class house?"—We are sorry to say no. In the retouching all likeness has been completely lost. The untouched negatives are portraits of living people, but the retouching has rendered them more like wax figures. A few lessons will set you right.

POPLAR says: "1. I enclose a piece of collodio-matt paper which was placed in contact with negative the wrong way—that is, with sensitised surface facing the pad of printing frame, which (the pad) was composed of sheets of newspaper. You will observe that the printing on pad has left an impression on the sensitised paper. Can you explain this peculiar action; is it not rather strange that a printing action has taken place with the pad at the back of paper? 2. Can you tell me where I can find out the names of photographers who are entitled by warrant to use the Royal coat-of-arms?"—In reply: Just what we should have expected. Both phenomena are perfectly well known, and the fact that printers' ink affects a sensitive surface is the basis of Dr. W. J. Russell's investigations, alluded to at great length in our columns during the last year or so. 2. A list was published some time ago in the *London Gazette*. A letter addressed to the Secretary of the Association of Royal Warrant-holders will possibly bring the desired information.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
The British Journal Photographic Almanac for 1899	577
Ex Cathedrâ	577
The Action of Persulphate of Ammonia	579
Leaderettes:— New Blue Glass—Phosphorescent Sulphides — Dust — Lightning Photographs — Bismarck's Portrait—Search for Andrée—The French Pictures at Guildhall—The Great Paris Exposition Telescope—Disappearing London	580
Estimating the Strength of a Solution	581
Development after Fixing	581
Printing in Different Lights	582
Notes on Intensification. By J. Pike	582
Albumenised Paper Printing By C. H. Hewitt	583
Hollinger of New York	583
Spots on Negatives. By Jesse Landon	584
Intensification with Lead. By Paul Hirschfeldt	584
Foreign News and Notes:— X-ray Photography and Surgery—Transfer Paper—Leaky Wooden Vessels—Flashlight Portraiture—Enamelling Prints—Photographing Drawings and Paintings—The Paper Ring—A New Colour Printing Process	584
Bas-relief Photography: Faris and Mason's Process	585
The Best Method of Illuminating the Negative for Enlargement or Reduction	587
A New Process of Relief Photography	587
The "Poco" Cameras	588
Photo-relief Impressions on Paper or Cardboard	589
New Kodaks, &c.	589
Our Editorial Table	589
News and Notes	590
Patent News	590
Meetings of Societies:— London and Provincial Photographic Association	590
Forthcoming Exhibitions	591
Correspondence:— Exposure Meters—A Crying Want—The Cinematograph Accident.	591
Answers to Correspondents	592

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRÂ.

Some two or three months ago we drew attention to the danger which photographers ran in taking pictures in too close proximity to fortifications, either at home or abroad. For unconsciously committing this offence near Gravesend, without being provided with a War Office permit, Mr. W. F. Slater and some companions last June were "arrested," and their dark slides confiscated. Mr. Slater immediately took means to regain possession of his slides, and it may be of interest to our readers if we briefly trace the steps rendered necessary by the military regulations before Mr. Slater was successful in his object. His first application to the officer at Shornmead, where the offence was committed, was referred to the chief staff officer of the Thames district, who decided that the plates should be developed at the School of Military Engineering in Mr. Slater's presence.

* * *

Mr. Slater having stated that the negatives would be no use to him unless he developed them himself, as he might want them for exhibition purposes, the necessary permission to do so was at once given, the presence of an officer being the only condition laid down. Captain E. H. Hills, the officer in question, who is the Assistant Instructor in Chemistry at the School of Military Engineering, Chatham, and, we believe, a well known photographer, courteously met Mr. Slater's convenience in the matter and supplied developing material. The plates were developed in due course, and a final communication was received by Mr. Slater from the Commandant of the School of Military Engineering, pointing out that some of the negatives, when developed, proved to embrace the fort. It was understood that no photograph of the fort had been taken, and the War Office ruled that all the negatives embracing the fort should be destroyed.

THE incident was terminated by Mr. Slater agreeing to the destruction of the negatives of the fort as a condition for the remainder of the negatives being returned to him. About five weeks were occupied in the settlement of the matter. We have perused copies of the correspondence that passed between Mr. Slater and the military authorities, who, it is plain, acted throughout with exceptional courtesy. We doubt if similar consideration would have been shown in like circumstances by any foreign military authority towards a photographic delinquent; what we constantly read in the Continental intelligence of the newspapers conclusively shows Mr. Slater and his associates to have been remarkably well treated. The moral of it all is, that photographers should give fortifications as wide a berth as possible when taking pictures for exhibition or other purposes, unless armed with an official authorisation to place their cameras inside the prohibited zone.

* * *

ONE of our American contemporaries prints a letter in which the writer claims to have "lowered the baby picture record to twenty minutes." As we know this sort of thing interests many readers, we print the letter in full: "Some time ago you published a letter claiming a record for baby portraiture at, I think, three days old. Since then I see the record has been reduced to three or six hours. I enclose a print which, I think, will smash these records. The baby on this picture (at the nearest estimate that can be had) is just twenty minutes old—certainly considerably under thirty minutes. This can be vouched for by the physician and nurse attending the birth. The photo was not taken with a view to making any record, as it was taken some time ago, in January last, I think, before there was any question of a record on this line in your paper. The picture and the original both belong to a close friend of mine, who is also an ardent snap-shottist, and, upon the baby being brought out of the sick-room for approval, the doctor in attendance, who knew of my friend's hobby, said partly in jest, Why not take its picture? That was enough; the camera ready loaded was right to hand, and within a minute or so the picture was taken." Now, surely British photographic enterprise will not allow this record to stand long without being challenged. Who will be the first to achieve the glory of photographing a baby under twenty minutes old?

* * *

THE latest idea in the production of coloured photographs is due to Mr. H. W. Cottrell, of Birmingham, who has devised an "improved method of preparing coloured photographs, which has for its object to provide means of producing photographs having a coloured or tinted background," and he claims that thereby an effective and artistic appearance is obtained at a low cost of production. The invention consists essentially in a method of producing specially prepared sensitive paper or material upon which are various tints or designs. Upon this paper the photograph is printed, toned, and fixed or developed in the ordinary way. Mr. Cottrell takes sheets of ordinary paper and prints thereon by a lithographic process, and any well-known means, various coloured or tinted designs." The said sheets are then covered with any sensitising medium, and cut to the usual size. The printing is done by arranging the negative and sensitive paper in the printing frame, and toned or developed in the usual way, which produces a beautiful and artistic effect."

THE frequently alleged superiority of the American and German patent systems over the British is subjected to considerable doubt at the hands of a recent correspondent of the *English Mechanic*. It is commonly asserted, he remarks, that the American and the German system of examination before granting a patent adds to the value of the patent, and is of benefit to the patentee. It has just been pointed out that the rigorous scrutiny to which inventions are subjected in Germany before patents for them are granted is no guarantee of the originality of the invention. Thus, in the year 1896, only twenty-nine patents were subject to litigation in England, whereas in Germany in the same year as many as 102 patents were subject to litigation. This extraordinary fact may, no doubt, in some measure be accounted for by the very great cost of patent litigation in England as compared with that in Germany; but the vital point in this comparison is that, while of the twenty-nine patents in England thirteen were declared void by the Courts, in Germany, of the 102 patents, forty-three were declared void; that is to say, almost exactly the same percentage in each country. In other words, patents that have passed the severe ordeal of the German Patent Office are not one whit more secure than those granted under the liberal system of England. These are facts to be noted, especially when it is considered that the German Office has many times refused patents to devices that were indubitably inventions. The British system seems the best, after all, for even in America patent legislation is ruinous.

* * *

THE writer's statistics appear to tell in favour of his arguments; but he has left out of account the indubitable fact that, by the British system, no trouble whatever is taken to assure a patentee any form of protection at all. Again, the fact that fewer English than German patents provoke litigation may be explained by the notorious circumstance that a very large number, if not the majority, of the former are *ipso facto* invalid, and therefore not worth fighting. The American and German patent systems many not be all they have hitherto been supposed to be, but the British system is, nevertheless, as full of faults as it well can be.

* * *

"VELOX," the development paper which may be manipulated in actinic light, and that has recently been prominently brought to the notice of British photographers, has apparently incited an Australian experimentalist to work out a paper having similar characteristics. The task appears to have been successfully accomplished, for, at the July meeting of the Amateur Photographic Association of Victoria, Mr. T. Baker (Messrs. Baker & Rouse) introduced to the notice of the members a new argentic bromide paper for obtaining prints by contact. This, it is said, is a slow bromide paper. "The great peculiarity of the paper, however, and the marked feature which distinguishes it from all others and gives it an extraordinary value, particularly to those who object to working in the orange or ruby light of the dark room, or who are so unfortunate as to suffer from weak sight, is the fact that it may not only be exposed by gaslight, but it can be afterwards developed in the same light. It is also sufficiently slow to allow of the making of prints by daylight." The method of manipulating the paper appears to be closely analogous to that employe with Velox. We congratulate our Australian brethren on their enterprise.

Australian photographers, moreover, may fairly claim precedence in the accomplishment of a feat in animated photography which caused some little stir here last May. It may be remembered that on the night of the last Derby horse-race a cinematograph record of that classic contest, as it is sometimes called, was exhibited at one of the London music halls. The celerity with which the positive was obtained and shown on the lantern screen was the subject of considerable comment and applause in the newspapers at the time. The editor of the *Australasian Photographic Review*, however, somewhat discounts the novelty and rapidity of the performance by pointing out that it is a trifle behind the time. A similar record feat, he says, was performed three times over last year in Melbourne by Mr. Thwaites. At any rate, films of the Derby, Caulfield Cup, and Melbourne Cup were exhibited in Melbourne each on the evening of the same day on which the respective races were run. Clearly, in the matter of photography, Australia pays close heed to the oft-quoted admonition to "advance," and is advancing in good earnest.

THE ACTION OF PERSULPHATE OF AMMONIA.

From the discussion that took place at the last meeting of the London and Provincial it seems that some doubt exists as to the action of persulphate of ammonia in reducing the photographic image. So far as its complete and precise action is concerned this is perhaps not surprising, as so little time has elapsed since it was first introduced to the notice of photographers, but we can scarcely imagine a loop-hole for doubt as to its actual and solvent action on metallic silver. It is but needful to apply a five per cent. solution to a negative film or a print for not more than two or three minutes, and then to add to it, in a test tube, a drop of the ordinary bromide restraining solution, or a grain of salt, to set that question at rest for ever. But it seems probable that other reactions proceed simultaneously, as the following rough experiment will show.

A solution of silver nitrate was precipitated with ferrous sulphate and acetic acid—the ordinary wet-plate developer, in fact—the acid being used in order to get as fine a deposit as possible. The precipitated silver was very thoroughly washed to get rid of the iron, as any remaining sulphate would form, with persulphate of ammonia, iron alum, which is a powerful solvent of silver. A quantity of this finely precipitated metallic silver was placed in a small glass flask, and one ounce of the five per cent. solution of persulphate of ammonia poured on to it, corked and well shaken at intervals for twenty-four hours. The supernatant liquid was closely drained off, and the remaining sediment rinsed with a drachm of distilled water, which was added to the rest.

This was then roughly titrated with a solution of bromide of potassium, and, although a copious precipitate was produced, the quantity of test solution employed only corresponded with something less than two grains of metallic silver. Assuming that the silver was present in the solution in the form of sulphate, this quantity would not be far off the mark, as sulphate of silver is only soluble to the extent of 1 part in 200 parts of water at ordinary temperature, therefore the quantity of solution could not hold any more. That being the case, we turned to the washed precipitate in the expectation of finding more soluble silver there.

At the outset we felt sure that such would be the case, as the sediment remaining was much whiter than the original precipitate, finer in grain, and had altogether lost what little metallic appearance it had at first. A fresh quantity of water was added, and it was raised to boiling point and kept in vigorous ebullition for some minutes, during which the precipitate apparently shrank slightly in bulk, but not much, and assumed a slightly darker colour. The supernatant liquid was again decanted and quickly cooled. As silver sulphate is soluble in only 88 parts of boiling water, there was just a chance that some of it might crystallise out on cooling, but such was not the case, and on again testing with bromide the silver contents of the liquid were practically *nil*, certainly no more than might be expected after the very slight rinse the precipitate had.

The precipitated silver bromide obtained in the first case was afterwards thoroughly dried on a weighed filter, and bore out the earlier estimate, as it was found to weigh a small fraction under three grains; and, though the experiment was not carried out with analytical accuracy, sufficient care was observed to show that that represented approximately the total weight of silver taken up by one ounce of the five per cent. persulphate solution.

It agrees too, as closely as could be in such a comparatively rough experiment, with the quantity of silver that would be present in a saturated solution of silver sulphate; but, if the reaction given in MM. Lumière *frères* and Seyewitz's recent note be carried out to its fullest extent, then more than ten times the quantity of silver would be dissolved by that quantity of solution. According to their equation, one equivalent each of persulphate of ammonia and of silver combine to form the neutral double sulphate of silver and ammonia; in which case, assuming the quantity of solution used to contain twenty-four grains of the persulphate, the yield of bromide of silver should have been nearly forty grains.

But, though that or some similar reaction may be the cause of the reduction of the silver image, it seems tolerably certain, from the general behaviour of the solution and the rapidity with which it is exhausted for the purpose, as well as from the above experiment, that the whole of the persulphate is not converted into the double sulphate of silver and ammonia, or, if it is, that the reflex reducing action of which Messrs. Lumière & Seyewetz speak comes on to decompose it again. It has been mentioned in a former article that the solution of persulphate gives evidence of containing free oxygen, and this, if of indefinite and small quantity, due simply to decomposition of the salt on solution, might possibly account for the action and for the small proportion of silver dissolved, the free oxygen acting on the silver, the oxide being then dissolved by the loose atom of sulphuric acid. This reaction may be explained by a suggestion made to us by a friend, that on solution of the persulphate it splits up into ordinary sulphate, free sulphuric acid, and free oxygen, thus—

$$2NH^4SO^4 + H^2O = (NH^4)_2SO^4 + H^2SO^4 + O.$$

The suggestion is feasible only as explaining how the free oxygen may work, but it is certain that this reaction cannot work out to completeness, or as much silver would be dissolved as in the previous case. But if we take the above equation as representing the gradual decomposition of the solution, and also take into consideration the counter reducing action, we may partly explain the small quantity of silver held in solution.

If this be the *rationale* of the action, then solution and

reduction proceed concurrently; for in a second experiment, in which a portion of the solution was allowed to act for twenty-four hours in excess of precipitated silver, and then decanted and set aside for another twenty-four hours, not the least sign of reduction occurred. We made this experiment because, in the case of ferric sulphate, which was mentioned many years ago by Mr. Warnerke as a solvent of silver, the silver is first dissolved and *afterwards* slowly redeposited. In the case of persulphate of ammonia no such after-reduction occurs when the excess of metal is removed. If it goes on in the presence of excess of metal—and this seems to be MM. Lumière's explanation of the reducing action on the negative image—then the reducing cause must be to some extent electro-chemical; but, in the case of ferric sulphate, the reduction is brought about by the iron. On adding a small crystal of ferrous sulphate to the solution just referred to, the silver was reduced in a few minutes.

New Blue Glass.—Many of the older readers of this JOURNAL will remember the vogue which glass coloured blue by cobalt had in the sixties. It was supposed to impart a peculiar "something" to the light passing through it that enabled photographs of a softness unattainable by any other means to be produced. It further, by virtue of the light that passed through it being rich in ultra-violet rays was supposed to give enhanced rapidity to the light—in fact, that the part was greater than the whole. A once well-known provincial photographer indeed was so great a believer in all these theories that he had the whole of his studio glazed with cobalt blue glass; but, like all other theories with incorrect bases, this ultra-violet improver collapsed, and we do not think any one would nowadays dream of using the glass for studio-glazing. At the same time there is a distinct place for the use of coloured glass in photographic technics, and the greater the variety of kinds available the more probable is it that they will be utilised. It is well known, though sufficient attention is not given to the subject, that coloured glass placed over a negative greatly influences the colour of the resultant print if on albumenised paper, while with platinotype the Company long since pointed out the value of a particular shade of green for the purpose. As an aid in obtaining monochromatic light coloured glass is valuable in photo-micrography, and this is a field by no means well worked. We are led to these observations by the study of a paper by M. André Duboin in a recent number of the *Chemical News*, wherein he describes a series of experiments in endeavouring to use aluminium and chromium as ingredients in glass-making for producing a blue colour. Those particularly interested in the subject we may refer to the original paper (*loc. cit.* p. 85); it will suffice here to state that according to the glass base used M. Duboin obtained blues of various character and brightness, thus "dull blue," "most beautiful blue," "fine blue," "very fine blue," &c.

Phosphorescent Sulphides.—When Balmain's luminous paint was first introduced, a wide sphere of usefulness was predicted for it, but nowadays we never hear of its employment for photographic purposes, with perhaps the sole exception of Warnerke's sensitometer. It seems, however, as though phosphorescent sulphides might find more employment than is now the case if the right one were chosen, and there is a wide range of colour to select from. It has occurred to us that a suitable red might be selected which would answer as a dark-room illuminant after due excitation. The subject of phosphorescent sulphides has lately been under investigation by M. J. R. Mourelo. He finds that a chemically pure sulphide is not suitable, the brilliancy of strontium sulphide, for example, being dependent upon the presence of certain impurities for a strong and lasting phosphorescence to be obtained, sodium sulphide and chloride, and bismuth sulphide and oxide having been found in the best samples.

Dust.—Last week we alluded to the inconveniences experienced by photographers who are supplied by the East London Water-works Company, owing to their present restricted supply. Now they have another inconvenience added, namely, dust, inasmuch as several of the vestries, to help the Company, have ceased to water the streets, and as a consequence dust prevails everywhere. Dust is not perhaps, so far as negative-making is concerned, so great a trouble now as it was in the days of wet collodion, but still it is a trouble in the dark room; and probably the greatest trouble arising from outside dust is that experienced by the hand-camera worker—particularly the cyclist camera man—because it is not often suspected. In carrying a camera along a dusty road, on a windy day, the dust finds its way into everything, and on to the plates as a matter of course. On them it does no real harm, if they are carefully dusted before development. It is in the shutter that it unsuspectingly works most mischief. With some forms of shutters, if set to work at say the fiftieth of a second, a particle of road grit may so retard their action that what is supposed to be a fiftieth will be more nearly a fifth of a second, hence error in exposure.

Lightning Photographs.—The great thunderstorm of about three weeks ago has been fruitful in photographs. The conditions were suitable for photographic recording—on a dark sky, a sufficient number of brilliant flashes in a restricted area—as to encourage any one with a camera to obtain results that should be of great value, the Meteorological Society are always open to receive good prints of lightning flashes. It need scarcely be explained that the method of taking the rays is very simple. The focus is set for distant objects, the camera pointed to the region in which the flashes are likely to appear, the slide inserted, shutter drawn, lens uncapped and left till a flash has appeared, whereupon another plate is inserted and so on. Obviously a wide-angle lens on a plate of suitable size will be best for the purpose, so as to embrace as large an area as possible. One of the most remarkable photographs of flashes we have seen is on a negative, where the path of the flash is most curious: instead of the common ramified effect, it presents the appearance of having endeavoured to tie itself into a complicated knot. With regard to our correspondent's difficulty last week about the extreme shortness of duration of a flash precluding the doubling of the image through movement of the camera, we may refer to our own experience in the storm in question. We were in the open watching the distant flashes, when we were aware of a flash of extreme brilliancy outside our then field of vision; instantly turning our head to the direction of the illumination, we were still in time to see a magnificent flash.

Bismarck's Portrait.—The two photographers who obtained access to the death chamber at Friedrichsruh, and surreptitiously took portraits of the deceased statesman, were put upon their trial at Hamburg last week, though up to the time of writing the result is not known. The offence charged against them is in virtue of paragraph 123 of the Criminal Code dealing with violation of domicile—*i.e.*, "disturbing family peace." It is very right that there should be a law to meet a case such as that of clandestinely taking portraits of deceased persons. But we doubt if we have any English law that would apply in a case of this kind.

Search for Andrée.—A telegram from Trömso, dated August 30, says that the *Frithjof*, of the Wellman Polar Expedition, has just returned, after having landed the explorers at Cape Tegethoff, the southern point of Hall's Island. It also mentions that on her return journey she met the Swedish Nathorst Expedition on King Charles Land in the best of health. It is added that all searches for Andrée and his expedition had proved fruitless. When this expedition first started, and was not heard of at the time expected, it was stated that it might not be heard of till about this time; but up to now there are no tidings of it, or any trace of the

balloon or any of its *impedimenta*, which included photographic appliances. By the way, there is to be an expedition across the Alps by a balloon, and in this photography is to be a feature. A series of photographs of the Alps taken from a balloon would be exceedingly interesting, as they would show them under entirely different aspects from what they have been seen by the most enthusiastic of Alpine climbers. Only those who have made balloon ascents can realise how *terra firma* appears from above. The sun on the glaciers and peaks would be quite beyond verbal description.

The French Pictures at Guildhall.—The loan Exhibition of Paintings by French artists, which was opened in June last, was closed on Thursday last week. During the period it was open it was visited by no less than 206,988 people. This speaks well for the appreciation of art in the City, and also shows that something more than business is thought of there. Although this loan Exhibition has closed, the Corporation's permanent collection of pictures is to be seen, amongst which are some very fine works. This gallery is open free daily, except Sundays, and, as we have said before, is well worth a visit.

The Great Paris Exposition Telescope.—This instrument, about which so much nonsense has been written and published, is really in hand, and good progress is being made with it by M. Gautier. It is rightly called a "giant telescope," for its aperture is to be 1·25 metres (over 49 inches), far out-classing the great Yerkes instrument in size of objective, the rest being in proportion. Thus, the length will be 60 metres (nearly 197 feet), the enormous size of which may be better grasped if we say that two dozen of them would almost extend to a mile. The ordinary method of mounting telescopes is considered impracticable with so enormous an instrument, so it has been decided to place it in a horizontal position, resting on solid masonry pillars. The observation of stars, &c., will be made by reflecting their images into the telescope by means of a huge mirror 2½ metres wide and 13 inches thick.

The instrument will have a special photographic objective to replace the observing one when needed, and when the light will permit, though that will be very rarely, a magnification of 10,000 will be used, the ordinary power of the instrument being 6000.

Disappearing London.—With the demolition of old Clare Market another of the old "bulk shops" which stood in Gilbert's-passage has gone. The bulk shop took its name from a slightly projecting roof overhanging the shop front. This kind of frontage used, in the old days, to be very common in London, and some are still to be seen in the same neighbourhood, but they will not be for long, as they will have to give place to more modern and utilitarian structures. Picturesque though they be, so with other ancient buildings. London is not alone in this respect, for, on the Continent, the ancient towns, so much admired by artists and written about by tourists, are fast being modernised, and the streets and buildings being made more in accordance with the requirements of the times. Therefore it is well, while the opportunity lasts, to secure photographic mementoes of them. In many instances these old buildings pass into the builders' hands before any public notification of their destruction is made and when it is too late to secure a photographic record of them. By the way, the *Christian Budget* calls attention to, and gives an illustration of, Baxter's house, in which he lived, and preached in 1663 to 1670, in the High-street, Acton. This old house or cottage, with two or three others adjoining, will shortly be swept away. When Acton was a mere village, they were not conspicuous or unsightly; but, now that the place has developed into a suburban town, they will have to give place to better premises; such is the progress of time. Those who wish to secure photographs of Baxter's house, and other relics of the past, should seize the opportunity while it lasts.

ESTIMATING THE STRENGTH OF A SOLUTION.

Herr von Gerstenbrandt suggests the following method of estimating the strength of a solution of a salt by using merely scales and a measure.

Let V = the volume of the liquid, which can, of course, be measured, and Q = the weight of this volume, s_1 = the specific gravity of the solvent, and s_2 = the specific gravity of the salt dissolved in it (this can be found from tables which are published). As a rule, s_2 will be greater than s_1. Let v_1 = the volume of the solvent, q_2 = the weight of the salt dissolved, both of which are unknown and have to be estimated.

The volume, V, of the solution, which has been measured, is formed by the volume, v_1, of the solvent and the volume of the salt. The latter is given by $\frac{q_2}{s_2}$. We have therefore the equation—

$$(1.) \qquad V = v_1 + \frac{q_2}{s_2}.$$

The weight, Q, of the solution which we have weighed is made up of the weight of the salt, q_2, and the weight of the liquid which is given by the product $v_1 s_1$. This gives the equation—

$$(2.) \qquad Q = v_1 s_1 + q_2.$$

From these two equations the two unknown quantities, v_1 and q_2, may be found.

$$v_1 = \frac{V. s_2 - Q}{s_2 - s_1}$$

$$(3.) \qquad q_2 = \frac{Q - V. s_1}{s_2 - s_1} s_2$$

If we are treating of two liquids, then the volume v_2 must be substituted for q_2, which = $v_2 . s_2$. Equation 3 then becomes—

$$v_1 = \frac{V. s_2 - Q}{s_2 - s_1}$$

$$(4.) \qquad v_2 = \frac{Q - V. s_1}{s_2 - s_1}$$

If one of the liquids is water, $s_1 = 1$.

Example: An aqueous solution of salt measured 50 c. c., and weighs 65 grammes, how much salt is contained in the liquid?

In equation 3 we have to put the following values:—

$$V = 50,\ Q = 65,\ s_1 = 1 \text{ (water, } s_2 = 2{\cdot}13 \text{ salt)},$$

then

$$v_1 = \frac{50 \times 2{\cdot}13 - 65}{2{\cdot}13 - 1} = \frac{41{\cdot}5}{1{\cdot}13} = 36{\cdot}73 \text{ c. c. water},$$

$$q_2 = \frac{65 - 50 \times 1}{2\ 13 - 1}\ 2{\cdot}13 = \frac{15}{1{\cdot}13}\ 2{\cdot}13 = 28{\cdot}27 \text{ grammes of salt.}$$

Whilst not strictly accurate, because the factor of temperature is left out, it is sufficiently so for ordinary photographic work.

DEVELOPMENT AFTER FIXING.

Dr. R. Neuhauss points out in the current number of the *Photographische Rundschau* that when a plate is developed after fixing the process is purely a physical development; in chemical development the exposed particles of silver bromide are reduced, whilst in physical development the image is formed by the deposition of silver from the developer itself.

Experiments were made with a chloro-bromide lantern plate and also a very rapid silver bromide plate, and exposures ranging from three to sixty seconds were given. By development with diogen it was found that one second would have been correct, so that all the plates were over-exposed.

The plates were fixed and then washed thoroughly, and all the processes after fixing were performed in daylight. Development was effected with the following silver intensifier:—

Ammonium sulphocyanide	24 parts.
Silver nitrate	4 ,,
Sodium sulphite	24 ,,
Hypo	5 ,,
Potassium bromide	0·5 ,,
Water	100 ,,

The solution will keep well, and the actual developer consisted of 6 parts of this solution, 54 parts of water and 2 parts of rodinal. When the water is added a white precipitate is formed which may be filtered

out, but it does no harm. Development takes a very long time in this solution, lasting about twelve hours.

The finished negative is white, and looks like a positive by reflected light. Several experiments were made to produce a blackening of the image. Exposure to direct sunlight and treatment with any of the ordinary developers had no results.

An observation was made, however, which knocks on the head one of the most sacred gospels of photography. When the developed white negative was laid in the ordinary mercurial intensifier (1·200), the image became black, whereas an ordinary negative is bleached. If, however, the blackened image was allowed to lie for a long time in the mercury, it was bleached, and looked exactly like an ordinary negative bleached in mercury. This plate can now be blackened with sodium sulphite, and a perfect printable negative thus obtained.

Neuhauss explains the development of the plate as due to the decomposition by the hypo of the silver sub-bromide and the deposition of metallic silver; this is so small in quantity, that it entirely escapes detection. If the plate is placed in a physical intensifier, the silver particles are deposited on the silver in the film, and there is gradually formed a vigorous image; as this is formed of metallic silver, the development may be performed in daylight.

The author suggests that travellers in the tropics should fully expose and fix their plates, and then send them home for further development. According to his experiences perfect negatives were obtained by this method when a sixty times over-exposure had been given. Examination with the microscope showed that the grain of these negatives was very much finer than when developed in the ordinary way.

PRINTING IN DIFFERENT LIGHTS.

We notice in the report of a recent meeting of the London and Provincial Photographic Association there was a discussion as to "whether slow printing did, or did not, have any effect on the print as compared with rapid printing." This is very much like raising an old topic, as to the advantage or otherwise of printing in a strong or a subdued light, or printing through various coloured media, &c. In the report there is no reference made to the character of the negative, though that, of course, is an important factor in the case. Experienced printers are quite well aware that the character of the light has a marked influence on the print, and therefore classify the negatives they have to deal with, because they know that some will yield better results when they are printed in a strong light than they will in a subdued one, while, on the other hand, others will give the best results only when printed in a weak light. The same applies in the case of carbon printing as it does in silver printing, and carbon printers are equally as well aware of the fact.

Somehow or other, modern workers, whether professional or amateur, do not seem to possess the same technical knowledge—that is, the *practical* technical knowlege—that those of two or three decades did; and the discussion in question serves to prove it. At one time printing was an important part of photography and was recognised as such alike by professionals and amateurs. Now the former, as a rule, relegate the work to girls and lads, who print the negatives on any paper in any light, whatever may be their character, and amateurs do the same. Hence we have such questions as that raised at the London and Provincial. How many, it may be asked, of the present-day printers (professional) could print in a background, or introduce an extra figure in a group, or even, by shading or masking, make a technically bad negative give a fairly good print? Echo answers, How many? Our negatives are not so perfect even yet that they will yield the best results under all and every condition of printing. As we have just said, printing was at one time an important section of photography, and was well paid for. Now it would seem that the chief qualification with the profession—or a section of it—with a printer is the largest amount of work within a given time, and the smallest salary. The same also applies to amateurs, who put their printing out. *They* get it done where they can the cheapest, and at a price that will not permit of such care and skill as would secure the best results from their negatives.

NOTES ON INTENSIFICATION.

This is a department of practical photography, which, faced by the average amateur, at once assumes alarming proportions. The reason for this, no doubt, lies in the fact that the chemical best suited to the purpose of adding density to a negative is extremely poisonous, and that the tender consideration of a paternal government has placed difficulties in the way of its sale and purchase—difficulties which it is only fair to say, look at it which way you will, seem to be for the most part unreasonable, and certainly trying to the temper. It is another version of "first catch your hare," &c.

It is not surprising, therefore, if, having succeeded in getting his poison, he, the average amateur, approaches the operation with a "hot-all-over" feeling, disgusted with the poor chemist and half inclined to chuck the whole thing overboard. But why do some people make such a mess of this, as they so often do? Simply because of the want of a little careful working. There are two or three simple rules to be observed, as all experienced workers will admit. The negative to be intensified must be *clean*, that is to say, properly fixed, not merely cleared of the creamy bromide, but allowed to remain at least five minutes over that stage, preferably in a fairly new hypo bath, thoroughly washed, then cleared by a dip in an acid bath, viz., one part hydrochloric acid to thirty-nine of water; again quickly washed and *dried*. Under such conditions we get a negative in the best possible state for purpose aimed at. It will not stain abnormally if densed with silver, and with the mercury bath will yield admirable, if not strictly permanent, results. It must be understood, of course, that we cannot intensify what is not on the plate; we can replace the bare glass by a certain amount of stain, but there must be some detail to work upon if the result is to be entirely satisfactory.

A mercury intensifier will consist primarily of a simple solution of mercury bichloride in water, 1–20, solutions of the mercury salt being facilitated by the addition of an equal weight of chloride of ammonium. Some authorities advocate the use of hydrochloric acid instead of the ammonium salt; this is not only to facilitate the solution of the salt, but, no doubt, with the idea of keeping the solution clear, and the negative also. It is better, I think, to use the acid bath separately as already indicated, the mercury intensifier formula being left at: bichloride of mercury, 1 part; chloride of ammonium, 1 part; water, 20 parts. When an absolutely clean and dry negative is placed in the above bath, the conversion of the silver deposit into the double salt of mercury and silver is accomplished to the fullest extent, and after a thorough soaking and washing it is ready for treatment by various methods. Taking these from the weakest to the strongest in their density giving effects, a simple solution of soda sulphite will often give the requisite added density; on the same chemical principles, probably the method of *redeveloping* with an old or semi-normal developer of the metol or hydroquinone class may be used, often with very good results, the blackening or darkening is gradual and under control; of developing agents, the best is ferrous oxalate, but I fear the average novice will not take the trouble to make this solution. After soda sulphite, the deepest black will be got with the usual ammonium solution, 1–20. Any over-density can be reduced by longer immersion in the solution; the results here are, in the case of absolutely clean and clear negatives, frequently very good indeed; this must, however, be qualified to a certain extent, for the best-*looking* negatives are, as is well known, by no means the best printers; with the above ammonia treatment we may get a good sparkling negative when, as in the case of a portrait or group, a more general softness would be better and give the retoucher a fairer chance; in this case the soda-sulphite solution would be the better, or the redevelopment method.

The uranium intensifier is not, I think, of much account; it is in the hands of even experienced workers, uncertain, unless you add a few drops of the mercury solution, when the results are often much improved.

For the purpose of getting the greatest amount of density, there is nothing in my experience to come up to the intensifier associated with the name of B. J. Edwards, the formula for which may be seen in the almanacs of the early gelatine days. This solution works out as follows:—

1.	
Mercury bichloride	60 grains.
Water	6 ounces.
2.	
Iodide of potassium	90 grains.
Water	2 ounces.
3.	
Hypo soda	120 grains.
Water	2 ounces.

Pour 2 into 1, and add 3, the red iodide of mercury formed by the addition of the iodide to the mercury solution is quickly dissolved on adding the hypo solution, and the fluid, a one-solution intensifier, is ready for immediate use. The thoroughly washed and *dried* negative is again wetted and then placed in this solution; the action is rapid, sometimes a few seconds only being required; the action may be *slowed* by the addition of more hypo—an advantage which will often be appreciated. Edwards's intensifier is the only one I know which can be said to shorten the preliminary washing, *i.e.*, the negative well fixed and only moderately washed may be immersed in the solution at once. The novice will find it safer, however, to go a bit slower, thoroughly fix, and wash, and clear his negative, and *dry* before attacking the redevelopment problem.

Many negatives, particularly those developed with metol, quinol,

and the like, show a tendency to frill; not only does the application of black enamel or varnish—a thin line all round the edge—give a finish to a clean negative, but we may carry through with more safety the foregoing operations.

The action of these intensifying solutions should be studied, if only because of the extent to which the character of a negative can be altered, thus affecting its value as a picture-giving plate; but we have to consider permanency, and of the methods enumerated how many result in negatives which will last? Personally, I have always mistrusted the coloured negative, that is, the negative toned or intensified to a brown or yellowish-brown colour. There is no reason why the deep *black* intensified negative, well coated with varnish—*a most important point with all intensified negatives*—should not last our time. For the rest, they should be only the means to an end, namely, the *reproduction* of the original negative by means of a transparency, if permanent records are wanted.

J. Pike.

ALBUMENISED PAPER PRINTING.

Recently two contributors had articles on P.O.P. and C.C. papers, which may be described as stating the case for these methods of silver printing in the most favourable way. Surely, in the oldest photographic journal, albumen, the earliest of the printing processes, may have a hearing, so that judgment may not go against it by default.

In any comparison the important question of negatives needs to be considered. It is as easy to produce the delicate and somewhat thin negatives required for either of the newer printing processes as it is to get the denser ones used for albumen. But it is not so easy to retouch them adequately. Another important point is that in many businesses carbon printing is making considerable headway, and negatives made have to be employed in producing both carbon and silver prints. Negatives suitable for carbon are too vigorous and dense to yield the most perfect results in P.O.P. or C.C., and the worker, in most cases, falls back on albumen. I know that many people do not object to buying prints made from a negative too strong and with gradations which the paper used will not render; but I am viewing the matter from a perhaps more ideal standpoint. I venture to think, too, that the appearance of a good albumen print, with its moderately glossy surface, is more pleasing to the *educated* person, and is, to use a somewhat slang expression, more "class."

But let us dwell no longer on comparison, but briefly go over the making of an albumen print, pointing out one or two matters which have in my hands been conducive to ease in working and success. Assuming that home-sensitised paper is used, I may say, heretical though it may sound, that so long as the silver bath is clear, and nitrate of silver is added proportionately to the number of sheets sensitised, no elaborate bath-faking is necessary. With common care and cleanliness in working, the bath will work month after month without hitch. Even frequent filtering may be dispensed with if care be taken to decant the clear portion of the bath, leaving any slight sediment at the bottom of the Winchester. Filtering is an advantage, of course, and the bath *should* be filtered and occasionally shaken up with a little kaolin; but the whole working is so simple and so little likely to get out of order if common sense be used and common care taken, that one feels the instructions in some of the handbooks and almanacs may frighten the worker with their over-elaboration. The silver bath for paper is a much more robust affair than the negative silver bath of the wet plate worker.

The sooner the sensitised paper is printed after preparation the better; but without deterioration it may be kept a couple of days at almost any part of the year, and in winter three or four days without yellowing. Where large batches of prints are daily produced the paper is, of course, floated each night and toned the night following. The old expedient of using blotting-paper, saturated with a strong solution of washing soda and dried, as a pad in the printing frame is an admirable preventive of yellowing, and metal spots at one and the same time. The loose cloth pads cannot but contain tiny particles of metal worn from springs and hinges, and should be well brushed pretty frequently; but, as the soda paper pads are renewed every few months or weeks, these tiny particles do not come into contact with the silver paper, and immunity from metal spots results.

Trimmed to size, the prints are placed in about three gallons of tepid water, to which a handful of common salt has been added. This reddens them, enabling the progress of toning to be judged, and the salt is quickly washed out in two or three changes of water. Toning in the acetate bath proceeds evenly and quickly, and when the desired colour is obtained, which may be judged both by transmitted and reflected light, each being a guide, the print is passed again into a weak salt bath which stops the toning action.

In the matter of fixation we owe much to the careful investigations of Messrs. Haddon and Grundy, as published in their 1897 Convention paper. The hypo is made up according to their standard, a ten per cent. solution, rendered alkaline by the addition of 1 drachm of ·880 ammonia to 40 ozs. (1 quart) of hypo solution. The time of fixation is ten minutes, and each print is turned over separately, at least once during fixing. The alkalinity of the fixing bath appears to be a perfect preventive of blisters. Out of thousands of prints made in the last twelve months I have only had one blister, and that was caused by the print kinking in the corner of the washer.

The importance of the first half hour in washing cannot be overestimated, and if the prints receive attention during that time there need be little doubt of their permanency. In mounting and finishing there is no difference between albumen and P.O.P. or C.C. Gelatine or starch is all that can be desired as a mountant, and the modern roller burnishers will give a gloss which should satisfy the most exacting.

C. H. Hewitt.

HOLLINGER OF NEW YORK.

A country professional writes: "It is somewhat remarkable that your contemporary, the *Practical Photographer*, for September, appearing almost simultaneously with the issue of The British Journal of Photography, for August 26, should contain an able article, by Mr. F. M. Sutcliffe, on 'Portraiture under a cloud'—an article which I would recommend all professional photographers to read alongside your Ex Cathedrâ quotations of Mr. Hollinger. No professional photographer, I imagine, with any understanding of artistic portraiture or any ambition for photography, will deny the truth of Mr. Sutcliffe's strictures. There are not many, however, who seem to be in a position to 'take the bull by the horns,' as Mr. Hollinger has done, or else there are few who have the courage. I say not many who have the opportunity, for it cannot be gainsaid that there are manufacturing towns where the population consists almost entirely of the artisan class, whose sole ideas of perfection are white, smooth flesh, and brilliant polish. To adopt drastic measures for the art education of such would be suicidal. It remains, however, for each photographer to decide whether there is, in his own locality, a sufficient number of people to appreciate a class of work similar to that introduced by Mr. Hollinger, and whose purses are deep enough to pay the prices which undoubtedly contribute to successful working. Many people want a thing simply because a big price is asked, and value it according to what they pay for it. Mr. Sutcliffe also remarks, in another periodical, anent Mr. Strauss's suggestion of a circulating exhibition of English photographs, that the taste of American customers is superior to that of Britons, and this raises the question as to whether it is safe, even in the larger towns of England, to make a bold stand, and lead instead of blindly following, and giving to an ignorant public 'the cheapest and the shiniest.'

"Granted, however, that there are fair probabilities of success in following Mr. Hollinger's lead, some will ask whether it is altogether an advantage to go to such an extreme as he appears to have done. No retouching, no posing, no lighting, no anything, except focussing and exposure. Perhaps many of us would be inclined to do a little posing, just a slight alteration, and to regulate the light a trifle. It could be done without fussing or worrying, and the probability is the result would be superior. But the question is, Does not a great deal of the success depend on the extreme to which the thing has been carried? "The people like it all right, it's so different from the rest'—an appreciation of individuality that must be encouraging, and a departure on the part of the worker from 'the dead level of commonplace excellence,' that is, we trust, only the beginning of better things all round. This is, perhaps, what Mr. Hollinger meant when he said: 'he quit knowing anything.' He stripped off the old bad traditions and the conventionalities that have flourished like ivy round the photographic tree, strangling its life. His method is a sort of reversion to type.

"But let the worker who reads Mr. Hollinger's words pause a moment before supposing that his work is just so much blind snap-shooting and trusting to chance.

"Mr. Hollinger is a photographer of experience. He got 2*l.* 2*s.* a dozen for his portraits before he went to New York, and to his new sphere and his new method of work he brought all his experience of sitters and all his technical knowledge. Then he devoted himself to a study of art, both in its theory and through its achievement, and to an endeavour to grasp 'what the people enjoyed and why they enjoyed it.' How few professional photographers read the photographic and art magazines month by month, particularly the latter! A fiddling formula receives far more attention than those principles which lie at the very foundation of all the best work. How many bolster up their ignorance of those principles by the lavish use of accessories! The old posing with its artificiality and affectedness is banished from Mr. Hollinger's studio; 'it's the simplest, homeliest place you have ever seen.' The pictures of accessories which the average English customer styles "*so pretty*" have no place there. Instead he photographs men as he sees them, and he is skilful enough to see them as they are. Of course, it is to the credit of the American that he wishes to be represented as he is. The Englishman generally wants to look like some one else.

"As we read and reread the sayings of Mr. Hollinger, we long that a Hollinger might arise in every town of importance in this country. A few photographers there may be who are striving to elevate the art. But what are they among so many? Would not the public respect a man who ceased toadying to it and said: 'Here is my work, this is what I think right; if you like it, pay me for my skill and knowledge; if not, leave it.' What does the public think of the quack and the charlatan?

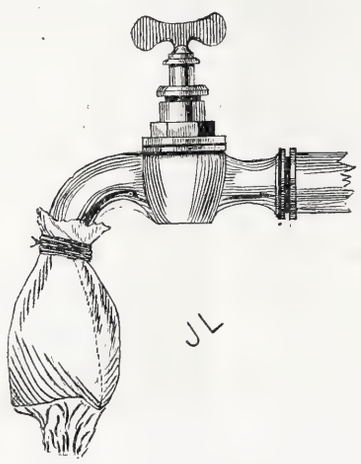
The most ignorant and gullible, it must be admitted, buy his pills and nostrums, and poison themselves, only too slowly. But the great majority go to the respectable practitioner. Are ninety-nine per cent. of photographers to remain in a sort of parallelism with the quack? Are the show-cases always to be filled with 'the cheapest and the shiniest?'"

SPOTS ON NEGATIVES.

Mr. Bolton's able article in The British Journal of Photography of July 1 interested me greatly, inasmuch as I myself suffered agonies by reason of the black and brown spots he describes; and, as I found a simple and inexpensive method of preventing their appearance, it struck me that many of my fellow-craftsmen would like to share in the benefits to be derived therefrom.

I had one or two important negatives spoiled in this way before I took the trouble to thoroughly investigate the matter. I went through almost the same process as did the writer of the previous article, and ultimately arrived at the same conclusion, *i.e.*, that the source of the trouble arose in the water. I then knew that the only thing to be done was to filter all the water used, and to do so in a quick and simple manner.

An easy way of doing so suggested itself to my mind which I immediately proceeded to carry out; how, I will endeavour to explain as lucidly as possible. I took a pocket handkerchief and placed in the centre of it a tuft of cotton-wool and then tied it with string tightly round the outlet of the tap, and upon turning on a flow of water I found that the supply was not impeded in the least, and after washing all dishes and



bottles, and making up fresh solutions, developed, fixed, and washed a negative which proved to be absolutely free from the annoying spots.

Making a small bag about four inches long by three inches broad and loosely filling it with ordinary wadding, I tied it tightly round the tap in place of the handkerchief; this I used for about a week, when I removed it, and found that the wadding and inside of the bag was a strong yellow colour and covered with tiny black specks.

I procured a few yards of common calico and the same of common wadding, and, by the aid of a sewing machine and the kind services of a lady friend, I had in half an hour a sufficient supply to last for a couple of years, each bag filled with wadding and a piece of string placed inside ready for use.

Each Monday morning, on commencing business, I remove the dirty and corroded filter, and replace it with a new one from my box, which I keep handy in the dark room.

I can only add that, by their means, I have had a freedom from spots for some five or six years. Jesse Landon.

INTENSIFICATION WITH LEAD.

[From *Wiener Freie Photographen Zeitung* through *Revue Suisse.*]

In 1876 Eder & Töth published in the *Photographische Correspondenz* a method of intensification by means of the salts of lead. Mercury intensification is still the method most generally employed, but the disadvantages accompanying its use have offered inducement to search for an alternative process. I have tried the method recommended by Eder & Töth, and I am surprised that it should have fallen into discredit, for it certainly possesses some distinct advantages over mercury intensification. My experiments, however, have led me to discard the potassium sulphide and hyposulphite of soda employed by Eder & Töth, and to use in their place a hydroquinone developer and sulphite of soda. An essential condition of success is thorough washing of the plate before intensification, and careful preservation of the lead solution in the dark. It is worthy of note that solutions of lead are less dangerous than salts of mercury.

The solutions which I employ, and which keep well, are as follows:—

Intensifier.

Lead nitrate	4 parts.
Potass. ferricyanide	6 ,,
Distilled water	100 ,,

Reducer.

Sulphite of soda	10 parts.
Water	100 ,,

Blackening Solution.

Any ordinary hydroquinone developer.

The practical method of procedure is that usually adopted, the plate being well washed after each bath. The operations can be performed in ordinary daylight.

Whilst in the lead bath the plate should be carefully watched in order to avoid over-intensification, for the process has this advantage over the usual methods, viz., that the action can be pushed much further, and vigorous printing density obtained on exceedingly thin negatives. According to the degree of intensification the plate becomes more or less yellow, passing finally to white, and becoming dark brown in the darkening process. If the intensification produced is not sufficient, the process can be readily repeated as many times as necessary. If the plate is placed in a bath of potassium sulphide, the image becomes an intense black; but this is a procedure which I do not recommend, first, because of the objectionable odour of the sulphide, and, secondly, because when thus treated the plate is not open to subsequent treatment. To reduce the plate it is allowed to remain in the lead bath until it is bleached completely through; it is then placed in the sulphite of soda solution, or, if a long washing is not objected to, into the usual fixing bath, until sufficiently reduced. It is then blackened with the hydroquinone developer. If necessary, the whole operation can be repeated.

Plates treated with the above intensifier have the following advantages over those treated with mercury.

1. They are capable of practically unlimited intensification.
2. Provided they were originally free from veil, they remain absolutely clear; or, if the veil is only slight, it can be removed by reduction.
3. The grain of the plate is not made any coarser than by other intensifiers.
4. Plates treated with an alkaline sulphide are absolutely permanent.

The first plates which I intensified by means of a developer have not (at the end of nine months) shown any tendency to change, a test which is, in my opinion, quite sufficient to justify their claims to permanency.

Paul Hirschfeldt.

FOREIGN NEWS AND NOTES.

X-ray Photography and Surgery.—The *Photographisches Wochenblatt* mentions that the hospital ship, *Relief*, was fitted out with Röntgen apparatus by the United States for the Cuban expedition. It is said that the results were highly satisfactory. One remarkable bullet wound is instanced. The shot entered the right arm at the elbow, traversed the length of the upper arm, passed through the chest down the left arm, and lodged in the left elbow, breaking the bone.

Transfer Paper.—The *Photographische Chronik* publishes the following method of preparing transfer paper by Mr. C. Fleck. Clean paper, made from rags, is stretched in the coating frame, and coated with the following celluloid solution:—

Celluloid scraps	35 grammes.
Absolute alcohol	400 c.c.
Ether	600 ,,
Castor oil	15 ,,

When dry the paper is passed through the press several times with constantly increasing pressure. The paper is then moistened with boiled water, 1000 c.c.; ether, 50 c.c.; and alcohol, 30 c.c. The paper is again passed through the press repeatedly until dry. If the paper does not strip well when dry, which is possible in summer time, it should be moistened with a ten per cent. solution of acetic acid. The transfer leaves nothing to be desired in sharpness and delicacy. This transfer paper is the best for three-colour work, as it does not expand if a good description of paper has been selected.

Leaky Wooden Vessels.—According to the *Photographische Monatschrift für Medizin*, these may be rendered water-tight in the following manner: Sink them in a solution of glue until they are saturated, and then in a solution of cane sugar, molasses, or glycerine and water. Lastly, immerse them in water glass. They are not only rendered waterproof, but their durability is increased.

Flashlight Portraiture.—Readers of the *Photographische Correspondenz*, doubtless, will notice a clever study in portraiture by Cæsar Kunwald, and, as it is indistinguishable from daylight studio work, the author's method is worth attention. The rapidity of exposure in flashlight photography is an advantage perhaps outweighing all the drawbacks attending the same, as it enables the operator to secure those momentary expressions that so often are the charm of successful portraiture. For the flash-lamp powder the author uses magnesium, permanganate of potash, and sulphate of antimony, in the respective proportions of 3, 4½, 1. The coarse particles should be removed by sifting. As permanganate of potash is most irritating to the mucous membranes, the mouth should be protected with a handkerchief, and the nostrils plugged with cotton-wool whilst sifting the powder. (We would also recommend protection of the eyes.) The mixture is explosive, and therefore great care should be exercised in handling it. If the combined powder is kept ready for use, it should be preserved in small strong, well-closed glass vessels. The lamp is enclosed in a box of trapezoid form as a smoke trap. The front of the box is of ground glass, 66 cm. high and 38 cm. broad. The back is 58 cm. high and 22 cm. broad. From front to back the distance is 22 cm. The interior of the box is covered with bright tin for reflection of the light. A small brass tube passes through the side of the box to connect the lamp with the indiarubber ball used for projecting the powder through the lamp flame. The top of the box is provided with a cardboard door, 14 cm. square, hinged with leather at the back and covered with tin. This allows for the escape of air when the ball is pressed, but, as it immediately falls back in its place, scarcely any smoke passes through. The box is taken from the room, opened, and the tin wiped after each exposure. The quantity of powder to be used may be determined roughly as follows: Given the quantity used for a successful exposure, as found by experiment, let L_1 represent the distance of object, D_1 the aperture of lens, and G_1 the weight of powder used; then the quantity of powder for another exposure may be calculated by the following formula, in which L represents the distance of object, D the aperture of lens, and G the weight of powder required:—

$$\frac{G}{G_1} = \frac{\left(\frac{L}{D}\right)^2}{\left(\frac{L_1}{D_1}\right)^2}$$

For focussing, a small lantern is used the front of which is covered with ground glass bearing a small geometrical figure cut out of black paper. The reflectors are made of white cotton satin, and with these the top, side, and bottom light may be regulated with ease. The lamp should be placed at a greater distance for groups or large objects, by from 6 to 7½ feet may be taken as the normal distance for a single portrait.

Enamelling Prints.—The *Photo-Gazette* mentions that prints which refuse to strip from the glass support in the process of enamelling may easily be removed by moistening them from the back with an aqueous solution of formalin. As soon as dry they will strip easily.

Photographing Drawings and Paintings.—Professor A. Albert refers, in the *Photographische Correspondenz*, to the difficulty attending the reproduction of pencil drawings on paper yellow with age. Even orthochromatic processes, wet or dry, will only give thin negatives, and if greater contrast is aimed at the lines will suffer. If the drawing is placed under a sheet of yellowish-green plate glass, it will present greater contrast to the eye, and a photograph taken under the same conditions will be found of much greater vigour. In copying old oil paintings, water, glycerine, albumen, or a mixture of these ingredients, is frequently recommended to clear the picture. But these washes are injurious, especially if the painting is damaged. A very simple and safe means consists in cleaning the surface with cotton-wool dipped in olive oil. The pledget should be frequently changed to get rid of the dust and dirt. The surface should be finished by means of a clean cloth, gently rubbed over until the last traces of oil are removed. The colours and the drawings in the shadows will gain in effect, and retouching may be dispensed with.

The Paper Ring.—We read in the *Photographische Mitteilungen* that the Chemische Fabrik (late E. Schering) declined to join the ring, and has striven to obtain a suitable paper to replace the monopolised article. The Company has recently submitted some celloidine paper, coated on a different make, to the Laboratory of the Berlin Technical School. Dr. H. W. Vogel reports in highly favourable terms upon it, and is of opinion that the results are in no way inferior to those obtained upon syndicate paper. It appears that the head of the photographic department, Herr Alfred Herzheim, has been working for some time with Herr Felix Schoeller, jun., at Burg Gretesch near Lüstringen, with the object of making a paper to replace the Rives and Steinbach products. Their efforts have been successful, and the Schering Factory thinks the new article will achieve great success in Germany.

A New Colour Printing Process.—According to the *Technische Rundschau*, patent has been applied for to protect a new process called steno-chromography. The *Weser Zeitung* has made some remarks concerning the process, and further details are awaited with considerable interest. The process appears to be especially suitable for the printing of bank notes, &c., as it is impossible to counterfeit the prints by any of the methods at present known. It is also adapted to the printing of coloured illustrations simultaneously with the text, either at one or several printings, as may be desired. Although the illustrations may be in several colours, it is not necessary to lay down the paper more than once. The prints may be either in litho or typographic style, and in the latter case the process is applicable to revolving presses. The German Government has constructed a press according to the specifications of the inventor, J. M. Heppler. The results have been found highly satisfactory, and the Government has taken over part of the patent. The *Deutsche Photographen-Zeitung* remarks that such an invention should prove of great value in three-colour printing.

BAS-RELIEF PHOTOGRAPHY: FARIS AND MASON'S PROCESS.

The inventors of this process thus describe it: We take a piece of sufficiently thin sheet-lead, or any other suitable sheet metal capable of receiving and retaining impressions from a stylus or other suitable tracing instrument (*e.g.* thin sheet copper will do, but we prefer lead to other metals, it being cheap and very ductile), and we place this upon a pad of blotting-paper or other suitable yielding substance. Upon the said sheet lead or other metal we place, face upwards, a photographic print, which may be fastened to the said sheet lead or other metal with gum or glue, or otherwise, on one edge or several edges of the print. This print should be of paper sufficiently thin to admit of tracing through it with facility, but not so thin as to be liable to tear under the stylus or other tracing instrument. Or the said print may be merely placed upon the sheet lead or other metal, and be secured thereon by drawing pins or otherwise. The print being thus fastened or secured to the sheet lead or other metal, we trace through the said print on to the said sheet lead or other metal, so as to indent into the latter such outlines and details as may be necessary, using for this purpose a lead pencil or any suitable stylus or pointed instrument. We then remove the print, and with the said pencil or stylus complete the embossing of the sheet lead or other metal from behind, or indent it from the front, or both, as may be required, until a suitable bas-relief is produced. In so completing the embossing, the said sheet lead or other metal should be placed face downwards upon a board of sufficient thickness, wherein is cut a hole corresponding to, but slightly larger than, the outline of the figure to be embossed, and the embossing of such figure may be done above such hole, or, in some cases, a wooden frame of suitable size and depth will do, or a cardboard box of suitable size and depth turned bottom upwards, and having a hole as described cut in the bottom thereof, may be used. In each case the sheet lead or other metal may, if desired, be secured to the board, frame, or cardboard box by pins or otherwise, or be merely placed thereon, and be moved about and reversed as desired.

We then place the bas-relief face upwards upon a rigid, flat, smooth surface, and pour over or place upon the said bas-relief plaster of Paris (properly mixed with water). When this has dried and set hard it forms a mould the counterpart of the leaden or other metal bas-relief, which is then removed. Or the leaden or other metal bas-relief may be allowed to remain in the said mould so as to constitute part thereof. The said mould may either be made "small," by which term we mean a mould including only the embossed portion of the bas-relief, or the intaglio impression thereof, and not the adjacent plane surface, but leaving, of course, a sufficient margin to give sufficient strength to the mould, and to allow for the subsequent trimming of the die. (In this case we trim or pare the edges of the die made in the said mould, as hereinafter described, to the outline of the figure to be embossed, as hereinafter described). Or the said mould may be "large" (by which term we mean a mould including not only the embossed portion of the bas-relief, or the intaglio impression thereof, but also so much of the adjacent plane surface of the said bas-relief, or produced thereby, as may be necessary), and thick by placing the bas-relief face upwards (upon a suitable rigid flat and smooth surface), within a frame of sufficient length and breadth relatively to the print to be embossed, and of sufficient depth, and then

filling up the said frame level with its upper edges with plaster of Paris (properly mixed with water).

Having thus made a mould, we sufficiently soften a piece of gutta percha in hot water, and with it we fill (or fill and cover) the said mould. When the gutta percha has sufficiently hardened, it is removed from the said mould, and when it has dried and hardened, and has been suitably trimmed (with a knife or other suitable instrument), it constitutes a die upon which photographic prints corresponding (as regards subject) with the original print may be embossed.

If the metal bas-relief has been left in the plaster of Paris mould as hereinbefore described, the said metal bas-relief, strengthened by the backing of gutta percha, may, when the said gutta percha has sufficiently hardened, be removed from the said mould, and (having been trimmed if necessary) will together with the said backing of gutta percha constitute a die.

If a "small" die, trimmed to the outline of the photographic figure to be embossed be required, it is only necessary to fill up with the softened gutta percha the cavity or intaglio (in the mould from which such die is to be made) representing such figure, allowing, of course, a margin for trimming and a sufficient thickness of gutta percha. But, if a "large" die with a flat surface adjacent to the bas-relief of such figure be required, we press upon the "large" mould made within the frame aforesaid a sufficient quantity of the softened gutta percha, not merely to fill the said cavity or intaglio, but also to spread over or cover to a sufficient thickness the entire upper surface of the said mould.

Having thus made a die either "large" or "small" as hereinbefore described (*i.e.*, either of gutta percha alone or of metal backed with gutta percha), we take a frame of cardboard or other suitable material, and of suitable size (relatively to the size of the die and of the print to be embossed thereon) and thickness, and gum, glue, clamp or otherwise affix (face downwards) to or upon the under side of such frame the edges of the print to be embossed (*i.e.*, in such a way that, when the frame is held with the upper side towards the operator, the face of the print to be embossed is visible within such frame). The object of using this frame is to prevent the print from wrinkling or creasing whilst under the pressure herein next referred to. We then place the print face upwards (and still affixed to the frame) upon the die aforesaid, which is supported by a flat, smooth, rigid surface, and then put upon the print some soft yielding substance (such as a small bag of flour or of powdered chalk, or some cotton-wool or both) interposing tissue paper or other suitable substance to prevent the said bag or pressing substance from marking the print. We then subject the whole to pressure in a suitable press or otherwise, so as to force the print on to the die when the said print assumes the form of the said die and becomes a bas-relief. In some cases (especially with enamelled prints) we find it advantageous, before pressing the print as aforesaid, to apply pressure with the fingers to those portions of the print which lie or rest upon the most prominent portions of the die (interposing tissue paper or other suitable substance between the fingers and the said print), the object being to prevent the cracking of the coating or the paper of the said print.

In some cases it may be advisable to add additional sharpness to the outline of the photographic bas-relief, by pressing or tracing around the said outline with a suitable stylus or other suitable instrument, or with the fingers, tissue paper or other suitable material being interposed between the said photographic bas-relief and the said stylus, or other instrument or fingers.

In some cases (*e.g.*, in the case of a photograph of a person with a very prominent nose) it is advisable so to manipulate the bag of flour or other pressing substance that there shall be a less thickness over the portions of the print which lie or rest upon the most prominent portions of the die, which portions of the print will thus be subjected to only the amount of pressure necessary to bring them into relief. The photographic bas-relief thus produced is then cut out or otherwise removed from the frame, and is trimmed and mounted in any usual manner. A great number of facsimile bas-relief photographs is thus obtainable with one die with a minimum of labour and time.

When desirable, the bas-relief photographs may, before being mounted, be filled in or stiffened at the back with beeswax (which sets at once) or other suitable material.

The foregoing process is that which we prefer, but it may be modified in many ways.

Thus, for example, instead of using a die as herein described, the said die may be dispensed with, and the photographic prints (which in this case should be on thick, strong paper) may be embossed in a mould, made (direct from the metal bas-relief as hereinbefore described with reference to the "large" mould) either of plaster of Paris (mixed with water) or of gutta percha. When plaster of Paris is used for making the mould, the said mould must be made of sufficient thickness to withstand the requisite pressure; but, when gutta percha is used for making the mould, the said mould may be made considerably thinner than when plaster of Paris is used. In making a mould of gutta percha, the metal bas-relief is placed face upwards (upon a suitable rigid, flat, and smooth surface) within a frame of sufficient length and breadth relatively to the print to be embossed and of sufficient depth, which frame is then filled up level with its upper edges with softened or melted gutta percha. If the gutta percha used for making the mould be merely softened and pressed upon the leaden or other metal bas-relief, the latter should first be filled in and strengthened at the back with plaster of Paris (mixed with water) or with other suitable supporting material. In doing this, the said bas-relief should not be placed face downwards upon any hard surface, lest the weight of the backing before it has set hard should flatten the prominent parts of the said bas-relief against such surface. To prevent this, the said bas relief, if of sufficiently small size, should be supported by being pinned or otherwise affixed or secured at its edges to a frame of sufficient depth. If the metal bas-relief be a larger one, it should be placed face downwards upon a board of sufficient thickness, wherein is cut a hole corresponding in form to, but slightly larger than, the outline of the embossed portion of the said bas-relief, which portion will enter the said hole, the said bas-relief being, if necessary, affixed or secured to the said board by pins or otherwise. The object of using the board hereinbefore last referred to is to prevent the said metal bas-relief from "bellying" or bulging under the weight of the backing. Or cotton-wool may, if necessary, be placed in various suitable positions within the hole in the said board and beneath the metal bas-relief, for the same purpose as hereinbefore last stated; but, if the gutta percha is to be melted, it may be held in any suitable flame, and be dropped upon the leaden or other metal bas-relief, which in this case will not require the backing of plaster of Paris.

In making a mould of softened gutta percha, the plaster of Paris die hereinafter described may be substituted for the aforesaid metal bas-relief, the advantage of this being, that any roughness or other imperfections in or on the said die may be remedied as hereinafter described, and extra detail and relief may be added thereto by carving and scraping, and additional depth and detail will thus be given to the mould made therefrom.

When the mould is made of plaster of Paris or of melted gutta percha, the metal bas-relief may either be removed therefrom, or be allowed to remain therein so as to form a portion of the said mould. When the mould is made of plaster of Paris, a die (if desired) may be made therefrom with softened gutta percha, whether the metal bas-relief be allowed to remain in the mould or not; but, if it be desired to make a die from the mould made of melted gutta percha, the metal bas-relief should be allowed to remain in the said mould to receive the melted or softened gutta percha of which the die is to be made.

The mould having been thus made, the bas-relief photograph is obtained by placing the photographic print face downwards upon such mould, placing above the print a soft, yielding substance and subjecting the whole to pressure as hereinbefore described with reference to embossing on a die, tissue paper being (when desirable) interposed between the print and the mould. When embossing in a mould, if the print do not take a satisfactory impression of the deeper portions of the mould, the portions of the said print which require to be accentuated may be pressed into the corresponding depressions in the mould by means of a suitable stylus or with the fingers.

And instead of making a mould as aforesaid, and then making the die therefrom, the die may be made direct from the leaden or other metal bas-relief by filling in at the back the embossed portion or intaglio thereof with a sufficient thickness of melted gutta percha (leaving, of course, a sufficient margin for trimming) which, when removed, allowed to harden, and trimmed, will constitute the die. Or the gutta percha may be left in the metal bas-relief so as to constitute therewith the die, which may, when sufficiently hard, be trimmed as necessary.

Or the said gutta percha die may be made "large," *i.e.*, of such size as not merely to fill the said intaglio but also to cover so much of the flat surface adjacent to the latter as to form a die of the size required relatively to that of the print to be embossed.

In this case also the metal bas-relief may either be removed from the said die or be allowed to remain thereon so as to constitute a part thereof. In either case the said die may be trimmed as required.

In making the gutta-percha die in any of the ways hereinbefore last described, the same precautions against the flattening and "bellying" or bulging of the metal bas-relief should be observed as those hereinbefore described with reference to the filling in and strengthening (at the back) of the metal bas-relief with plaster of Paris, when making a mould of softened gutta percha.

Plaster of Paris may be used to make a "large" die, in which case it should be cast in a frame as hereinbefore described with reference to making the "large" mould; but in this case the said frame should be provided with a loose bottom of sufficient thickness having cut therein a hole of a shape corresponding to but slightly larger than the outline of the embossed portion of the bas relief which will enter the said hole, the object of this being to prevent the projecting portions of the said bas-relief from becoming flattened against the surface upon which the frame rests, and the same precautions against "bellying" or bulging should be taken as described with reference to the filling in and strengthening (at the back) of the metal bas-relief with plaster of Paris when making a mould of softened gutta percha. In this case also the metal bas-relief may either be left upon the die, and thus constitute a part thereof or be removed therefrom.

We prefer, however, to make a plaster-of-Paris mould and a gutta-percha die therefrom as hereinbefore first specified by us for the reasons, firstly, that the said mould may readily be deepened by carving and

scraping, so as to give greater relief to the die made therefrom, and extra detail may be added to the said mould by carving and scraping; secondly, that, should the said dye by any means become injured, another can be made from the plaster-of-Paris mould, whereas the metal bas-relief will seldom admit of a good second die being made therefrom; and, thirdly, that a number of dies may be made from the said plaster-of-Paris mould, so that a corresponding number of operators may work at the same time at the embossing of the corresponding photographic prints.

Powdered plumbago may, in many cases, be applied with advantage to the inner sides and ends of the frame aforesaid to prevent the mould or die formed therein from adhering thereto (especially if the frame be a metallic one), but we prefer to place slips of paper of suitable size against such inner sides and ends, the said mould or die adhering to the paper and being removed therewith from the said frame.

If any roughness or other imperfections occur on or in the gutta-percha or plaster-of-Paris moulds or dies (*i.e.*, those whereof the metal bas-relief does not constitute a part), made respectively by any of the methods hereinbefore described as constituting our process, such roughness or other imperfections may be readily removed or rectified by the insertion (in the case of air bubbles, small holes, or other improper depressions or indentations) of a small quantity of the material used in the making of the said mould or die (or with other suitable material), or (in the case of unnecessary relief) by depressing, cutting, or scraping away a portion of the material.

We therefore prefer (when practicable) to remove the metal bas-relief from the mould or die. Or, in the case of a "large" mould made in any of the ways hereinbefore described, improper indentations or depressions in the flat surface adjacent to the intaglio in the said mould may in many cases be remedied (and additional depth given to the said intaglio) by affixing thereon a sheet of paper of suitable size and thickness, wherein is cut a hole corresponding with the outline of such intaglio. Or, in the case of a "large" die made in any of the ways hereinbefore described, improper indentations or depressions in the flat surface adjacent to the outline of the raised figure thereon may, in many cases, be remedied (and less relief given to the embossing portion of such die) by affixing to the said flat surface of such die a sheet of paper of suitable size and thickness, wherein is cut a hole corresponding to the outline of the raised figure upon such die. In either case the said sheet of paper may first be embossed in the said mould or upon the said die, as hereinbefore described with reference to the embossing of photographic prints as a guide to cutting the said hole in the said paper.

This direction is not intended to apply to cases where it is wished to make a die from the mould or a mould from the die, but only to those cases where the mould or die is to be used for embossing photographic prints therein or thereon respectively.

When a frame is used for making therein a mould or die as hereinbefore described, the slides and ends of such frame should be detachable from each other (the sides may be held to the ends by means of screws) to facilitate the separation of the said frame from the mould or die made therein, or the said frame may be made of sufficiently strong cardboard, and as much as necessary thereof be torn from the said mould or die made therein (a sufficiently strong cardboard box of suitable size and depth will do, the bottom thereof being removed when necessary).

When the term "softened" is used in connexion with gutta percha, we intend it to mean sufficiently softened in hot water, and when the term "melted" is used in connexion with gutta percha we intend it to mean melted in a flame and dropped, as hereinbefore described with reference to making a mould of melted gutta percha.

In order to provide for the proper registering of the photographic print to be embossed with the die on which the said print is to be embossed, we proceed as follows:—

We take care in the first place to have all the photographic prints (of each series) of equal size, and so printed that the figure or figures is, or are, in the same position on each print. This is done by means of boundary lines upon the negative. We then take a print and cut out neatly the eyes and the outline of the nose, and such other portions as may be desirable (this is in the case of portraits; landscapes and other photographs than portraits may have some of their salient portions thus cut out). We place the said print in, or affix it to, a cardboard or other frame, as hereinbefore described. We then mark upon the said frame the boundary of the print. We then take a piece of paper, cardboard, wood, or other suitable material, somewhat larger all around than the frame, and at or about the centre of such paper or cardboard (or as nearly as can be judged the proper place) we fix the die ("large" or "small" face) upwards by means of glue or otherwise. We then place the print (still affixed to the frame) upon the said die in such a position that the eyeholes cut therein as aforesaid (or other cut-out portions) shall be exactly above the eyes or other corresponding portions of the die. We then mark on, or fix, pins or pegs in the supporting cardboard upon which the die rests at at least two sides of the frame, so that, when the cardboard frame has been removed and the cut-out print has been replaced by the photographic print to be embossed, the said frame when placed with two of its edges bearing against the said pins or pegs registering with the said marks will bring the said print into the exact position relatively to the die for the proper embossing of the said print by the said die.

THE BEST METHOD OF ILLUMINATING THE NEGATIVE FOR ENLARGEMENT OR REDUCTION.

At the meeting of the Photographic Club on August 31, Mr. W. D. Welford in the chair, the discussion was upon the best method of illuminating the negative for enlargement or reduction.

Mr. Smith said that it was, of course, open to discussion and a personal matter whether artificial light or daylight was the best. Daylight was so variable in its intensity that one had to pick his day very carefully to be within reasonable distance of a correct estimation of its value. On the other hand, artificial light, although comparatively constant in this respect, possessed disadvantages of its own. Even illumination and sufficient of it was not easy to arrange, and then, again, the size of negative was a factor to be considered. He had worked with an eleven-inch condenser on a whole plate, and yet it was surprising, starting with a powerful light, how little was the effective power of that which was actually passed by the negative when effectively covered.

Mr. F. A. Bridge said he would never, if he could help it, make a large enlargement by daylight. He fancied everything being fixed up, and the exposure to daylight started. A cloud comes over the sky, and before the exposure is finished the sun reappears. How could one correctly judge of the differences so caused and be sure of a good result? With artificial light he remembered enlarging a whole-plate to five feet by seven feet in fifteen seconds, using a condenser with limelight and a blow-through jet. The negative was, of course, suitable, which was a consideration, one that would give a good P.O.P. print.

Mr. Mackie said, of course it was not everybody who had an eleven or twelve-inch condenser, and it was the aim of such people to dispense with such aid and substitute some diffusing material. Here, again, was a difficulty in getting illumination sufficiently powerful to penetrate material of more than ordinary density, and to provide an even diffusion throughout the area of the negative. More even illumination followed the use of two thinner media separated a short distance one from the other than one of denser material. Some time ago he was called upon to make some whole-plate negatives from some lantern slides, and successfully did so by putting the focussing screen of a camera three or four inches from the slide, and moving about a paraffin lamp behind it.

Mr. Smith recalled a method of illuminating by diffused light. Two lamps were used, either Argand or paraffin, one at each end of, and in a plane with, the diffusing material. These projected their light against a curved reflector, from which it streamed through the diffuser to the negative to be copied, and it was thought that this would produce a very even lighting. He also had found it an excellent thing to be able to move his source of light about during exposure.

The Chairman stated that he had done so, the resulting illumination being the better for it. His source of light, he added, which was large, and not a spot, was not in the correct focus of the condenser; he was careful to avoid this.

Mr. Smith, Mr. Mackie, and Mr. Bridge agreed that the most effective means of distributing the light was to place a piece of ground glass between the lenses of the condenser system.

Mr. Bridge mentioned that, the smaller the condenser in relation to the negative to be enlarged, the better would it be for the enlargement. However, on the whole question, he could not help saying that there was no definite practice which could be said to constitute the best method; rather that, for each particular purpose, certain methods were more suited and better for the case in question.

Mr. Newell mentioned a difficulty he experienced in getting out his skies in enlargements, although they were such as easily printed by contact and without shading the rest of the negative.

The Chairman said he had been under-exposing the enlargement, and that he should increase the exposure.

Mr. Smith stated that there was a tendency to hardness, and that it was much harder to get by enlargement detail which would be readily obtained by contact.

The discussion concluded with some opinions as to weak *versus* strong light in enlarging, and whether prolonged exposure to low power equalled a briefer one to strong light. It was agreed that the weak light might not equal the strong in many instances.

A NEW PROCESS OF RELIEF PHOTOGRAPHY.

The process in question is due to Herr Pietzer, of Vienna.

The relief is produced in a chemical manner, and has only to be retouched from the back.

The process is conducted as follows: Ordinary gelatine is used and placed in water until it is completely soaked. Isinglass is used in the proportion of one-fourth, by weight, of the dry gelatine, and similarly the isinglass must be well soaked in water. Finally, to the isinglass and gelatine, sugar, in the proportion of one-sixth, by weight, of the dry gelatine, is added. The gelatine and isinglass, when they have absorbed their maximum of water, are heated and thoroughly mixed with the sugar and filtered; then this mixture is poured out on to well-levelled glass plates in such a manner as to avoid blisters, and then carefully dried. The glass plates so coated are laid in a solution of acid chromate

of potash and water, in the proportion of one to fifteen, being placed in the ordinary dark chamber with red or yellow light until the solution has penetrated the coating of the plate, the time taken to effect this penetration lasting, according to the quality of the gelatine, from one-half to two hours.

As an alternative to allowing the acid chromate of potash solution to penetrate in this manner, it could be added to the gelatine, but the first method is preferred, as the gelatine is otherwise too thin and the relief is apt to lose its plastic appearance.

After the superfluous acid chromate of potash solution has drained off, the plate is again dried in a light-proof drying cupboard having an air draught. The sensitive plate thus prepared is now placed in the copying frame so that the negative containing the picture reproduces it or prints it upon the plate. When possible, this is done with direct sunlight, though ordinary diffused daylight is sufficient, but the exposure necessary is then three to six times longer in duration, varying according to the thickness of the negative.

As soon as the effect of the light has rendered the gelatine insoluble at the parts affected, and in a corresponding degree to the graduations of the negative, which with a little practice is easily attained, then the plate is taken from the frame and placed in a dark room in a tray containing water. The plate is left over night in this tray, and the gelatine swells or expands differing amounts corresponding to the graduation of shade upon the negative. The parts which have become completely insoluble are least affected, and the differing amount of expansion or swelling according to all the graduations of the negative produces the photograph in relief.

Exactly the same process is employed if, instead of printing with a negative, a photographic glass transparent positive is used, though, of course, in this case the relief is reversed, and to produce the proper relief a second cast would require to be taken to again reverse it. If, now, the relief produced is to be somewhat strengthened or increased in contrast, it is cast in wax or modelling clay from the first relief, and the portions which it is desired to operate upon are pressed out from the back in clay or wax, then the required relief is once more cast or modelled from this second clay or wax one.

Reliefs obtained in the manner described in the last paragraph in ceramic masses, glass, or metals, can further be coated with a photograph of the portrait or object represented, the said photograph, of course, being precisely similar in size.

The photograph so applied to the ceramic mass or the like may be on silk or other fabrics as required, or produced in any manner well known in the photographic art.

It is evident that, from the first relief produced, relief casting may be obtained in gold, silver, bronze, or other metals, and thus a new field is opened to engraving and other trades.

The reliefs can also be produced in thin proof impressions made of white enamel, and applied on the dark enamel ground and burnt in. By this means the dark tint of the underground shows through the transparent thin enamel relief, and relief enamel cameos can be thus produced.

In the manufacture of ceramic ware, the relief itself may be impressed into the mass with which it is to be fired or burned, as, for instance, in porcelain, terra cotta, faïence, cyderolit, and the like, and, if desired, coated with a vitrifiable pigment photo and again burnt in, and the said vitrifiable pigment photo may be produced in various tints. Vitrifiable pigment photos for ceramic ware were only possible on flat surfaces, but the present improved process allows the production of the vitrifiable or pigment photo on linen or other pliable stuff, which is then cautiously transferred by means of thick oil on to the relief.

Where the same relief is to be duplicated in number, the original relief can be rendered stable by any of the known galvanic deposit processes, and the reliefs galvanically produced according to this process can be employed in the usual way.

THE "POCO" CAMERAS.

A SERIES of cameras, manufactured by the Rochester Camera Company, Rochester, N.Y., termed the Poco, is being introduced to the English market by Messrs. Thomas Illingworth & Co., of 5, Soho-street, W., who have the sole agency for the cameras. These in their respective varieties and qualities are characterised by great excellence of construction; they are neat and well finished, and have every necessary movement. Among amateur photographers they should be popular.

We have selected three cameras from among the large series for mention:—

The Cycle Poco No. 1, is designed to meet the requirements of the wheelman. Its wooden parts are made of the best seasoned mahogany, highly polished, trimmed with polished and lacquered brass. The covering is morocco grain cowhide leather. The double swing back as fitted to this camera, is adjusted at any angle by push buttons, remaining perfectly stationary when placed. Both swings are at centres. The back and ground glass are spring-actuated, receding when the plate-holder is inserted, returning to its original position when withdrawn, the camera back and ground-glass screen working in conjunction with each other. A small panel is so placed on the back that it can be opened when focussing on the ground glass when using a tripod. When the use of a roll-holder is desired instead of plate-holders, the camera is so made that the entire back can be removed for the adjustment of the roll-holder. It has rising and double sliding front, fine rack-and-pinion

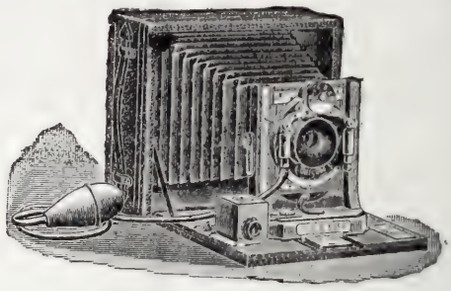


FIG. 1.

focussing movement, reversing view-finder and level combined, and can be used either in the hand, on the bicycle, or tripod. It is fitted with the Unicum shutter with iris diaphragm, hand and pneumatic release, with bulb and hose attachment, adjusted for time, bulb, and instantaneous exposures, working automatically from one second to one one-hundredth part of a second.

The Poco folding camera (series B) is made of mahogany, trimmed with polished and lacquered brass throughout, covered with morocco

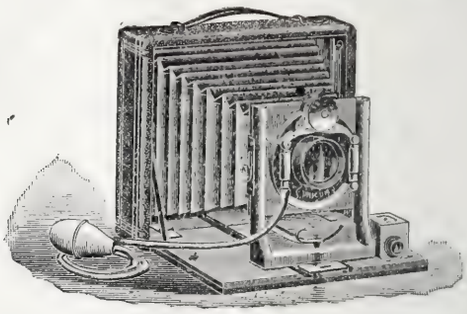


FIG. 2. (Open.)

grain leather, has leather handle, and is self-contained when closed, no metal parts showing.

The single swing back swinging perpendicular is operated from the centre, which in no way affects the focus of the camera when being used. It has rising and sliding front, spring-actuated ground-glass screen, large panel at the back to focus on the ground glass when using tripod, and

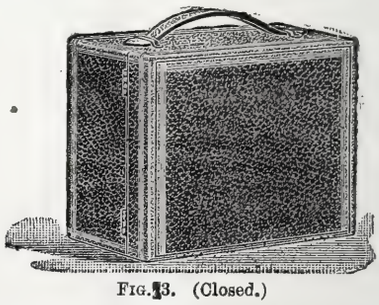


FIG. 3. (Closed.)

reversing view-finder and level combined. It is fitted with the Unicum shutter with iris diaphragms, finger and pneumatic release, and rubber bulb and hose. The lens is a Rochester symmetrical, and adapted for all general work: the 4 × 5 size carries four plateholders or roll-holder. The 5 × 7 size, three plate-holders or roll-holder.

The Gem Poco camera is constructed with a fixed focus lens. It is covered with morocco grain leather, has leather handle, two tripod plates,

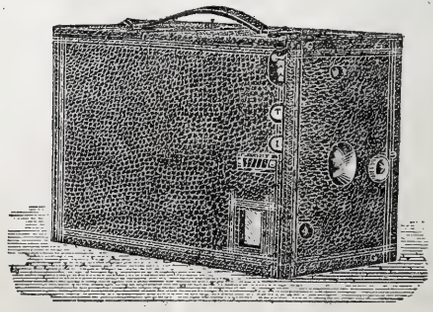


FIG. 4.

nd two large brilliant oblong view-finders, made in proportion to the late, which ensures the correct position of the views. It is equipped ith a new Gem lens, together with rotary diaphragm with three apertures, ochester safety shutter, arranged for time or instantaneous exposures, nd speed regulator. The parts are made flush with the camera box, so nat there is no possibility of their becoming broken or getting out of rder.

Each of the foregoing cameras takes dark slides, or roll-holders may e fitted if desired. The cameras, in addition to being well made, are heap, and are excellent value for the prices charged.

PHOTO-RELIEF IMPRESSIONS ON PAPER OR CARDBOARD.

Herr Lichtenberg-Madsen carries out this process as follows: From a hotographic negative a transparency or positive is copied upon a ensitised gelatine-coated flat glass plate. This plate, upon which the ositive picture is thus obtained, is immersed in water, whereby the elatine is caused to swell and the picture to appear in relief. From his relief, whilst still wet, a plaster cast is taken, and after the same has et hard and dry a counterpart cast is taken therefrom by means of a late of celluloid previously softened by heat. These celluloid plates are hen used as dies or matrices for producing photographic water-mark mpressions or for relief stamping on cakes of soap and the like, but they ay also directly and without difficulty be used as matrices, and in this ay an indefinite number of celluloid stereotypes can be obtained, all of hich exhibit the fineness and detail of the original picture.

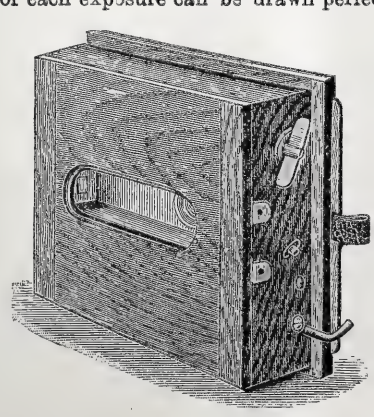
If the finished negative die is to be used for producing photographic ater-mark impressions, the paper or card is laid between it and a flat etal plate and placed in a press by which it is subjected to a steady nd powerful pressure, whereby the paper or cardboard will be more or ss embossed in relief, the impression thus produced being permanent. hen the paper or card is viewed by transmitted light, the impression produces the picture in all its photographic fineness of detail and efinition.

For stamping cakes of soap and the like the negative die is merely npressed thereon, but, if the matrix is to be used for stereotyping, a plate suitably hard celluloid should be used, which must be softened by heat efore being moulded upon the plaster cast, from which, after cooling own, it is removed, whereby a hard, flat, and exceedingly fine and correct atrix is obtained, from which an indefinite number of celluloid stereos ay be produced. Such celluloid stereo matrices may also be produced will from any other original block obtained by any known process, or om type or the like which it is required to multiply by merely pressing e block or the type upon a plate of celluloid previously softened by eat, which, when it has become hardened, may be used as a matrix, om which to obtain an indefinite number of celluloid stereos.

NEW KODAKS, &c.

The Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

he Daylight Changing Cartridge Roll-holder.—The Eastman Company aw our attention to the fact that the daylight changing cartridge roll-lder is now made in the following sizes: $4\frac{1}{4} \times 3\frac{1}{4}$, 5×4, $6\frac{1}{2} \times 4\frac{3}{4}$, and $\times 5$, the two latter being recent additions. The principal feature of this nvenience is that any glass-plate camera can, by the attachment of one these roll-holders, be quickly converted into a film cartridge instru-ent. The roll-holders are sold with the frame, of such length, breadth, nd thickness as to be adaptable to any glass-plate camera made for the me size of plate. By an ingenious and simple locking device, the sec-on of film used for each exposure can be drawn perfectly tight and flat.



The roll-holders can be easily fitted to almost any existing camera thout interfering with the camera or the plate-holders. The cartridge ll-holders are made in vertical and horizonal form. In the vertical, the de draws from the end of the roll-holder like an ordinary dark slide, d is adaptable in the same way to reversing backs of glass-plate cameras. the horizontal form, the shutter draws out on the longest side.

The No. 4 Special Bull's eye Kodak, for Roll Films only.

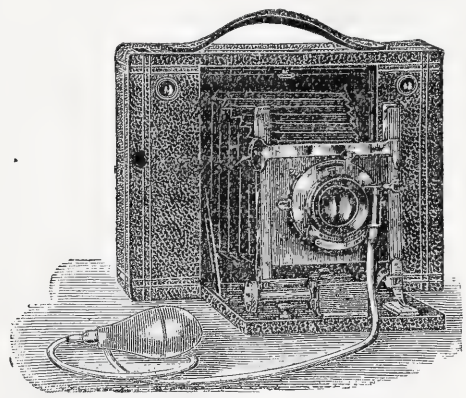
This camera is for rectangular film pictures 5×4 inches; its capacity is twelve exposures without reloading; the size of camera, $5 \times 5\frac{7}{8} \times 8\frac{3}{4}$ inches; the weight, 2 lbs. 9 ozs.; and the length of focus of lens, $6\frac{1}{2}$ inches.

The instrument combines with the simplicity of the original No. 4 Bull's-eye a rapid rectilinear lens of superior quality and the Eastman triple-action shutter. The shutter has three speeds for instantaneous exposures, and by the moving of a single lever can be instantly changed from instantaneous to time or to "lever" exposures, the latter being used for very short "time exposures," the shutter remaining open as long as the exposure lever is kept under pressure, and closing the instant it is released. The lens is fitted with iris diaphragm stops graduated for Nos. 4, 8, 16, 32, 64, and 128. The shutter is set and operated without opening the front except to change stops or change action from time to instantaneous or *vice versâ*.

It is fitted with two finders, one for vertical and one for horizontal exposures, and two sockets for tripod screws. It has a carefully adjusted focussing scale, and, being made on the "cartridge system," can be loaded in daylight.

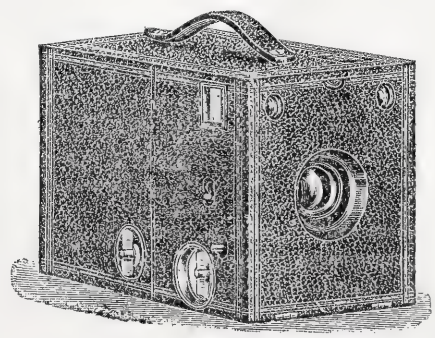
The No. 4 and No. 5 Cartridge Kodaks.

The distinguishing features of these cameras are compactness, efficiency, and lightness. They are specially adapted for cycling and for hand and tripod use. They are hardly more than half the thickness of other



cameras which are adapted to take both film and plates, and are capable of taking 5×4 and 7×5 pictures and having the daylight loading feature.

The Cartridge Kodaks of both sizes use either the daylight loading film cartridge or glass plates, are fitted with rapid rectilinear lenses and pneumatic release shutter fitted with iris diaphragm stops. This shutter has three speeds for instantaneous exposures; it makes short time



exposures by one pressure of the bulb, the shutter closing when the bulb is released, and makes longer time exposures by pressing the bulb once to open the shutter and again to close it. It may be operated by the finger trigger instead of the bulb when so desired.

The Cartridge Kodak is provided with a rising, sliding and falling front, two view-finders, one for vertical and one for horizontal exposures, two sockets for tripod screws. It has an index for focussing, and when used with plates may be focussed on the ground glass if desired. When used with film there are no projecting parts, no attachments to become lost, no extras to be mislaid.

Our Editorial Table.

The Cromer Express is the title of an illustrated booklet of fourteen pages, which takes the reader over that part of the Great Eastern system covered by the Cromer trains. The historical and other data are full of interest, and the visitor to the capital of Poppyland will find the little book an agreeable companion on the journey down by the famous 1.30 out of Liverpool-street which does the 138 miles in two hours fifty-five minutes.

News and Notes.

PHOTOGRAPHIC CLUB.—September 14, Members' Open Night.

LIGHT is diminished by the interception of glass as follows: British polished plate, ¼ inch thick, thirteen per cent.; rough-cast plate, ¼ inch thick, thirty per cent.; rough, rolled, ¼ inch thick, fifty-three per cent.; sheet glass, 32 ounces, twenty-two per cent.

As a result of a serious explosion which occurred on Monday, September 5, in the Newark Celluloid Factory, United States, twenty-five dwelling-houses were burned to the ground. One man was killed and forty injured by the explosion, which was caused by spontaneous combustion.—*Dalziel.*

THE South London Photographic Society will hold its Tenth Annual Exhibition on March 4 to 11, 1899, inclusive, at the Camberwell Baths, Church-street, Camberwell. Application for entry forms and further particulars should be made to the Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

MESSRS. HILLS & CO., of 2, Bayer-street, Golden-lane, inform us that they have been appointed the sole wholesale agents for Messrs. Poulton & Son's photographic views by the Graphotone Company, who have purchased the negatives and business from Messrs. Poulton & Son. They are now preparing a series of local view Christmas cards.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, September 15, Mr. A. L. Henderson will give an account of his visit to Corsica, illustrated with lantern slides. The Hon. Secretary will be pleased to see any one who would care to go. The meetings are held at the White Swan, Tudor street, Whitefriars, at eight o'clock.

LUDLOW PHOTOGRAPHIC SOCIETY.—Mr. J. H. Williams, Guildhall, Ludlow, Hon. Secretary, writes: "The Ludlow Photographic Society intend to hold their autumn Exhibition in the Assembly Rooms, Ludlow, on Thursday, November 17. As this is only the first season of the Society, we shall be very glad to have our own exhibits supplemented by the loan of photographs, if we can so far trespass upon the good nature of the artists."

Re ERNEST ELLIS, photographer, Westgate, Cleckheaton, and residing at 169, South-parade, Cleckheaton.—The summary of accounts filed under this failure shows liabilities amounting to 90*l.* 15*s.* 9*d.*, and the assets are estimated to produce 29*l.* 8*s.* 6*d.* The debtor alleges his failure to have been caused through law costs and depreciation in the value of the studio erected for him. At the first meeting of creditors held at the offices of the Official Receiver, Bradford, it was decided to leave the estate in the hands of the Official Receiver for summary administration.

Re CHARLES LONG, photographer, Union-street, Plymouth.—The statutory meeting of the creditors interested under this failure was held on Friday last at the offices of the Official Receiver, Plymouth. The statement of affairs filed by the debtor disclosed liabilities amounting to 592*l.*, and a deficiency of 479*l.* He alleged his failure to have been caused through competition, excessive rent, bad trade, and sickness. The debtor, it transpired, had been in business thirteen years, and when he commenced he had a capital of 500*l.*, advanced him by his wife. He had not paid any interest on that loan. His rent amounted to 80*l.* per annum. Amateur photographers had done a great deal to ruin his business, and he had had to contend with a considerable amount of sickness in his family. The estate was eventually left in the hands of the Official Receiver for summary administration in the usual manner.

THE reports of inspectors on schools and classes under the Department of Science and Art, contained in the forty-fifth annual report of the Department, show that the teaching of science in the Government schools is undergoing distinct improvement. In the schools of science inspection has entirely taken the place of examination, at any rate in the elementary course, and this, by relieving the teacher of the strain entailed by preparation for examination at a prescribed date, has tended to sounder and more satisfactory work. It is being gradually realised that a school of science should be characterised more by a systematic course of study than by the mere possession of laboratories and apparatus. In classes in physics and chemistry a decided improvement in the methods of teaching is reported. Apparatus is more freely used than formerly, the teaching is less mechanical, and increased attention is being given to practical work. There can be no doubt that the practical instruction in these and other science subjects adds enormously to the value of the theoretical lessons, and it is to be hoped that the number of schools arranging for such work will increase year by year.

Re GEORGE SHEARS, photographer and photographic printer, Gloucester House, Hexham-road, New Barnet, and carrying on business in Bulwer-road, Barnet.—The Official Receiver for the Barnet district has now issued particulars under this failure, from which it appears that the receiving order was made on July 29, on the debtor's own petition. The statement of affairs filed by the debtor shows gross liabilities amounting to 324*l.* 16*s.* 7*d.*, of which 257*l.* 15*s.* 4*d.* is due to unsecured creditors. To fully secured creditors, 52*l.* 19*s.* 3*d.*, the value of the securities being estimated at the same amount. To preferential creditors payable in full, 22*l.* 17*s.* 2*d.* The assets are estimated to produce 73*l.* 3*s.*, from which 22*l.* 17*s.* 2*d.* has to be deducted for the preferential creditor claims, leaving the net assets at 40*l.* 5*s.* 10*d.*, and disclosing a deficiency of 217*l.* 9*s.* 10*d.* The report and observations of the Official Receiver are to the following effect: "The debtor who has been adjudicated bankrupt, commenced business in March 1887, and is now carrying on such business under the style of 'Shears & Sons.' He states, however, that the sons have no interest in the business whatever beyond the wages they receive. The debtor executed a bill of sale over his furniture on May 24, 1898, to the London and Westminster Loan and Discount Company for 30*l.*, and he states that 18*l.* 10*s.* and interest are now due thereunder. He also holds some furniture under a hiring agreement with the Hackney Furnishing Company, the furniture being worth about 30*l.*, and he has paid 8*l.* 16*s* under the agreement. The causes of his insolvency are 'Bad trade, want of capital, and bad debts.' The debtor has only kept a day book, and the deficiency account does not furnish sufficient particulars of his insolvency."

THE Hackney Photographic Society's Annual Exhibition will be held at Morley Hall, Triangle, Mare-street, Hackney, on Tuesday to Friday November 15–18. The following are the Classes:—Members': Class A, Portraiture (figure and animal studies); Class B, Architecture; Class C, Landscape (seascape and river scenery); Class D, Hand-camera Work; Class E, Set of Four Slides. Open Classes (entries in these classes may be priced for sale at the option of the exhibitor): Class F, For any picture not previously having received an award; Class G, For Portraiture and *Genre;* Class H, Champion Class (for pictures which *have* previously received awards); Class I, For four lantern slides *not* having previously received awards); Class J, Champion Class (for four slides which *have* previously received awards). Class K, Stereoscopic (set of four prints or transparencies). A silver medal will be offered for the most useful photographic article exhibited by the trade or amateurs generally. Extra entry forms, and all further information respecting the Exhibition, can be obtained from Mr. W. Fenton-Jones, Hon. Secretary, 12, King Edward-road, Hackney, N.E.

Patent News.

THE following applications for Patents were made between August 22 and August 27, 1898:—

KINETOGRAPHIC APPARATUS.—No. 18,135. "Improvements in Kinetographic Apparatus." Complete specification. F. MCMILLAN and A. C. ROEBUCK.

BORDER NEGATIVES.—No. 18,196. "Border Negatives." H. I. HAWKSHAW and W. D. RITZEMA

APPARATUS.—No. 18,207. "Improvements in Photographic Apparatus." J. P. LEA.

LANTERNS.—No. 18,346. "Improvements in Lanterns for Scientific Purposes." Complete specification. H. C. NEWTON and F. E. IVES.

CAMERAS.—No. 18,409. "An Improvement in the Construction of Photographic Cameras." I. N. AINSWORTH.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

September.	Name of Society.	Subject.
10.....	Birmingham Photo. Society ...	Excursion: Hampton-in-Arden and Berkswell. Leader, F. Lewis.
10.....	Croydon Microscopical	Excursion: Darenth. Leader, J. H. Baldock.
12.....	North Middlesex	*Fair Life.* Lewis Medland.
13.....	Birmingham Photo. Society ..	Exhibition of Negatives, Illustrating Various Methods of Development with Different Brands of Plates.
13.....	Hackney	Lantern Evening.
14.....	Photographic Club	Members' Open Night.
15.....	London and Provincial	Lantern Night. A. L. Henderson.
16.....	Croydon Microscopical	Conversational Meeting.
17.....	Borough Polytechnic	Excursion: Ashtead Woods.
17.....	North Middlesex	Excursion: Thames Pool. Leader, S. E. Wall.
17.....	West London.....	Excursion: West Drayton.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 1,—Mr. A. Haddon in the chair.

Mr. A. L. HENDERSON showed several photographs of hunting scenes by Marshall Wane, of Edinburgh, given him by that gentleman, and taken with a focal-plane shutter. Mr. Henderson referred to the difference of opinion between him and one of the members on a former occasion on the question of the asserted difference in result with gelatine paper printed fast as against slowly printed pictures. He now showed a piece of collodion paper, divided in two, and each printed under different conditions, but both to an equal degree. One had nearly four hours' exposure at the far end of his bedroom, while the other received an exposure to the unclouded sky of one minute forty seconds. It was impossible now for him to distinguish one from the other. He could before they were toned, because the one opened several times for examination printed somewhat bluer.

Mr. E. J. WALL understood that the difference of opinion was in respect of a gelatine paper; but the test prints now in evidence were upon collodio-chloride paper, which could not by any means be taken to answer for the behaviour of gelatine paper under the same conditions.

Mr. HENDERSON repeated Mr. Cowan's conclusions that prolonged exposures with a lens stopped down, equalled proportionately shorter exposures at full aperture, and he saw no reason to expect differences upon paper.

Mr. WALL replied that, in the instance given, a lens and plate were concerned. In a plate one had definite silver salts to act upon, whereas with collodion paper there were probably present chloride of silver, an organic salt of silver (possibly citrate), and free nitrate. In gelatino-chloride paper one has chloride of silver, the organic salt (citrate), and another organic salt of silver—gelatinate of silver, which has an important effect in printing. For this reason they should not compare the two papers at all.

Mr. WALTER D. WELFORD then read a paper upon

EXPOSURE IN SHADOW AND DIFFUSED LIGHT,

an outcome of a discussion that has for the last two weeks occupied the attention of the Society. He first of all stated that the whole matter arose out of a statement that a building in shadow required longer exposure than the

ame building in diffused light, he taking one side and Mr. Wall the other. The point at issue, however, had been confused by the members, some of whom ad gone off upon "any decently applicable tangent," even with an elastic interretation of "decently applicable." Some had stated that the longer exposure vas due to the necessity of softening down the high lights, thus introducing he factor of development. He had been anxious from the start to avoid all onfusing elements, and to bring the matter down to the simplest possible asis. He gave full credit to his chief antagonist, Mr. Wall, for the way he ad rendered assistance in keeping the subject to its proper boundaries; so hat, whilst they were absolutely opposed as regards the point at issue, they vere just as absolutely united in their efforts to keep to the point, and to revent the discussion being dragged away into bypaths. His proposition vas that there was less light in a shadow, such as a shop window covered by n opaque sunblind than when the same window was illuminated by iffused light, and therefore the plate required more exposure' not only on ccount of the development which might need a longer exposure for the sake f expediency, or to fit in with the development, but also because there was ess actual light in the shadow. Some amusing references followed to the lackboard and the "blackboard and soft chalk angles" of the sun's rays, which a sober man would fear to follow, and which made the sun wonder vhere he had been the night before." On the blackboard each proved is own case, unless the chalk broke, and so they got no "forrader." He had made a practical test, using a piece of sensitive paper in a printing rame, one half printed in the shadow of his window, and the other half in he same place in diffused light, *i.e.*, when the shadow disappeared. He used four n tacks to ensure the frame being exactly in the same spot, showing that he ad spared no expense in making the test. The half of the paper printed in difused light was printed to a greater degree than that exposed in shadow, proving hat on the same spot there was greater light power. He defined the conitions as the brightest sunlight at mid-day in June and the consequent hadow, as against the best diffused light obtainable, *i.e.*, the best light without a shadow. He was emphatically of opinion that an object in shadow equired a longer exposure than when in diffused light.

Mr. P. EVERITT thought the conditions of the test should be more accurately efined. What did "shadow" and "diffused light" actually mean? He ent through many of the conditions which the skies might be in on different ays, the effects of which would be different, although within the prescribed efinitions. Again the discussion had been concerning the exposure for a egative, but Mr. Welford had used gelatino-chloride paper tests. What, so, was the nature of the surrounding walls where the exposures were made? Vere they white-washed? So far he thought nothing had been proved.

Mr. E. J. WALL criticised the definition of "shadow" and "diffused light." iffused light was given as one that did not cause a shadow, but this implied othing definite at all. What, too, might be understood as the "best" iffused light? He agreed with Mr. Everitt that it all hinged on what this iffused light was; and he also should like to know more of the surrounding uildings where the exposures were made. Exception was taken to the fact hat P.O.P. had been used which did not include in it the same silver salts we ad in a plate. In his own tests Mr. Wall used bromide of silver paper aked in nitrite of potash, which was exposed in the actinometer in the hadow cast by a building and in diffused light. He found, as Mr. Welford id, that the advantage was with the diffused light.

Mr. WELFORD replied to the points raised. He had decided to eliminate he development factor, and, as he could not get results on plates without evelopment, he used paper. This he had not toned, and indeed would have one without fixing if possible. He restated the conditions to satisfy the quiries made, and was given a cordial vote of thanks.

FORTHCOMING EXHIBITIONS.

1898.

pt. 26–Nov. 12 ... Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.

,, 30–Nov. 5 ..... Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.

ovember 15–18 ..... Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.

,, 15–Dec. 15 Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.

,, 23–26 ..... Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.

Correspondence.

* *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

* *We do not undertake responsibility for the opinions expressed by our correspondents.*

EXPOSURE METERS.

To the EDITORS.

GENTLEMEN,—"J. F. T." thinks I am rather hard on the traders and tentees. Allow me to explain that all my writings on matters photoaphic are from the standpoint of the interests of the body photographic, d not from the point of view of this or that section. It is my opinion that, in relation to exposure meters, the private interests of a few are at this moment injuring the profession at large. Photography might be greatly extended amongst journalists, engineers, architects, men of science, artists, &c., and professional photographers and amateurs would effect an economy if only we possessed a right method of calculating exposure. I asserted that since 1888 no advance had been made in the subject. Mr. Watkins corrected, and said since 1890. That leaves eight years until the present day. Take eight years previous to 1890, that is before any patents appeared, and the following inquirers added something to the general stock of knowledge: Burton, Eder, Darval, Clément, Léon Vidal, Goodwin, Dr. Scott. Platts, Thornton, J. Watts, W. A. Watts, Wormald, Ackland, Pluvinel, D'Espinassoux, Stanley, Cartwright and Rattray, Woodbury, Fuidge and Green, Hurter and Driffield. Since 1890 the whole matter has stagnated, no such list of workers being possible. What does this mean? Surely that all investigation has been snuffed out by a patent. Supposing the gelatine emulsion had been patented, modern photography as we know it would have had no existence; and can any one assert that various instruments for calculating exposure would not have been developed during these eight years if they had been years of freedom? Expansion of photography in the future will be determined by the industrial liberty we enjoy in the present. Hence I have no hesitation in being hard on individuals when I consider their actions injure the general welfare.

"J. F. T." next tells us that what has been patented is merely the form of instrument. I am afraid the patentees will not agree with him. If "J. F. T." is right I have no more to say on this point, for it reduces the information available to that of mechanical ingenuity, about which I said nothing. If, however, the principles are old, and the instruments new, what we require to know is in what manner those principles are worked out in any one instrument. I defy "J. F. T." to construct a Watkins meter from the details furnished in the specification 1388, 1890.

"J. F. T." next discusses the respective merits of the actinograph and the Watkins meter. As at present constructed I believe the one to be as reliable as the other, both being instruments of the greatest utility, as many workers have proved. If one surpasses the other, the Watkins is superior. In spite of this present advantage, however, I differ from "J. F. T.," and agree with Hurter & Driffield in deliberately rejecting a meter and choosing a method of calculation as most likely to solve the problem of exposure. In Watkins' meter the actinometer method, I consider, has reached its highest point of development, but with the actinograph I can see no limit to its perfection until it reaches mathematical certitude. I do not consider the variation in the sun's altitude tells so much against the accuracy of the actinograph as the want of subject factors and values for atmospheric conditions. What is required is a series of experiments to determine subject factors covering a photographic range from clouds to dark interiors, and another set to ascertain, apart from the sun's altitude, the limits of brightness arising from atmospheric conditions. These experiments might well be undertaken by one of the many photographic societies. Subjects I believe could be most accurately valued in C.M.S. units, and given the range of variations from bright sun to dull light, at any given altitude of the sun, and time of year and day, exposure could be brought to such a near approximation as to be practically correct.

The data given by "J. F. T." in regard to speed numbers will, doubtless, be welcome to many, and he, evidently being an expert on exposure meters, I hope he will expand still further.—I am, yours, &c.,

September 2, 1898. JOHN A. RANDALL.

A CRYING WANT.

To the EDITORS.

GENTLEMEN,—In reply to your "Crying Want," I beg to offer a very simple suggestion, and one that I have used for years very effectively. A small brass plate with two vertical ends with holes, with a piece of stout watchspring with its centre elevated to the centre bearing of holes to grip a wire when passed through—the whole very small, to screw on the top or sides of camera—and two pieces of stout steel wire of any length desired, say, a foot, which may be either carried in the tripod leg or in your pocket. At the end of your focussing cloth have two loops, the width of camera apart. All you have to do is to slip in your wires, place the loops of focussing cloth on the hooked ends of the wires, and there you are, adjusted as you like for either length of lens used, and can be adjusted to suit picture while focussing. *The only extras to carry are two pieces of wire.* Of course, with my camera there is always a rigid front. I did not have the elaborate spring plate which I now suggest, but simply two tiny screw eyes each side of camera.—I am, yours, &c.,

Acacia Villa, Leicester-road, New Barnet, JAMES COLE.
September 4, 1898.

THE CINEMATOGRAPH ACCIDENT.

To the EDITORS.

GENTLEMEN,—Referring to your notes on the cinematograph accident, it ought by this time to be known that, when a cinematograph film is wound on a metal spool, it is as free from risk of fire as any ordinary substance, say the wood body of a lantern which, as every exhibitor knows, sometimes smokes a little. Practically the only danger of fire at a

cinematograph exhibition, apart from the use of ether or defective apparatus, is the liability of the film to ignition when lying about in a loose state after passing through the machine. The life of a film is much prolonged if it is always kept on a spool and never allowed to run into a box or occasionally along the floor. Unfortunately many makers of cinematographs do not supply the winding-up apparatus with the machine, but charge it as an extra. All machines having the sprocket wheel as motive power can have a winding-up apparatus fitted at a cost of a few shillings. In my own practice I use two machines; one ejects the film continuously, the other intermittently. I join all the films together, about twenty, or 1200 to 1500 feet; they run through the machine and are automatically wound on another spool. I compensate for the different speeds at periphery, one spool being empty and the other full. I use what engineers call a "friction pulley," and also the band on the friction pulley will, if necessary, slip a little. In the machine which passes out the film intermittently I found towards the end of the exhibition, when there are sixteen or eighteen films on the lower spool, that its weight becomes too great for the control of the band, the spool either tugging the film out too fast with the tendency to tear or the pulley failed to move it at all; but this difficulty was easily overcome by interposing another pulley which acts like the governor of a steam engine and regulates the speed In the case of the machine in which the film comes out continuously, this difficulty does not arise, as the band can be kept tight enough to allow for every difference of speed. To fit a winding-up spool on to a "claw" machine is a little more troublesome, but it can be done.

The London County Council issued last January some rules which they stated were only provisional, but I understood from their officials that there were one or two regulations therein which would be insisted upon, the most important being that the films must be wound upon spools, the prohibition of the use of ether or other inflammable fluid, and the introduction of a water bath between the condenser and the film, but the L.C.C. have no direct means of enforcing their regulations except the hold they have upon the licence of the hall-proprietor. In the case where the cinematograph is exhibited every evening, there is no difficulty about enforcing the regulations; it is in the case of casual exhibitions—such as a concert, with the cinematograph as a *bonne bouche* (French, I think)—that the risk of fire comes in. In this case it is seldom known who the operator is going to be, or what apparatus is to be used, until an hour before the doors are opened, and then it is practically too late to do anything and things take their chance. The L.C.C. have under their consideration some regulations which will remedy this state of affairs. In the mean time I am disclosing no secret when stating the L.C.C. have an officer whose special duty it is to see that cinematograph exhibitions are conducted with safety, and especially to take care that ether and acetylene are not used, that the film is wound up, that there are two operators, that a water tank is used, that no lucifer matches are used except the necessary one to light up with, and that the public have no access to the machine. Quite recently the proprietor of a large hall in London received a severe caution because one of the operators in charge of a cinematograph was seen to strike a match to look at some portion of the film, but this caution was not of much use, as the hall proprietor did not even know the name of the operator.

Another hall-keeper in North London prohibited an exhibition at the last moment, when the doors were open, because the operator declined to show from the gallery. This, to a professional exhibitor such as myself, would be a serious matter. I therefore went to the L.C.C. and asked them to inspect my apparatus and method of working, and certify that it was correct. An official blandly informed me this was unnecessary, as he had been present at an exhibition given by me a few days previously, and, although every regulation had not been complied with to the letter (*e.g.*, I was *not* enclosed in an iron box), yet he considered there was no cause for remark, as my two assistants working the machine "seemed to understand what they were doing," which he considered to be of more importance than whether rubber or iron tube was used, or whether the lantern was lined with asbestos as well as iron, which at that time it was not.

The L.C.C. official referred to is not generally known as such; he pays for his admission to the hall, and finds a seat as near the cinematograph as possible.—I am, yours, &c.,

C. GOODWIN NORTON.

38, *Marchmont-street, W.C.*

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

B. Clarke, Bungay, Suffolk.—*Photograph of members of Waveney Valley Golf Club, and club house on Bungay Common.*

J. Wilkinson, Pendle-street Studio, Nelson.—*Three photographs of the Nelson fire brigade, with the Dewar challenge shield.*

F. B. Williams, 80, Kingsdown-parade, Bristol.—*Photograph of interior of Colston Hall, Bristol, after the fire on September* 1, 1898.

E. M. ANSELL.—We are unable to say. Probably any animal painter would undertake the work for you. Possibly, if you supplied a photograph, with a description, a photographic colourist would colour it.

BOOKS OF VIEWS OF LOCAL SCENERY.—NORTH COTSWOLD writes: "Can you give me the addresses of firms who undertake the making and printing of the view books sold at pleasure resorts?"—The Autotype Company, New Oxford-street.

RURICOLA.—The process is a perfectly practicable one, and is being commercially worked by Messrs. Waterlow & Sons; Andre & Sleigh; Swain & Son, and others. We should advise you to intrust the work to one of these firms; we know no one we could recommend you to for the purpose of taking the negatives.

STUDIO GLASS —W. W. S. Use ordinary twenty-six mica sheet glass for the roof. That is good enough for all purposes. The difference between that and the "special white" is of so little moment that it is not worth the extra cost. After two or three weeks of town smoke on them, there would be no practical difference between the two glasses.

LENS TUBE.—R. T. WATSON says: "My lens is going bright; what can I get to put on it? Will you kindly reply?"—Take a dilute solution of shellac in alcohol, or thinned negative varnish, and to that add lamp black, and coat the inside of the tube with that. The proportions must be adjusted so that the coating dries dead black. A few experiments will decide them.

ENAMEL COLLODION MOUNTANT.—F. C. writes: "1. What is the cause of enamelling collodion film going milky? 2. I thinned it with ether ·720, is that the right strength? if not, why? 3. A chemist has suggested boracic acid as a preservative for gelatine. Would that have any detrimental effect on albumen prints, to use a fresh lot of gelatine each time?"—In reply. 1. Possibly an unsuitable pyroxyline, or too much water in the solvents. 2. ·720 will do very well for thinning. 3. No preservative is necessary if the gelatine is used freshly made each time.

PERMANENCY.—TONING asks: "Would you be so kind as to answer the following questions. The 'combined' toning and fixing bath, as compared to the 'single' (for P.O.P.), is said not to be so 'permanent,' I believe. 1. Is it the *tone* or the *depth of printing* which is not permanent? 2. Would not an extra fixing bath obviate this? 3. There is a combined toning and fixing bath (I don't know the formula) into which the prints should be placed *without previous washing*. My results seem to be satisfactory, but is the bath reliable?"—These queries seem to be somewhat "mixed." 1. The combined bath is a single bath, and by permanence is meant the stability of the print when finished. 2. To some extent. 3. We can offer no opinion without knowing its composition, and the conditions under which it is used.

PHOTOGRAPHING IN ITALY.—Mr. W. M. ASHMAN writes: "Will you kindly give me your construction of notice recently issued by the Italian Government as to photographing within 10 kilos of fortifications? Do you think that means on the land side only between France and Italy, or at seaside as well? Some members of this society are about to visit that district, and would be glad of fuller information than given in the *Times* a week or two ago."—We are very sorry that we can give no more information than that given in the report referred to that would be really reliable. We would suggest that Mr. Ashman should write to the Italian Consulate on the subject. Its reply could, of course, be depended upon, and, possibly, some kind of permit would be accorded to this society, or at least such information given as would enable its members to keep out of trouble when photographing in that district. Foreign Consulates, when approached in this country, are very obliging in such matters.

LIGHTING SITTER.—C. RICHARDSON says: "Will you please answer the following for me? My studio is 20 × 12, work with north light five feet top and side, each end covered in. I work north end, only have five feet, white curtain top and side, the other parts are covered with dark blue curtain. Do you think that is enough light to work with? I get a reflection in the eye on lighter side which comes from the side light. What colour curtain would you think best for side light to do away with that reflection? Is it best to place sitter a little back in shadow or right under the light to get good photos? An answer to this will greatly oblige. Enclose print showing you the light in eye."—The specimen sent shows that the portrait was taken in plenty of light, but that it was not rightly arranged. There appears to be too much direct front light, hence the flat-looking face and the "reflected" light in the eyes. Place the sitter more in shadow. Could you not get a few lessons in lighting from some professional photographer in your neighbourhood? They would be worth paying for, as you seem somewhat "at sea" on the subject.

VARIOUS.—ROBERT MCCONCHIE writes; "1. Could you give me the hydrometer numbers of ten per cent. solutions of the following: Soda carb., potassium carb., soda sulphite, soda metabisulphite? I have an idea that if I kept above in quantity in saturated solutions, and drew off twenty ounces or so as I wanted them, it would save a lot of bother. 2. I have a lot of stale whole-plates, three or four gross, one of the penalties of living so far from a centre, and I wish to try to clean them as per formula laid down in ALMANAC. Are isochromatic plates amenable to the same treatment? also, if surface moisture is rolled up, could such plates be used wet, and about how much would they lose in sensitiveness by the cleaning? 3. Could you give me a formula for ink for pen and ink which will stand bleaching and washing? I have hunted ALMANACS and back numbers of JOURNALS, but cannot light on one.—1. We could only give the sp. gr. by making up the ten per cent. solution and then testing them with the hydrometer, as our correspondent can do for himself. 2. We have not tried the method with isochromatic plates, so can give no opinion. Personally, except for experiment, we do not consider it worth the trouble to "restore" spoilt plates now that they are so cheap. 3. Lithographic chalk answers the purpose, and is that generally used.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 2002. Vol. XLV.—SEPTEMBER 16, 1898.

Contents.

	PAGE
The British Journal Photographic Almanac for 1899	593
Ex Cathedrâ	593
Paper	595
On Things in General. By Free Lance	596
By the Way. By Dogberry	596
Variation of Tones in Prints	598
The Correction of the Distortion Produced by Tilting the Camera. By C. Welborne Piper	598
Increasing the Latitude in Exposure	599
On the Colours and Surfaces of Photographs from the Artistic Point of View. By Roland C. Whiting	600
Recent Advances in Physical Science. By Sir W. Crookes, F.R.S.	602
The Thornton-Pickard Competition	603
Our Editorial Table:— The Folding Apek—An Adjustable Triple Study—Catalogue Received	604
News and Notes	605
Patent News	606
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Leeds Photographic Society	606
Forthcoming Exhibitions	607
Correspondence:— Exposure Meters—Old Roman Villa, Darenth	607
Answers to Correspondents	608

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRÂ.

We have received the prospectus and time table for the fourth session, 1898-99, of the Bolt-court Technical School, 6, Bolt-court, Fleet-street. The first term commenced on Wednesday last, September 14. The Director is Mr. Charles W. Gamble, and evening classes in the practical study of process work are held throughout the session, which lasts until next summer. A glance through that part of the prospectus which deals with the process department shows that, excepting photogravure, opportunities are given the student of traversing the entire field of process work. Those young photographers who contemplate taking up this branch of photography as a means of livelihood should apply for a prospectus of the school at the address given, and make a study of it with a view of ascertaining whether the excellent advantages supplied by the Technical Education Board of the London County Council cannot be availed of. On former occasions we have spoken favourably of the school and the work it is accomplishing, and we have no doubt that the session just opening will be as successful as those that have preceded it.

* * *

According to *Nature*, two sets of Röntgen-ray apparatus were provided for the Sudan Expeditionary Force. One of these, which has been taken up the Nile by Major Battersby, will be established at Abadieh. Considerable difficulty and the greatest care had to be exercised to get the apparatus to the hospital in good order. Major Battersby has the assistance of Sergeant-Major Bruce, Royal Army Medical Corps, who is skilled in the manipulation of the necessary apparatus. This will be the main dépôt for Röntgen ray work, but Lieut. Huddlestone, R.A.M.C., has taken a small outfit with six-inch coil to the front.

THE Lords of the Committee of Council on Education have decided, at the suggestion of the Council of the Society of Arts, to hold, during the autumn, an Exhibition of lithography in the buildings of the South Kensington Museum on the west side of Exhibition-road. As lithography was discovered by Senefelder in the year 1798, the present is the centenary year of the invention, and therefore offers a suitable occasion for such an Exhibition as is proposed. The department will be assisted in the selection and arrangement of the exhibits by the influential committee, with some additional members, which had been already organized by the Society of Art. It is proposed that the Exhibition should be opened about November 1, and remain open for four months. The lithographs will have to be sent in not later than October 1. Any further information will be furnished on application to the Secretary, Department of Science and Art, South Kensington, S.W., to whom all communications on the subject should be addressed.

* * *

THE Annual Meeting of the members of the Photographic Copyright Union will be held on Monday, September 26, at 8 p.m., at St. James's Hall (French Salon), Piccadilly entrance. We believe that the report which the Committee will lay before the meeting will show that during the past year the Union has accomplished some very useful work in the defence of photographic Copyright. Financially, too, there will be a distinct improvement to report in the affairs of the Union.

* * *

REFERENCE to the subject of copyright reminds us that our contemporary, the *Gentlewoman*, which makes a feature of illustrating the weddings of the week, gives prominence in every issue to this notice:—"Important.—Wedding Photographs.—In the interest of our readers it is well that they should be advised that, in the event of their accepting 'free sittings,' which certain photographers are systematically offering, the sitter loses all copyright in his or her own face. The photograph may then be sold, published, or otherwise displayed without the consent or even knowledge of the person photographed. It is not sufficient to order and pay for subseqnent copies."

* * *

THE long and valuable paper on "The Latent Image and its Development," by the late Dr. Hurter and Mr. V. C. Driffield, which the latter gentleman read before the Royal Photographic Society early in the year, has, with additions, been reprinted in separate form. It extends to sixty-three pages. On a future occasion we shall probably make further references to this most important paper, which deals in a new and searching manner with some of the more complex phenomena of development. For the present let us quote two sentences from the last page of the book, which go to show the spirit which animated the late Dr. Hurter and his happily surviving colleague in their photo-metrical and photo-chemical work. "It appears to us that the chief glory of photography lies in its power to truthfully represent natural objects . . . . our aim throughout has been to banish rule of thumb, to remove any necessity for correction in development, to render the production of the negative a matter of certainty, and to place photography in its proper position as a quantitative science." We trust Mr. Driffield will at some future time resume the work interrupted by Dr. Hurter's death.

IT appears that kinematographic records of at least two of the incidents of the recent battle at Obdurman were obtained. Messrs. Fuerst Bros., of 16, Philpot-lane, E.C., write us as follows: "We are in a position to supply the following films (now being shown at the Alhambra, London), either in Lumiere or Edison gauge—Macdonald's Egyptian Brigade; Charge of the 21st Hussars (now the 21st Lancers). We shall deliver all orders within two days from their receipt."

* * *

F. R. A. S., in the *English Mechanic*, asks for an explanation of a remarkable photograph obtained in the following manner: "In the year 189– there died, at his seat in S——, a nobleman, whom I will call Lord X. At the time of his death his two daughters, the Hon. Mrs. Y. and Lady Z., were both in the house. Now, the favourite sitting-room of the family was the library, and on the day of the funeral one of the sisters said to the other, 'We have been so happy in this room that, before we leave it for good, we will take a photograph of it,' which, to shorten my story, as a matter of fact, she (or rather her daughter) did. Upon developing the negative, to her horror, this lady found a partial image of a man seated in an otherwise empty armchair, and *at once, with her sister, recognised it as that of their father!* She and her sister were so shocked and stupefied at this result that they determined to keep the matter secret. They, however, printed one or two positives from the negative, and so the story leaked out among their friends; and it is after a careful examination of one of these prints that I have determined to tell the tale here, with a view to its possible elucidation. The library is a very large room, with the walls covered with books. There are no portraits, or anything analogous, in it, whose reflection might have formed a spurious image. The right-hand side of the sitting figure is certainly the more distinct of the two, the face in the positive not being very well defined. The right shoulder and arm resting on the arm of the chair are, however, perfectly clear and distinct, and the right hand, which I have just been examining with a magnifying glass, is as sharply defined as is that with which I am writing these lines. One extraordinary coincidence, identifying this imperfect image with that of the deceased peer, I purposely suppress, as its mention would almost certainly lead to his identification. I can attempt no explanation of this whatever. It seems to me, a practical photographer, absolutely inexplicable. Perhaps, though, some one or more of my brother-readers may be more fortunate in finding a solution. I have simply given the facts as stated to me. I have myself certainly no theory to account for them. I may perhaps add, it may be needlessly, that I have personally not the very slightest faith in ghosts."

* * *

WE fear that the phenomenon must remain inexplicable on ordinary photographic grounds; nevertheless, if any of our readers care to let us have their ideas on the subject, we shall be pleased to publish them. Like F. R. A. S., we do not believe in ghosts; yet, to paraphrase a remark made by our predecessor in relation to a similar apparition of supplementary figures on photographic plates, how came this particular photograph there?

* * *

THE opinion of Dr. P. H. Emerson on the gum-bichromate process, having regard to his position as the principal modern

exponent of pictorial photography will, doubtless, be of interest to our readers just now, when we are probably on the eve of a revival of the discussion of the claims made on behalf of the process: "Recently some French and English amateurs have revived the old 'gum-bichromate' printing method, announcing it as a new discovery and dubbing it by the stupid and specious name 'photo-aquatint.' The chief claim of these amateurs," he points out, "has been that the process allows of the exercise of "individuality." Of course, this is merely verbal juggling—for what is photography is mechanical—in the drawing and rendering of textures, for example; what is due to jets of hot water is not photography nor limited to this process, for ordinary carbon printers have always modified their results by "hot water" locally applied. We have examined what are given out to be the best examples of this work, and find them all most false in tone and bad in texture, and in no way whatever comparable to a platinotype. Every good quality of photography is lost in them except the mere outline of things, and the method is most incomplete and inferior to the best ordinary carbon prints." This opinion appears in Dr. Emerson's forthcoming new edition of his work, *Naturalistic Photography*.

* * *

THE case against the two German photographers who made their way into the late Prince Bismarck's death chamber for the purpose of using their cameras on the remains was, last Thursday, decided in the Hamburg Court. The Berlin correspondent of the *Standard* telegraphed on the day named: "It will be remembered that two Hamburg photographers made their way into the room in which Bismarck's body was lying, only a few hours after his death, and photographed the body with magnesium light, with the permission of the watchers. At Prince Herbert Bismarck's instance, the Berlin police seized the plates, and the Hamburg Court granted a provisional injunction against the sale of the photographs, on pain of a fine of 20,000 marks for each case of contravention. The Court decided to-day that each contravention shall be punished by six months' arrest." The penalties appear severe, but not unduly so for such a flagrant offence.

PAPER.

IT was mentioned in the Foreign News and Notes, last week, that in Germany a paper-maker, with the assistance of the head of the photographic department of the Chemische Fabrik (E. Schering), has been working on a paper to compete with the Rives and Steinbach productions; also, that the efforts had been successful, and had been favourably reported upon by Dr. H. W. Vogel, of the Technical School, Berlin. It will be remembered that a short time back the Rives and Saxe firms amalgamated, and, as a result, the prices of the papers made by them were at once raised, which is a serious matter for the preparers of the various photographic papers in this as well as all other countries.

It seems more than a little strange that, for the last thirty years or so, these two firms should have had the entire monopoly in photographic papers, not only here and on the Continent, but throughout the world. Some few years ago, it is true, a third firm started its manufacture in the Rives district, which produced as good a paper as the older firm, but it was soon afterwards bought up by it, thus reducing the output once more to two sources, which, as previously mentioned, is now practically one concern only. Therefore users and preparers of paper for photographic purposes will hail with satisfaction the favourable report on the paper of the new firm, and wish it every commercial success; for it is not a pleasant outlook to have to rely entirely upon only one source of supply for the chief commodity in the photographic industry. Competition is good in more ways than one, it not only keeps down prices, but at the same time it keeps up quality, which is of even greater importance to the users of photographic papers than its actual price.

We have often commented upon the fact that English paper-makers have allowed this branch of their business to pass out of their hands. At one time they nearly had the monopoly of it, for if we turn up some of the old manuals—Hunt's, for example—we shall see that English papers, at that period, were found better than foreign ones. The makes mostly used were those of the well-known mills of Towgood, Whatman, Turkey Mill, Turner's Chafford Mill, &c, the last-named being the one most in favour. All these mills, we believe, are still in existence, and, if they could once make the best paper for photographic work, one might well surmise they could do so still. Referring to the old works on photography, we find other firms abroad manufactured photographic papers, Lacroix d'Angoulême and Causer *frères* of Annonay, for example; they too seem to have become lost to the photographic world.

In the processes in which the papers were then used purity of the material was essential, inasmuch as the image was in the body of the paper, and anything that would cause a reduction of the silver would have been fatal to it; but the papers mentioned were free from that, hence it is clear that the English makers could then make a paper pure enough for photographic purposes. It was found, however, when glossy pictures came into vogue, that the English papers were not so well suited for albumenising as those issued by the Saxe (Steinbach) and the Rives firms. The other firms at home and abroad seem to have made but little, if any, effort to adapt their papers to the then requirements, for the reason, possibly, that they did not anticipate that photography and the demand for the paper would eventually assume its present proportions.

With emulsion photography one is not altogether so dependent upon the purity of the raw paper as formerly, for in that it more depends upon the baryta coating upon its surface, and here, again, these two foreign firms, Rives & Saxe (now one) have almost the entire monopoly in the production of these surfaced papers. They appear to have learnt photographic requirements, and they supply them. These requirements are not, however, difficult to fulfil. Surface papers are made for lithographic and for collotype work, and some of them we have tried have answered quite well for collodio-chloride, except that the paper itself is of too rotten a nature for convenient handling while wet, otherwise they were good.

Our pen, we find, has run a little adrift, for in commencing we had not intended to have said so much on the subject of paper for strictly photographic purposes, but rather to refer to papers into which photographs are frequently brought into contact that may have a marked influence on their future. We were led to this matter by our attention being called to the fact that some of the silver prints in the ALMANACS have become of a faintly yellow tint in the lights; but a critical examination shows that this yellowness is only where the prints have been in contact with the tissue paper, always smaller than the

picture, inserted to protect it from the printed matter on the opposite page. Now, if this happens with the more robust images of developed prints, how much more likely is it to occur with continual contact of similar paper with the more delicately constituted images of direct prints, which are frequently "protected" (?) with a like paper.

It might well be surmised that the paper contained some deleterious matter that had, with time, exerted some action on the silver compound forming the image, or was left in the paper; also, that, if there were no silver compounds present, there would have been no yellowing of the image. That might have been a fair inference at first; but is it so? The other day we happened to turn over the pages of Mr. Werge's work, the *Evolution of Photography*, published in 1890, which is illustrated with several collotype prints, and we were struck with the fact that these prints, or rather the paper upon which they are, have changed to a faint yellow tone, and only where they have been "protected" by the tissue paper, just the same as have some of the silver prints in the ALMANACS. In this case there can be no question of silver, or any of its compounds, being in the picture or the paper, or in the material with which it is surfaced. If tissue paper, or some tissue papers, have this effect upon the papers that have no silver in them, or ever have had, it would be unfair to charge the yellowing in any way to the silver compounds that may or may not exist in silver prints.

We had intended to have said more on the subject of paper as indirectly employed in photography, but space will not allow of it on the present occasion.

ON THINGS IN GENERAL.

THE "Descriptive Camera Reporter" is a good phrase, and he should, we read, "either by his own efforts or by the assistance of the proprietors of the illustrated papers which may be fortunate enough to have him on its staff obtain technical proficiency in photography so as to enable him to give the best prints as well as the most vivid word-painting. His proprietors could provide a dark room and studio, so that he could develop his plates and prints if necessary, and photograph any celebrity who might visit the editorial sanctum or be interviewed there." Did the writer of these sentences, which are full of suggestions—if they were necessary—of real value, evolve the idea out of his own consciousness, as the German did the camel; or are they the unconscious product of telepathic suggestion? There may be need for more of such men; but I have certainly in real life only come across two of them who were real smart. Attached permanently to the staff of leading illustrating newspapers, they can photograph well, and they can write first-rate articles. Things don't stand still in the journalistic world. One of the "Descriptive Camera Reporters," the last time I saw him, took a series of photographs, developed them—a couple of hundred miles away from the sanctum—wrote a column and a half of letterpress the same day. The paper he represented had all—photographs and letterpress—in the later editions on the next day. Oh, yes, the D. C. R. is already well to the fore, and has been for some time past. Then, as to photographing celebrities at the sanctum, that is already a moot project, though I don't suppose it will ever mature. Some of the paper proprietors, when they are asked more than the traditional minimum of half a guinea, throw up their hands in holy horror, and express amazement at such demands. I am afraid that "pious grief" is not an accurate description of their state of mind when they pay the bill, for some pictures they must have, be the price what it may. Then they threaten a gigantic combination "to take our own photographs, Sir." It is nothing to them that illustrated journalism has virtually killed the sale of celebrities. I am sorry to say, in this connexion, that one leading photographer does make the minimum half-guinea his customary price for all his subjects.

If illustrated journalism has killed celebrity sales, photogravure has almost killed line engraving, to which, in a general way, it is not fit to hold a candle; and a thousand pities it is that so essentially English an art should be in danger of extinction. It is a craft which is a mystery to learn and requires a long apprenticeship to master. Let us hope that, like miniature painting, its eclipse by photography is temporary only. By the bye, in speaking of Art Unions the other day, the Editor, no doubt, did not refer to the original art union, the head of the family, the *Art Union of London*. There have been a large number of these bodies launched upon the public from time to time—some mere lotteries, others genuine institutions, intended to promote artistic methods of culture. But the Art Union of London is the oldest, and, like everything else, has felt the correcting touch of time; for, established as it was with one leading idea, the cultivation of line engraving, it published in 1889 a print, by the deadly enemy of that craft, photogravure, from a favourite painting by Yeames, *True and Loyal*.

Speaking of paintings, I notice that the suggestion (this time made in Germany) of our old friend, olive oil, to treat a painting with preparatory to photographing it, is brought forward, the *Photographische Correspondenz* being the culprit. I am no advocate of physical arguments in a general way; but I do assure my readers that I could point out one man, a wealthy connoisseur and owner of pictures, and not one only, who would, without compunction kick a photographer out of the room if he caught him olive-oiling a picture of his! And I do think I should uphold the wielder of physical argument in such a case.

The free-portrait swindle, yes, I should rather think it did still exist, its precious owners now dating from Paris. A gentleman the other day showed me a circular from Paris, and in a half shamefaced manner, as though he really had ordered one of these rewards for assisting in publicity, asked me if I had "seen this." As soon as I saw the heading I told him I had seen it a dozen years ago, and that, without reading, I knew it offered to enlarge a picture, and do it without charge. He turned the conversation. In regard to this topic of enlargements, there was a healthy discussion at the Photographic Club two or three weeks ago. The endeavour to pooh-pooh photographs of small size in favour of direct large ones is a mistake. It shows great perseverance and the presence of purse plethora to go about carrying a 12 × 10 camera and slides; but that there should be more credit in making pictures direct of that size and larger, than in making small negatives and then enlarging them, is an utter delusion. The best results with the minimum of labour and cost should be the constant aim of the photographer desirous of furthering the true interests of his art. There was also an interesting discussion at the Photographic Club on this question, and the illuminant to use. Mr. Bridge summed the whole in a nutshell when he said there was no one way that was best under all circumstances. I know several amateurs who use the incandescent gas burners with great success; at the same time I may say I know another amateur who uses it with conspicuous insuccess; but he does not know that. Has any one tried Franck's plan for improving the incandescent fabric, brought before the Berlin Polytechnic, of blowing out the mantle from the inside during the burning of the mixed gases? It is reported that the German makers are sending out a pneumatic ball and tube for the purpose.

One of the most valuable suggestions on the mechanical side of photography which has been made of late years is that of the Editor in THE LANTERN SUPPLEMENT, that all cinematograph films should be coated on the back with gelatine to render them virtually incombustible. It could add little to the cost, take nothing from the translucency of the film, and would quickly suppress the production of such nonsense as is usually printed whenever an accident happens to a cinematograph.

FREE LANCE.

BY THE WAY.

THE summer of 1898 will be remembered as one of the, if not *the*, most singularly favourable to outdoor photographic work within the recollection of even the oldest hands, for in most parts of the country it has been an almost continuous succession of fine weather; and,

hile the early part presented no special features in the way of normal temperatures, the present month will go down to history a "record" September for heat, the thermometer readings uring the early part of the month being not only the highest of e year, but much above the average of our English hottest days; d yet it is astonishing how little we hear of "hot-weather oubles," as they are usually termed.

The result is partly to be explained by the improvements not only our films, but also in the methods of treatment now available, ough I, for one, believe that we must look further for the cause the comparative freedom from hot-weather cares that has marked e recent and, as I write, present tropical temperatures. I am more an ever convinced that the troubles do not arise from merely hot eather as such, or such as do are very easily met by simple medies. The troubles that really do worry us are, I think, most equently to be traced to electrical disturbances of the atmosphere ther than to mere heat. Thus in the early part of the season, and ain about the middle of last month, we had visitations of thunder-orms in different parts of the country, and, though the temperatures evalent were nothing like as high as those that we have had just cently, I can say, speaking personally, that I both experienced and ard of more difficulties and worries than during the past fortnight, ith all its "ninety-odd" in the shade.

I think it was in the early part of June I had my first (this year's) perience of the old troubles of softening and melting of the film, hough the temperature at that time was not only nothing out of e way, but if anything below the normal, though there were spicions of thunder about. But films became soft and rotten, and stered and melted in spite of all precautions. Alum, formalin, ohol, and even specially cooled water, proved equally incapable of nding matters to any great extent, until suddenly, without any rticular change of temperature, matters returned to the normal ndition. Again, in August, when a spell of thunderstorms came, ompanied this time by a more than ordinary degree of warmth, same troubles made themselves felt; but, during the past ten ys or a fortnight, although I have developed several negatives rly every day with the advantages of an Indian climate thrown I have not had the slightest symptom of gelatine troubles, and ept once as a matter of precaution when the heat seemed lly too much, I have not resorted to any of the usual remedies. rely this points to some connexion between the troubles referred and electrical, rather than thermometrical, vagaries.

Of course, it will be understood that in this, as in other matters, ircumstances alter cases." Not only do plates differ in their ividual behaviour, but the same plates will probably show a iation in their style of working, say, at home and on a journey. fact, a change of water used in development and washing may gether alter the order of working. It stands to reason, other gs being equal, that a negative film in which the gelatine is at inimum will give less trouble in hot weather than one in which, er from abnormally thick coating or from its larger proportion compared with the silver, it is present in relatively larger ntity. Here I think, for general landscape work, the thin icate films, which show a strong image at the back of the plate ore fixing, have a distinct advantage over the thick, heavy films t you cannot see through when half developed. And, moreover, ecially if "backed," the thin films will give all the gradation it is sible to utilise with ordinary printing surfaces, and offer less risk hard results than the grosser films.

hen, again, a plate that may behave *sans reproche* at home with hard Company's water will possibly go altogether "off the i" if you happen to get into a part of the country where the er supply is as soft as rain water or where perhaps it actually is water. All these matters should be taken into consideration in ding between heat and electricity. But, as I have been using same plates under precisely the same conditions — except hatic—part of the time at least, very little doubt remains in my d as to the true cause of the troubles.

But during the very hottest—up to now—of the recent weather I was working under conditions eminently favourable to freedom from gelatine troubles in spite of the temperature. We have not very long since heard complaints of troubles of another kind arising from the impurity of the water derived from pumps and wells in country districts; but, at least, I can point to one advantage that may arise in the country in hot weather. When every drop of water for developing as well as other purposes has to be wound up in a bucket from a depth of forty feet or so, it matters very little what the temperature above ground may be so far as the gelatine is concerned, provided the water is freshly drawn. Working as I was a week or more ago under these conditions, although the thermometer was standing at nearly ninety in the shade, I was as free from trouble of every kind as if the time had been February and the temperature 40°. The water was drawn from the well as wanted at the deliciously cool temperature of 46°, and when this was used for mixing developers and all washing operations there was not much loophole for frilling.

With regard to the impurities of "country" water, I think, from my own experience and taking a common-sense view of the matter, that the fault is more frequently with the distributing arrangements than with the water itself; in other words, it is rather a case of foul pumps than bad water. I have had a good deal of experience of country water, drawn from wells, "becks," ponds and pumps, and, so far as wells of moderate depth are concerned, have never had cause to complain. Of course, when the "well" is merely a small tank just below the ground level, it is nothing better than a collecting vessel for the surface drainage water; but, if it is thirty or forty feet down, the water is pretty certain to be at least as well filtered as most of that that comes through the Company's pipes.

Frequently when travelling in Scotland, the Lake District, or Wales, my water supply has been derived from a stream or "beck" some distance from the dark room, and hundreds of outdoor, wet-plate workers have in years gone by contentedly drawn their water supplies from similar sources without any cause for complaint. The only occasion on which I remember to have had any trouble under such circumstances was once near Coniston, when the weather had been very stormy and wet and the becks were over-charged with flood water from the mountains and fells. As "Coniston Old Man" is rich in copper and other mines, the character of its water at flood time may be pretty well imagined; but at ordinary times, there as elsewhere, it is perfectly safe.

But, when we come to ponds and pumps, we need only go half a step further to *ditches* to be pretty sure that the water contains any amount of inexpressible filth. And, though in some parts of the country—ay, even beneath the very shadow of many an important town—the inhabitants are, by necessity, compelled to *drink* such stuff, one cannot reasonably expect a gelatine plate, or a P.O.P. print, to accept it without some little sign of rebellion. Even "rain water," which is accepted by many as only a shade inferior in quality to "distilled," is far from being beyond suspicion, for under the best of circumstances it carries with it the washings of the roof, from which it is collected; but if, in addition, it is stored in the ordinary type of "water butt," Heaven only knows what the result of its analysis would be. The average water butt, I should say, forms about the richest "fishing" ground the microscopist who desires living subjects could find; and, even if these are filtered out, a vast amount of mystery remains as to the invisible accompaniments of the residual H_2O.

To those, therefore, whose lot takes them with the camera into country places, I would say, Before all things, inquire into your water supply or its source, and, where there is the possibility of a choice, select that from a fairly deep well. You will then not only have it fairly pure, but nice and cool in summer, and in winter almost certainly warmer than the temperature of the atmosphere. It must not be taken for granted, however, that because a well is thirty or forty feet deep it is necessarily pure. All sorts of things

may get in. For instance, I heard a story a week or more back. In a certain village near where I was sojourning, a calf fell down the public well, and it was some days before rustic enterprise "ran" to recover the body. When the attempt *was* made, there was no calf to be found, and now the whole village is feeling very queer at the idea of having *drunk a calf*. DOGBERRY.

VARIATION OF TONES IN PRINTS.

IT seems almost impertinent to suggest that, if there is one thing more than another that is misunderstood in connexion with printing, it is the variation of tones that may be obtained on commercial papers, whether albumenised or the gelatine emulsion papers. We see so often the recommendation of some particular bath for some particular tone, and the equally frequent complaint that the said bath is useless for the particular tone, that the fact is forced home that "tone" is supposed to be the inherent property or some particular combination of gold and a neutral or alkaline salt.

It is rarely recognised that one of the most potent factors in the determination of the final colour of the printed-out image is the negative. A vigorous negative will give almost any tone on any paper, whereas, with a feeble negative, it is frequently impossible to obtain any colour beyond a red-brown without the print becoming flat and poor.

A vigorous negative need not necessarily be a dense one, nor need a feeble one be thin, for a vigorous negative is one which has a wide range of tones between the deepest shadows and the highest lights. A negative with absolutely bare glass in the shadows need not have very dense high lights. With a feeble negative, where there is no bare glass in the shadows and a low range of tones, the high lights must be made correspondingly denser.

If two negatives of the same subject, one vigorous and the other feeble, be printed from on the same paper and in the same light, there will be in most cases not only a distinct difference in the tint of the image when printed, and this difference is frequently noted in the finished print; with a very vigorous negative almost any tone may be obtained with almost any bath.

There are several other factors which, of course, enter into the question, and one which has some influence is the chloride used in the salting or emulsion, though variation from this cause can rarely be seen in the finished print; a far stronger factor is the organic salt of silver that is employed, and here we refer entirely to gelatino-chloride emulsion papers. The presence of acid and damp too has considerable effect on the final tone.

When we come to consider that the process of toning is purely a chemical one, and is the replacement of a definite quantity of metallic silver by gold, and that the tone is actually the modification of the original colour by this deposited gold, it is easy to see that we may get a variation in tone by depositing the gold quickly or slowly, that is, in a coarser or finer state of division, and that it is this rate of replacemen which affects the tone more or less, and, as we may assume that the gold is deposited more quickly in an alkaline than in an acid or neutral solution, it is the acidity or otherwise of the bath that has some influence not the particular formulæ employed, except, of course, in so far as this fact is affected.

There is one experience probably which almost every professional and probably a great many amateur printers have noted, and that is, the ligh in which the print is made has some considerable influence on the fina result. If we take, for example, a landscape negative which may be stained a deep yellow by pyro, and, having printed this on gelatino chloride paper, print a cloud in from a negative free from yellow stain the colour of the two images is totally different during printing, and wil remain so in toning, and it is almost impossible to obtain a uniforml coloured print.

Very much the same result will be obtained if a negative be printed in the sun and in the shade. The colour of the print differs throughout Both results are entirely due to the different constitution of the light, that is to say, with the yellow-stained negative so much of the violet and blue rays is cut off that the organic silver salt is more affected than the chloride, whereas, with the perfectly clean negative, the chloride is more affected than the organic salt. In the case of sunshine there are, undoubtedly, far more of the violet and blue rays present than in diffused light.

This action of the spectrum rays upon the different salts of silver is, of course, the explanation of the difference in result that is to be obtained by printing through coloured glasses, such as green, as was recommended some years back, particularly with plain paper. The maximum of the spectrum on pure chloride of silver extends from G in the violet into the ultra-violet, whereas, with an organic salt of silver as the citrate, the action extends into orange-yellow at C.

When an emulsion is prepared of a mixture of chloride and an organic salt of silver, the more chloride is used the softer and flatter the results, whereas an increase of the organic salt produces a harder-printing paper. This being the case, it is obvious that when we limit the action of light to the one salt or the other, or enable it to act on the one more than the other, there will be a difference in the character of a sun-printed proof and one printed in the shade as regards gradation. We have also to take into account the far greater penetrative power of sunlight over diffused light.

THE CORRECTION OF THE DISTORTION PRODUCED BY TILTING THE CAMERA.

SUPPLEMENTARY ARTICLE.

IN the second article on this subject, which appeared on September 2, there is an omission in connexion with equation 7. It should have been explained that it is founded on the assumption that the difference between sin. A and tan. A is negligeable.

On page 567 I suggested that "possibly the most useful all-round lens for correcting purposes will prove to be either that with which the negative was made or one of a slightly shorter focus." During the three months which have elapsed since the article was written the question of limitations has been further considered, with the result that the anticipation quoted above has been falsified. It now appears that, unless lens of *longer* focal length is employed, sharp focus cannot be secured, even by stopping down. To completely satisfy equation 13, the focal length of the correcting lens must be greater than the original focal distance from lens to negative (the distance v), and the greater the focal length of the lens the smaller is the required degree of enlargement, though the greater are the angles of inclination, B and C.

Equations 5 and 6 state the conditions necessary for perfect correction of height and width, and, if a sufficiently long focus lens is used, equation 13 is approximately satisfied. If the use of stops is to be altogether avoided, equation 13 must be completely satisfied, and this imposes very severe limitations, for, with a given case of distortion and a certain lens of focal length greater than v, the image must be enlarged to *a certain definite scale* to produce simultaneous perfect correction and sharp focus. By relying to a certain extent on the use of stops there is greater latitude in regard to scale.

It is impossible to copy the same size and completely satisfy equation 13, but by using a lens of focal length, not less than $2v$, we can either secure sharp focus with very slight enlargement, or produce an equal size image slightly out of focus; a small stop will then correct the latter defect.

With the original lens only an approximation to sharp focus can be secured, even with an enormously enlarged image.

The equations 5, 6, and 13 assume that we know the scale on which the image is to be copied with a lens of a certain focus. Equations showing the extent to which we must enlarge to secure perfect correction and focus with a lens of a certain focal length will be more useful.

Let F = focal length of correcting lens; then, as V must be greater than F, it may be considered to equal $F+x$. From the laws of conjugate foci it then follows that $\frac{U}{V}=\frac{F}{x}$ = scale of enlargement.

Now, from equation 13,

$$\frac{F}{x} = \frac{a^2+1}{a^2-1} = \frac{V^2+v^2}{V^2-v^2}$$

$$\therefore \quad x = F\,\frac{V^2-v^2}{V^2+v^2}$$

$$\text{and } V = F+x = F\,\frac{2V^2}{V^2+v^2}$$

$$\therefore \quad 2VF = V^2+v^2$$

$$\therefore \quad V^2 - 2VF + F^2 = F^2 - v^2$$

$$\therefore \quad x = \sqrt{F^2-v^2} \quad \ldots\ldots\ldots\

gain, from equation 13—

$$\frac{F}{x} = \frac{a^2+1}{a^2-1}$$

$$\therefore \quad x = F\frac{a^2-1}{a^2+1} \text{ and } F = x\frac{a^2+1}{a^2-1}$$

$$\text{but } V = a\,v = F + = Fx\frac{2\,a^2}{a^2+1} = x\frac{2\,a^2}{a^2-1}$$

$$\therefore \quad \frac{F}{v} = \frac{a^2+1}{2\,a}$$

$$\text{and} \quad \frac{x}{v} = \frac{a^2-1}{2\,a}$$

pare with equations 5 and 6, and it is evident that

$$\text{sin. } B = \text{tan. } A\frac{x}{v} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (16)$$

nd sin. C = sin. $A\frac{F}{v}$ ..... (17)

s before, the trigonometric ratios may be disregarded if the angles small, and then

he inclination of negative, or

$$\text{the angle } B = \text{angle } A\frac{x}{v} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (18)$$

he inclination of copy, or

$$\text{the angle } C = \text{angle } A\frac{F}{v} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (19)$$

he fact that F must be greater than v is manifest from the equation $= \frac{a^2+1}{2\,a}$, for, as a must be greater than unity (see page 567), $a^2 + 1$ ust be greater than $2\,a$.

As an example of the applic ation of these formulæ, suppose we have listorted image produced with a lens working at a focal distance of n. and with camera inclined 10°. For correcting purposes, the ginal lens is unsuitable; but we have, say, two to choose from— e of 6½ in., or one of 18½ in. Taking the 6½ in. lens first, from uation 14—

$$x = \sqrt{\frac{169}{4} - 36} = 2\tfrac{1}{2} \text{ in.}$$

e required degree of enlargement then equals $\frac{6\frac{1}{2}}{2\frac{1}{2}} = 2\frac{3}{5}$

From equations 18 and 19 —

$$\text{Inclination of negative} = 10° \times \frac{2\frac{1}{2}}{6} = 4\tfrac{1}{4}° \text{ nearly}$$

$$\text{Inclination of copy} \quad = 10° \times \frac{6\frac{1}{2}}{6} = 11° \text{ nearly.}$$

With the 18½ in. lens—

$$x = \sqrt{\frac{1369}{4} - 36} = 17\tfrac{1}{2} \text{ in.}$$

Degree of enlargement $= \frac{18\frac{1}{2}}{17\frac{1}{2}} = 1\frac{2}{35}$

$$\text{Inclination of negative} = 10° \times \frac{17\frac{1}{2}}{6} = 29\tfrac{1}{4}° \text{ nearly}$$

$$\text{Inclination of copy} \quad - 10° \times \frac{18\frac{1}{2}}{6} = 31° \text{ nearly.}$$

It is evident that, if the original negative is taken with a long-focus ns, and is therefore on a large scale (say 12 × 10 taken with an 18 inch ns), then either enlargement or the use of a lens of much longer ocus is impracticable; and so, in order to secure good definition, the orrection of the vertical distortion must be given up. There is, f course, no difficulty in correcting horizontal distortion, and at the ame time securing good focus; it is only the inclusion of the vertical orrection that renders the matter complicated, and limits the size of he corrected copy, in accordance with the focal length of the correcting ns.

The formulæ given are applicable only when the principal axis of the orrecting lens intersects in the negative the same point that was inter- ected by the principal axis of the original lens. Possibly the method f correction might be less restricted if this point was considered to be ovable, but the effect of shifting it has not been studied.

C. Welborne Piper.

INCREASING THE LATITUDE IN EXPOSURE.

We have already chronicled the researches of M. Mercier in the direction of using certain metallic and organic salts to prevent the ill effects of over-exposure, and we give here a more extended abstract of his work.

The author points out that, if exposure is very short, it is extremely difficult to obtain the half-tones at the same time as the high lights, and, if development is forced, fog is caused, and the detail that is obtained is buried in this fog. If, on the other hand, the exposure is long, the contrasts diminish in the ratio as the exposure is lengthened, the high lights become weaker, and the details are accentuated, and finally the image becomes grey and flat, or black and fogged.

The best remedy for over-exposure when using hydroquinone and carbonate has, up to the present, been an increase of the quantity of bromide, and this developer enables one to obtain good negatives with most commercial plates, but it acts very slowly, and it is useless when very great over-exposure has been given.

Thinking that there was a considerable variety of chemical substances which would enable one to correct over-exposure, M. Mercier tried a larger number of them, which may be divided into two groups, and each group into two subdivisions. The first group comprises those substances which have to be used in a solution of from one per cent. to three per cent. strength; these are the antimonious and arsenious salts combined with an organic salt, and morphia and codeia or their salts.

The second group comprises those substances which have to be used in very weak solution, and they are the bases of the alkaline developers, such as amidol, metol, ortol, hydroquinone, pyrogallol, to which must be added eserine and apomorphine and the same substances oxidised.

All these substances, introduced into the sensitive film both before and after exposure, possess generally the property of producing a dense deposit of the high lights in cases of over-exposure with a developer such as hydroquinone. Some substances, as, for instance, the salts of antimony and arsenic, act but little on the half-tones, and others, such as morphia and codeia, slightly accelerate them. Some of the second group, metol, eserine, &c., especially when oxidised, retard the appearance of the half-tones; they act, at the same time, as accelerators for the high lights and restrainers for the detail.

Antimony and Arsenic.—The first process which gave the best results in correcting over-exposure, and also, within certain limits, under-exposure, consists in adding to gelatino-bromide of silver a certain quantity of an organic salt of antimony or arsenic, such as the citrate and tartrate, &c. The arsenic salts being very dangerous to manipulate, and being inferior to the antimony salts, they are left out of further consideration.

The salt of antimony, which gave the best results, is the double tartrate of potassium and antimony, generally known as tartar emetic. It accelerates considerably the development of the high lights and does not act on the half-tones. It enables a much longer exposure to be given, and still gives vigorous negatives with good contrasts, with a hydroquinone soda developer.

The formula employed is similar to that used by Captain Houdaille, namely—

Hydroquinone.....	8 parts.
Sodium sulphite (anhydrous)	50 ,,
Sodium carbonate	100 ,,
Potassium bromide	2 ,,
Water	1000 ,,

Nothing is easier than to prove the efficacy of tartar emetic in cases of over-exposure. Take an ordinary bromide plate and immerse half of it for one or two minutes at the most in a 2·5 per cent. solution of tartar emetic. The plate should then be dried in the dark and exposed, and, on developing in the above-mentioned developer, it will be seen that the image appears about twice as quickly on the part treated with the tartar emetic, and the high lights are denser than on the other half—and this effect is more marked in the case of over-exposure; it is thus possible to obtain excellent results on plates with exposures which would, in the ordinary way, give reversed images.

This treatment with tartar emetic may be carried out as well after as before exposure. It is of little use in cases of correct exposure, as it gives too much vigour and brilliancy. It is curious that plates thus treated behave very differently with other developers, with amidol, ferrous oxalate, or eikonogen, development is slightly hastened, there is no difference with metol, and with pyrogallol and pyrocatechine it is retarded.

Morphia and Codeia.—Assuming that the explanation of the action o the salts of antimony and arsenic was that they acted as reducers by retaining the bromine partially separated from the silver by the action of

light, it was thought that all reducers of silver salts ought to give good results in cases of under and over-exposure, and morphia which readily reduces silver nitrate to the metallic state, and codeia, or methyl-morphia, which possesses similar properties, were tried.

The results given by these substances resemble those obtained with antimony, but development is accelerated instead of retarded when using pyro. Morphia does not permit of so great over-exposure as antimony, as the whole of the image is accelerated, and the details are generally more advanced in the case of normal or under-exposure.

It is easy to test this statement by immersing half a plate in a two per cent. solution of sulphate of morphia or a one per cent. solution of codeia. It should be pointed out here that some plates are alkaline and others acid, and with the former the sulphate of morphia may be decomposed and give rise to stains.

A large number of substances were tried of an analogous nature, such as the alkaloids, glucosides, &c., but none gave such satisfactory results.

The oxidised developers used after exposure give softer images than when used before exposure. In such cases it is advisable to reduce the amount of the substance, and use, for instance, 0·01 per cent. of amidol; but, when the oxidised amidol is used before exposure, it gives vigorous negatives, even with an exposure 1000 times too long.

It is possible, by taking certain precautions, to introduce into the sensitive film certain developers not oxidised, and to keep them in that state, and one thus obtains considerable latitude of exposure; but this is less than with the same developers oxidised, and then development is accelerated. Ortol, metol, eserine, and pyrogallol give the best results. The plates should be treated for one or two minutes with 0·1 to 0·2 per cent solution of the developing substances with a small quantity of acetic acid.

The plates thus prepared keep well, and develop rapidly with hydroquinone, and the reducer imprisoned in the film oxidises in contact with carbonate of soda and keeps back the shadows, and thus good, clean negatives are obtained with normal and over-exposure. Pyro produces slow development with normal exposure, but accelerates development with over-exposure, and gives good density. Ortol and metol generally produce yellow stains.

Oxidised developing agents when introduced into the film retard development in the shadows, but increase the density of the high lights in case of over-exposure.

If the reducer is dissolved in water in the proportion of 0·1 per cent. and allowed to oxidise by exposure to the air, and the plate bathed in this for one or two minutes, it is possible to give it an exposure of 100 times too much, and then obtain a negative with excellent contrasts.

ON THE COLOURS AND SURFACES OF PHOTOGRAPHS FROM THE ARTISTIC POINT OF VIEW.

[Read before the South London Photographic Society.]

At the commencement of the production of any work of art, by whatever process produced, the artist is confronted by a very pertinent question, which must be at once answered if the proposed work of art is to possess any claim to general recognition. This question is, What is to be the use of the object when created?

The painter, the poet, the author, the musician, or whatever the artist may be, has always some particular reason for the production which he calls forth, some sapient apology for bringing into existence the child of his imagination and talent. A reason, which is the moral he wishes to to teach and the mission which he in the first place sets himself to fulfil.

It is taken for granted, for the purposes of this paper, that a photograph is a work of art, and it will be understood that the standard of merit to which photography is expected to aspire is placed in a somewhat exalted position. I must here pause to mention that it is my desire in this, as in my other lectures of recent appearance, to endeavour to elevate the artistic status of photography as much as possible; and I must ask you to follow me in what I have to advance with the same desire in what I trust you will consider to be a laudable intention.

Decorative Effect or Picture?

From the utilitarian point of view a photograph that lays claim to artistic qualifications must fulfil one or both of two purposes. It must be produced as (*a*) a decorative effect, or (*b*) as a picture in itself alone; or it may possess both of these qualifications in greater or lesser degree. Before we proceed any further it will perhaps render the matter clearer if I define what these two characteristics really mean.

If a picture is to be only a decorative effect, it must be produced so as to harmonise with the surroundings amidst which it is to be hung. It must form a part only of the whole comprehensive scheme wherein it is to find a place, and that in such a manner that it attracts no greater notice than its purpose requires. This is what is meant when a picture is described as a decorative picture, and when producing such there must always be fully borne in mind the conditions under which it is to be regarded.

In contradistinction to this style of work is the pictorial photograph. All the conditions before mentioned must in this case be reversed. The picture must be composed with every regard to the balance of lines, of light and shade, and all the other canons of art, without any regard whatever to the requirements of the Hanging Committee, and when produced, and not before then, should the wall on which it is to be hung receive any consideration. Then its surroundings must be adjusted to suit the picture, and every endeavour made to enhance the pictorial effect of it in such a way that its greatest value may be brought forth.

The neglect of these conditions is one of the reasons why a picture may look so much better on one wall than on another, and likewise will sometimes explain why a picture which is passed by unrecognised by the Judges at one Exhibition is awarded a prize at another.

The two qualifications which have just been discussed are, of course, the extreme uses to which a photograph may be put; but perhaps the middle course, where a photograph has to be both pictorial and decorative, is not only the most frequent, but the most difficult to contend with. In the production of such works every facility must be employed, and every power made use of, to obtain the best results; and, amongst other considerations, the question of colour and surface plays a most important part in producing that feeling of satisfaction and pleasure which the contemplation of a successful work of art should yield. I think also it will be seen, as we proceed, that colour helps to no small extent in causing those soulful emotions which the works of our great artists, past and present, are so potent in causing.

The Choice of Colour.

Now, in regard to the choice of colour in which a photograph is to be produced, I hope to be able to show that a great amount of discretion is required to be exercised before finally deciding; and also I hope to impress sufficiently upon you the great necessity that exists in obtaining a correct judgment in this respect, that you will be induced to give greater attention to this matter when producing such future works as I hope will bring you fame and reputation.

Now, as the argument of this paper, I contend that (with some exceptions) if a photograph is in any colour other than black or its derivatives, its colour should be analogous to the predominating hue of the subject photographed.

Photographs of any subjects may be quite correctly produced in black or its derivatives, such as the various tones of grey, because they do not in any way attempt to render or suggest the colour of the original, and,if by any means we conceive the colour in which the original presented itself, it is only because we happen to know its colour, and not because the tone of the photograph tends in any way to call that colour to mind.

In considering the colour of a photograph from a pictorial point of view and from the artistic standpoint, it must coincide with the colour of the original in one of two ways:—

(*a*) The colour should only be suggested, or

(*b*) It should be of the actual colour of the original.

Of these two the former is decidedly the better choice, since a photograph cannot, as far as our present methods enable us, represent all the colours of the original subject, and, if the actual predominating colour represented is employed, it is at best apparently only a failed attempt to reproduce a picture in the actual colours of nature, whereas, when the original predominating colour is only suggested, then no idea is produced that any attempt at reproducing the original colours had been made, but that the original colours were *only* suggested.

It is very bad taste to employ a colour which is doubtfully suggestive, such as, say, a greenish-blue to suggest that which is true blue; a cold sepia to represent a ruddy sunset; a green to represent a moonlight; or a blue to represent a green sea.

The reason that this choice is not artistic is much the same as in the previous case about positive colours; but, where it is not possible to satisfactorily suggest the true colour, it is better to use a positive colour than one which will lead to doubt and uncertainty.

If photographers would only realise the fact, they would see that this question of colour really places a great power in their hands, whereby they could very greatly enhance the value of their pictorial efforts. But it must be remembered that it is very possible to overstep the mark in such matters as this.

Bartolozzi, well knowing the beautiful effect of the red chalk used by draughtsmen in making studies, thought to employ the colour for engraving purposes, which, so long as he used it for fanciful and sketchy effects, produced some of the finest results imaginable; but some of his engravings do not appeal so strongly to the artistic taste, because the colour employed did not quite so happily harmonise with the subject; still I very much doubt whether he ever used such a colour to give the effect of moonlight, although I have seen some similar attempts made by photographers.

Photographic Reproductions in Colour of Well-known Pictures.

Like all artistic innovations, people with the artistic instinct, but minus the artistic experience, are very apt to lay hold of this and other such effects, and, of course, unjustly use and even abuse the power that is in their hands for doing much that is good. With the idea of strengthening my argument, and also with the hope that I may render my remarks with greater clearness, I will cite a few instances of what I consider to be right and wrong in the choice of the colour of photographic pictures. Now, by the employment of the various processes which are to be found under the name of photography, it is possible, I believe, to obtain a print in any one colour that may be thought desirable; but for our purposes it will be sufficient to confine our attention to red, sienna, sepia (warm and cold), green, and blue, all of which colours may be obtained by photographic means.

At the commencement, and with the idea of strengthening my future remarks, I would like to mention the reproduction of a few well-known paintings.

Now, I suppose you are all familiar with the *Burial of Wilkie*, by Turner, which hangs in the National Gallery? The prevailing colour of this is decidedly cold in tone, yet I have seen this reproduced by photography in a warm sepia; whilst the same artist's *Fighting Téméraire*, which is, perhaps, the highest ideal of a glowing sunset, has been printed in a moonlight blue. I cannot conceive a greater violation of the possibilities of photography than this. Can you by any possible method of reasoning imagine anything of a sunny appearance in Turner's *Téméraire* in blue? Yet bear in mind this is no six months amateur's mistake. The prints mentioned have been found in some of the principal print-sellers' in London.

Of course, if only business is intended, I suppose we are justified in prostituting the purity of art in any way that the great British public desires, at least, some may think so; but these remarks are not in any way intended for the use of those who buy and sell, but for that small and select minority who, like myself, can see that photography can be made, in suitable hands, one of the fine arts.

Returning to Turner's reproductions, I would like to suggest that, for the *Burial of Wilkie*, either a very cold sepia, a black, or a bluish-black will be found most in keeping with the subject; but, of the three colours, and without making an actual comparison, I think I should most prefer a cold sepia. For the *Téméraire*, a Bartolozzi red, a sienna, or a very warm sepia; but perhaps, for the nicest choice, a warm sienna. This is all, of course, in the event of a positive colour being desired; but I, for choice, would much prefer the *Wilkie* to be printed in a good black, and the *Téméraire* in sepia.

Paintings that are kaleidoscopic in colour do not reproduce well in photography, owing to the absence of a definite colour scheme, and, be it remembered, paintings of this class are generally the weakest of the particular artist's attempts. I might instance Turner's *Queen Mab's Grotto*, also in the National Gallery, and would ask you to tell me, if you can, how you would decide to print a reproduction of such a picture as that.

I will not say anything further respecting the copying of paintings, which is not the average photographer's particular *forte*, but will endeavour to lay before you some ideas in connexion with more photographic practice.

Colour of Landscapes and Portraits.

For open landscapes, especially those including foliage and green fields, I think that neither red chalk nor blue can possibly be used with true æsthetic feeling, and from this we may conclude that very warm and very cold tones are inadmissible; therefore we must look to the more intermediate colours for our choice. The positive colour, of course, is green, but, as the positive colours are not the purest choice, the best suggestive colour would be a greenish tone of black, such as it is possible to obtain in the carbon process. If this is not chosen, then, since we have come to the conclusion that the tone must be between warm and cold, and also bearing in mind the fact that we know the colour of foliage is green, a coldish sepia will be well in keeping with the subject depicted.

For seascapes red again is decidedly out of the question, and sepia cannot with justice be said to recommend itself much better. A greenish-blue, a bluish-green, or a pure green will be the colour if positive, whilst the greenish-black in carbon, or a cold tone in silver, must be used as suggestive tones.

For moonlight views I do not see how anything but a bluish-black can be used. A moonlight picture is frequently represented as greenish, but I cannot say that I have ever seen a green moonlight in nature. We often talk of the "silver moon," and silver is certainly not green. The true colour of a moonlight is really what is known as a French grey, but in the picture it is better to render it rather more bluish, for the sake of getting the cold brilliant effect which is really the charm in a moonlit view.

In portrait and figure subjects, I think you will agree with me that no one desires to look either blue or green, and, even supposing the person depicted was dressed in a blue or green dress, it still would hardly be in keeping to paint them in such colours. In every portrait or figure study the face is the prime object, and the colour of flesh is decidedly warm in tone; therefore we have the whole range of sepias, siennas, and reds to choose from. Of course, red is the nearest to the positive colour of the flesh, but I do not think there is any better effect produced than that of the ordinary photographic purple-brown. It certainly suggests the warmth of the flesh, and at the same time gives the necessary vigour to the picture which a portrait requires. Moreover, it is so purely a photographic effect, and that is a great deal in its favour.

Now, all that has here been stated is, of course, in connexion with pure pictorial photography, and the reason that I claim for advancing these ideas is based on the fact that "truth is the soul of art;" and that to produce truly artistic pictures we must get as near to truth as we possibly can.

In decorative work the case is very considerably modified, and any colour can be employed that will harmonise and fall in with the whole decorative scheme; but even in this case the artist will show his good taste in excluding those subjects which do not coincide with the colour employed; such, for instance, as in choosing a picture which, owing to the requirements of the decorative scheme, must be red, the artist will exclude the uses of a cold seapiece in favour of an actual sunset view, which would be in keeping with so fiery a colour.

Surface: Coarse or Glazed.

I will not detain you any longer on the subject of colour, as I wish to say a few words upon another very important matter, that of surface. Let me, at the very commencement, raise my voice against the employment of that latter-day reviving of an almost defunct abomination, the glossy surface. I cannot imagine how any persons with any real artistic feeling in their nature can really say they like the highly glazed surface. I will tell you why I think so badly of it, and I think your indignation thermometer will rise to the same degree as mine when you fully realise the weakness of the elaboration which the condemned surface shows.

One effect of glazing a print is to greatly enhance the detail all over the picture. Now, in a photograph there is nearly always too much detail showing at the very onset, so that it is quite unnecessary, and indeed objectionable, to do anything which will introduce more than it already contains; in other words, the existence of an excess of detail gives the effect of over-finish. Now, when a painting possesses this character, it gives the appearance that much labour has been exercised in the attempt to produce a servile production; it shows, therefore, a want of freedom and an absence of breadth of air. Likewise the glossy-surfaced photograph presents the same character, and is besides, on account of its gloss, a showy, tawdry, glaring thing, which, to use a common expression, is somewhat loud. It cannot be said to embody refinement, because pronounced effect is considered to be contrary to refined taste.

It also is not the outcome of any of the producing processes, as is the plate-marking in copper-plate printing, and cannot therefore be looked at in the same way that we look upon the tool marks in carving or the brush marks in painting; and this very consideration shows that it is only the result of an outside process which is used to produce effect.

Now, I maintain that, if it is necessary to resort to any means which are not truly photographic, it shows that photography here exhibits its weakness and its limitations to a sorrowful degree; but I am pleased to know that such means are not necessary. That photography can rank amongst the most beautiful of any of the art methods that are known, and there is quite sufficient charm in a photograph, pure and simple, for it to need no means to increase its worth.

The Uses of the Glazed Surface.

Although I have spoken thus strongly against the glazed surface, it must not be imagined that I am blind to its uses. On the contrary, I consider that where it is necessary to force out detail it is a good means of doing so; and also I do not object to its use in very small pictures, such as locket miniatures and suchlike. In fact, I think it enhances the beauty of pictures which are small, by giving them a brilliancy which they really require, and the smaller the picture the brighter the gloss may be. This last remark will show that I look upon the dead surface as best for large work. To some extent this is correct, but discretion must here be used.

It may be taken as a general rule that the more objectionable detail a picture contains the coarser the surface should be, and that the more the detail is desired to be brought out the finer the surface is required. In most cases, however, it will be found that the roughness of the surface should be increased as its superficial area enlarges. Then, again, in a picture possessing a bold effect, the coarse grain will be more in keeping with the subject, and, of course, the reverse applies to pictures with weak effects.

In decorative work the artist is quite at liberty to use either a glossy or a matt surface if the requirements of the scheme render it necessary to do so, and this without consulting the subject of the picture, because the pictorial effect is in subjection to the decorative scheme, and the surface chosen can be that which will produce the best harmony, or contrast if required, such as a glossy picture on a dead ground, or *vice versâ*.

I have now stated all that I think my argument requires, but before I close I would submit the following formulæ: When photographing for pictorial effect, the first thing to be considered and decided upon should be the subject; after which the colour the intended picture is to be

should be settled. When this is known, the kind of surface required should be determined.

When all this is satisfactorily settled, it will be possible to decide upon which process will best produce these results. Then, and not until then, should the negative be made, for it is impossible to produce a perfect negative until it is known what kind of print is required, since scarcely two processes can be found which require quite the same kind of negative. This is somewhat contrary to the usual method where the negative is first made, after which the process is chosen, in most cases the colour and surface being quite unconsidered in connexion with the subject photographed. But the method I have advocated is working with an end in view, and it is working with an aim to get all that photography is capable of yielding to those whose heart is in the work and who love it for its own sake alone.

ROLAND C. WHITING.

RECENT ADVANCES IN PHYSICAL SCIENCE.

THE Presidential address of Sir William Crookes, F.B.S., to the British Association last week contains the following interesting *résumé* of recent advances in physical science :—

Having kept you for the last half-hour rigorously chained to earth, disclosing dreary possibilities, it will be a relief to soar to the heights of pure science, and to discuss a point or two touching its latest achievements and aspirations. The low-temperature researches, which bring such renown to Professor Dewar and to his laboratory in the Royal Institution, have been crowned during the present year by the conquest of one of nature's most defiant strongholds. On May 10 last Professor Dewar wrote to me these simple but victorious words : "This evening I have succeeded in liquefying both hydrogen and helium. The second stage of low temperature work has begun." Static hydrogen boils at a temperature of 238° C. at ordinary pressure, and at 250° C. in a vacuum, thus enabling us to get within 23° C. of absolute zero. The density of liquid hydrogen is only one-fourteenth that of water, yet in spite of such a low density it collects well, drops easily, and has a well-defined meniscus. With proper isolation it will be as easy to manipulate liquid hydrogen as liquid air.

The investigation of the properties of bodies brought near the absolute zero of temperature is certain to give results of extraordinary importance. Already platinum resistance thermometers are becoming useless, as the temperature of boiling hydrogen is but a few degrees from the point where the resistance of platinum would be practically nothing or the conductivity infinite.

Several years ago I pondered on the constitution of matter in what I ventured to call the fourth state. I endeavoured to probe the tormenting mystery of the atom. What *is* the atom? Is a single atom in space solid, liquid, or gaseous? Each of these states involves ideas which can only pertain to vast collections of atoms. Whether, like Newton, we try to visualise an atom as a hard, spherical body, or, with Boscovitch and Faraday, to regard it as a centre of force, or accept the vortex-atom theory of Lord Kelvin, an isolated atom is an unknown entity difficult to conceive. The properties of matter—solid, liquid, gaseous—are due to molecules in a state of motion. Therefore, matter, as we know it, involves essentially a mode of motion ; and the atom itself—intangible, invisible, and inconceivable—is its material basis, and may, indeed, be styled the only true *matter*. The space involved in the motions of atoms has no more pretension to be called matter than the sphere of influence of a body of riflemen, the sphere filled with flying leaden missiles, has to be called lead. Since what we call matter essentially involves a mode of motion, and since at the temperature of absolute zero all atomic motions would stop, it follows that matter, as we know it, would at that paralysing temperature probably entirely change its properties. Although a discussion of the ultimate absolute properties of matter is purely speculative, it can hardly be barren, considering that in our laboratories we are now within moderate distance of the absolute zero of temperature.

I have dwelt on the value and importance of nitrogen, but I must not omit to bring to your notice those little-known and curiously related elements which during the past twelve months have been discovered and partly described by Professor Ramsay and Dr. Travers. For many years my own work has been among what I may call the waste heaps of the mineral elements. Professor Ramsay is dealing with vagrant atoms of an astral nature. During the course of the present year he has announced the existence of no fewer than three new gases—krypton, neon, and metargon. Whether these gases, chiefly known by their spectra, are true unalterable elements, or whether they are compounded of other known or unknown bodies, has yet to be proved. Fellow-workers freely pay tribute to the painstaking zeal with which Professor Ramsay has conducted a difficult research, and to the philosophic subtlety brought to bear on his investigations. But, like most discoverers, he has not escaped the flail of severe criticism.

There is still another claimant for celestial honours. Professor Nasini tells us he has discovered, in some volcanic gases at Pozzuoli, that hypothetical element Coronium, supposed to cause the bright line 5316·9 in the spectrum of the sun's corona. Analogy points to its being lighter and more diffusible than hydrogen, and a study of its properties cannot fail to yield striking results. Still awaiting discovery by the fortunate spectroscopist are the unknown celestial elements Aurorium, with a characteristic line at 5570·7—and Nebulum, having two bright lines at 5007·05 and 4959·02.

The fundamental discovery by Hertz, of the electro-magnetic waves, predicted more than thirty years ago by Clerk Maxwell, seems likely to develop in the direction of a practical application which excites keen interest—I mean the application to electric signalling across moderate distances without connecting wires. The feasibility of this method of signalling has been demonstrated by several experimenters at more than one meeting of the British Association, though most elaborately and with many optical refinements by Oliver Lodge at the Oxford meeting in 1894. But not until Signor Marconi induced the British Post Office and foreign Governments to try large-scale experiments did wireless signalling become generally and popularly known or practically developed as a special kind of telegraphy. Its feasibility depends on the discovery of a singularly sensitive detector for Hertz waves—a detector whose sensitiveness in some cases seems almost to compare with that of the eye itself. The fact noticed by Oliver Lodge in 1889, that an infinitesimal metallic gap subjected to an electric jerk became conducting, so as to complete an electric circuit, was rediscovered soon afterwards in a more tangible and definite form, and applied to the detection of Hertz waves by M. E. Branly. Oliver Lodge then continued the work, and produced the *vacuum filing-tube* coherers with automatic tapper-back, which are of acknowledged practical service. It is this varying continuity of contact under the influence of extremely feeble electric stimulus, alternating with mechanical tremor, which, in combination with the mode of producing the waves revealed by Hertz, constitutes the essential and fundamental feature of "wireless telegraphy." There is a curious and widely spread misapprehension about coherers to the effect that, to make a coherer work, the wave must fall upon it. Oliver Lodge has disproved this fallacy. Let the wave fall on a suitable receiver, such as a metallic wire, or, better still, on an arrangement of metal wings resembling a Hertz sender, and the waves set up oscillating currents which may be led by wires (enclosed in metal pipes) to the coherer. The coherer acts apparently by a series of end-impact of the oscillatory current, and does not need to be attacked in the flank by the waves themselves. This interesting method of signalling—already developing in Marconi's hands into a successful practical system, which inevitably will be largely used in light-house and marine work—presents more analogy to optical signals by flashlight than to what is usually understood as electric telegraphy, notwithstanding the fact that an ordinary Morse instrument at one end responds to the movement of a key at the other, or, as arranged by Alexander Muirhead, a siphon recorder responds to an automatic transmitter at about the rate of slow cable telegraphy. But, although no apparent optical apparatus is employed, it remains true that the impulse travels from sender to receiver by essentially the same process as that which enables a flash of magnesium powder to excite a distant eye.

The phenomenon discovered by Zeeman, that a source of radiation is affected by a strong magnetic field in such a way that light of one refrangibility becomes divided usually into three components, two of which are displaced by diffraction analysis on either side of the mean position, and are oppositely polarised to the third or residual constituent, has been examined by many observers in all countries. The phenomenon has been subjected to photography with conspicuously successful results by Professor T. Preston in Dublin, and by Professor Michelson and Dr. Ames and others in America.

It appears that the different lines in the spectrum are differently affected, some of them being tripled with different grades of relative intensity, some doubled, some quadrupled, some sextupled, and some left unchanged. Even the two components of the D lines are not similarly influenced. Moreover, whereas the polarisation is usually such as to indicate that motions of a negative ion or electron constitute the source of light, a few lines are stated by the observers at Baltimore, who used what they call the "small" grating of five inches width ruled with 65,000 lines, to be polarised in the reverse way.

Further prosecution of these researches must lead to deeper insight into molecular processes and the mode in which they affect the ether ; indeed, already valuable theoretic views have been promulgated by H. A. Lorenz, J. Larmor, and G. F. Fitzgerald, on the lines of the radiation theory of Dr. Johnstone Stoney ; and the connexion of the new phenomena with the old magnetic rotation of Faraday is under discussion. It is interesting to note that Faraday and a number of more recent experimenters were led by theoretic considerations to look for some such effect ; and, though the inadequate means at their disposal did not lead to success, nevertheless a first dim glimpse of the phenomenon was obtained by M Fievez, of the Royal Observatory at Brussels, in 1885.

It would be improper to pass without at least brief mention the remarkable series of theoretic papers by Dr. J. Larmor, published by the Royal Society, on the relationship between ether and matter. By the time these researches become generally intelligible they may be found to constitute a considerable step towards the further mathematical analysis and interpretation of the physical universe on the lines initiated by Newton.

In the mechanical construction of Röntgen-ray tubes I can record a few advances, the most successful being the adoption of Professor Silvanus P. Thompson's suggestion of using for the anti-cathode a metal of high

atomic weight. Osmium and iridium have been used with advantage, and osmium anti-cathode tubes are now a regular article of manufacture. As long ago as June 1896, X-ray tubes with metallic uranium anti-cathodes were made in my own laboratory, and were found to work better than those with platinum. The difficulty of procuring metallic uranium prevented these experiments from being continued. Thorium anti-cathodes have also been tried.

Röntgen has drawn fresh attention to a fact very early observed by English experimenters, that of the non-homogeneity of the rays and the dependence of their penetrating power on the degree of vacuum; rays generated in high vacua have more penetrative power than when the vacuum is less high. These facts are familiar to all who have exhausted focus tubes on their own pumps. Röntgen suggests a convenient phraseology; he calls a low vacuum tube, which does not emit the highly penetrating rays, a "soft" tube, and a tube in which the exhaustion has been pushed to an extreme degree, in which highly penetrating rays predominate, a "hard" tube. Using a "hard" tube, he took a photograph of a double-barrelled rifle, and showed not only the leaden bullets within the steel barrels, but even the wads and the charges.

Benoit has re-examined the alleged relation between density and opacity to the rays, and finds certain discrepancies. Thus, the opacity of equal thicknesses of palladium and platinum are nearly equal, whilst their densities and atomic weights are very different, those of palladium being about half those of platinum.

At the last meeting of the British Association visitors saw—at the McGill University—Profs. Cox and Callendar's apparatus for measuring the velocity of Röntgen rays. They found it to be certainly greater than 200 kilometres per second. Majorana has made an independent determination, and finds the velocity to be 600 kilometres per second with an inferior limit, certainly of not less than 150 kilometres per second. It may be remembered that J. J. Thomson has found for cathode rays a velocity of more than 10,000 kilometres per second, and it is extremely unlikely that the velocity of Röntgen rays will prove to be less.

Trowbridge has verified the fact, previously announced by Professor S. P. Thompson, that fluor spar, which by prolonged heating has lost its power of luminescing when reheated, regains the power of thermo-luminescence when exposed to Röntgen rays. He finds that this restoration is also effected by exposure to the electric glow discharge, but not by exposure to ultra-violet light. The difference is suggestive.

As for the action of Röntgen rays on bacteria, often asserted and often denied, the latest statement by Dr. H. Rieder, of Munich, is to the effect that bacteria are killed by the discharge from "hard" tubes. Whether the observation will lead to results of pathologic importance remains to be seen. The circumstance that the normal retina of the eye is slightly sensitive to the rays is confirmed by Dorn, and by Röntgen himself.

The essential wave-nature of the Röntgen rays appears to be confirmed by the fact, ascertained by several of our great mathematical physicists, that light of excessively short wave-length would be but slightly absorbed by ordinary material media, and would not in the ordinary sense be refracted at all. In fact, a theoretic basis for a comprehension of the Röntgen rays had been propounded before the rays were discovered. At the Liverpool meeting of the British Association, several speakers, headed by Sir George Stokes, expressed their conviction that the disturbed electric field caused by the sudden stoppage of the motion of an electrically charged atom yielded the true explanation of the phenomena extraneous to the Crookes high vacuum tubes—phenomena so excellently elaborated by Lenard and by Röntgen. More recently, Sir George Stokes has restated his "pulse" theory, and fortified it with arguments which have an important bearing on the whole theory of the refraction of light. He still holds to their essentially transverse nature, in spite of the absence of polarisation, an absence once more confirmed by the careful experiments of Dr. L. Graetz. The details of this theory are in process of elaboration by Professor J. J. Thomson.

Meantime, while the general opinion of physicists seems to be settling towards a wave or ether theory for the Röntgen rays, an opposite drift is apparent with respect to the physical nature of the cathode rays; it becomes more and more clear that cathode rays consist of electrified atoms or ions in rapid progressive motion. My idea of a fourth state of matter, propounded in 1881 (*Phil. Trans.*, part 2, 1881, pp. 433–4), and at first opposed at home and abroad, is now becoming accepted. It is supported by Professor J. J. Thomson (*Phil. Mag.* October 1897, p. 312); Dr. Larmor's theory (*Phil. Mag.*, December 1897, p. 506) likewise involves the idea of an ionic substratum of matter; the view is also confirmed by Zeeman's phenomenon. In Germany—where the term cathode ray was invented almost as a protest against the theory of molecular streams propounded by me at the Sheffield meeting of the British Association in 1879—additional proofs have been produced in favour of the doctrine that the essential fact in the phenomenon is electrified radiant matter.

The speed of these molecular streams has been approximately measured, chiefly by the aid of my own discovery nearly twenty years ago, that their path is curved in a magnetic field, and that they produce phosphorescence where they impinge on an obstacle. The two unknown quantities, the charge and the speed of each atom, are measurable from the amount of curvature and by means of one other independent experiment.

It cannot be said that a complete and conclusive theory of these rays has yet been formulated. It is generally accepted that collisions among particles, especially the violent collisions due to their impact on a massive target placed in their path, give rise to the interesting kind of extremely high frequency radiation discovered by Röntgen. It has, indeed, for some time been known that, whereas a charged body in motion constitutes an electric current, the sudden stoppage, or any violent acceleration of such a body, must cause an alternating electric disturbance, which, though so rapidly decaying in intensity as to be practically "dead beat," yet must give rise to an ethereal wave or pulse travelling with the speed of light, but of a length comparable to the size of the body whose sudden change of motion caused the disturbance. The emission of a high-pitched musical sound from the jolting of a dustman's cart (with a spring bell hung on it) has been suggested as an illustration of the way in which the molecules of any solid, not at absolute zero, may possibly emit such rays.

If the target on to which the electrically charged atoms impinge is so constituted that some of its minute parts can thereby be set into rhythmical vibration, the energy thus absorbed reappears in the form of light, and the body is said to phosphoresce. The efficient action of the phosphorescent target appears to depend as much on its physical and molecular as on its chemical constitution. The best-known phosphori belong to certain well-defined classes, such as the sulphides of the alkaline-earthy metals, and some of the so-called rare earths; but the phosphorescent properties of each of these groups are profoundly modified by an admixture of foreign bodies—witness the effect on the lines in the phosphorescent spectrum of yttrium and samarium produced by traces of calcium or lead. The persistence of the samarium spectrum in presence of overwhelming quantities of other metals, is almost unexampled in spectroscopy; thus one part of samaria can easily be seen when mixed with three million parts of lime.

Without stating it as a general rule, it seems as if with a non-phosphorescing target the energy of molecular impact reappears as pulses so abrupt and irregular that, when resolved, they furnish a copious supply of waves of excessively short wave-length, in fact, the now well-known Röntgen rays. The phosphorescence so excited may last only a small fraction of a second, as with the constituents of yttria, where the duration of the different lines varies between the 0·003 and the 0·0009 second; or it may linger for hours, as in the case of some of the yttria earths, and especially with the earthy sulphides, where the glow lasts bright enough to be commercially useful. Excessively phosphorescent bodies can be excited by light waves, but most of them require the stimulus of electrical excitement.

It now appears that some bodies, even without special stimulation, are capable of giving out rays closely allied, if not in some cases identical, with those of Professor Röntgen. Uranium and thorium compounds are of this character, and it would almost seem from the important researches of Dr. Russell that this ray-emitting power may be a general property of matter, for he has shown that nearly every substance is capable of affecting the photographic plate if exposed in darkness for sufficient time.

No other source for Röntgen rays but the Crookes tube has yet been discovered, but rays of kindred sorts are recognised. The Becquerel rays, emitted by uranium and its compounds, have now found their companions in rays—discovered almost simultaneously by Curie and Schmidt—emitted by thorium and its compounds. The thorium rays affect photographic plates through screens of paper or aluminium, and are absorbed by metals and other dense bodies. They ionise the air, making it an electrical conductor; and they can be refracted and probably reflected, at least diffusively. Unlike uranium rays, they are not polarised by transmission through tourmaline, therefore resembling in this respect the Röntgen rays.

Quite recently M. and Mdme. Curie have announced a discovery which, if confirmed, cannot fail to assist the investigation of this obscure branch of physics. They have brought to notice a new constituent of the uranium mineral pitchblende, which in a 400-fold degree possesses uranium's mysterious power of emitting a form of energy capable of impressing a photographic plate and of discharging electricity by rendering air a conductor. It also appears that the radiant activity of the new body, to which the discoverers have given the name of Polonium, needs neither the excitation of light nor the stimulus of electricity; like uranium, it draws its energy from some constantly regenerating and hitherto unsuspected store, exhaustless in amount. Sir W. Crookes, F.R.S.

(*To be continued.*)

THE THORNTON-PICKARD COMPETITION.

We append the list of awards in the above competition, for which over two thousand prints have been sent in from professional and amateur photographers in all parts of the world.

Class I.—*1st Prize* (50*l.* in cash): Pierre Dubreuil, Lille, France. *2nd Prize* (25*l.* apparatus): A. A. Bellingham, 2, Grimshaw-street, Burnley. *3rd Prize* (10*l.* apparatus): F. Spalding Chelmsford. *4th Prizes* (5*l.* apparatus): O. Kirkdjian, Sourabaya, Java; Viscount de Valle Paraise, Funchal, Madeira Island; W. Kirk & Sons, Cowes, Isle of Wight; H. G. Kennard, 5th Dragoon Guards, Meerut, India. *Highly*

Commended: J. C. Burrows, Camborne; W. D Welford, London; W. H. Whittard, Clapham-park, S.; W. N. Dow, Penang, India; F. S. Brown, Launceston, Tasmania.

Class II.—1*st Prize* (25*l.* cash): A. Lindsay Miller, 112, Wellington-street, Glasgow. 2*nd Prize* (15*l.* cash): E. G. Boon, Alassio, Italy. 3*rd Prize* (10*l.* cash): W. J. Warren, 13, Bedford-street, Leeds. 4*th Prize* (5*l.* apparatus): C. F. Inston, 25, South John-street, Liverpool. 11 *Prizes of* 3*l. each* (apparatus): R. W. Robinson, Linkfield-corner, Red Hill; H. Owen, Talavera-terrace, Wellington, N.Z.; F. H. Vine, Hobart, Tasmania; C. M. Wane, Morningside-drive, Edinburgh; A. W. Andree, Colombo, Ceylon; J. E. Hunt, 141, Clarendon-road, N. Kensington, W.; A. E. Banfield, 13, Carlyle-road, Edgbaston, Birmingham; C. Metcalfe, Mill House, Halifax; J. Patrick, 75, Comiston-road, Edinburgh; Henri Breux, 37, Rue Bernard Palissy, Tours, France; Louis Meldon, 31, Ailsbury-road, Dublin. 21 *Prizes of* 1*l.* (apparatus): J. Warburg, London, W.; H. C. Leat, Bristol; (Mrs.) Jeanie Welford, London; J. N. Taylor, Christchurch, N.Z.; H. E. Brightman, Bristol; H. E. Harris, Leighton Buzzard; G. H. Lillie, Kansas City, U.S.A.; H. Allison, Belfast; W. E. Inston, Liverpool; W. D. Hussey, Alresford, Hants; W. P. Thompson, Manchester; E. Hopkins, Southsea; A. H. Duncan, Glasgow: J. Smith, Nurlfordby; W. S. Poole; G. J. Shepherd, London; J. C. Oliver, Glasgow; W. G. E. Robinson, Umtata Tambuland, S. Africa; T. C. Sole, Grahamstown, Cape Colony; H. S. Parsons, Tottenham; W. Barry, Nantwich.

Mr. H. Snowden Ward, who was one of the Judges, has been kind enough to supply us with the following notes on the competition:—

The Thornton-Pickard Competition, with its thirty-five prizes, amounting in value to 200*l.*, naturally attracted a great amount of work. Nearly three thousand pictures, from considerably over two hundred competitors, were entered, and an interesting feature of the competition was the large proportion of foreign work which it included. We give a complete list of the awards, from which it will be seen that the competitors were so numerous as to make it quite impossible to criticise their works in any detail. In Class I., for pictures taken with Thornton Pickard cameras, as well as shutters, the first prize fell to the work of Pierre Dubreuil of Lille, whose pictures were distinctly novel and striking. The two best were country scenes in which white-hooded peasant women were entering a churchyard; somewhat fuzzy as to the church, but well composed and with the figures strongly brought out. The mounts were distinctly characteristic—decorated with pen drawings suitable to the subjects of the pictures.

A. A. Bellingham, of Burnley, had four very charming scenes from pastoral life, well-chosen subjects, excellently photographed, and well printed on platinum paper. Two of the subjects, in which figured a donkey, a shy little boy, and a self-confident little girl, were decidedly good. If any fault could be found with this series, it was perhaps in the matter of the trimming of the prints, which had a tendency to leave too little foreground, and to bring the principal figures too near the edge of the picture.

F. Spalding, of Chelmsford, who secured the third prize, entered a great collection of very novel and striking work. The subjects included a white-dressed girl jumping over a garden seat, the same girl skipping, a well-trained dog in various attitudes (balancing a biscuit, jumping through a hoop, &c.); and in all of them there was the strong effect of the well-emphasised central figure, brilliantly lighted, yet full of delicate detail, against a very dark background. It must have been difficult to decide to which of these sets the prize should be given, but the jumping girl secured it, probably by dint of its novelty.

The fourth prize, to O. Kirkdjian, of Sourabaya, Java, was won by four well-chosen and excellently lighted street scenes, all crowded with detail, moving pedestrians, and vehicles, yet without any suggestion of spottiness. They were excellent, old-fashioned pictures.

Viscount Valle Paraiso and W. N. Kirk & Sons both well deserved the prizes they secured, though in the matter of one or two of Kirk's yacht studies, slightly more contrast and vigour might have been an advantage.

Class II., for pictures taken with the Thornton-Pickard shutter (any camera), brought forward far more pictures than Class I., and the Judges had a very difficult task in awarding the principal prizes.

A. Lindsay Miller secured the first prize for four of his wonderfully effective rural scenes of men and women at work in the fields, printed in brown carbon. All were wonderfully good, and showed ample evidence of movement. One of Mr. Miller's secrets, which is difficult to fathom, is his strong rendering of a white cap, bonnet, or kerchief, in a picture which has no other light so high in tone. These strong white spots are most effectively used in the composition, and we have been assured that they are obtained by pure photography.

E. G. Boon secured second prize with some delightful little pictures printed in platinum. One was a delicate street scene, more like a work of imagination than a record of fact; one a simple and effective sunlit study of an old man asleep against a wall; a third, entitled *A Fish Story*, reminded us of Frank M. Sutcliffe's *Stern Reality* and Dr. Mainwaring's *Quay Side*, representing a group of eight or nine fishermen with their backs to the spectator leaning over the side of a boat, and deeply interested in the story told by one of them. The fourth, *Pasturing among the Olives*, was a sunny landscape with a few sheep and a young shepherd.

W. J. Warren's four pictures were not entirely new to us, but they lost nothing by familiarity. Perhaps they were scarcely so varied in subject as they might have been, for Mr. Warren, apart from his photogravure work, is very versatile. They were all misty evenings with the sun fairly low down, and buildings, omnibuses, &c., dark against the sky, in Trafalgar-square and Whitehall. All of them had very good, wet-day foregrounds, in which some portion of the glory of the sunset was reflected.

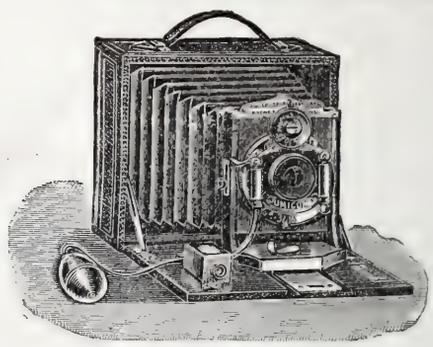
C. F. Inston's set was very good indeed, though perhaps not quite as good as he might have selected from his well-known work. The most successful picture was that entitled *An Arab Tribe*, representing a dozen street urchins seated round the base of a fountain, and all grinning at the photographer. Two of his well-known and striking scenes on the Mersey (though not quite his best of this class) were included, and the fourth picture was a snap-shot on the approach of one of the landing stages with omnibuses standing by the kerb-stone, pedestrians in motion, and the buildings well grouped against the sky.

Our Editorial Table.

THE FOLDING APEK.

Wilfred Emery, 3, Soho-street, W.

THIS little camera is designed for cycle or tourist use. It is well made of seasoned mahogany, highly finished with polished and lacquered brass. The front has a rising and falling movement, and can be securely clamped



in any position. The finder is reversible for either vertical or horizontal pictures. The focussing scale is accurately marked for six feet and any distance beyond. The ground-glass frame forms the back of the camera, and has a door for focussing on ground glass. It is spring-actuated and recedes for the insertion of the plate-holder. The camera is covered with seal-grain leather. The shutter gives time and instantaneous exposures, and when closed the size of the camera is $6 \times 5\frac{1}{4} \times 2\frac{1}{4}$ in., and the weight $1\frac{3}{4}$ lbs. Three double dark slides, a doublet lens, a Unicum shutter, and a leather case complete the outfit.

MESSRS. MARION & Co., of Soho-square, W., have kindly sent us a couple of photographs of unusual interest. They are groups, taken on H.M.S. *Crescent*, lately commanded by H.R.H. the Duke of York, of the Sailor Prince himself, the Duchess of York, and little Prince Edward of York. Messrs. West & Son, of Southsea, took the photographs, which are remarkably good specimens of group work, the pose of the three figures being easy and natural, the lighting soft and harmonious. The negatives were made on Marion's plates, which have yielded images of great delicacy and detail; and the prints—comparable to the finest platinotypes—were made on the same firm's Smooth Bromide paper. Altogether a bit of photographic work in which all concerned may take pride.

THE editor of the *Gentlewoman*, Arundel-street, Strand, W.C., sends us a copy of an original water-colour drawing recently sketched in Denmark by the Princess of Wales, which is presented as a supplement to this week's *Gentlewoman* by permission of Her Royal Highness. It is said to be the only occasion in which a drawing by the Princess has been reproduced in facsimile. The reproduction is in three-colour half-tone—a process which, aside of the interest attaching to this particular example, might with advantage receive more attention at the hands of editors of high-class illustrated papers than is the case at present. Our contemporary deserves to be applauded for its spirited enterprise.

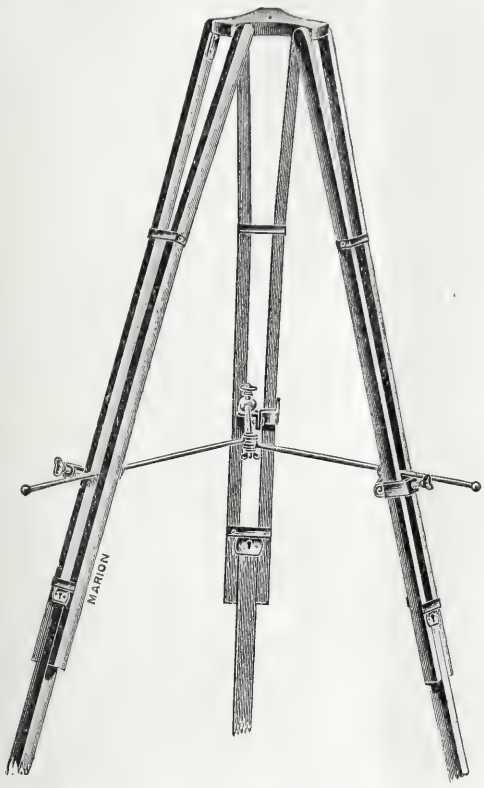
FROM Messrs. E. Marlborough & Co., 51, Old Bailey, E.C., we have received *German Self-taught* and *German and English Correspondence*. Both little books are edited by Mr. Carl A. Thimm, F.R.G.S., well

known for his foreign-language primers. The volumes are capital aids to the study of elementary German, and the former includes a brief vocabulary on photography.

An Adjustable Triple Stay.

Marion & Co., Soho-square, W.

The object of this stay, which is strongly made in brass and fits any tripod, is to hold the legs of the latter steady and rigid in any position. It is pointed out that it is most useful when the camera has to be set up



n pavements, polished floors, &c., slipping being thereby prevented. As ill be seen by the illustration, each arm of the stay is attached by screw djustment to the legs of the tripod. This convenient adjunct to stand-amera work should be highly appreciated.

Catalogue Received.

W. Tylar, 41, High-street, Aston, Birmingham.

R. Tylar's new catalogue is a handsome production of 266 pages, ell printed on green paper, and having, among its hundreds of illus-ations, several striking plates in chromo-lithography. It is one of the ost pleasing productions of the kind that has come under our notice, id is of a very comprehensive nature, apparently omitting nothing in rrent request by photographers. Mr. Tylar says: "The catalogue has en carefully revised, new goods added, and the work brought up to date ith a few useful hints for beginners, and here I would mention that, owever much I am willing, I cannot possibly devote time instructing ginners, as a good many imagine, if I am to judge by the long lists of estions they ask. I advise them to read up carefully, and either join e of the numerous photographic societies that exist for their benefit, or t aside of an amateur photographer to assist them in their early fficulties."

News and Notes.

The Bolton Canine Society, who are holding their dog show on October 1, ve decided to give a silver and bronze medal for the best photograph of a g from life as an encouragement for professional photographers to take up imal photography. Schedules can be had from the Secretaries, Messrs. orburn and Kirkpatrick, Acresfield, Bolton.

The fifth ascent of the Rev. J. M. Bacon's scientific series took place at the ystal Palace on Saturday, September 10. Mrs. Lachlan, wife of Dr. R. chlan, of Cambridge University, occupied a seat in the car, Mr. Percival encer being in charge. Experiments in acoustics were made, and photo-phs of the country crossed taken. The balloon at times reached an altitude about a mile. After four hours' journey, a descent was made near Dover.

The late Secretary of the Lichfield Amateur Photographic Society writes: "I regret to inform you that the Lichfield Amateur Photographic Society breathed its last yesterday, the certified cause of death being the absolute lack of any pretence to interest in it by all except three members. This is the natural and speedy end of all such ventures in this decrepid city."

"The Fair Sex and the Camera."—Mr. Clinton Dent, in the Camera Club *Journal*, tells the following story of photographing in the Caucasus: "One of our objects was to make the first ascent of a mountain near the central group named Tsiteli, and for that purpose we proceeded by way of Styr-Digor, a characteristic and rather squalid mountain village. However, we were hospitably entertained, and, indeed, I was invited up to the house of the chief man to photograph his wife and family. He declined himself to be included in the group—not, I think, from modesty, but rather because he desired a whole plate to himself. When the suggestion was made to the ladies, they at once said they could not hear of such a thing, and ran away. An inexperienced photographer in the Caucasus would have packed up his camera sadly and gone on his way lamenting. An experienced photographer would have known better, and would have felt assured that the ladies had merely gone away to put on their best dresses."

Re Richard James Whitehead & John Cox, camera-makers, trading at 54, Irving-street, Birmingham, the former residing at 52, Morville-street, and the latter at 26, Varna-road, Birmingham.—The statutory meeting of the creditors concerned under this failure took place at the offices of the Official Receiver, Birmingham on the 8th inst. The statement of affairs filled by the debtors showed liabilities amounting to 187*l.* 19*s.* 6*d.*, and assets estimated to produce 66*l.* 0*s.* 1*d.*, thus showing a deficiency of 121*l.* 19*s.* 5*d.* It appeared that the debtors alleged their failure to have been caused through advances in the prices of materials and labour. They were pledged to supply a certain firm under contract, the price having been fixed some years ago, but since then increasing expenses have gradually reduced their profits to vanishing point. A composition of 7*s.* 6*d.* in the pound was submitted to the meeting on behalf of the debtors, but one of the principal creditors refused to entertain it, and the Official Receiver said that under those circumstances, there was no alternative but to wind up the estate in bankruptcy.

Readers of prospectuses of educational institutions and polytechnics may have noticed that of late years there has been a tendency to convert the teachers into professors. The nature of the institution in which the instructor can rightly use the latter title is apparently a matter of opinion, and it is becoming worth while to define the duties and position of a professor. Miss Catherine Dodd describes in the *National Review* how she asked 105 primary school children, between the ages of ten and fourteen, to give this definition among others. Here are some of the attempts: "A man who has passed a high examination." "A very clever man." "One who can do his work easily." "A man skilled in sense." That a professor has a certain social standing is evident from the definition which described him as "a man who is well off," and "a man who lives in a nice house." Among the vague definitions are the following: "A person who professes to do something." "A man who says he can do anything." But the children's general idea is that a professor teaches music, dancing, or language, or performs conjuring tricks. Thus, "A professor teaches all kinds of instruments." "He is a gentleman that generally plays at balls," and "a man who knows clever tricks." To correctly define a professor would probably prove a difficulty to many children of older growth.

Progress in Spectroscopy.—A contemporary points out that the spectroscope with which Fraunhofer made his famous map of spectral lines early in the century contained a single prism. Greater dispersion of the light vibrations was later effected by the use of trains of prisms, and in recent investigations the spectrum has been still further spread out by ruled gratings. Even more powerful is the new Echelon spectroscope, the invention of Professor A. A. Michelson, which is pronounced the greatest advance for many years in optical science. The light-diffracting part of this consists of a pile of glass plate, each plate narrower on one side than the preceding, thus forming steps, and dividing the light into beams, each of which has travelled something like 20,000 waves more than the one behind and 20,000 less than the one next in advance. In other spectroscopes the difference between successive beams is one to four waves. In the trial Echelon at the University of Chicago there are twenty plates, each about three-quarters of an inch thick, and projecting one-twenty-fifth of an inch over the next succeeding plate; and with this the three components into which Zeeman found spectral lines to be separated in the magnetic field are doubled and tripled. The resolving power is increased from 100,000 in the older instruments to 300,000, with the reasonable certainty that at least 500,000 will soon be reached. With the advantages of cheapness and enormous dispersion of small portions of the spectrum, the new instrument has the disadvantage of not giving a continuous spectrum.

Time to the One-thousandth Part of a Second.—Herr F. L. Lobner, of Berlin, who has gained a European reputation by the invention of an apparatus for measuring time to the one-hundredth part of a second, has again excelled himself, and has now perfected a mechanism for measuring and recording the one-thousandth part of a second. This wonderful machine consists of a clock, mounted on a movable carriage, and with a dial plate three metres in diameter. At the edge of the latter are two concentric rings, the outer one marked with 360°, and the inner one divided into 200 parts. The clockwork moves the single hand at such a rate that it can make five complete turns in a second, thus enabling the one-thousandth part of a second to be read on the inner ring. As the instrument would be ruined by stopping the hand suddenly, and as, moreover, the eye could not follow the pointer, a photographic apparatus is used to record the exact time. Twelve open cameras are arranged in a circle behind a revolving disc two metres in diameter, which is provided with a hole for admitting light to the plates as it passes before them. The disc revolves at the rate of twenty times in one second, so that light is admitted into the twelve plates one after the other in the space of one-

twentieth of a second. The pictures thereby obtained show the position of the hand on the dial and the object which is being observed. The apparatus will be useful in measuring the rate of speed of flying bullets, of falling objects, &c. It is possible to take with it 2880 photographic impressions in a single second.

THE whistling buoy, which has long served to mark the entrance to the Golden Gate, San Francisco, has lately been replaced by a lightship, which was specially built for the purpose. Powerful electric lights are swung in ball-and-socket hinges, one at each masthead, fifty feet above the deck of the vessel, and in clear weather will be visible for a distance of twelve to fifteen miles. The vessel is also fitted with a fog horn and a large bell, to aid in giving signals in thick weather.

LANGUAGE OF THE EYE.—There seems to be considerable difference of opinion as to the influence of the emotions upon the pupils of the eye. That they do exert a marked effect would appear to be a common belief from the frequency with which novelists remark upon eyes "blazing with anger," "on fire with rage," and exhibit "a cold, steely look, enhanced by dilated pupils." Sir S. Wilkes, the distinguished President of the Royal College of Physicians, after long inquiry, was unable to obtain any trustworthy information upon this subject, hence undertook a personal investigation, with the result he discovered the pupil of the eye in birds under the influence of anger became contracted. Louis Robinson, who sums up his conclusions in a paper contributed to a recent number of Blackwood, was also led to investigate, by observing the pupils of a fox terrier, when teased beyond endurance, became greatly dilated, and that the eye-chambers reflected light in exactly the same way as those of the human when under the dilating influence of belladonna or atropine. He discovered the same phenomena extended to cats and monkeys when enraged and meditating mischief, but that, when making an attack, the pupils became suddenly contracted. He suggests, as a solution of this dual phenomenon, that when an animal is angry and face to face with a foe, but has not decided upon the most effective mode of assault, it is important the eyes should take in as much as possible of the opponent and his surroundings; but, when the actual onslaught is made, the attention of the assailant is suddenly concentrated upon some particular point of its adversary's body. Robinson's explanation is ingenious, to say the least, but it does not explain why an enraged cat, and more rarely an angry dog, before the actual assault is made, often exhibits alternate contractions or expansions of the pupils. That the eye is an index to the emotions is not to be doubted. The horse that rolls its eye, exhibiting a dilated pupil, and an undue proportion of sclerotic (the "white" of the eye) is always recognised as tricky and unsafe. While it is doubtful if the eyes of man "blaze" or exhibit a "fiery glint" when the possessor is enraged, there may usually be observed a change in the pupil, often considerable contraction, which, in a blue or light grey eye is best described as a "steely glitter." Notably most blue, grey, and hazel eyes are capable of a most wonderful expression, but light blues ("buttermilk" or "fish" eyes) and blacks are often expressionless. Kind and mild expressions are conveyed by the eyes, are not mere figures of speech. Neither is the declaration that the eyes "are the windows of the soul and temperament" without a great measure of truth; but the more intimate relations of the organs of vision to mental conditions require more study than has yet been bestowed, and these relations, in connexion with mental alienation—the different forms of insanity—though long recognised as extinct, strange to say, have attracted little attention.

Patent News.

THE following applications for Patents were made between August 29 and September 3, 1898:—

FABRIC FEEDING APPARATUS.—No. 18,643. "New or Improved Apparatus for Feeding or Moving forward intermittently Definite Lengths of Paper, Textile, or other Fabric, Photographic Film or other Material, in Sheet or Rolled-up Form." A. S. NEWMAN and NEWMAN & GUARDIA, Ltd.

CARRIERS.—No. 18,662. "Improvements in Photographic Dry-plate Carriers." R. D. OLDHAM.

COLOUR PRINTING.—No. 18,672. "An Improved Process for Transferring to Stone or Metal any desired Drawings, Paintings, or Photographs, for Reproduction in One or More Colours." E. SPITZER.

CELLULOID FILMS.—No. 18,697. "Improvements in the Method of, and Means for, Producing Cellulose Films for Photographic and Other Purposes." J. C. CHORLEY.

STEREOSCOPIC PHOTOGRAPHS.—No. 18,698. "Improvements in the Method of taking Stereoscopic Photographs and in Apparatus therefor." G. F. HATTON.

OXYGEN-GENERATORS.—No. 18,768. "Improvements in Oxygen Gas-generators and Gas-holders." W. RILEY and A. KERSHAW.

PHOTO-SCULPTURE.—No. 18,799. "Improved Process and Apparatus for the Plastic Representation of Solid Bodies by the Aid of Photography." Complete Specification. W. SELKE.

COLOUR PHOTOGRAPHS.—No. 18,875. "Improvements in Apparatus for Producing and Exhibiting Colour Photographs." W. WHITE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

September.	Name of Society.	Subject.
17	Ashton-under-Lyne	Excursion: Belle Vue. Leader, J. Turn Hull.
19	North Middlesex	*Selection of Subject.* A. J. Golding.
19	South London	*On Perspective and Composition as A plied to Landscape.* W. R. Stretton
20	Gospel Oak	Holiday Papers, Illustrated with La tern Slides.
20	Hackney	*Some Optical Experiments.* E. J. Wall.
20	Leeds Photo Society	Social Evening.
21	Borough Polytechnic	Lantern-slide Making.
22	Ashton-under-Lyne	Meeting for Conversation, &c.
22	London and Provincial	Open Night
23	Croydon Microscopical	Conversational Meeting.
24	Hackney	Excursion: Theydon Bois. Leade W. A. Hensler.
24	South London	Excursion: Hayes and Keston. Leade H. Esler.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 8,—Mr. P. Everitt in the chair.

Mr. A. L. Henderson had a very thin negative, and in printing the sam recently he noticed the curious fact that, printed in the sun, it gave conside ably more brilliancy than the alternative method. This was opposed to wh he expected, but he saw the reason, which would be apparent when the neg tive was seen, and promised to show it to the meeting. Speaking of gol toning, he had always discountenanced the sulphocyanide bath, both o account of the frequency of double tones and the fact that the balanc between gold and sulphocyanide required such nice adjustment, a difficu accomplishment, as the two were not equally exhausted. He believed he ha made a good hit in the composition of a bath which eliminated this disturbin factor, sulphocyanide, and, as far as he could see, it promised to work equall well as a combined bath or as a single bath. He claimed for it lovely ton and pure whites, and promised particulars in a fortnight's time.

A discussion took place upon the influence of the depth of gold toning o the permanency of silver prints.

Mr. HENDERSON thought he might repeat a question asked by him o another occasion, viz, Why, after a print is toned and placed in the fixin bath, is it necessary to leave it so long that it may recover its original ton which, on the immersion of the print in the bath, becomes a foxy colour He was anxious to know what action this was. It could not be a deposition gold. He was inclined to the idea that it was sulphur toning. His remar went to show how absurd was the opinion that prints separately toned an fixed were more permanent than those of the combined bath. It was nothin of the kind, he said; they were less permanent. This statement, of cours presupposed the proper use of the combined bath.

Mr. HADDON remarked that thereon hung the whole thing. There was doubt that by far the larger proportion of faded or yellowed prints were th product of the combined bath, and so the character of greater permanen was generally given to the print toned and fixed separately.

The CHAIRMAN said there was the question whether the small quantity gold deposited on a print was at all conducive to permanence. Was not t life of a print rather a matter of care in manipulation?

Mr. HENDERSON did not doubt that an image composed wholly of go would be capable of more resistance than a silver one; not that the latt really faded, however, for the silver was always there. He did not accept t substitution theory of toning, but rather deposition, and, if one only fix first and toned afterwards, the trouble of change of colour would disappear.

The discussion was continued regarding the claims of the substitution the as opposed to the simple addition of gold to the silver image.

Mr. E. BANKS, in response to the Chairman's request, detailed the process sulphide toning. The prints first require to be fixed, preferably in two bat and then are thoroughly washed. Toning is effected with a few drops sulphide of ammonium in a pint of water, a stronger solution tending staining the whites. The method is a severe test for hyposulphite, and washing following fixing cannot be too thorough. If this is seen to, the wh will retain their integrity, and the toning will proceed only upon the prin portions of the paper, giving to them the black tones of silver sulph No change had come over some prints made by him over thirty y before.

The CHAIRMAN had succeeded very well with the process. He obtai good black tones and pure whites, but careful and thorough fixing was in pensable, followed by thorough washing.

Mr. RAPSON showed an old weather-beaten print which had been subjec to a long test for permanence. He found that it had actually darkened in high lights instead of fading.

PHOTOGRAPHIC CLUB.

SEPTEMBER 7,—Mr. J. R. Williams in the chair.

A discussion took place on some of the methods of intensification, mercu uranium, and silver being chiefly touched upon.

Mr. F. HAES described a uranium formula given him by Lord Crawfo which gave excellent results. It was made up of uranium nitrate, ferricyanide of potassium, in one per cent. solution, with a trace of acetic a The whole or any part could be removed where intensification was required by slightly alkaline water and a brush. As regards colour, negative acquired a faint yellow tint. The action was very quick, absor but a few minutes, but the negatives must be quite free from hypo.

Mr. E. W. FOXLEE said that, having a few negatives not quite up to printing density, he had adopted the plan of simply putting them into the solution of bichloride of mercury for a few seconds to change their colour and give them a little sparkle. Mr. Welford had told him that in repeating this experiment he always got stains. Mr. Foxlee did not understand the reason for this, and showed some examples which were quite free from stains. He used a saturated solution, the first action of which was to darken the image and afterwards to bleach it. He stopped the action in the former stage for his purpose, washing the negative in water.

Mr. WELFORD stated that the invariable unequal action he complained of disappeared as the bleaching continued. He was confident that the negatives were thoroughly fixed and washed.

Mr. FOXLEE laid great stress upon completely fixing the plate. He never used a bath a second day, and always left his negatives in the bath as long again after the disappearance of the white from the back. Sometimes he gave them a second bath of fresh hypo, this course necessitating a less lengthy washing, because the more perfectly a plate was fixed the less the washing required, the silver composing the image being in a more stable condition.

Mr. WELFORD mentioned a useful means of locally reducing the effects of intensification, applicable to mercury and other methods. This was by the application of ferridcyanide of potassium, the drawback being that it removed the whole of the intensification in that particular spot.

Mr. RICHARD SMITH said his experience showed that a much better result was obtained with uranium on an amidol-developed negative than a pyro negative Since then, however, whether due to some change in the character of the amidol he could not say, the quality had fallen off and he had returned to pyro.

It was stated that amidol was supposed to differ somewhat from that of two years ago. Several speakers spoke of the effect of temperature upon developers, and especially so upon the so-called newer developers—amidol, metol, &c.

MANCHESTER PHOTOGRAPHIC SOCIETY.

SEPTEMBER 8,—The President (Mr. James Wood) in the chair.

This being the last meeting of the present session, the nomination sheet for the election of the next Council was on the table, and several suggestions were made whereby the membership could be increased for the coming year.

The CHAIRMAN then called upon Mr. GEO. GRUNDY to give his experiences with Sandell plates, after which Mr. HARRY WADE read a paper on

PYRO-ACETONE,

a new developer for dry plates. Mr. Wade first gave a sketch of the theory of the pyro-ammonia and pyro-soda developers, afterwards saying that the acetone, when in conjunction with pyro and sodium sulphite, liberated sodium hydrate and sodium bisulphite, thus making a pyro-soda developer, but without the disadvantages of the ordinary soda developer, as a little acetone can be commenced with, and, if the plate be under-exposed, more can be added as development proceeds. The films or hands are not stained by this developer. Two plates were then developed by Mr. Wade, one having an exposure of one forty-fifth of a second, the other three seconds; they were treated differently, and both were found to be good printing negatives. A bromide enlargement was then developed, and, with an increased proportion of acetone, a sepia colour was the result.

Leeds Photographic Society.—After a very enjoyable vacation spent in excursions, the 1898–9 session opened on the 1st inst. with a conversational meeting, at which members' prints from plates exposed during the summer were presented for friendly criticism. The dark room was also thrown open from seven to eight p.m. for giving instruction in development and other photographic manipulations to beginners, and will be open on the first Thursday in each month, at the same hour, from October to June, a member of the Society being present on each occasion to give advice in difficulties. The "survey scheme" inaugurated last March has not been taken up with the enthusiasm which the character of the work should command, but is, nevertheless, being carried on by an energetic portion of the Society, and will be more in evidence during the coming session, their attention being somewhat divided by the more pressing necessities of the Yorkshire Photographic Exhibition, to be held in Bradford in November and December. At the next meeting of the Society Messrs. G. Bingley and J. Taylor will give full details as to sending in pictures, lantern transparencies, and other exhibits. The Society's new syllabus contains the following interesting items: "Photographing of Birds' Nests and Flowers," Mr. A. G. Beilby; "The Caucasus," by Mr. G. Yeld, M.A., editor of the *Alpine Journal;* "Röntgen Rays, with Demonstration of their Remarkable Properties," Mr. J. H. Gash; "Lantern-slide Making, Dry Collodion, Wet Collodion, and Dry Plate," Mr. W. T. Wilkinson, Wakefield; Annual Dinner, paper by Mr. W. E. Tindall, R.B.A.; "In Wordsworth's Country," the poet interpreted by the photographer and illustrated with lantern slides, Mr. Percy Lund; "Colour and its Reproduction by Photography," Mr. E. J. Wall, editor of *Photographic News;* "Instantaneous Photography," Mr. H. B. Buckley; "Some New Points in Platinotype Printing," Rev. J. Beanland, M.A.; "Principles of Art applied to Photography," Mr. Alex. Keighley, F.R.P.S., President Bradford, P.S.; "Stereoscopic Photography," Mr. James Taylor, L.D.S., R.C.S., Ed.; "On some Exposures," Mr. Frank M. Sutcliffe, Whitby. In addition, there will be the annual sale of surplus apparatus, the Lantern Exhibition in the Albert Hall, and other hardy annuals, which are regularly expected by the friends of the Society as each season comes round. The Committee, on the recommendation of the members, have added the following volumes to the library, hoping they may prove an additional attractive feature at the meetings, viz.: *The Use of the Hand Camera, A B C Guide to Autotype, Guide to the Choice of a Photographic Lens, Photographic Lenses: How to Use, Photographic Enlargements: How to Make them, Chemistry for Photographers, The Stereoscope and Stereoscopic Photography, Practical Pictorial Photography, Barnet Book of Photography, Photographic Pictures of East Anglia, Sun Pictures in the Norfolk Broads.* The following gentlemen have been elected ordinary members, viz.: R. Mackay, Alf. T. Thompson, J. W. T. Holgate, Geo. C. Grundy Arthur Bainton, and F. Talbot.

FORTHCOMING EXHIBITIONS.

1898.		
Sept. 26–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
,, 30–Nov. 5	.....	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 17	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
1899.		
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

** *Correspondents should never write on both sides of the paper. No notices taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

EXPOSURE METERS.

To the EDITORS.

GENTLEMEN,—As you know, I am one of that much-abused class of photographers, the amateurs. I have no interest in the patents for, or manufacture of, any exposure meter or any other apparatus, and my only desire is to obtain the best things I can on the most favourable terms. In order to do this in the matter of meters, it was necessary for me to study the principles involved, and the mode in which they were practically applied, in such instruments as came under my notice. The result has been my adoption of Wynne's Infallible Meter, and that I have recommended it to my friends; but I fully admit that in this, as in most such matters, the user has as much to do with the result as the instrument; hence it is quite likely that one of the other meters available succeeds better in other hands.

I have not troubled myself about the patents; they can tell me nothing to the point. If it be true, as Mr. Randall says, that no one can make Watkins' meter from the specifications, then I apprehend that the patent is void; but I am neither lawyer nor judge to give an authoritative opinion on such a point. Admitting the fact that in the eight years preceeding Watkins' patent (1890) there were several published investigations into the subject of photometry, and that none have appeared since, Mr. Randall's conclusion does not follow; it is possible that the practical problem has been sufficiently solved, and that no one has found any better solution than those already published; and it is still more probable that what has been done has escaped our knowledge. At all events, I can speak for myself that I have been content with what I have, and have not searched for what I did not expect to get. There is one remarkable circumstance which seems to have escaped Mr. Randall's notice: there are three patent instruments at least (there are more) which involve some of the same principles as the others. Why, if the patents extend to the principles, do not the inventors claim the rights they have purchased? Are the owners of these patents members of a pool, or ring, who tolerate each other and exclude all others?

I do not think any exposure meter is perfect. The most prominent theoretical defect in those on the principle I prefer is that one cannot be sure that the sensitive paper of the actinometer receives its visible image at the same rate as the invisible image is formed on the plate in use, but I think that experience shows that the result is practically sufficient; another objection is that it is difficult to recognise the identity of the tint produced on the sensitive paper with that which is given as a standard for reference, but a little practice overcomes this to a great extent.

Whatever the difficulties and uncertainties these cause, they are applicable to the data for the exposure meters and cards, though there the user may not be aware of them. The laws which regulate the values of the actinism at various heights of the sun, and consequently for different times of the day, are themselves founded on actinometric observations combined with theories of absorption of light. These observations were indeed made by practised observers and under carefully considered conditions for ensuring a *normal light* or being able to refer them to such, but of these the user

has no knowledge, and he is obliged to supplement the very indefinite information as to a mean light by the use of factors for such qualifying adjectives as bright, hazy, dull, overcast, &c. These might be multiplied, as Mr. Randall desires, but the result would only be to complicate the instrument without really adding to the value of the result. The instruments which measure the intensity of the light at the time are free from these uncertainties; they do not remove all room for the exercise of judgment, but they enable the worker to concentrate his attention on fewer things and thus facilitate his success. But, after all, it is man and meter combined which are necessary.

Having now given some reasons for my preference in the matter of meters, perhaps you will allow me further to say that I fear the formulæ I gave for the conversion of speed numbers in your JOURNAL of the 2nd will puzzle many owing to the printer's mistakes. The best plan to rectify this will be to repeat the simple forms.

It will be understood that these comparisons refer only to the comparison which has served as the foundation of the numbers on Mr. Wynne's exposure card. Calling, then, Hurter & Driffield's speed No. H, and Wynne's F,

$$F = \sqrt{82\,H}\,;\ \text{or conversely, } H = \frac{F^2}{82}$$

but I like very full exposures myself, and I would recommend any one of similar tastes to use 65 or 70 in lieu of 82 above in making his conversions.

Since my former letter I have examined one of Mr. Watkins' speed cards. He gives certain numbers by the use of which Hurter & Driffield's scale can be converted into his own. I noted that for one brand of plates the numbers were the same, whereas for other brands they were to be multiplied by factors such as $1\frac{1}{2}$ or even $2\frac{1}{2}$. Now, it is quite possible that plates differing in their manufacture may require somewhat differing factors when tested by differing lights, such as daylight and candle light, in taking their speeds; but, if such variations as these are *real*, one at least of the modes of testing must be practically useless.—I am, yours, &c., J. F. T.

OLD ROMAN VILLA, DARENTH.

To the EDITORS.

GENTLEMEN,—When I was at Darenth on Saturday last, for the purpose of obtaining some more photographs of this interesting archæological discovery, I was informed that the remains of the villa would shortly be covered up again, and that corn probably would again grow on the site, as it did before the excavations were begun. Those of your readers, therefore, who may wish either to see or photograph this interesting relic of the past had better select an early opportunity. Harningham-road, on the L. C. and D. R., is the station to go to.—I am, yours, &c.,

Croydon, September 12, 1898. J. H. BALDOCK.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

T. A. F. Tlemons, 141, High-street, Tonbridge.—*Photograph of arrival of the Skinners and oration at Tonbridge School*, 1898. *Photograph of east front of Tonbridge School.*

W. SINCLAIR.—The address is 143, Powerscroft-road, Clapton, E.

BLACKING SHEATH AND LENS MOUNTS.—T. BILLING.—Bates' dead black varnish is as good as anything you can have.

SPECIAL BITUMEN FOR ETCHING.—BEGINNER. This may be had from Mawson & Swan, Soho-square; also, we think, from Penrose & Co., Upper Baker-street, W.C.

A. T.—The paper in question has no London agent that we are aware of; but we believe it may be ordered or obtained of Messrs. Dawbarn & Ward, 6, Farringdon-avenue, E.C.

S. M.—There are some chapters on the subject in *The Art of Retouching* by R. Johnson, published by Marion & Co., Soho-square, W.C., price 2*s.*, which give some excellent information.

SPOILT PICTURE.—T. T. H. As the enlaagement was spoilt through an accident, we do not see that you would be in any way justified in deducting its cost out of the assistant's wages—nor could you legally do so. Accidents occur, at times, to most people. Have you always been free from them?

RESIDUES.—R. C. We do not doubt that, by sending the waste to the firm named, you have received their full value. The weight of the stuff sent is no guide whatever as to the quantity of the silver they contained.

UNSHARP PICTURES.—OUT OF FOCUS. We shall probably have something to say shortly as to why negatives taken in "fixed focus" cameras are sometimes sharp, and at other times not; but the subject cannot be dealt with in this column.

COPYRIGHT.—TOURIST. You can certainly make the photograph copyright, and sell copies of it. The fact that the Rector of the church said he has given the sole right of photographing it to a local photographer is sheer nonsense, he has no power to give any one such a right.

INQUIRER.—We believe that your daughter would find the necessary facilities at the Polytechnic School, 309, Regent street, W. The fees are moderate. The winter session will shortly commence, and the prospectus will, no doubt, soon be ready. We should advise you to write for a copy.

STEREOSCOPE.—S. WARDELE. No doubt the old negatives were taken in a bi-lens camera, hence the picture must be transposed as regards right and left when mounted, in order to get the stereoscopic effect. If, in making transparencies, they are made in a bi-lens camera, the pictures will be the right way about.

STAINED PRINTS.— . & Co. The stains are unquestionably due to careless work, whatever your printers may say to the contrary. In what particular way it is impossible for us to say definitely. We should suspect, however, that the prints were contaminated with hyposulphite of soda, or perhaps sulphocyanide when washing out the silver prior to toning, but that is but a surmise.

BLOOD ALBUMEN.—W. CONNOR inquires where he can get some blood albumen for experimental purposes. There are one or two makers of it, we believe, in the neighbourhood of the Cattle Market in the Caledonian-road, but we think they only supply it in wholesale quantities. Messrs. Skilbeck Bros., Upper Thames-street, also sell it, but theirs is a wholesale house, but they would possibly let you have a pound or two for experiment.

BAD HYPO.—W. T. S. writes: "Herewith I send you a sample of seven pounds of hypo I have just bought of a local druggist; will you please give me your opinion of it? I don't like the smell and look of it. Will it be safe to use it for fixing P.O.P. prints?"—We should say, Certainly not. It is a very crude sample, and the worst we have seen for some time. The local druggist's is usually not the best place at which to buy photographic chemicals.

LENS.—PECKHAM says: "I have recently bought a portrait lens, whole-plate size, bearing the name of Bourquin, London. It has no stops, and I want some fitted; can you tell me the maker's address, as I do not find it in the Post Office Directory?"—Bourquin was a dealer in London many years ago, though not probably for the last twenty or more. He was not a lens-maker, but only supplied them—of French make. Any optician will fit the instrument with stops.

PHOTO-MICROGRAPHY.—S. TREADWAY. It is quite true that some photographic miniature lenses are better for photographing some microscopic objects than low-power microscopic objectives. That does not apply to all of these lenses' power, but only those of the best quality, such as those supplied by the best opticians. We are not surprised that those you have purchased at four-and-sixpence each do not answer for that class of work—it is only the very best that will do so.

H. PHŒNIX.—As regards India and Ceylon, your best course is to watch our outer columns, in which advertisements for assistants occasionally appear. You might also try an advertisement in the pages of the *Journal of the Photographic Society of India* or *St. Veronica*, both published in Calcutta. South Africa, from what we can hear, offers an excellent field for good photographic operators, and, if you have ability above the average and sufficient money to take you out, we do not think you need be long out of a situation.

ENGAGEMENT.—RECEPTION-ROOM. It would seem, from your statement, that you have been badly treated, and we are sorry to say that your case is not an uncommon one. Unscrupulous photographers at pleasure resorts too often engage assistants with a promise (verbal) of a "permanency," and then give them a month's notice, or less, when the season is nearly over. We fear you have no remedy, as the agreement was only a verbal one. Had you had a written agreement for a term the case would be different.

LENSES.—JENA says: "Kindly say if the new type lenses without stop, such for instance, as the Cook lens, are as quick as a portrait lens, say No. 3 rapid cabinet; and will they also serve the same purpose as wide-angle rectilinear?"—As the rapid cabinet lenses, by the best makers, usually have an aperture of *f*-3, and the largest aperture of the lens named is *f*-6·5, the former, when both are worked at their full aperture, will require but about a fourth of the exposure of the latter. The latter, when stopped down, will cover a wide angle, while the latter will not.

STAINED PRINTS.—PAPER writes: "I enclose two prints, and should be greatly obliged if you can tell me the cause of those marks in them, I use alum before and after toning."—It is impossible with no data to form even the most remote opinion upon, to say the precise cause of the marking. All we can say is that they are due to want of care in the work. There is clear evidence of the want of that beyond the marks complained of as there are yellow spots on the prints which *would* not be there if due care had been taken in the manipulation. In several ways careless working would cause markings and spots such as those on the print sent.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
The British Journal Photographic Almanac for 1899	609
Ex Cathedrâ	609
Sulphites of Soda and their Solutions	611
Leaderettes:— Ammonia Accident—Risks of War Correspondents with the Camera — The Spectacle-makers' Company's Exhibition — High Altitude — The Hurricane in the West Indies—The British Association	612
Further Uses for Persulphate of Ammonia.—I. By W. B. Bolton	613
New Methods of Colouring Prints on Fabrics	613
The Development of the Latent Image	614
Recent Advances in Physical Science. By Sir W. Crookes, F.R.S.	614
Holiday Photography	615
Photographic Economy.—II. By T. N. Armstrong	615
Gelatine for Emulsion Work. By C. T. Sutton	616
A Scientifically Constructed View-meter	617
"Stereoscopic Effect (?) from Single Photographs"	618
Hanging the Pall Mall Exhibition	618
Our First Efforts	619
A Portable Developing Apparatus	619
Prestwich's Bas-relief Process	619
The Arctic Light	620
New Methods of Telegraphy	620
Phosphorescence	620
News and Notes	621
Patent News	621
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Croydon Camera Club	621
Forthcoming Exhibitions	622
Correspondence:— Stereoscopic Lantern Projection—Exposure Meters—A New "Land of the Free"—The Photographic Club	622
Answers to Correspondents	624

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRA.

We are pleased to learn that the Yorkshire Photographic Exhibition, which opens about the middle of November, promises to be one of the most successful provincial shows which have yet taken place. The Exhibition is not in any sense competitive, no medals are offered, no entrance fee is imposed. Since the object of the Exhibition is purely artistic, there will be no classes, and it is a condition that each picture be framed separately. In addition to the General Section, there will also be a large collection of pictures on loan, to which most of the prominent pictorial photographers have been, or are being, invited to contribute. The Committee have carefully calculated the space at their disposal, and, although the room which is to be used for the purpose in the City Art Gallery is an exceedingly spacious one, they propose to limit the number of pictures to such a quantity that it will be possible to hang them with a large space between each group, and in this manner to provide the most effective display possible. It has been decided to keep the Exhibition open for a longer period than was at first intended, until January 14, in order that the pictures may prove an attraction during the Christmas holidays. A special illustrated catalogue is in active preparation. The Secretaries, Messrs. E. Clough and F. Nicholson, 13, Chesham-street, Bradford, will supply particulars of the General Section, which is open to everybody, and not in any way confined to Yorkshire. Lantern slides will also be admitted and suitable stands will be provided by the Committee for their display. In the Loan Section there is a small Committee of Invitation, consisting of Messrs. Alexander Keighley and Percy Lund. Invited exhibits, of course, will not be submitted to the Judges.

We have received the prospectus of the day and evening classes at the Battersea Polytechnic, Battersea-park-road, S.W. This is a book of over sixty pages, with many half-tone illustrations of the laboratories and workshops at the Polytechnic. The classes in photography are conducted by Mr. E. Senior, a very able photographer and experimentalist, and the course is divided into elementary and advanced, trade students having an advantage in the matters of fees over amateurs. We learn that the Photographic Department contains a large studio fitted with Joel arc lamp and reflector, for photographic work at night; two commodious dark rooms, lit with electric lanterns, and fitted up with every convenience for work. The equipment includes a $8\frac{1}{2} \times 8\frac{1}{2}$ studio camera and lens, a 10×8 copying camera, fitted with Zeiss lens, an electric-light enlarging apparatus with 10-inch condenser, a complete set of carbon and platinotype printing apparatus, and a special camera for lantern-slide making, so that ample provision exists for practical work. We have examined the syllabus, which is very comprehensive and obviously drawn up for the purpose of enabling young people to obtain a thorough practical knowledge of photography. We trust that this section of the Battersea Polytechnic will be well patronised this winter.

* * *

We read that the Eastman Kodak Company, of Rochester (N.Y.), have contracted to manufacture three photographic films of a length of 50,000 feet each. The films were ordered by Mr. Dunn, for use in a machine of the kinetoscope type, of which he is the inventor. Mr. Dunn's machine is said to show animated pictures with the vibration entirely eliminated. "He has been working on it the past four years, and has only recently brought it to a state of perfection. Mr. Dunn calls the machine the "Cellograph." He has sold the English rights in it for $250,000, but this sum is small compared to the profits that the maker expects to reap. The three films which the Eastman Company has contracted to make will cost about $10,000 each. To give an idea of their great length, it may be stated that 50,000 feet is only a little short of ten miles. So Mr. Dunn will have about thirty miles of film, in three pieces, costing about $1000 a mile." These films were to be used in photographing the Corbett-McCoy fight at Buffalo, on September 10. Three photographing machines were to be used, to make sure that there would be at least one perfect set of pictures. Each machine was to run eighty minutes; that is to say, it would take eighty minutes for 50,000 feet of film to run through a machine. Pictures were to be taken at the rate of twenty-seven per second. It was assumed that the fight would not last more than twenty rounds. With three minutes to a round, and one minute interval between rounds, twenty rounds would be fought in just eighty minutes. From the negatives secured at the ringside at Buffalo six positives were to be made and exhibited about the country in Mr. Dunn's machines. For the six machines Mr. Dunn is to receive a rental fee of $300 each per week. That makes $1800 per week, and the pictures are to be shown for six months.

* * *

Our contemporary, the *Daily Chronicle*, one day this week had a prominent paragraph under a heading that makes a somewhat frequent appearance in its pages, "Colour Photography." After vainly asking, "Has the Problem been Solved?" it goes on to quote its New York correspondent saying that "the *Herald* yesterday" (Sunday, September 1 "published a somewhat sensational telegram, claiming that t late W. McDonough, of Chicago, who died a year ago, had last solved the problem of reproducing natural colours by phot graphy. Although the *Herald* to-day again editorially affir its faith in the invention, the authorities who have been int viewed on the subject are sceptical. Professor Harkness, the United States Naval Observatory, said yesterday, 'I not believe the process will ever be a success. The idea is n new. It was originated, I believe, by Professor Joly, Dublin, who published a description of his experiments in tl *Transactions of the Royal Dublin Academy*.' Several practic photographers, on the other hand," adds the correspondent "seem inclined to believe that the claims made on behalf McDonough may be justified." The Joly and McDonoug processes have the same principle in common, but neither ca be said to have solved the problem of photography in natur colours. We take sensationalism as a matter of course in a American newspaper, but we are surprised to observe that important an organ as the *Daily Chronicle* does not take som care in verifying what it publishes about colour photography, subject upon which the public is so easily misled.

* * *

The most remarkable of the modern achievements of phot graphy may fairly claim to be the portrait of a baby plane Messrs. Witt, at Berlin, and Charlois, at Nice, have eac simultaneously taken a photograph of the new planet recentl discovered by the former observer. Putting into plain languag the particulars already published of the Witt planet, they ma be said to amount to a suggestion that either it is a piece c another planet, or an astral body from elsewhere, brought int its present quarters through the influence of some one o other of the older and larger members of the family. At an rate, its photograph has been secured in case of its demis and its rate of progression round the sun calculated, its yea lasting nearly twice as long as our own, 645 days.

* * *

Recently there has been visible what appears to be th largest sunspot of which there is any record. Though we d not number ourselves among those who find in sunspots ex planations of every natural or abnormal occurrence that take place on our planet, we cannot but admit that those who clai for sunspots an intimate connexion with meteorologic phenomena can point to the concurrent extraordinary h weather as an argument in favour of their views. But ou present purpose is not to discuss what our contemporary, th writer in the *English Mechanic*, recently quoted by us i connexion with a spirit photograph, terms "sunspottery"; it is rather to take up our parable again on the question c amateur photographers and astronomical photographs. W have on former occasions pointed out what interesting luna photographs could be obtained by any one with an ordinar camera, and to a still simpler extent can such photographin be done when the sun is in question. There are few half-plat cameras which have not an extension of at least twelve inches Taking that as a basis and a six-inches focus rectilinear lens one of the lenses of which may be used, giving a focus of abou twelve inches, setting the exposing shutter at its greatest rapidit and stopping down the lens to the utmost, a snap-shot migh

be taken of the sun and enlarged. When a negative is very sharp, twenty diameters of enlargement is no great strain (it is not much more than enlarging a *carte-de-visite* vignette just to life size), and we may now estimate what that would amount to in case of our sun negative. The mean angular measurement of the sun's diameter is about 32 minutes, the natural sine of which is ·0093. Multiplying this by 12 (the focus of the lens), we get ·1116 as the size before enlarging, and twenty times this gives us 2·232 inches. Thus any one with an ordinary half-plate camera can get a lantern slide of the sun $2\frac{1}{4}$ inches in diameter, a size amply sufficient to show a good-sized sunspot. Our calculation will naturally not be useful for the recent spot, for, as it was at the sun's centre on the 8th inst., it would have passed round to the other side before this paragraph meets our readers' eyes.

* * *

Our readers may remember a recent alleged discovery that the human body emitted a species of effluve capable of impressing a photographic plate. Professor Percy Frankland, at the British Association meeting, has suggested the possibility of all living structures being capable of emitting radiations that will impress a photographic plate and give developable results. He was led to this view by experiments he had made with cultivations of certain bacteria. He found that, when they were placed at a short distance from, but not touching, a sensitive plate, it was acted upon in the same way as by light. The same result was obtained if the "cultures" were placed in direct contact with the sensitive plate.

* * *

The effect to which the name dark light was given by the French investigator, Le Bon, has been thoroughly investigated by Dr. W. J. Russell. It is somewhat analogous to that just referred to, in that the radiations in each case were incapable of passing through glass. Dr. Russell's experiments have already been recorded in these pages, and his paper read at the British Association was in the main a lengthy *résumé* of what had already appeared. He found that a large number of substances in absolute darkness were capable of emitting radiations that would act on a dry plate and develop out, even though a screen of some thickness were interposed. In view of these remarkable discoveries, it affords much food for wonder and congratulation that dry-plate makers seem, for packing purposes, to have hit upon one of the few substances that do not appear to be capable of emitting fog-begetting radiations.

* * *

At the same meeting Professor Ayrton dealt with a subject which must have attracted the attention of most photographers who have had much practice—the odours given off by various metals. Every one knows the odour that clings to the fingers after handling copper coins, and the photographer who has soiled his fingers with chloride of gold must be familiar enough with the odour of gold. In like manner, solution of sulphate of iron conveys to our organs of smell a distinct odour of iron, even though they be not brought into contact with the fingers. A glass measure in which iron solution has been placed, and then emptied out, can be detected by the sense of smell instantly—a smell which is the same with all samples of iron sulphate, pure or commercial.

SULPHITES OF SODA AND THEIR SOLUTIONS.

The important place occupied by the sulphites in so many photographic operations renders every detail in connexion with their properties under various conditions of especial interest, a singular contrast to the first introduction of sulphite of soda, by Herbert Berkeley, no great number of years ago, when it remained almost unnoticed for more than a year, and beyond then only had its value generally recognised after a further considerable lapse of time. It was not at once recognised that its functions were not confined to its use as a preservative of pyro solutions; that was nearly as efficiently performed by the mere addition of almost any acid, the effect of each being naturally balanced by the presence of the other. The gradual substitution of the metabisulphite for the ordinary sulphite is in many instances of qualified advantage owing to the more ready oxidation of the latter in solution, and the consequent uncertainty introduced as to the amount of alkali neutralised when making up a developing solution. Solution of either salt is liable to oxidation, as need scarcely be said, the resulting sulphate being inert in most cases; hence any method of retarding that oxidation would naturally be valuable. For some time it was believed that a layer of petroleum oil would prevent the access of air, but it has been shown that this is an error, the petroleum layer itself absorbing oxygen and acting as a carrier between the atmosphere and the lowermost solution. Lately, however, Mr. S. L. Bigelow has described some experiments he has been making with sulphite-of-soda solutions, and the influence of the introduction of various foreign substances. For some time it has been known that the rate of oxidation is increased when certain inorganic salts are present, but Mr. Bigelow has discovered that certain other inorganic substances have a precisely opposite effect. For example, it was well known that, when a current of air was passed through a solution of the sulphite, it quickly absorbed oxygen, but the rate of oxidation was largely reduced when a small quantity of alcohol was added. Thus, using, it is true, very weak solutions—centi-normal—one part of alcohol in ten thousand produced a sensible effect; while, when mannitol was substituted for alcohol in the proportion of one equivalent to eight hundred, the oxidation was reduced one half. Definite and constant results were difficult to obtain owing to the fact that the presence of small quantities of impurities largely influenced the rate of oxygen absorption. It may thus, eventually be the case that stock solutions of sulphite of soda will be made up by the addition of small quantities of alcohol in the form of ordinary methylated spirit.

That the change brought about by oxidation is recognised as being of moment in making up solutions is shown by the fact that one firm of paper-manufacturers, in giving the formula for a toning solution with small quantities of sulphite added advises that the solution of this salt be made fresh each time it is needed to make up a new bath.

It is often advised with sulphite or such other salts used in photography to store them in saturated solution, a method against which we have long set our face. It would be ample enough objection to point out that saturation is almost always a mere question of temperature. A solution saturated at, say 65°, would, when it became cool, throw down a considerable quantity of the dissolved salt. Then, again, it too often happens that the process of dissolution is imperfectly carried out—the mere throwing of crystals into a jar or bottle, and then filling up with water, does not ensure saturation; the

receptacle must be frequently shaken. For such reasons we prefer solutions of definite and known strength, and especially is this needful with sulphite of soda, which is usually required in certain proportions to make up, for example, a developer. The strength to which sulphite should be made up is not important; but twenty per cent. will be found useful and as near saturation as is safe. Twenty-five per cent. is often recommended, but, notwithstanding all that has been written and recommended, we must say that during seasons of low temperature a bottle containing a twenty-five per cent. solution will be found to contain, after a time, a coherent deposit of crystals that have formed during the prevalence of the low temperature.

For a strong standard sulphite-of-soda solution, therefore, it is probable that the formula may run best as follow:—

Sulphite.....	2½ pounds.
Methylated spirit	2 ounces.

Water sufficient to make one gallon.

Ammonia Accident.—A serious accident, in which one man was killed and six injured, happened with ammonia in Glasgow on Saturday last. It appears that at the Scottish Cold Storage and Ice Company's works, in George-street, the cold is produced by the ammonia method, and one of the large receivers burst, scattering the ammonia in all directions, and filling not only the building in which it was situated but the whole of the neighbourhood with the fumes. The manager could not be extricated before he was suffocated, and the others had to be taken to the infirmary as soon as they were got out, suffering alike from the inhalation of the fumes and from the caustic action of the ammonia on the skin.

We call special attention to this circumstance, inasmuch as many do not seem to be aware of the danger of incautiously dealing with strong liquor ammoniæ, particularly in such hot weather as we have been having. The liquor ammoniæ, as supplied by the photographic warehouses, has, or is supposed to have, the specific gravity ·880, and it generally has. In this state, if a Winchester quart, or even a pound bottle, be accidentally broken in a small apartment, such as the dark room, serious results may follow unless the operator quickly makes his escape. In opening a fresh bottle when the temperature is high, it should be done carefully, because, when the stopper is suddenly liberated, the ammonia often spurts out, and if any reached the eyes it would produce serious effects. In warm weather it is better to open fresh bottles in the open air, and then always pointing the neck of the bottle away from the face.

The best way of dealing with the strong liquor ammoniæ as supplied for photographic purposes is, immediately on its receipt, to dilute it with an equal bulk of water, as then it can be handled without inconvenience. In this diluted form it can also be kept of a more uniform strength than is possible with the more concentrated ·880 strength, unless the bottles are always kept full and the stoppers securely locked. It is needless to say that it is necessary that double the quantity of the diluted solution should be used with formulæ given for the ·880 one.

Risks of War Correspondents with the Camera.—It seems, according to the war correspondent of the *Daily Telegraph*, that the *Times* correspondent, the Hon. Hubert Howard, was really killed by a shell from one of our own guns while he was on photography bent. Mr. Burleigh says that Howard had just said, "I should like to get a photograph or two, bad as the light is," and rode inside the gates for the purpose. Shortly afterwards a shrapnel burst over their heads, and, a little later on, Howard was hit by a fragment from another on the face, which killed him instantly. This instances a few of the risks under which some of the photographs of war scenes which illustrate the newspapers are taken. Many when looking at them do not think anything of the dangerous conditions under which many of them were secured. It requires some courage and a considerable amount of coolness to successfully manipulate photographic apparatus, even the most simple of hand cameras, while flying bullets and bursting shells are showering about in every direction, and every credit should be given to such as possess that pluck and coolness.

The Spectacle-makers' Company's Exhibition.—The Exhibition of Optical, Scientific, and Mathematical Instruments, organized by the City Spectacle-makers' Company, to be opened by the Lord Mayor at the Mansion House on October 3, promises to be a success, and it will contain a large number of exhibits, both ancient and modern, and including some of each, it is expected, from Mr. Christie, the Astronomer Royal. Those who have anything of interest to lend should communicate forthwith with Mr. H. C. Kemp, of Thavies Inn, E.C., who has been intrusted by the Guild with the organization of the Exhibition. The show will be open from October 3 to October 7.

High Altitude.—On Thursday, last week, Dr. Burson, with Mr. Stanley Spencer, ascended from the Crystal Palace in a balloon inflated with pure hydrogen, and attained the altitude of 27,500 feet. In addition to the various scientific instruments carried were cylinders of compressed oxygen for inhaling at the greatest height. At this, the lowest temperature registered was 61° Fahr. below freezing point. At the altitude of 25,000 feet, on account of the rarefied atmosphere, it is stated that the explorers had to have recourse to the oxygen, which they breathed through tubes. This altitude, high as it was, is far short of that reached some years ago by Mr. Coxwell and Mr. Jas. Glaisher, formerly President of the Photographic Society, and they were not provided with compressed oxygen; but, before they reached the greatest height, the latter gentleman had become insensible, and Mr. Coxwell's hands had become so benumbed with the cold that he could not hold the valve line with his hands, and only saved their lives by being able to grip it with his teeth, and thus keep the valve open till they got to lower regions. Coxwell's and Glaisher's highest record has yet to be beaten by a mile or two.

The Hurricane in the West Indies.—In connexion with this devastating storm it is noteworthy that the United States Weather Station, established at Kingston only a few weeks ago, telegraphed hurricane warnings on the Saturday night to Barbadoes, Martinique, St. Kitts, and St. Thomas. The message prognosticated the immediate appearance of a hurricane, and it was fulfilled—to the full. If a station only established a few weeks could do this over several islands, what should we expect from our own Meteorological Department, with the means it has at command and what it costs in the matter of weather forecasting? Those issued by it, to those who read them, are little short of ludicrous—but there, perhaps it is due to our changeable climate.

The British Association.—This Association finished up its annual outing on Thursday last week. During the whole of the meeting there was little which had directly to do with photography as photography, though it was often referred to as a means — and a valuable one—to an end or ends. The only paper, directly connected with photography was that read by Mr. Francis Galton before the section for Zoology and Physiology on "Photographing Pedigree Stock by Means of Composite Photographs," &c. It was not to be supposed that such a subject as composite photography would go unchallenged before any scientific society, and it did not do so on this occasion. In the discussion which followed Professor Lancaster

challenged the scientific value of composite photographs, and Mr. Galton defended them, saying, according to the report in the daily press, that "the photographs gave all that was common, and all that which was uncommon disappeared." If that be the case, of what value is photography in the case? Years ago we discounted the *practical* value of "composite photography," for every experienced worker knows quite well that it is possible to emphasise any particular point he may desire under the system, or, on the other hand, subdue it according to exposure and development, and so make it, if he so desire, one thing or the other. Whence, then, its scientific value? It would be interesting to learn the opinion of Captain Hayes, perhaps the greatest authority we have on horses on this matter, also whether the next edition of his valuable work, *The Points of the Horse*, and admirably illustrated with photographs of his own taking, will contain composite photographs of horses?

FURTHER USES FOR PERSULPHATE OF AMMONIA.

I.

Messrs. Lumière's recent introduction of persulphate of ammonia for the purpose of reducing negatives does not by any means exhaust the possible or probable uses of that comparatively new reagent in connexion with photographic manipulations; indeed, Herr Liesegang's earlier proposal to utilise its curious action upon the gelatine film as a means of forming an etching resist is another application that opens up a very wide field for experiment. But no one whose photographic work takes him beyond the beaten track of every-day negative and print-making can fail to see innumerable directions in which the persulphate may not improbably be used with advantage in preference to other substances hitherto employed.

One prominent instance which struck me as soon as I heard of the new salts is found in the possible use of a fog-eliminator or destroyer. It is a well-known fact, first made known by Abney, that most oxidising agents exercise a powerful action upon the latent image, which they virtually destroy, and in a similar manner light fog, as well as some forms of chemical fog, are removed by oxidation, though possibly the result is not wholly due to that influence. The agents chiefly employed for such purposes have been nitric acid, potassium bichromate, and potassium permanganate, against all of which, though useful to a certain extent, there are serious objections in use. The destructive corrosive action of nitric acid very seriously limits its application, though where it can be used it is perhaps the most efficient, since its ordinary action is supplemented by its solvent power as an acid. Permanganate of potash, although a powerful oxidiser, is totally inapplicable for any purpose in which gelatine negatives or prints are concerned, owing to its powerful colouring action on the gelatine itself, though, when employed under suitable conditions with collodion films, it proves a very efficient fog-destroyer. Those conditions, however, necessitate its use in an acid state, otherwise the original fog is only replaced by a veil of manganous oxide resulting from the decomposition.

Finally, we come to bichromate of potash and chromic acid, which alone have secured any great amount of use in this direction.

Those of my readers whose connexion with photography carries them far enough back to remember the days when emulsion-making was a subject occasionally discussed in the pages of the photographic papers, will remember how important a part bichromate of potash played in securing freedom from fog. The method of its use consisted either in adding a certain quantity of the salt to the emulsion after ripening, or in washing the jellified preparation in a solution of definite strength. Bichromate (as well as chromic acid) has also been used for the purpose of restoring accidentally exposed plates, being employed for this purpose in solutions of from five to ten per cent. strength in conjunction with a soluble bromide.

The chief advantage to be gained in substituting the persulphates of ammonia or potash for the two salts last mentioned would be in the entire absence of dangerous by-products. In the case of permanganate and bichromate of potash their use is limited by the chances that exist of the formation of insoluble compounds of manganese or chromium, but with the alkaline persulphates this danger is altogether absent, as the salts and combinations of potash and ammonia are all soluble.

Having said so much to show cause for the use of the persulphates, let me proceed to describe one or two experiments, most of which have been made with collodion films for convenience sake, but repeated with gelatine in order to be sure that the effect is the same. The first experiment of all consisted in exposing a plate in the camera, and before development dipping one half of it, or, rather, flooding it several times with a five per cent. solution of persulphate of ammonia, and afterwards washing. I may say that the result on development was just as I had anticipated; there was a distinct mark where the persulphate solution had been poured on, and the image on that portion was a little slower in coming, but otherwise, except perhaps that it was a little weaker, the image was as perfect as on the other half of the plate.

I have said that I anticipated this result, for I have never found that oxidising agents *per se* are capable of wholly removing an image whether it be impressed by light or in the shape of chemical fog. Even when allowed to act for a long period and in a concentrated condition there is invariably some trace left behind, and in this case a five per cent. solution applied for a minute or so cannot be considered a very severe application. Another plate was exposed and cut in halves, one of which was soaked for half an hour in the persulphate solution and then very thoroughly washed before development, but the result was practically the same, the image was as perfect as if it had undergone no treatment.

This does not, I think, require much explanation. If the action of the persulphate or other oxidiser is to convert the image, whether visible or invisible, into oxide of silver, the plate can only be restored to its original unexposed condition on the assumption that the *whole of the bromine* dissociated by exposure to light recombines with the oxide thus formed. I am supposing now the chemical or sub-bromide theory to be correct. But it seems as likely as not, or perhaps more likely, that the dissociated bromine is partly or wholly removed or converted into other compounds by the oxidising solution. If, however, an addition of soluble bromide be made to the oxidising solution, then we can ensure not only the oxidation of any existing "image" but also its reconversion into bromide, and therefore the restoration of the plate to its pristine condition.

To the five per cent. solution of persulphate of ammonia one per cent. of bromide of ammonium was added, or, roughly, twenty-five grains of persulphate and five of bromide were dissolved in each ounce of water. In this solution one half of a plate previously exposed as before was soaked for three minutes, and then very thoroughly washed. The two halves were then developed simultaneously, with the result that one portion gave a good negative, while the other gave only a very faint image, probably due to insufficient action of the persulphate. A repetition of the experiment with five minutes' immersion gave practically no image.

In repeating this experiment with gelatine a longer immersion is necessary in the persulphate solution, or else the latter must be strengthened. There appears to be some doubt as to whether the gelatine film will bear the action of a strong solution, but, up to about twelve per cent., which is the strongest I have tried, I can find no tendency to frill or dissolve. I think that the solvent action is only set up by the action of the reagent on the visible image, *i.e.*, on silver *in quantity*, in Herr Liesegang's process. At any rate, with a solution of sixty grains to the ounce and an immersion of five minutes, a gelatine plate is sufficiently cleared of its original image to bear re-exposure and development without showing any trace of the first picture. The plate is slowed slightly, but not so much as I should have expected. The second exposure was sufficient to require no forcing; I cannot yet say how such a restored plate would bear forcing.

W. B. Bolton.

NEW METHODS OF COLOURING PRINTS ON FABRICS.

In the current number of the *Bulletin de la Société Francaise*, M. Villain suggests that, when prints are made on silk or other fabrics, they may be coloured by painting them with pigments mixed with albumen; any pigmentary colour in powder form may be used, and should be mixed

with a forty per cent. solution of dry albumen to the desired tint, and the print painted with it and then allowed to dry, and then submitted to the action of steam for from twenty to thirty minutes, which coagulates the albumen and fixes the colours.

Prints on fabrics may also be coloured by the Dansac-Chassagne or similar processes by first imbuing the fabric with solution of albumen, coagulating it by heat, and then painting with the colours mixed with albumen solution, allowing to dry and coagulating by heat.

Very satisfactory results may also be obtained by using the so-called "lake" colours," which are formed by the union of the colours with tannin or other mordants and acetic acid, and painting the print then steaming, which drives off the acetic acid, and then dipping into a solution of tartar emetic, by which means a double compound of tannin and the colouring matter is formed, which gives very solid colours. The following formula is suggested, but the strength of the gum solution is not stated :—

Hot gum water	100 parts.
Tannin	10 ,,

dissolve, and when cold add—

Acetic acid	5 parts.
Methylene blue or other colour in solution	31 ,,

When alizarine colours are used, the tannin must be replaced by other mordants, and, as a typical formula, the following is given for red :—

Water	100 parts.
Acetic acid	50 ,,
Alizarine (forty per cent. solution)	15 ,,
Olive oil	10 ,,
Starch	150 ,,

boil and allow to cool, and add—

Aluminium acetate solution 12° B.	10 parts.
Calcium acetate solution 9° B.	10 ,,

Mix well and apply to the tissue, dry, and steam.

THE DEVELOPMENT OF THE LATENT IMAGE.

At the third International Congress for applied chemistry, held last month in Vienna, Dr. Andresen, of Berlin, read a paper on the above subject, in the course of which he made a statement which throws quite a new light on the action of sulphite in the developer.

After a considerable length of experimenting in various directions, he determined the reducing power of several developing agents by estimating the amount of metallic silver they would precipitate from washed bromide of silver, with the following results:—Pyrocatechine, 4·62; hydroquinone, 10·46; ortho-amidophenol, 1·74, para-amidophenol, 9·36.

Wishing to determine the specific action of sulphite, he found that 1·86 gramme of para-amidophenol, equivalent to 1 gramme of benzole, reduced in the presence of 20 grammes of sodium sulphite, and 20 grammes of potassium carbonate, 9·36 grammes of silver bromide.

In a second experiment the sulphite was omitted, and it was found that the developer, immediately almost in contact with the silver bromide, became an intensely dark violet colour, and the quantity of silver bromide reduced was only 2·4 grammes.

Dr. Andresen suggests that the oxidation of the developing agent, in the absence of sulphite, came to a standstill through the formation of coloured compounds, which are totally different to those formed in the presence of sulphite, and says: "There is no longer any doubt from this that the addition of sulphite, which is generally considered to be a preservative, does not merely play the so-called preservative part, but takes a direct part in the chemical reaction."

In order to determine what the actual reaction was, the author experimented with hydroquinone, as he hoped, by its use, to get over certain difficulties. The relative reducing power of hydroquinone was found to be 10·46, and calculation showed that, by the action of freshly precipitated silver bromide on the hydroquinone developer, with carbonate and sulphite, four atoms of bromine were brought into action with one molecule of hydroquinone. For some time it was impossible to isolate the oxidation product, but this was finally accomplished. From the clear solution obtained by filtration from the reduced silver bromide a yellow-coloured compound was obtained, after standing for eight days, in fine microscopic needles, in sufficient quantity to enable its properties to be examined.

It was found to be insoluble in alcohol and ether, slightly soluble in cold, more readily in hot water; the addition of an acid made it dissolve in cold water. By heating on platinum foil, it was burnt, and an ash obtained which contained sulphur. It had no developing power, and everything pointed to its being the soda salt of a sulphonic acid. Considering the reaction, the developing process may be represented by the following equation :—

$$C_6H_4\begin{matrix}OH\\OH\end{matrix} + \begin{matrix}NaO\\Na\end{matrix} SO_2 + 4Br = C_6H_3 \begin{matrix}O\\O\\SO_3Na\end{matrix}\!\!> + NaBr + 3Br.H.$$

Here we have the soda salt of the hitherto unknown quinone-sulphonic acid. Unfortunately, enough of the substance was not obtained to enable a quantitative analysis to be made.

RECENT ADVANCES IN PHYSICAL SCIENCE.*

It has long been to me a haunting problem how to reconcile this apparently boundless outpour of energy with accepted canons. But, as Dr. Johnstone Stoney reminds me, the resources of molecular movements are far from exhausted. There are many stores of energy in nature that may be drawn on by properly constituted bodies without very obvious cause. Some time since I drew attention to the enormous amount of locked-up energy in the ether; nearer our experimental grasp are the motions of the atoms and molecules, and it is not difficult mentally so to modify Maxwell's theories as to reduce them to the level of an inflexible law, and thus bring them within the ken of a philosopher in search of a new tool. It is possible to conceive a target capable of mechanically sifting from the molecules of the surrounding air the quick from the slow movers. This sifting of the swift-moving molecules is effected in liquids whenever they evaporate, and, in the case of the constituents of the atmosphere, wherever it contains constituents light enough to drift away molecule by molecule. In my mind's eye I see such a target as a piece of metal cooler than the surrounding air acquiring the energy that gradually raises its temperature from the outstanding effect of all its encounters with the molecules of the air about it; I see another target of such a structure that it throws off the slow-moving molecules with a little exchange of energy, but is so influenced by the quick-moving missiles that it appropriates to itself some of their energy. Let uranium or polonium, bodies of densest atoms, have a structure that enables them to throw off the slow-moving molecules of the atmosphere, while the quick-moving molecules, smashing on to the surface, have their energy reduced and that of the target correspondingly increased. The energy thus gained seems to be employed partly in dissociating some of the molecules of the gas (or in inducing some other condition which has the effect of rendering the neighbouring air in some degree a conductor of electricity) and partly in originating an undulation through the ether, which, as it takes its rise in phenomena so disconnected as the impacts of the molecules of the air, must furnish a large contingent of light waves of short wave-length. The shortness in the case of these Becquerel rays appears to approach without attaining the extreme shortness of ordinary Röntgen rays. The reduction of the speed of the quick-moving molecules would cool the layer of air to which they belong; but this cooling would rapidly be compensated by radiation and conduction from the surrounding atmosphere; under ordinary circumstances the difference of temperature would scarcely be perceptible, and the uranium would thus appear to perpetually emit rays of energy with no apparent means of restoration.

The total energy of both the translational and internal motions of the molecules locked up in quiescent air at ordinary pressure and temperature is about 140,000 foot-pounds in each cubic yard of air. Accordingly the quiet air within a room 12 feet high, 18 feet wide, and 22 feet long, contains energy enough to propel a one-horse engine for more than twelve hours. The store drawn upon naturally by uranium and other heavy atoms only awaits the touch of the magic wand of science to enable the twentieth century to cast into the shade the marvels of the nineteenth.

Whilst placing before you the labours and achievements of my comrades in science I seize this chance of telling you of engrossing work of my own on the fractionation of yttria, to which for the last eighteen years I have given ceaseless attention. In 1883, under the title of "Radiant Matter Spectroscopy," I described a new series of spectra produced by passing the phosphorescent glow of yttria, under molecular bombardment *in vacuo*, through a train of prisms. The visible spectra in time gave up their secrets, and were duly embalmed in the *Philosophical Transactions*. At the Birmingham meeting of the British Association in 1886 I brought the subject before the Chemical Section, of which I had the honour to be President. The results led to many speculations on the probable origin of all the elementary bodies—speculations that for the moment I must waive in favour of experimental facts.

There still remained for spectroscopic examination a long tempting stretch of unknown ultra-violet light, of which the exploration gave me no rest. But I will not now enter into details of the quest of unknown lines. Large quartz prisms, lenses, and condensers, specially sensitised

* Concluded from page 603.

photographic films capable of dealing with the necessary small amount of radiation given by feebly phosphorescing substances,* and above all tireless patience in collating and interpreting results, have all played their part. Although the research is incomplete, I am able to announce that among the groups of rare earths giving phosphorescent spectra in the visible region there are others giving well-defined groups of bands which can only be recorded photographically. I have detected and mapped no less than six such groups extending to λ 3060.

Without enlarging on difficulties, I will give a brief outline of the investigation. Starting with a large quantity of a group of the rare earths in a state of considerable purity, a particular method of fractionation is applied, splitting the earth into a series of fractions differing but slightly from each other. Each of these fractions, phosphorescing *in vacuo*, is arranged in the spectrograph, and a record of its spectrum photographed upon a specially prepared sensitive film.

In this way, with different groups of rare earths, the several invisible bands were recorded—some moderately strong, others exceedingly faint. Selecting a portion giving a definite set of bands, new methods of fractionation were applied, constantly photographing and measuring the spectrum of each fraction. Sometimes many weeks of hard experiment failed to produce any separation, and then a new method of splitting up was devised and applied. By unremitting work—the solvent of most difficulties—eventually it was possible to split up the series of bands into various groups. Then, taking a group which seemed to offer possibilities of reasonably quick result, one method after another of chemical attack was adopted, with the ultimate result of freeing the group from its accompanying fellows and increasing its intensity and detail.

As I have said, my researches are far from complete, but about one of the bodies I may speak definitely. High up in the ultra-violet, like a faint nebula in the distant heavens, a group of lines was detected, at first feeble and only remarkable on account of their isolation. On further purification these lines grew stronger. Their great refrangibility cut them off from other groups. Special processes were employed to isolate the earth, and using these lines as a test, and appealing at every step to the spectrograph, it was pleasant to see how each week the group stood out stronger and stronger, while the other lines of yttrium, samarium, ytterbium, &c., became fainter, and at last, practically vanishing, left the sought-for group strong and solitary. Finally, within the last few weeks, hopefulness had emerged into certainty, and I have absolute evidence that another member of the rare earth groups has been added to the list. Simultaneously with the chemical and spectrographic attack, atomic weight determinations were constantly performed.

As the group of lines which betrayed its existence stand alone, almost at the extreme end of the ultra-violet spectrum, I propose to name the newest of the elements Monium, from the Greek *μόνος*, alone. Although caught by the searching rays of the spectrum, Monium offers a direct contrast to the recently discovered gaseous elements, by having a strongly marked individuality; but, although so young and wilful, it is willing to enter into any number of chemical alliances.

Until my material is in a greater state of purity, I hesitate to commit myself to figures; but I may say that the wave-lengths of the principal lines are 3120 and 3117. Other fainter lines are at 3219, 3064, and 3060. The atomic weight of the element, based on the assumption of R_2O_3, is not far from 118—greater than that accepted for yttrium and less than that for lanthanum.

I ought almost to apologise for adding to the already too long list of elements of the earth class the asteroids of the terrestrial family. But, as the host of celestial asteroids, unimportant individually, become of high interest when once the idea is grasped that they may be incompletely coagulated remains of the original nebula, so do these elusive and insignificant rare elements rise to supreme importance, when we regard them in the light of component parts of a dominant element, frozen in embryo, and arrested in the act of coalescing from the original protyle into one of the ordinary and law-abiding family for whom Newlands and Mendeleeff have prepared pigeon-holes. The new element has another claim to notice; not only is it new in itself, but to discover it a new tool had to be forged for spectroscopic research.

Further details I will reserve for that tribunal, before whom every aspirant for a place in the elemental hierarchy has to substantiate his claim.

SIR W. CROOKES, F.R.S.

* In this direction I am glad to acknowledge my indebtedness to Dr. Schuman, of Leipzig, for valuable suggestions and detail of his own apparatus, by means of which he has produced some unique records of metallic and gaseous spectra of lines of short wave-length.

HOLIDAY PHOTOGRAPHY.

HOLIDAY photography does not differ much from home photography, except in so far as it is practised under slightly different and generally more difficult circumstances. Work with the camera is very much the same, except in so far as the subjects are concerned, as their nature will depend on the nature of the locality to which the photographer betakes himself, which, as a rule, change of scene being a *sine-quâ-non* of a holiday, says Dr. John Nicol in *Outing*, is very different from his home surroundings, although, after all, the difference will be mainly in the exposures, which a little experience will enable him to get correctly. The real difficulty or inconvenience will be found in the developing and finishing of the negative in places where no suitable dark room can be found or extemporised; and therefore the first question to settle is whether to develop as you go or leave development till your return, and I strongly recommend the latter course.

But, even as the most experienced photographer may make mistakes in exposure on unaccustomed subjects, he should take with him a bottle of "one solution" developer, a candle, a sheet of "post-office paper," and a rubber or celluloid tray, and waste a plate, a duplicate exposure, occasionally by developing it in his bedroom at night. There is no need to carry anything beyond the developing solution or a box of developing tabloids or powders, as a few minutes in the solution will tell him all he wants to know, and the plate can then be thrown away.

A good deal has been written about how best to repack the exposed plates, a matter of considerable importance, especially in view of the light thrown by Dr. Russell on the effects produced on the sensitive film by contact with, or even the proximity of, various metals, paper, printed or otherwise, and various other substances. I have tried many ways, and am confident that none is better, or even so good, as putting them face to face in half-dozens, wrapping them tightly in plain, tough paper, preferably black, and returning them to the box from whence they came.

In spite of all that has been said about mechanical development, I insist as strongly as ever that intelligent development can only be intelligently managed with a knowledge of the conditions under which the exposure was made and the nature of the subject photographed. Hence the necessity for keeping careful note of those in connexion with a certain figure or number, and the marking of each plate with a corresponding number as it is removed from the plate-holder. This may be done by small discs or squares of gummed paper, to be had at the stationer's for a few cents, but better still by a scratch with a writing diamond, as thereby a permanent record and connexion between the plate and the note-book is secured.

With holiday as with home photography, he who would reach the highest standard must specialise, must take up one branch or class of work, study it thoroughly, and, as far as possible, stick to it. What that should be will, of course, depend on the nature of the locality, but I may say at once that marine work, so generally a favourite, should not be attempted by those who have only the average outfit, including the camera that is bought with the lens already fitted into it, as such lenses are nearly all of much too short focus, giving a wide waste of water out of all proportion to the small size of the vessels.

Next to specialisation as contributory to success is a motive or object, and the proprietors of many magazines and papers have just in the nick of time furnished that, by offering prizes for the best photographs of just such subjects as the holiday photographer comes across, ranging from $5 to $100 each for a single picture of such subjects as pretty suburban houses, girls' rooms, summer piazzas, or gardens of any sort; indeed, of anything and everything of which a picture can be made. Nor is that all. There is a chance of both profit and honour even to those who do not obtain prizes.

Here, surely, there is motive enough, to induce many to resolve to go in and do their best to win. But success is not to be attained by aimless snapping at whatever comes in their way, or at everything that seems attractive. Nature *per se* is not artistic, nor does every scene that pleases the eye make a picture when reproduced by the camera. "A pretty suburban villa" must be studied from all points of view and lighted from various directions, and photographed from that at which it is most picturesque and when the shadows will fall where they will be most effective. Groups on piazzas or garden parties rarely arrange themselves according to the laws of composition, although in no phase of art are those laws of more importance. This the photographer must do for himself, and, while it is admittedly difficult, there is comfort in knowing that, when successfully done, the credit is fully proportionate to the difficulty.

How best to evolve the artistic and picturesque out of nature, animate or inanimate, as she presents herself, space here will not permit me to say; but there is one thing that the would-be prize-taker and successful photographer should ever keep before him as his pole star and chief factor in picture-making, simplicity. He should constantly act on the belief that a picture should have a story to tell or an impression to convey, and that nothing should be included that does not in some way help to tell that story or convey that impression. A picture should have only one objective point or place of special interest, and everything that does not help to produce the desired effect is a hindrance. Second only in importance to simplicity is tonality, or *values*, as it is more frequently called, the rendering of the various parts of a picture in something approaching to their relative luminosity. No photograph is in the least degree worthy of the name of a picture, or should ever be awarded a prize, in which sky or water is represented by white paper.

PHOTOGRAPHIC ECONOMY.

II.

IT is often asserted, and, no doubt, with a large amount of truth, that many ladies and gentlemen are induced to take up photography as a hobby chiefly on account of the tangibility of the pastime, as well as the small outlay required for the acquisition of a really serviceable outfit, and, when to this is added the statement that the cost of really excellent

quarter-plates is only one penny each, it seems by no means a costly venture, considering the pleasure derived from a reasonable amount of practice. The modest quarter-plate, however, on the score of economy, has, no doubt, much to answer for when, at the close of a year's practice, all is summed up, and the percentage of good, bad, and indifferent results are calculated. There is an old saying among professional photographers, and one which is quite true also, viz., We never lose a big plate, but often a small one. No doubt this is in a large measure attributable to the greater amount of care displayed when manipulating extreme sizes, and the almost certain precautions that hedge around every action when such large plates are being exposed. But with small sizes, and especially in the case of hand-camera exposures, there are very few ladies and gentlemen, who are not expert workers, who can be found to honestly say that their percentage of failures is not far in excess of their successful results. A professional worker, as a rule, has to turn out twelve good negatives from every dozen of large-sized plates he exposes; but how many are there who can say that in hand-camera working they can show even from four to six perfect negatives out of each dozen exposures? Very few indeed, I fear; or, if they exist, then they locate elsewhere than in the West of Scotland.

Hand-camera work to the uninitiated looks so very easy, and the cost apparently so trifling, that many are induced to go in for this class of camera at the outset, never thinking of the failures that are more than likely to arise. Before the hand camera became so almost universally used, the favourite size was the good old half-plate, and all exposures were made by means of a rigid tripod. Slow plates were the order of the day, and, as a rule, the results showed a very much larger percentage of good negatives than is the case at the present time, when three out of almost every four are found using a hand camera and plates that are the fastest that can be acquired.

Against the use of hand cameras, when such are made capable of turning out a large percentage of perfect results, nothing can be said on the score of economy; but I fear there are a vast number who, on looking back at the failures they have produced by hand exposures, must confess that, on the score of economy at least, the modest hand camera is a delusion and a snare. But, then, nowadays, in some quarters, such absolutely perfect results are not expected from the employment of hand cameras, and, if the print only yields a fairly good resemblance of the view, it will be appreciated and accepted as quite good enough. No doubt there is a large amount of this sort of carelessness rampant at the present day, especially by those workers who merely press the button and get some one else to do the, to them, drudgery, but to others most interesting part of the work, viz., development and printing. Such workers, however, seldom study the economical side of the question, or derive the full benefit from the delightful occupation of photography. Hand cameras, however, notwithstanding the apparent ease of using them, as well as the low primary cost of the small plates they consume, are certainly less desirable to a beginner, both from the standpoint of economy as well as that of leading up to a successful practice of photography, as cameras of, say, quarter or half-plate sizes intended for purely fixed tripod working, and the sooner beginners realise this fact the more encouragement they will offer to their friends to follow after them in the practice of photography as a hobby. On the other hand, there is no doubt, when once a worker has learned to master the handling of a hand camera, most lifelike results are obtained; but the percentage of those who are able to hold a hand camera absolutely steady is certainly very small, and, were dealers and opticians to impress strongly upon beginners the need of this requirement in the use of a hand camera, it would certainly go a long way to prevent much after-disappointment.

The use of a tripod or some form of rest whereby a camera may be held without vibrating during exposure has for a long time been advocated by those who know the benefit arising from the employment of such, and this has given rise, no doubt, to the light tripods that have recently been placed upon the market.

If a tripod or any camera support is to be of any use, it must be absolutely rigid, and this means weight where tripods are concerned, no matter what size of camera is being employed. Some clever workers overcome the difficulty by a method of slinging by means of straps, and one well-known expert (Mr. Andrew Pringle) many years ago pointed out the great utility of a camera walking-stick, facetiously termed by him his unipod, as a first-rate means of steadying a camera during exposure. The writer can speak from experience as to the value of this simple contrivance, and in every instance in which he has recommended the same to his friends and pupils the employment of such has been followed by the most gratifying results. To gain the utmost advantage of this unipod system the walking-stick should be rather longer than would be deemed necessary for comfortable walking, and one having a suitable shaped top selected. This is then made somewhat flat, and, when the camera is supported almost breast high on the stick, that frequently can be placed a few inches in the ground, and the breast used to steady the camera. Almost perfect results are regularly obtained, and a vast saving n expense results likewise.

In a previous article reference was made to the loss frequently entailed by those workers who were in the habit of using a formula in development which embodied the various chemicals in a mixed condition, such as the preservation of pyro in a concentrated form by means of sulphite of soda or other preservatives. Many years ago, before these preservatives came into general use, there was far less loss incurred than at the present time, simply by reason of the pyro being used in a dry state just when it was wanted in conjunction most often with ammonia and bromide, and when negatives were produced by such means, and afterwards subjected to a bath of chrome alum, a good printing colour was the result. This old method of development has never been abandoned by some workers who study the economical side of the question as well as the printing quality of an ammonia-developed plate.

Sulphite of soda produces a clean, pretty negative, but it has yet to be shown that for some kinds of printing papers such can equal the colour of a cleared pyro and ammonia-developed plate. The introduction of platinotype, no doubt, gave a great impetus to the employment of sulphite of soda, the object being to produce a class of negative more especially suitable for this paper alone; but there are those who have suffered from its uncertainty, often traceable, no doubt, to faulty samples of this chemical, but which is only discovered when it is too late. Used in the dry state, when such has been carefully protected from the atmosphere, an ounce of pyro will go a long way in development, and it is a very easy matter to gauge the necessary quantity at the moment of using without recourse to the trouble of weighing, for an odd grain or two makes but little difference in practical photography. With some workers the writer has met in with, the dark-room shelves contained an array of chemicals for development, almost every one of which had been mixed for indefinite periods, with distinct traces of deterioration, often to such an extent as to necessitate the preparation of a freshly compounded developer, and, as a general rule, almost all workers have more confidence in using a freshly made-up developer than one that has lain upon the shelf for an indefinite period. In this alone there is a great lack of economy, and *dry pyro* is a motto for those workers who only develop a few plates now and again.

In bromide work there has been a distinct advance within the last five or six years, and we have now samples of this invaluable paper that it would be very difficult, if indeed possible, to improve upon. Some years ago it was urged that no sample of bromide paper was on the market capable of yielding an absolutely pure white in the high lights, and whose deep shadows were not somewhat rusty. These objections certainly cannot now be urged, at least against the samples of paper that I have experienced. The employment of metol as a developer for these papers has, to a large extent, supplanted the good old system of iron development, and, where negatives of a certain class are concerned, there is no doubt metol yields exquisite results, and is far preferable, on account of its cleanliness and freedom from stains, than iron; but there are instances, such as when dealing with very fully exposed and thin negatives, where any one who has derived the experience of iron development, and has learnt how such can be made to ring the changes and build up almost any amount of density in flat results, and thereby can appreciate the great value of ferrous oxalate, which, after all is considered, is, perhaps, the best all-round developer the world has ever had, either for plates or papers.

Ferrous oxalate properly understood will develop a very wide range of exposures in either plates or papers, and in many instances it has been a sheet anchor to fall back upon, especially in cases of over-exposure. When an old and somewhat spent developer will work wonders in the way of coating density and vigour, not to speak of the suitability of such negatives for intensification, but we live in an age when something new must be produced, and when a new thing is brought out, all and sundry discard their good old friends and rush madly after the new idol until they finally settle down again, very probably to their first love or until such time as something new again appears. This has been appropriately termed "butterflying;" it certainly is not photographic economy.

T. N. Armsirong.

GELATINE FOR EMULSION WORK.

Considering the large quantities of gelatine used in England for emulsion work, it seems strange that none of our many English gelatine-manufacturers apparently find it worth while to cater for this demand, but allow almost the whole of it to come from the Continent; and this is the more strange, as it commands a good price, and large quantities of similar kinds of gelatine are used in other arts and industries, which are also supplied by Continental manufacturers.

I believe there is only one English firm which produces photographic gelatines, and although they make a number of various kinds, many of which are excellent for several photographic processes, none of them are entirely satisfactory for emulsion purposes. The chief defect is a strongly marked yellowness, a very bad failing where paper work is concerned, as, although the film of gelatine upon the paper is remarkably thin, there is sufficient to cause a decided yellowness, giving a very bad colour to the finished print. For plate work this is not quite such a drawback, but still it is a fault, as it undoubtedly tends to make the plate print more slowly, by reason of the yellow film cutting off many of the chemically active rays of light. Two of the brands manufactured by this firm would be very suitable for emulsion purposes if they could be decolourised without detracting from the quality of the gelatine; certainly they might be bleached by the action of acids, but this usually affects the gelatine,

esides almost invariably including the addition of sulphurous acid or a ulphite, thus introducing sulphur, which is a very dangerous element in n emulsion. Another failing with most of these gelatines is that they bsorb too much water, thus causing a delay in the drying, with the dditional disadvantages that decomposition may set in, and in hot 'eather the film is likely to be detached from the plate or paper. Gela- ine may be made less absorbent by the addition of alum, but, of course, his is a highly deleterious adulterant.

English gelatines seem more pure than the Continental varieties, as he former are practically tasteless, and, on dissolving, merely give the haracteristic odour of gelatine, while the latter taste and smell strongly f chlorine, probably due to the hydrochloric acid used in their anufacture.

A chemical analysis of gelatine shows it to be composed, in varying roportions, of two substances, known as glutin and chondrin, both of ndefinite composition, gelatine containing the most glutin giving the ofter and more absorbent kinds, while those containing the most hondrin give the harder and less absorbent gelatines. Most of the English gelatines seem to be prepared from hides, and the larger propor- ion consists of glutin; these are very suitable for photographic rocesses, which require the gelatine to be easily dissolved away, while the Continental gelatines appear to be prepared from bones, and contain a reater proportion of chondrin, making them more suitable for emulsions. One great difference between English and Continental gelatines is seen pon adding a fairly concentrated aqueous solution of common alum to strong solution of the gelatines, when the latter will form an almost nsoluble lump with a quantity of the alum solution, which apparently as little or no effect upon the former.

Freedom from grease is a very necessary item in an emulsion gelatine, s, if present in any quantity, it entails a large amount of trouble, even f it does not eventually spoil the emulsion. All the English photo- raphic gelatines, and most of the better-class foreign varieties, are almost, f not quite, free from this failing; while, on the other hand, some con- ain sufficient to unfit them for emulsions.

In testing gelatine some photographic authorities advise burning the ample, and, if the ash weighs only one to two per cent. of the original elatine, it is considered good, while, if the residue shows a larger per- entage than this, they consider the gelatine inferior; but this test is not lways reliable. Another way recommended is to immerse the gelatine n a measured quantity of cold water, and, according to the amount of vater absorbed, the quality of the gelatine is judged, the gelatine absorbing he most water being considered the best by them; this may hold good or many purposes, but the reverse is the case where emulsions are con- erned. These methods may answer very well when testing for alum r other adulterations and impurities, but are of little service in selecting gelatine for commercial emulsion purposes. The necessary qualities of hard emulsion gelatine are, that it should be colourless, free from grease, ot too absorbent, melt at a temperature of 100° to 110° F., and set at a emperature of from 70° to 80° F., for paper work nearer the latter emperature.

The hides of old animals produce a much stronger and tougher gela- ine than that from the hides of young animals, and, by reason of the ndefinite composition of gelatine and the varying proportions of glutin nd chondrin, gelatine seems to be a difficult substance to manufacture vithout variation, even different batches from the same manufacturer xhibiting some slight difference, not enough as a rule to make any very reat difference, but still the change is apparent, and, as for some peculiar nd at present unexplained reason, the quality of the gelatine and the nethod of its manufacture largely affect the resulting emulsion, this ariation of the gelatine is one of the difficulties emulsion-makers have o contend with, for, on starting a new batch of gelatine, they never now whether the finished emulsion will vary much from the preceding nes or not.

Bearing in mind the recent "corner" in photographic paper, it is hardly dvisable to rely too much upon Continental manufacturers, although a 'corner" in gelatine would be more difficult to form, in consequence of elatine-makers being so much more numerous than photographic paper- makers. Fortunately "corners" almost invariably fail, even when acked by a very large capital, as witness the recent Leiter wheat 'corner;" but, while they last, a very great amount of inconvenience nd loss is sustained. As so many of the Continental manufacturers are ble to produce a suitable gelatine, there seems no good and sufficient eason why English makers could not do likewise. Perhaps their atten- ion has not been drawn to the subject and to the large quantity used; so, f this article is successful in that direction, perhaps we may have a good English emulsion gelatine upon the market, and thus keep in England ome at least of the very large sums of money now annually paid to Continental countries for emulsion gelatine. C. T. Sutton.

A SCIENTIFICALLY CONSTRUCTED VIEW-METER.

[Abstract translation from *Photo-Gazette*.]

A desire for a view-meter or finder, which should give exactly the mount of subject which will be included on the plate, has been ex- ressed over and over again. Certainly there are plenty of meters and inders of various types upon the market, but the unreliability of many of them is notorious, a fact which, doubtless, has a good deal to do with the increasing popularity of the twin-lens camera for hand or stand work. The construction of a satisfactory finder is apparently one of the things which they do better in France, judging from the description of a recently introduced instrument which appears in our contemporary, the *Photo-Gazette*:—

"The finder, or meter—for the instrument acts as both—is the invention of M. Benoist, and is placed on the market by the house of Krauss, of Paris. It is of the direct-vision type, but differs so widely from previous instruments that some explanation of the principles involved in its construction may well be given. Before doing so, let it be said that M. Benoist claims for his invention that it can be used for any focal length of lens, for any size of plate, and however the lens may be displaced (horizontally or vertically) from its central position; and, further, that it enables the distance of an object in the field of vision to be at once ascertained in such a way as to admit of the focal extension of the camera being adjusted without the trouble of focussing or reference to any numerical tables.

"The finder is purely geometrical in principle, having no lenses or mirrors attached, and its action depends on several well-known laws of perspective, the first of which (*vide* later) was first utilised by Davanne some years ago in his "Chercheur focimétrique," and afterwards by Barton in his "lens-finder" (*Year-Book of Photography*, 1882, p. 165). The sensitive plate and the second nodal point of a lens constitute the base and the apex respectively of a quadrangular pyramid, the opposite system of which, having for its apex the first nodal point, will embrace the subject photographed. If a pyramid be constructed parallel to this latter, the apex being exactly at the optical centre of the eye, this visual pyramid will take in precisely the same field as the optical pyramid, provided that the eye and the objective occupy practically the same position. This visual pyramid might be built up by using a sight hole some distance behind a diaphragm—the usual arrangement in view-meters of the direct-vision type—but the use of a sight hole does not admit of the optical centre of the eye being always placed exactly at the apex of the pyramid, and, in order to realise this absolutely essential condition, a different arrangement is adopted by M. Benoist. This consists of two diaphragms or frames forming two sections of the pyramid, and so placed that the distance between them is always equal to one-fifth of the focal length of the lens in use, whilst, if the eye is placed in such a position that the smaller and nearer diaphragm, which is black, appears exactly coincident with the larger, which is white, the eye will then have its optical centre exactly coincident with the apex of the pyramid. If the lens is displaced from its central position to any given extent and in any given direction, the identity of the visual and photographic field is sustained by displacing the second or white diaphragm to an extent equal to one-fifth of the displacement of the lens and in the same direction. Lastly, the instrument can be used for focussing; for, as is well known, the ratio of the height of an object to its projection in perspective in a plane parallel to its own is equal to the ratio of the respective distances of the eye from the object, and from the plane of projection. The white diaphragm is used as a plane of projection, and is divided by a series of black threads (horizontal and vertical) into a number of squares of such empirical dimensions that, when the eye is placed at the apex of the visual pyramid and sees a person covering one, two, or three, &c., squares in the plane of projection, the distance of the eye from the person is equal to—

$$\frac{100}{1}, \frac{100}{2}, \frac{100}{3}, \text{ \&c.,}$$

times the focal length of the lens. The focal extension of the camera is at once arrived at (from the usual equations) by moving the objective forward $\frac{1}{100}$, $\frac{2}{100}$, or $\frac{3}{100}$, of its focal length when focussed on an infinitely distant object. A scale is therefore fixed alongside the sliding portion of the camera, graduated into hundredths of the focal length of the lens, the graduations being numbered 0, 1, 2, 3, &c. The number of squares giving the apparent height of an object is therefore the number of the graduation to which the camera must be extended, a slight correction being applied to allow for the eye being slightly above the back focus of the lens.

"Lastly, the finder makes the use of any spirit levels on the camera unnecessary, for nothing is easier than to adjust the sides of the diaphragm parallel to the horizontal and vertical lines in the subject.

"The practical form in which M. Benoist's instrument is turned out is as follows: The two diaphragms are attached by means of spring hinges to a baseboard, graduated into millimetres, the smaller diaphragm being movable to and fro. The baseboard is fixed on the camera so that it is parallel to the axis of the lens. The diaphragms are turned up, and the distance between them adjusted to one-fifth the focal length of the lens. The white diaphragm is made to slide in its plane vertically and horizontally. Two scales, graduated into millimetres, measure its displacement, the zero graduation corresponding to a central position. When using the meter, the camera is raised in the hand and the meter placed level with the eye, the position of which is adjusted so that the black diaphragm just blots out the white one. When this is the case, the eye sees precisely the amount of field included on the plate. With a stand camera, the camera is pointed in the best direction, and, if in selecting the view with the meter any displacement of the white diaphragm is

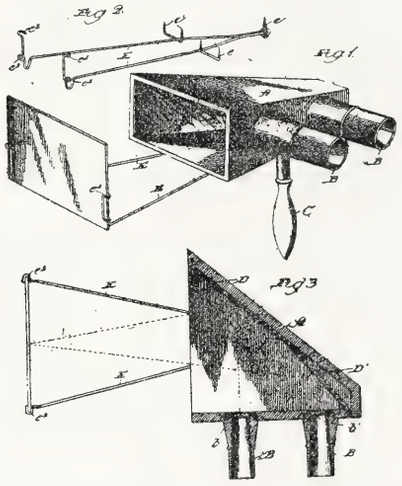
made, the lens is moved in the same direction five times the distance. For focussing, the number of squares which a person subtends gives at once the number of the graduation to which the camera must be extended. This adjustment can be made as rapidly as to permit of the focus being adjusted or changed immediately before releasing the shutter. In fact, after a little practice, all the operations described above will be found to require only a second or two."

"STEREOSCOPIC EFFECT (?) FROM SINGLE PHOTOGRAPHS."

Mr. H. H. Hill, of Chicago, has attacked this problem, and has made "a binocular optical instrument, in which but one picture is needed instead of two, as in the ordinary stereoscope." We give the description of the instrument in Mr. Hill's own words.

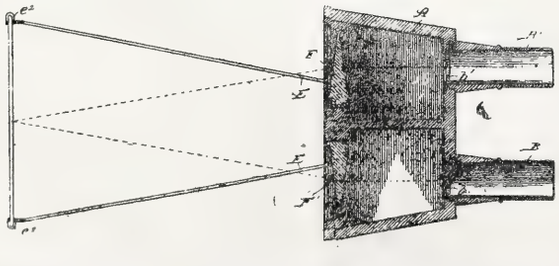
Fig. 1 is a perspective view of the instrument; fig. 2, a perspective view of the picture-holding wires; fig. 3, a sectional plan view, taken through fig. 1; and fig. 4, a sectional plan view of a modified form of the instrument.

"In making my improved optical instrument, by which the stereoscopic effect is to be obtained by the use of a single picture instead of a double one, I make a case, A, which may be of any desired material. This case is provided with two viewing tubes, B and B^1, arranged a proper distance



apart to suit the eyes, which will usually be about two and a half inches. At the inner end of these viewing tubes are arranged lenses, b and b^1, of the ordinary construction. As shown in figs. 1 and 3, these viewing tubes are arranged at one side of the case of the instrument. The case should also be provided with a handle, C, to enable a user to easily hold it in position. Within the case—in the forms shown in figs. 1 and 3—I arrange two mirrors, D and D^1, set at such angles as that the rays of light from the picture to be viewed will strike the mirrors and be reflected, respectively, through the lenses, b and b^1, on parallel lines to the eyes of the beholder. To support and hold the picture in place to be viewed, I arrange picture-holding wires, E. These wires are preferably formed of a single piece of spring wire, attached to the case by a screw, e, and passing through staples, e^1, which serve to hold them in proper position, while at the same time permitting the free ends of the wires to be sprung apart to accommodate pictures of different sizes. The free ends of the

Fig 4.



wires are bent into loops, e^2, adapted to receive and embrace the ends of the card on which the picture is mounted. The rays of light from the centre of the picture pass to the mirrors, D and D^1, whence they are reflected through the lenses and to the eyes of the beholder, as represented by dotted lines in fig. 3. This causes two images of the single picture to be produced in the mirrors, and to be transmitted from the mirrors to the eyes of the beholder, so that the impression of a single perspective view is created.

"In fig. 4 I have arranged the viewing tubes opposite the picture, and two refracting prisms, F and F^1, are placed in front thereof. The rays of light from the picture to be viewed striking these prisms will be refracted and transmitted through the lenses to the eyes of the beholder, as shown in dotted lines. In this way two images are obtained from a single picture, which, being transmitted to the eyes of the beholder on parallel lines, have the appearance of a single picture, the practical effect being that a perspective impression is obtained by the use of a single picture instead of a double one."

[Stereoscopic photography would be reduced to its utmost simplicity if the duplication by reflectors or prisms of a single photograph and the examination of the two identical pictures in the stereoscope gave the required effect of relief and solidity. But the system above described does not—and cannot—accomplish so much. As Mr. Hill's object is presumably to present to the eyes two exactly similar photographs, why does he not dispense with his reflectors and prisms, make two prints from the same negative, mount them side by side on a card, and examine them through an ordinary stereoscope? This would save the cost of the prisms or mirrors, and it would also conclusively show that true stereoscopic relief is no more obtainable from two identical photographs than it is from a single one.—Ed.]

HANGING THE PALL MALL EXHIBITION.

One of our contemporaries gave, last week, a succinct account of the procedure of the Selecting Committee of the forthcoming Pall Mall Exhibition, with details as to the time taken to perform the very simple duty of separating the reasonably good pictures from the hopelessly bad. As we always like to give our readers as early information as possible of all that is of interest in the photographic world, even though it be of so trivial a nature as that which our contemporary has printed, and, knowing the incorruptibility of the Hanging Committee, and that a personal appeal from ourselves to divulge anything connected with the Exhibition would be futile, we hatched a scheme for obtaining early information concerning the Exhibition.

It had come to our knowledge that the Hanging Committee were wont to resort to a refreshment establishment not far from the Pall Mall Gallery about midday after their morning's labours, and that they were accustomed to sit at a certain table. Our scheme was to employ a private detective to sit at an adjacent table to listen to and report what he could of the conversation that took place. Accordingly we applied to several known private inquiry agents to supply a suitable person. We were unable to find exactly the man we wanted, and finally decided to disguise our own porter and send him.

On our man's return to the office, we summoned our shorthand clerk, and the following is as nearly as possible a *verbatim* account of our man's report:—

"I knowed the gents directly they come in cos' they was so excited, and cos' they all said they wanted somethink to drink. The gent with the grey beard, 'e arsted them if they would have a drop of champagne and they all ses yes. So he orders arf a dozen, and wile it was a comin' they all sets to eatin' bread and butter like mad. Then one of 'em ses he don't think the water colour society knowed much about decoration, they orter painted the ceilin' a nice quiet grey. Then another gent, a stoutish gent wif a wite choker, ses it orter been brown paper and theres nothin like brown paper for everythin', and another smallish gent with moustaches ses how 'e thinks it orter been, and they all sets to rowin' for about a quarter an hour. Then one of the gents ses something orter be chucked cos' it taint a photergrarf, and the gent wif the choker ses 'e likes 'em wen they aint photergrarfs, and another gent ses 'e likes 'em a little like a photergrarf but not too much, and they all sets to rowin' again except the gent wif the grey wiskers and the gent wif the grey beard, they never does no rowin' but keeps on a sippin' of their wine and a swallerin' of their grub.

"After they'd done a rowin' they all talks about the great surprise, and from what I could find out, a gent wot 'adn't sent nothing to the Exhibition for a lot of years, but wot 'ad always been a jawin' about what other people orter do, 'ad sent a pictur which was a fair knock-out, and orter give everybody fits, especially if they looked at it through a magnifine glass. Some of 'em thought it ortent to be looked at through a magnifine glass, and some of 'em thought it warn't worf nuffin if yer didn't; but they all thought it was a fair knock-out, and if it wasn't it orter be. Then one of the gents, 'im wif the black beard, begins a torkin' about birches a breakin', and another gent ses 'e orter 'ad it when he was young, and they all larfs. Then they bring out their cigars, and seems to get a bit friendly, and torks about as 'ow they chucked everybody as they didn't like, and copped all the posteses and honour for theirselves, and as 'ow the Salon wouldn't be in it 'cept they got a man wot draws mackarels on the pavement with chorks to 'elp 'em, but they didn't think as no self-respectin' pavement artist would do it for 'em.

"Then one of the gents says as how Lord Crawford was a goin' to leave 'em cos he couldn't keep 'em in order, and another of 'em ses, if Lord Crawford couldn't, there wasn't nobody what could, and they couldn't go

to South Kensington cos of the revylations wich was shockin', and there wasn't nobody as could keep 'em in order wot 'adn't revylations. Then one of 'em ses as how they'd been their hour and a 'arf over their lunch, and they'd better go back, and then goes out a smokin' of their cigars."

That is the story as it was told to us and faithfully reported; but, although our messenger's reputation for veracity is unimpeachable, we find it difficult to accept his account without some reservations. Be that as it may, we thought our readers would like to know the result of our endeavours to get them the earliest information on a matter of such importance as to how the hanging of the pictures at Pall Mall is really done, and we trust our efforts may be not altogether unappreciated.

OUR FIRST EFFORTS.

Before the Leeds Camera Club, at its last meeting, a lecture on "Our First Efforts" was given by Mr. Heywood, who said that, while photography was a most fascinating study, he felt sure no one could boast of his efforts at the beginning of it. It was said that photography could not lie; but, when the beginner found, on developing his plates, that buildings leaned and assumed all shapes except perpendicular, or, when trying his prentice hand at portraiture on his lady or other friends, and saw the outrageous distortions he invariably produced, his opinion of the veracity of the camera became considerably modified, and, in the majority of cases, he took straight back to the dealer his faulty camera. Or again, when, perhaps, having got, as he thinks, a good exposure, on pouring on his developer he sees the image for a few seconds, and then it is gone for ever, a plate of uniform blackness resulting, he at once makes up his mind to try another dealer for his next batch of plates. Now in these and many other similar predicaments Mr. Heywood said he would give to the beginner *Punch's* advice, "Don't."

Don't blame the camera, lens, plates, or other material, but just sit down and think it over, and you will find it is the man who is at fault. Get as far away as you can at the first from the kind inquiries of anxious friends, and practise on your own account. Personally, he recommended an attic, having a good view of chimneypots. They made capital subjects for a beginner; they remain quiet (generally speaking) until you have done with them, and, unlike personal sitters, do not upset your nerves by asking, "How you are going on?" at a critical moment. Then, having made a few varying exposures, use one developer and make of plate until you are master of its eccentricities. Don't be afraid of asking your more advanced friends for advice; you will derive great benefit from them. Remember they have been in the same difficulty. Don't be careless; the most absolute cleanliness is necessary; keep each tray for its own chemical. In outdoor work remember you are using the rays of actinic light to act on your sensitive plate, that these rays vary at different periods of the year, and also at different periods of the day.

There are plenty of books and periodicals which deal with these particulars, and don't forget to study them. Actinometers are useful, but will not always apply, for there are certain rays of light which, while acting quickly on the plate, do not appreciably affect the sensitive paper in the actinometer. When you begin printing, in using silver or albumenised papers, print several shades deeper than is apparently required. Don't be in a hurry to look at it out of its printing frame, for if you once get it out you will not get it back again. Don't print in the sun, and, when toning, don't handle the prints unnecessarily.

Don't touch your hypo till you have done with your toning, or stains will assuredly result. Wash carefully and thoroughly, but don't leave them all night swimming about in the bath, there is no need for it. Endeavour to work intelligently. Think twice before acting once, and you will soon find you have something done which is creditable. All our members are learners, and the most advanced workers by their experience constantly feel that they can do better.

A pleasant discussion ensued amongst the fifty-four members present, exposures and development being generally dealt with, and some amusing experiences of their first efforts being given.

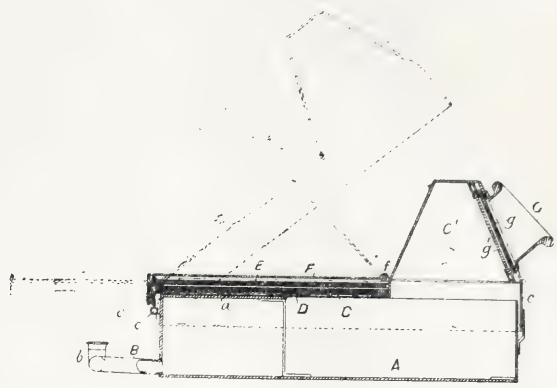
A vote of thanks was unanimously accorded to Mr. Heywood for his instructive and entertaining lecture.

The President (Mr. W. J. Warren) said he was pleased to see so many new members, and he gave them a hearty welcome.

A PORTABLE DEVELOPING APPARATUS.

Mr. A. S. Coblenz, of Höchst-on-Main, has devised an apparatus whereby negatives, taken on tour or otherwise, may be developed and fixed without the use of a dark room.

The apparatus, which is illustrated in longitudinal vertical section in the accompanying drawing, consists of a developing tray or box, A, having a permanent cover, *a*, extending over about one-third of its length from the back end. To this end of the box are connected inlet and outlet pipes, B, for the solutions bent at right angles, and having a common filling and emptying mouth, *b*, closed by a stopper, whereby the pouring in and out of the solutions may be effected without access of light to the interior of the developing tray. The tray is provided with a cover, C, hinged at, c^1, to the back end of the tray, the cover extending over and enclosing the whole top of the tray, the cover having downwardly projecting flanged sides, *c*, which closely embrace the sides of the tray, this cover consisting, for about two-thirds of its length, of a frame fitted with superposed red and orange glass plates, D, forming a window for lighting the interior of the tray. To exclude unnecessary light, the window is provided with a sliding shutter, E, and is enclosed by a lid, F, hinged at *f*. The forward part of the cover, C, is formed with a rising domed portion as at c^1, the inclined front side of the dome having binocular eye-tubes, G, fitted with an orange plate, *g*, and closed by a sliding shutter, g^1, which is only opened during observation. The position of the eye tubes



on the domed part of the cover is such as to afford a view of the whole plate undergoing development.

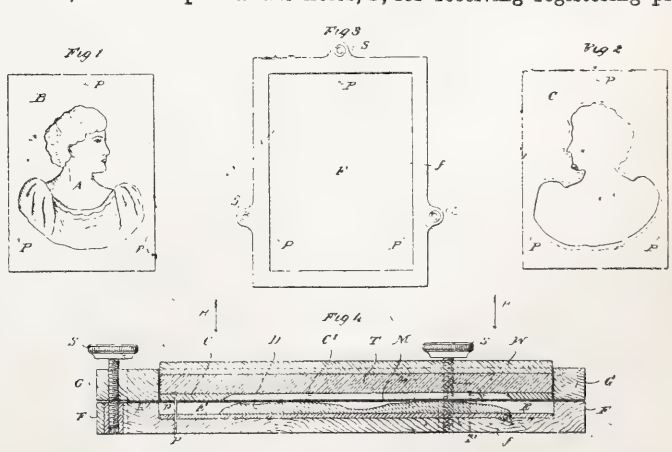
The apparatus is used as follows: By means of an ordinary light-excluding sleeve bag the plate is introduced into the tray, the cover, C, being raised for the purpose as shown in dotted lines. The cover, C, being closed and the shutters, E and g^1, being also closed the developer may be introduced in open daylight through the filling orifice, *b*, and, when it is desired to observe the progress of development, the slide, E, of the window is drawn out as indicated in dotted lines with one hand, and, the eyes being applied close to the eyepieces, the shutter, g^1, of the sight holes is opened with the other hand, whereby the operation can be sufficently observed. When development is complete, the developer is poured off and the fixing solution introduced, and, after the time deemed necessary for fixing, the plate can be removed.

PRESTWICH'S BAS-RELIEF PROCESS.

Fig. 1 is a plan of an intaglio block for making a cameo, and fig. 2 represents a card having the picture or image to be embossed (and which has been previously outlined thereon) cut out and removed. Fig. 3 is a plan of the receiving and pressing box, and fig. 4 an enlarged longitudinal section, showing all the parts arranged in position ready for the pressure and embossing process.

Mr. Prestwich first prepares, as far as convenient, an intaglio by carving or engraving in a block of wood or plaque of plaster of Paris, as B (fig. 1), the portrait or picture, A, which is to be embossed or raised up.

To the end that correct registration in all subsequent operations may be effected, he makes permanent holes, P, for receiving registering pins,



p, in convenient positions near to the margin of the block, B, which is to be carved or engraved, as shown in fig. 1. He then places and fixes on the face of the said block, B, a piece of thin cardboard, C, of the same size as the said block, B, and registers the same by the pins, *p*. A tracing of the portrait or picture to be embossed is now made by placing on the block a piece of thin or tracing paper, underneath which is a piece of

carbon paper; by following the outlines and details with a pencil or stylus a correct drawing of the picture in reverse is produced. This reversed picture tracing is now laid and registered by the pins, *p*, in the required position on the sheet of cardboard, C, fixed, as stated, upon the block, B, the carbon paper being placed underneath the traced outline, and details of the picture are again traced over, thus leaving the picture upon the cardboard sheet.

The outline of the picture, together with the card, C, underlying same, is now cut through, and the cut-out central parts, C^1, of both paper and card removed, as shown in fig. 2.

These cut-out representations, C^1, of the picture in card and tracing paper he uses as guides for the subsequent work of completing the carving of the intaglio, *i.e.*, as to depths and other details, and thereby he is enabled to obtain the precise positions and effects of all detail of the picture with great accuracy. By laying the cut-out card, C, upon the block, B, and piercing holes therein exactly corresponding to those already made in the said block as described, he is enabled to accurately register all pictures subsequently to be embossed from the same cameo by means of the registering pins, *p*, and holes, P, referred to.

After completion of the intaglio carving in the block, B, he proceeds to make a cameo, D. This he does by filling the intaglio with plaster of Paris or some other suitable plastic substance. During the operation he leaves the cardboard, C (out of which the centre part, C^1, viz., the figure or image, has been cut), in the position upon the block, B, already described, and he fills in the plaster to the level of its surface. When the plastic cameo is set and dry, it is lifted off the block, B, together with the cardboard, C, and can be readily and artistically trimmed, and any required corrections and improved details made.

The next operation is to replace the cameo, D, in its original position in the intaglio, and by glue or other adhesive to mount upon its back a card or wood block, E, of the same size as the block, B, and in said card he makes register holes exactly corresponding with those in said block, B. He next places the mounted cameo (face upward) in a box or frame, F (fig. 3), having a solid back, *f*. Any number of copies of the same picture can now be registered for embossing by placing the cut-out cardboard or paper over the picture in correct position of outline. A pricker is then passed through the registering pinholes, P, thus giving corresponding holes through the mount of the picture. The photograph or picture, M, which is to be treated and raised up, and which has already been mounted on thick blotting or other suitable paper or cardboard the full size of the box frame, F, is now laid on the cameo; in some cases the cardboard or sheet, C, out of which the centre figure, C^1, had been cut as described, may be then placed upon and over the portrait to be embossed, in correct register of outline, but the use of the cut card at this period is not essential.

The picture having been placed upon and with its back to the cameo, absolutely correct position is assured by means of the registering pinholes and pins. An open frame (G fig). 3, of the same size and form as that clamps or otherwise, conveniently upon the said box frame, F, and its shown at F, in fig. 3, is now laid and fastened by screws, such as S, or by contents so as to firmly grip the margin of the mount of the picture, M; this is to prevent any buckling of the picture while being pressed out, and at this stage the pins, *p*, having performed their function, may be withdrawn. A thick elastic indiarubber pad, T, about $\frac{3}{4}$ in. thick, is now placed on the face of the picture, then a block of wood, W, is laid on the top of rubber pad, T, and the arrangement is complete. The above-described arrangement of the parts is well shown in the longitudinal section (fig. 4), which also shows the card, C, applied upon the picture. In this condition the whole of the parts superposed within the frames is subjected to pressure applied in the direction of the arrows, H H, in any usual or convenient way; when the pressure is removed and the photograph or picture removed from the frame, it will be found to be embossed with all the form and detail of the cameo, D, by which it has been raised up. It can then at once be removed from the frame and mounted on a suitable cardboard, or it may be found desirable to first back up the raised part with wool or plaster of Paris to prevent any subsequent sinking of the embossing.

THE ARCTIC LIGHT.

Lieutenant Peary, in his recent book of Arctic travel, gives the following vivid idea of the intensity of the Arctic light: "The Arctic sun, in clear weather, is as brilliant as the sun of any southern latitude. When this brilliancy is increased by reflection from an interminable and absolutely unrelieved glistening white surface of snow, lifted into the highly rarefied and pure upper strata of the Arctic atmosphere, the intensity of light is something that can be only realised by one who has actually experienced it. The pungent quality of this blinding glare is such that the strongest eye can endure it unaided only for a few hours. A man placed in the centre of the Great Ice in midsummer, with no means of protecting his eyes, would be as utterly helpless at the end of a day as a blind kitten. The traveller across the ice-cap must keep his eyes constantly protected by goggles of heavy smoked glass, and even with these we frequently, when in camp and trying to sleep, were obliged to guard our eyes still further by a strip of fur tied across them, to exclude the light which otherwise would penetrate the closed lids. . . . . In clear weather, the traveller upon this white waste sees but the snow, the sky, the sun. In cloudy weather even these disappear. Many a time I have found myself in such weather travelling in grey space, feeling the snow beneath my snow shoes, but unable to see it. No sun, no sky, no snow, no horizon—absolutely nothing that the eye could rest upon; zenith and nadir alike, an intangible grey nothingness. As far as my eyes gave me evidence to the contrary, I was walking upon nothing. The strain, both physical and mental, of this blindness with wide open eyes was such that, after a time, I would be obliged to stop until the passing of fog, or formation of higher clouds, gave me something to keep the course by."

NEW METHODS OF TELEGRAPHY.

In the course of experiments conducted with the object of confining Hertzian waves to one particular direction, and of preventing of such messages being taken up by any but the desired receiver, Professor Karl Zickler, of Brunn, Moravia, has come to some interesting results, respecting which *Engineering* says: The apparatus used for radiation telegraphy are such that transmitter mirrors, of which much was expected originally, must be of very large dimensions. It has further been ascertained that the oscillatory disturbances emanating from the customary forms of Hertzian vibration decrease so rapidly in amplitude that almost any receiver will respond to some extent. By means of syntony secrecy can hence be obtained to a small degree only. Professor Oliver Lodge has realised increased discrimination by syntony with the help of two separated induction coils, in which the magnetic energy exceeds the electric energy. Professor Zickler has had recourse to the fact, which he learned from Hertz's researches, that the ultra-violet rays given out by an ordinary arc lamp facilitate the discharge between electrodes. He concentrates the beams of an arc lamp by placing it between a concave mirror and lens. Not to cut off the ultra-violet rays, the lens must be of crystal; for the same reason the mirror should not be made of glass silvered at the back. A glass screen fixed in front of the crystal lens will not disturb the visible beam, but will stop the ultra-violet rays. The receiver consists essentially of a spark gap inserted in the secondary circuit of an induction coil, and of a coherer, a secondary relay, or a telephone. The gap is too wide to allow the discharge to pass unless the ultra-violet rays play upon the receiver. By manipulating the glass screen after the manner of a shutter of a camera, Morse signals can be given. Zickler has found the following arrangement most suitable: A glass chamber, filled with rarefied air (partial vacuum of 200 millimetres of mercury) or some other gas, contains the two spark electrodes, a sphere and a disc, both made of platinum, the latter inclined at 45° to the longitudinal axis of the chamber, like the anti-cathode in an X-ray tube. On the front of the chamber, which is closed by a pane of crystal, is fitted a telescope tube with an object-lens of crystal, upon which the arc-light beam falls. The length of the spark gap is not altered, but the resistance of the circuit is adjusted to the desired degree of sensitiveness.

In the *Elektrotechnische Zeitschrift* Zickler explains that, with the imperfect apparatus at his disposal, he has, as yet, only been able to telegraph through a distance of 200 metres, this with an arc lamp of twenty-five ampères and fifty-four volts, and an arc of ten millimetres. The concentrating lens of the receiver was not required in that instance; the weather was dull, and rain threatening. For long-distance signals we should want strong arc lamps. But we have powerful searchlights at our command, especially on light-houses and on board ship, where this new kind of telegraphy might be utilised for communication between vessels and the shore and for naval operations. This is an application which will occur to everybody. Zickler also speaks of communication between fortresses and approaching armies. The large Schuckert searchlight of the Chicago Exhibition was visible at Milwaukee, eighty miles distant. In foggy weather the arc does not penetrate very far, but it may be possible to strengthen the ultra-violet rays, which alone are needed. The circuit of the receiving battery and induction coil would permanently have to be closed; the current consumption would be insignificant, however. The call does not cause any difficulties.

PHOSPHORESCENCE.

One of the discourses at the British Association was delivered by Mr. Herbert Jackson, who commenced by referring to the two main classes of phosphorescent phenomena, viz., those associated with chemical change, and those accompanying which no such change could be observed. Typical examples were shown of phosphorescence in varying conditions, such as quinine and fluorescein in the path of an electric beam, thallium illustrated by a light from a vacuum tube, Balmain's luminous paint excited by burning magnesium wire. The light given out by heating a mineral (chlorophane) was shown, and then examples of phosphorescence in a Crookes tube and the phosphorescence under X rays were exhibited. After a short description of the condition of each experiment, such as the presence of ultra-violet light, &c., the subject was divided into three heads, viz.: (1) The nature of the substances giving out the phosphorescent light; (2) The character of that light; (3) The nature of the

exciting causes. Under the first head the question of the purity of the substance was considered. It was pointed out that, while in many cases the addition of impurities favoured phosphorescence, still, pure substances did glow, and often brilliantly. Under the second division, viz., the character of the light given out, stress was laid upon the suggestion that a spectroscopic study of the phosphorescent glows of many substances showed that these exhibited a general resemblance to the spectra of the same substances obtained in other ways; thus the glow of phosphorescent lime showed that the principal intensity of the light was grouped about the bands seen in the spectrum of a calcium flame. Following this suggestion, the question of possible differences in the complexity of the molecular groupings of limes from different sources was dealt with, and specimens were shown of limes prepared from different chemicals, which gave respectively red, orange, green, and blue glows. The colours yielded were stated not to be pure, *i.e.*, restricted to one part of the spectrum, but to appear as they did because, for instance, in the orange specimen, of the high percentage in it of lime of a molecular constitution, suited to giving out that light. Next the nature of the exciting causes was investigated. It was stated, keeping to lime on account of the ease with which it could be made tolerably pure, that this body could have phosphorescence excited in it by discharge *in vacuo*, by exposure to the light of the sun, to X rays, to the light of the electric arc. Taking the idea that phosphorescence could, for the present, be looked upon as response to rapid oscillations, it was suggested that the response might in some cases be direct, or the effect might be that either in the case of light acting or under the discharge *in vacuo* the particles of the phosphorescent substance might themselves receive a charge, and, in their readiness or reluctance to part with this and to oscillate in consequence, it was thought an explanation might be found of the various lengths of time over which the ability of a substance to phosphorescence extended. The actions of intense cold and of heat were dealt with in connexion with this hypothesis. Retaining the notion of oscillations, the various sources of these were referred to, the chief ones being electric discharge, light, and chemical combination. In connexion with this latter source, attention was first called to the manner in which a porous substance will act to favour chemical combination, and it was shown that the porous lime would favour the oxidation of the vapour of many easily oxidised substances, and would in turn respond to the oscillations thus set up and exhibit phosphorescence, faint indeed, but of the same kind as it showed when responding to oscillations from other sources. In connexion with this it was stated that, since many substances retained the power of phosphorescence, even at very high temperatures, the colours of different incandescent mantles might be attributed to the phosphorescence of the substances composing them, showing, as it were, through the white heat, and so modifying the colour of the light, the source of the necessary rapid oscillation being the chemical combination of coal gas with the oxygen of the air. The attempt having been made to bring all the phenomena of phosphorescence under modifications of one general principle, an experiment was shown to illustrate the influence of the suddenness of the discharge *in vacuo* upon the brilliancy of the phosphorescence.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, September 28, at eight o'clock. Paper by Mr. W. D. Welford.

THE AUSTIN-EDWARDS MONTHLY FILM NEGATIVE COMPETITION.—The prize camera for the current month has been awarded to Mr. William Norrie, 8, Cross-street, Fraserburgh, N.B., for his negative, *Where the Melon went*.

THE HACKNEY EXHIBITION.—The Judges at the Exhibition will be Messrs. Thomas Bedding, F.R.P.S., W. J. Byrne, and J. B. B. Wellington. The Greens are to be illuminated by acetylene, supervised by Messrs. Thorne & Boddle.

THE prize-winners in the Warwick Monthly Competition for September are: First prize, 20*l.*, Mr. Herbert Evans, 6, Market-place, Kettering; second prize, 10*l.*, Mr. A. E. Casson, 18 Burlington-road, Withington, near Manchester; third prize, 5*l.*, Mr. Edwin Matthews, 25, East Dulwich Grove, East Dulwich.

AMMONIA FOR EXTINGUISHING FIRES.—One of the best agents for extinguishing fires, according to the *National Druggist*, is liquid ammonia, without any addition whatever. "We have personally had experience with the almost marvellous power of this substance in this direction," says the editor of that journal. "In one instance, where fire had originated, probably from spontaneous combustion, in a pile containing several tons of cotton seed, and the interior of which was almost a solid body of live coal, a half gallon of ammonia completely smothered the fire. In another, which occurred at Avenay, France, the vapours of a tank containing fifty gallons of gasoline caught fire in the linen room of a laundry. The room was instantly a mass of roaring flames; but a gallon and a half of ammonia water thrown into it completely, and almost immediately, extinguished the fire. The ammonia was in a glass demijohn in an apothecary's shop next door to the laundry, and was thrown into the room by the druggist as an experiment. To use his own words in reporting the circumstance—in the *Union Pharmaceutique*—M. Canneau, the pharmacist, says: 'The effect was instantaneous, torrents of black smoke rolled upward in place of flames, and in a moment every trace of fire was gone. So completely was the fire extinguished, that workmen were enabled to enter the room almost immediately, where they found the iron tank of gasoline intact.'"

Re HARRY MARRIOTT, photographer, the Market Place, Peterborough.—The above-named debtor has executed a deed of assignment for the benefit of his creditors, under which Mr. Richard W. Parr, accountant, Peterborough, is trustee. The unsecured liabilities are returned at 700*l.*, and the assets, after deducting the claims of preferential creditors payable in full, are estimated at 300*l.*

VARNISH FOR PHOTOGRAPHS.—Varnishes for photographic negatives have to meet very special requirements. They must be colourless, hard, impervious, but at the same time elastic and exceedingly adhesive. If they are not hard enough, the plate is injured in printing the positive copies; if the elasticity is lacking, the negative will easily tear and crack. Another important requirement is exacted from the photograph lacquer: with hardness, elasticity, and viscosity, it must dry so quickly that the plate can be retouched immediately after varnishing. Following are some recipes for photograph varnishes (by weight thoughout): 1. Sandarac, 16; lavender oil, 12; chloroform, 2; rectified alcohol, 90. Filter off all insoluble parts. 2 Place shellac in a concentrated solution of ammonium carbonate, extract the latter, and substitute pure water (shellac, 1 part; water, 8 parts), whereupon the shellac dissolves. 3. Take shellac, 2; sandarac, 12; mastic, 12; ether, 150. Dissolve entirely and add benzole, 9. 4. Digest dammar, 2, with acetone, 9, in a well-closed flask for two weeks in a warm place, shaking from time to time Then pour off from the insoluble residue. Several coatings are required of this lacquer, which is also adapted for paper. 5. Gum lac, 75; sandarac, 10; alcohol (95 per cent.), 915. 6. Amber, 2; copal, 2; benzole, 4; rectified alcohol, 30. 7. Amber, 4; copal 4; mastic, 2; petroleum ether, 20; rectified spirit of wine, 40. 8. Sandarac 40; turpentine, 4; lavender oil, 5; ether, 5; absolute alcohol, 100. 9. Mastic, 2; turpentine, 2; bleached shellac, 10; rectified spirit, 60. Care should be taken to use only the purest ingredients obtainable.—*Färben-Zeitung.*

Re TOM SMITH, photographer, residing and carrying on business at 7, School-street, Low Moors, Bradford.—The first meeting of the creditors interested under this failure was held on the 16th inst. at the offices of the Official Receiver, Bradford. The statement of affairs filed by the debtor, disclosed gross liabilities amounting to 673*l.*, of which 346*l.* was due to unsecured creditors. The assets, including 114*l.*, the estimated surplus from securities in the hands of fully secured creditors, were returned at 169*l.*, after deducting 21*l.* for the claims of preferential creditors, payable in full. The deficiency was returned at 177*l.* It appeared that the debtor commenced business in 1875, without any capital of his own, at Low Moor, and he did fairly well until about fourteen years ago, when, chiefly owing to competition, his trade began to decline. His turnover, which at that time was about 5*l.* per week, had not for the last four years averaged more than 2*l.* per week. He would have been compelled to stop years ago but for the assistance of his wife, who had a private income of 90*l.* per annum. About the middle of August he called his creditors together, and proposed to execute a deed of assignment; but, as the principal creditor refused to fall in with that arrangement, the debtor was compelled to file his petition in bankruptcy. After some discussion, Mr. Riley moved, and Mr. Midgley seconded, that Mr. William Lawson be appointed trustee to act in conjunction with a committee of inspection. The Official Receiver said that was a very unusual course to take in such a small estate. Mr. Riley said it was the wish of the creditors present, as there were certain matters wanted inquiring into. Eventually, Mr. Lawson was elected trustee, with a committee of inspection.

Patent News.

THE following applications for Patents were made between September 5 and September 10, 1898:—

PHOTOMETER.—No. 19,087. "Illumination Photometer." C. W. S. CRAWLEY.

CHRONO-PHOTOGRAPHY.—No. 19,220. "An Improved Machine for taking and projecting Chrono-photographs." R. ATCHISON.

LANTERN.—No. 19,282. "'The Combine,' a Lantern for Enlarging, Reducing, and Projection in all kinds of Protographic Processes." G. B. CLIFF.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

September.	Name of Society.	Subject.
26.....	**North Middlesex**	*Kogelmann and the Latent Image.* Philip Everitt.
27.....	Birmingham Photo. Society ...	Exhibition of Individual Work. G. F. Lyndon, J.P.
27.....	**Hackney**	Lantern Evening: *Norway.* F. A. Bridge.
28.....	Borough Polytechnic	Annual General Meeting.
28.....	Leeds Camera Club.....	Members' Lantern Night.
28.....	**Photographic Club**	Paper by W. D. Welford.
29.....	Ashton-under-Lyne.....	Meeting for Conversation and Sale of Papers.
29.....	London and Provincial	*Standards and Uncharitableness.* Walter D. Welford
30.....	Croydon Microscopical	*Intensification and Reduction.* John McIntosh.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 15,—Mr. S. Herbert Fry in the chair.

Mr. A. L. HENDERSON introduced Mr. R. W. Wicks, of Brighton, and showed a number of cloud negatives made for him by Mr. Wicks. They were printed in carbon, and were vignetted off, leaving the lower half of the plate clear fo-

whatever foreground may be used. To prevent damage in use, from scratching and rough wear, the films were treated with formalin.

Mr. EVERITT asked whether Mr. Wicks had used formalin much for this purpose. He had heard complaints that formalin used for hardening gelatine films caused them later on to give way, owing to a brittle condition which set in, and split up upon the support. He was rather chary himself of using the stuff.

Mr. WICKS said this present application of formalin was at the desire of Mr. Henderson. He had little experience of its use. He passed round a packet of double-transfer carbon prints, chiefly portraits, purely as commercial productions.

Mr. A. L. HENDERSON proceeded to show some one hundred and fifty to two hundred slides from photographs taken during his recent winter trip to Corsica, accompanying the display with an interesting series of short historical notes and descriptive matter. With an excellent start from Ajaccio, situated in the most beautiful scenery that can be imagined, he showed the principal sights in the island, with its old castles, and groves of palm, orange, and lime trees, the numerous Napoleonic relics; the churches and cathedrals, with their handsome interiors, and the life and customs of the people. Corsica, he said, was a wonderful place, and its climate magnificent. The panoramic and other slides spoke for its beauty, though deprived of the rich colouring of nature, and well merited the warm reception of the meeting.

PHOTOGRAPHIC CLUB.

SEPTEMBER 14,—Mr. H. P. Smith in the chair.

The subject of the free-portrait frauds cropped up in conversation, and several recollections were recounted. Photographers' insurance policy rates and their alleged severity occupied much of the time of the meeting in discussion. A statement made in the same room by a barrister was repeated to the effect that a policy once broken was void, however great the amount of premium paid and accepted after its breach by the Company, and that therefore a new policy should be substituted. It was generally allowed that insurance companies were generous in settling claims, and the question arose whether, in a case of total loss, a policy-holder would have to show proof that everything claimed for was on the spot at the time.

Mr. FOXLEE gave as a reason, perhaps, for the excessively high scale for photographers, that there could be so little salvage, prints, negatives, lenses, &c., if not destroyed by fire, receiving equal damage by water.

Mr. WILLIAMS stated, as bearing upon the subject, that a bottle of collodion emulsion, which was usually kept in a disused oven, was forgotten, and in course of time was heated very considerably on a fire being lit in the grate. Whether as a result of this risky proceeding he could not definitely say, but the emulsion was extremely rapid, and gave a fine clear image with no fogging whatever.

Mr. NESBIT said that some experiments that Mr. Warnerke made did not seem to confirm this. The effect of the heat seemed to deprive it of its milky nature, and it became limpid and semi-transparent.

Croydon Camera Club.—On Saturday, 10th inst., at the invitation of Sir David Salomons—communicated to the President of the Club—a party of twenty members travelled down to Tunbridge Wells, where, on arriving about two p.m., they were met by members of the local society and of the Eastbourne Photographic Society; and, under the guidance Mr. Joseph Chamberlain, the whole party, numbering about fifty, drove over the delightful common and along the breezy heights of Broomhill, where Sir David received them with that genial hospitality and bountiful consideration which always characterise his conduct. In a few short words (delivered in the Science Theatre) he explained the afternoon's programme and privileges, the latter of which included free permission to go whither members pleased, either in or outside the house, and photograph whatever they list. This permit was freely availed of. While many rambled around the picturesque grounds and flower gardens, others climbed the lofty electric beacon tower, or explored the palatial stables, which are so full of fine examples of building construction, sanitation, decoration, and labour-saving devices. Yet others devoted their chief attention to the picture and sculpture galleries, several photographs of the delightfully chiselled marbles being attempted. But, perhaps, those were best advised who hung around Sir David the while he *ciceroned* detachments of inquisitive photographers through his mechanical laboratory and workshop, and also around the hall devoted to physical and similar instruments. It is impossible to descant in detail upon the large assemblage of instruments and machines on view, all of which, by the way, are moved by electric current, which not only drives delicate devices, such as the instrument which measures a ten-thousandth part of a second of time, but drives cutting shears, which at one snap cut in two a piece of sheet iron three-quarters of an inch in thickness by several inches in breadth. The so-called Marconi system of electric telegraphy without communicating wires, which was originally noted as possible by Hertz, was, to the company's delight, demonstrated, a message being sent from an electric source to a totally unconnected receiver placed at a considerable distance away. Sir DAVID stated that occasionally the electric generator at Tunbridge Wells, about two miles distant, without intention, acted upon the receiver and set the bell a ringing. Mr. H. P. ROBINSON inquired whether the aurora borealis, which was so noticeable on the preceding night, had any effect upon the instrument? This Sir David was unable to answer. At five p.m. the whole of the company assembled in the theatre, and were entertained by a series of the latest applications of science to art. A loud-speaking phonograph discoursed instrumental and vocal selections, and also repeated a humorous dialogue. Some unusually effective coloured moving photographs followed, this exhibition being accompanied by a concert played by an electric orchestra. Finally some examples of tricolour photography were shown. The company having been refreshed by a daintily served tea and coffee repast, a move was made for the gardens, where Mr. J. T. Sandell took Sir David surrounded by his guests. This sacrifice to the rites of Photographia being accomplished on the proposition of Dr. HABGOOD (President of Eastbourne Photographic Society), seconded by Mr. HECTOR MACLEAN (President of Croydon Camera Club), the company's heartfelt thanks were tendered to Sir David, the assemblage testifying by their long-sustained applause how strongly they endorsed the appreciative sentiments expressed by the mover and seconder of the vote of thanks. Sir DAVID, in acknowledging the foregoing, expressed the hope that he might in future years see the company again and again at Broomhill.

FORTHCOMING EXHIBITIONS.

1898.		
Sept. 26–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
„ 30–Nov. 5	.....	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
„ 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
„ 17	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
„ 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
1899.		
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

STEREOSCOPIC LANTERN PROJECTION.

To the EDITORS.

GENTLEMEN,—Absence from England has prevented my earlier attention to this subject. I had hoped, as Mr. Harvey seems to do in your issue of August 19, that you would have given scientific reasons for the binocular theory of stereoscopic vision; but you simply refer your readers to Sir D. Brewster or some "primer," as though the matter had long ago been disposed of. Sir David had to invent a theory to fit in with the phenomena he noted, and both theories and primers of great scientists have to be revised from time to time when they are found to fail to account for all the facts. I have seen a good many of such revisions in my time. The whole theory is based on the fallacy that one-eyed vision differs from two-eyed vision, in being non-stereoscopic and flat. Any person with normal eyesight can easily satisfy himself by a few trials that the sole difference is in the lighting, and that with this difference the one eye sees as well as the two.

In my last letter I gave some facts which have not been disproved, and now adduce a few more. A fly has thousands of eyes, and yet sees stereoscopically, for his judgment of distance and solidity is very clearly shown by his movements. A bird has two eyes, each of which views a distinct area, so that the two views cannot possibly include the same objects, yet he evidently sees his surroundings stereoscopically, and correctly estimates their solidity and distance. So with fishes, one eye sees one side of the field of view, and the other eye the other side; and these optical pictures cannot possibly be superposed or supplement each other. The eagle is known to have the most piercing vision, seeing small objects as great distances, yet his eyes are so placed as to see distinct fields of view. Most animals in fact, except man, have their eyes so placed that each sees a different picture, and such pictures cannot possibly blend upon the optic apparatus, and yet there are plain evidences that their vision is stereoscopic.

With all deference to Sir D. Brewster and the Editors, there is a much simpler explanation than the binocular one; for, besides duplicate eyes, we have duplicates all over the body, and it is well known that these simply reinforce each other, or accentuate their particular functions, on the simple but sufficient theory that two are twice as good as one.

The reply to the quotation from Sir D. Brewster is, of course, that pictures taken with a one-eyed camera must be viewed with one eye to appear as the camera saw them—that is, stereoscopic—but they, of course, appear only half as brilliant and distinct as a two-eyed picture in the stereoscope. Pictures painted or drawn, and looked at, as they usually are, from a short distance, require the eyes to close up to an angle entirely different from that at which they would view the actual scene the picture represents; besides which, the defects of the pictures themselves, considered as representations of natural objects, are so great

and numerous that the eyes, with their extensive and accurate training on nature itself, cannot be deceived.

I am bound to say here that Sir David's statement, that "the singular relief which stereoscopic representation imparts is independent of light and shade and of geometrical as well as aërial perspective," is entirely false, for I have already shown that a view in which these are absent is quite flat to the eyes, because distant objects appear as strongly coloured as near ones, and the eye then fails to estimate distance or solidity, having been trained from infancy by these necessary adjuncts of atmosphere, light and shade.

If the binocular theory were true, which requires that the *different* views of every object shall be necessary in order that such object shall appear stereoscopic, then it follows that all such objects as cylindrical columns, spheres, and symmetrical forms ought to appear flat instead of round, because any two views of these must be absolutely identical, however far apart the eyes may be. I need hardly say that the theory is wrong here again, and that such objects are quite round when seen by either one or two eyes.

The true explanation of the stereoscope I believe to be, therefore, that the pictures are taken with a two-eyed camera, the lenses of which as nearly as possible imitate our eyes, and then such pictures are seen by the eyes under similar circumstances, the eyes maintaining approximately the same angle as when looking at the natural scene represented; thus, by the device of two pictures, the lighting and definition are doubled as in natural vision, while with a single picture, looked at with one eye, we get exactly the same effect as the natural scene looked at with one eye, stereoscopic, but lacking in lighting, and consequently in definition, that is, *f*-16 instead of *f*-8.

As I have just been exhibiting the electrorama lantern pictures in Germany, I have taken the opportunity to note again their stereoscopic effect, which is very marked in pictures having proper exposure in the foreground, and I believe the result is due to the correct rendering of distance, natural colouring, and the distance of the pictures from the eyes, which, added to their immense size, gives the sense of relief. There is no reason why these effects cannot be introduced to a great extent in the ordinary lantern.—I am, yours, &c., T. W. Barber.

[The chief point at issue between Mr. Barber and ourselves is stated in the concluding paragraph of his letter. He claims that his lantern-slide pictures shown last spring at Niagara Hall were stereoscopic. We carefully examined those projected transparencies, and are in a position to assert that they were *not* stereoscopic. The varying convergence of the optic axes upon a plane representation of a natural scene cannot possibly produce the sensation of relief or solidity, obviously because that convergence can be neither greater nor less, all parts of the picture being equidistant from the eyes. We can only suppose Mr. Barber to be the victim of self-delusion. He appears to think, if we rightly interpret his penultimate paragraph, that a photograph made with one lens is stereoscopic when looked at with one eye! He also seems to hold the extraordinary opinion that a photograph taken with *f*-16 is necessarily not so well lighted and defined as one at *f*-8! Again, who is his authority for the quotation that one-eyed vision is non-stereoscopic and flat? Most, if not all, writers on binocular vision state exactly the opposite. We have not space to follow Mr. Barber point by point, nor do we feel called upon to do so, for he leaves us quite unsatisfied that he knows anything at all about stereoscopic photography. In his letter on July 8, he referred to existing methods for producing stereoscopic effects in lantern pictures as "clumsy and impossible," whereas the Anderton and Freshwater systems easily yield results of the most striking and realistic character—really stereoscopic pictures, giving the illusions of height, depth, solidity, roundness and distance, which Mr. Barber's single lantern transparencies do not and cannot, for the reason already stated above. As to Brewster's binocular theory of stereoscopic vision, here, again, Mr. Barber supplies no evidence that he has studied Brewster's writings on the subject. But, whether he has or not, he signally fails to upset a theory which, whatever its minor imperfections may be, certainly explains on rational grounds why binocular vision is necessary (in human beings) to obtain perfect stereoscopic effect in nature and in photographic reproductions of it. For the present we prefer Brewster to Barber.—Eds.]

EXPOSURE METERS.

To the Editors.

Gentlemen,—My desire is not to increase the factors, nor to complicate the calculation of exposure, but to establish a subject and light variation table on experimental data. In the actinograph five factors are used: plate, normal light, lens, subject, and abnormal light. The two former Hurter & Driffield, after many years of work, succeeded in putting on a sound basis, the two latter they left almost where they found them. We have thus three factors exactly determined, leaving two still largely dependent on the personal equation. The next step, therefore, is to bring these up to the level of the speed and light factor. This has already been attempted by a Mr. Saunders of the Liverpool Amateur Photographic Association; a short account of his work appeared in the Journal. Mr. Saunders took subjects ranging from sky to dark interiors, this range being taken as 1:18,000. On what grounds did he take that range, and in what manner did he estimate the relative values of subjects coming between? Being shown that such estimations are founded on careful experiment and observation, our subject table is a realised fact.

The table of light variations presents more difficulty. Hurter & Driffield take a normal light, and have four exposures, two longer and two shorter. Their normal is a result of actinometric experiments extending over two years. They found that the normal brightness of light at any hour is about one half the possible maximum. The altitude of the sun gives the maximum. What is the minimum at any hour on any day? Experiments on this point are, I believe, wanting. From personal observation I am inclined to think that on many days the minimum would not be much below the normal. Assuming the variation from maximum to minimum on a given day is generally 1:3, and occasionally 1:8, we are in a position, out of two negatives, to secure one that is properly exposed. Provided always we use a plate that allows a latitude of exposure 1:4, with one exposure, knowing the limits, an inspection of the light would give a very good guide to whether it should be near the maximum or minimum.

These tables established, there would result a still greater separation between "man and meter," a separation which, in my opinion, makes for science and accuracy.

I would next point out that there is no analogy between the actinometric observations carried on by Dr. Scott and Hurter & Driffield, and the tests made to determine the light previous to exposure, because, in the former case, the results are open to the inspection of independent witnesses, who may deny or verify them, whilst the latter never undergo the test of independent judgment. They begin and end with the individual observer.

I shall only touch briefly on the remarks of "J. F. T." and the patentees.

I have traced six patents, and as an outsider, on comparing them, I fail to see that, if any one is valid, how the remainder can likewise be valid. What differences the legal mind could find I do not know. I speak only as a photographer, and the legal mind may have sources of information not open to me.

As a matter of law, no patent is valid until it has been proved so, that is, until it can point to a judgment in its favour. This being so, every patent monopoly naturally consists of a pool or ring, each member being afraid to test the validity of a second patent, because it might end in showing the invaiidity of his own. To me, personally, if the patent of Hurter & Driffield is valid—which it cannot be, there being others—no subsequent patent is valid, because I find nothing in these latter which is not claimed in the former. This I said in my first article, and no patentee has yet come forward and specified what he claims as an original idea. Mr. Watkins claimed "a new principle," "quite a different way," but specified nothing. Yet, on these generalities and dark sayings, he based a charge of "absolutely untrue."—I am, yours, &c.,

September 16, 1898. John A. Randall.

A NEW "LAND OF THE FREE."

To the Editors.

Gentlemen,—From my earliest days I have been taught that England was the land of the free, but now that I have seen a little more of the world I begin somewhat to doubt the truth of that adage. It probably will be a surprise to many when I say that Greece now claims the proverb. I speak, of course, from a photographic point of view, and from no other. A permit to photograph is of more value to me than the price of currants, rate of exchange, financial state of the Government, &c. Being a photographer, the question of photography is foremost in my mind, and all other political matters are secondary.

On arrival in Athens I was told that a permit, though not absolutely necessary, was advisable, especially as I intended going into the interior. I went to the Government office in Hermes-street, the ticket was given me, and I was out again in the street in less than one minute. No awkward questions were asked, and no charge made. I travelled over the whole of the Peloponnesus, and showed the ticket only once, and even then I pleased myself about it. I photographed in all the streets, museums, ruins, &c., and met with no objection whatever, neither was any *charge* made anywhere. The caretakers (if there), of course, always expected something, but that is not like a fixed charge, and personally I prefer always to give voluntarily. The Greeks may perhaps be a little behind in war and culinary matters, but they know how to treat and encourage photographers, and that is more than I can say of some of my own countrymen.—I am, yours, &c., Richard Penlake.

Paris, September 16, 1898.

THE PHOTOGRAPHIC CLUB.

To the EDITORS.

GENTLEMEN,—As in previous years, we shall be pleased to welcome to our meetings, during the R. P. S. Exhibition period, all provincial visitors who may care to look in. The meetings are held at Anderton's Hotel, Fleet-street, E.C., on Wednesday evenings, at eight o'clock.—I am, yours, &c.,

W. R. STRETTON,
Hon. Secretary.

4, *Queen-street Place, London, E.C., September* 17, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

F. Valery, The Parade, Beckenham, Kent.—*Two photographs of stillborn child.*

H. Cumming, 88, St. Thomas-street, Weymouth.—*Photograph of Weymouth Bay from Nothe, illuminated by night.*

Alf. Haughton, Rockspring, Camolin, co. Wexford, Ireland.—*Photograph of floral design, consisting of arches and cones.*

Mr. J. H. Stott, 217, Great Horton-road, Bradford, Yorks.—*Drawing of prize card for Bradford and District Canine Association.*

RECEIVED.—J. C.; J. F. T. In our next.

SYSTEMATIC.—It seems subject-matter for a patent. Apply at the nearest post office for the necessary form.

J. E. TOWERS.—The address required is, we believe, The American Biograph Company, Great Windmill-street, London, W.

PHOTOS (Brierfield).—It is against our rule to recommend any particular house. There are many in London that supply pictures of the kind. Apply to the foreign printsellers.

FLASHLIGHT POWDER.—S. P. The formula that appeared last week will give a brilliant and actinic light, but we should recommend you to keep the substances separate, and only mix them as required for use, mixing them on a sheet of paper with a piece of cardboard or a bone spatula.

STAMP PORTRAITS.—G. Cooling asks: "Can you tell me if there is anything for printing of midgets and stamp photos? I have heard of a certain prepared paper in a sort of frame to do them off quick. Should be greatly obliged."—Messrs. Seaman & Sons, Chesterfield, supply printing frames for the work. Any paper can be used with them.

SUBSTRATUM—HERMAN WEITZL asks for a good substratum for plates for the wet-collodion process. Let him take the white of one egg, and free it from the germ, and put it into a quart bottle together with a pint and a half of water, a few drops of ammonia, and some small pieces of broken glass. Then shake well for a few minutes and filter through paper. After the glass has been thoroughly cleansed, and still wet, flow over the albumen two or three times and stand up to dry.

COPYRIGHT.—LUX. As the portrait was taken by you in the ordinary way of business, you have no copyright in it. Therefore the owner can send it to your competitor to be enlarged, or anything else done with it that he likes. You cannot prevent him doing so, or the other photographer from doing the work, even if you did register the copyright, because you would be registering what did not belong to you. You were paid for taking the portrait, and that is the end of the transaction so far as you are concerned.

AMATEUR AND PROFESSIONAL.—GRIEVED PROFESSIONAL. So far as we are aware the line has not yet been drawn as to where the amateur ends and the professional begins. If the person referred to is a clerk in a Government department and fills up his spare time in taking local views and supplying prints for sale as a matter of business, we should say he is to all intents and purposes a professional photographer as well as a Government clerk, and that he would not be justified in competing for prizes in purely amateur exhibitions.

CONDUCTING SURFACE.—COMYN writes: "I have a good order for zinc blocks. My client up to the present has had the blocks etched after the photograph is on zinc. He has now protected an arrangement so that by electricity he can do away with the etching and take transfers (unlimited number) from the photo-zinco process, but the coating of the zinc for the photographic basis is a non-conductor of electricity, and he wants a coating which is a good conductor. Can you give me a formula for same? My client mentions that there are blocks prepared with a good conducting coating."—The conducting surface most generally used is plumbago. Apply it with a tolerably soft brush and obtain a good polish the higher the better.

DEFECTIVE PRINTS.—SPOTO asks: "Can you explain the cause of marks on print enclosed? During the last batch or two I have been troubled with prints have more or less of the marks on them. Have not noticed them until mounted and dried. If you can explain the same, I shall be greatly obliged."—We are sorry we cannot, as our correspondent says nothing whatever to guide us to an opinion. We can only say: some fault in the working. From the appearance of the marks we should say that they could be seen before mounting if they were carefully examined.

MOUNTING BOARDS.—PHOTO ENAMELLER says: "Kindly give me your opinion of the enclosed samples of boards for enamelling purposes; or, rather, boards used for backing up enamelled prints. The sample, No. 1, costs me 1*l.* 8*s.* 6*d.* per gross; the sample, No. 2, costs only 5*s.* per gross. For a long time I have used No. 1, but lately have been offered from another firm quality No. 2 at 5*s.* per gross. Do you think No. 2 would answer all right? if so, it would be a great saving of expense, as most of my prints are sent out enamelled."—There is no question whatever that No. 1 is an infinitely better quality than No. 2, which is of a very porous character, and which, we should say, would not answer the purpose so well. However, it is a matter for trial, which we should advise you to make; also, test the cheaper board to see if it is inert for any photograph mounted upon it.

SUN IN STUDIO.—URGENT writes as follows: "Would you be so good as to advise me what to do in the following matter. I have a studio erected in such a position that it will have the sun on the glazed portion nearly all day long. How can I obviate the stream of sunlight from coming in? My idea was to have ground glass, with dark blue or green blinds, also white calico blinds; if this were not sufficient, to have a screen run up the side, and some canvas stretched across. Do you think this would bridge over matters, or what would you advise? This was the only possible aspect that could be got. A reply will oblige."—Ground glass with the blue blinds will, doubtless, get over the difficulty, or thin tracing linen on light wooden frames, that could be easily fixed up when the sun is shining, will also answer very well, and they could be removed when not wanted. Stippling the glass over with starch paste, to which a little whiting has been added, is also a good way of subduing the direct sunlight.

TRAVELLING EXPENSES.—J. S. writes: "Two or three days ago I applied for a situation at Middlesbro', in answer to an advertisement which I saw in your JOURNAL, and a few days after received a telegram, asking me when I could give an interview at Middlesbro'; I replied, saying next day, and went through to advertiser. We had a talk, and it was decided I should write next day to say finally if I would accept the situation. I considered it over night, and then wrote accepting, but got a letter by return, saying it was now filled. I asked for expenses when there, and was told they would be sent with specimens in a day or two. The specimens arrived without the money. As I have repeatedly written for an explanation, and got no answer or acknowledgment of any kind, I would be very pleased if you could tell me if I can legally claim my expenses, as I went through at invitation, and if so should I sue for same? Hoping you will be able to advise me on the matter."—If the promise to send the expenses is in writing, you can, doubtless, recover them through the County Court; but, if only verbally made, we fear the case is different.

AGREEMENT,—INEXPERIENCED writes: "I shall be very much obliged if you can give me advice under the following circumstances. I have taken a year's lease of a studio here, and have an agreement with my landlord, who is a photographer, that he shall tone, mount, &c. all prints of all sizes at a cost of 3*d.* each. I enclose a copy of agreement, in which no mention is made of who shall pay for mounts or postage. By far the larger number of my prints have been cabinets, and I think 3*s.* a dozen a fair price, including the best gold-edged light enamelled and named mounts, and myself paying carriage one way only. But I find he is charging me a penny for each mount as well as postage, making an average charge of over 4*s.* a dozen cabinets. If you have time to consider this, and say if you think it fair, and if not, whether you think it could be fairly adjusted without quarrelling, I should be very grateful. If we must quarrel, have I any means of redress?"—The agreement seems clearly worded: "The prints of all sizes are to be sent to——for toning, mounting, and burnishing at the charge of 3*d.* each." This certainly does not imply that the 3*d.* is to include the mounts, which may be of any size, like the prints; under these circumstances, and those under which the business was taken, we see nothing to complain of.

DEVELOPER—TONING.—PRINTER asks: "1. For what purpose is sulphite of soda added to developer when pyro is used dry? 2. The other day, being out of sulphocyanide of ammonium, I tried the carbonate of soda toning bath, as given in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1897. I did not make it up as given exactly, but added the carbonate of soda dry to the bath after gold had been added. Would this be the cause of the gold being precipitated, as the solution on use became very dirty? Kindly tell me how to rectify this, as some of the prints were a splendid tone, while others were very yellow. The bath worked very slowly. The following is the formula used: Chloride of gold, 2 grains; carbonate of soda, 4 grains; water to make 16 ounces. 3. Would the following proportions constitute a good developer for normal exposures: Pyro, 3 grains (dry); sulphite of soda, 2 drachms of ten per cent. solution; carbonate of soda, 1 drachm of ten per cent. solution; bromide of potassium, 1 grain; water to 1 ounce? If not, please give proportions of each."—In reply: 1. To prevent rapid decomposition of the developer and staining of the developer. 2. In all probability the vessel in which the bath was made was not chemically clean, or possibly contaminated with either sulphocyanide or hyposulphite. 3. Yes.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 2004. Vol. XLV.—SEPTEMBER 30, 1898.

Contents.

PAGE

HE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899 625

X CATHEDRÂ..... 625

N THE ACTION OF LIGHT ON THE SALTS OF COBALT.—IV..... 627

ONING WITH SULPHIDE OF AMMONIUM 628

EADERETTES:—
What is a Silver Print?—Pictures and Processes at the Photographic Exhibition—Chemists and the Foods and Drugs Act—The Coming Weather — Glover's Island—Vesuvius..... 629

OYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION..... 631

EW MEDIA FOR THE PREPARATION OF PHOTOGRAPHIC PRINTING SURFACES, AND THEIR PROPERTIES. By Dr. Leon Lilienfeld 631

OREIGN NEWS AND NOTES:—
Collodio-chloride Paper — Stand Development — International Exhibition at Munich—A New

PAGE

FOREIGN NEWS AND NOTES (*cont.*):—
Lens — New Developing Substances 633

PHOTOGRAPHING A SPIRIT 634

COLOUR PHOTOGRAPHY 635

A NEW TONING METHOD 635

PHOTOGRAPHIC COPYRIGHT UNION... 636

OUR EDITORIAL TABLE:—
The No. 4 Special Bullet Kodak—Catalogue Received 636

NEWS AND NOTES 637

PATENT NEWS 638

MEETINGS OF SOCIETIES:—
Royal Photographic Society—Photographic Club—Borough Polytechnic Photographic Society—Leeds Camera Club 638

FORTHCOMING EXHIBITIONS 638

CORRESPONDENCE:—
"Ortol"—Mr. Barber's Stereoscopics—Slides Lent for the Photographic Convention 639

ANSWERS TO CORRESPONDENTS 640

HE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

E have entered on the preparation of the thirty-eighth issue of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the ALMANAC. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

hose of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the ALMANAC, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

ecretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the ALMANAC will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the ALMANAC are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRÂ.

MR. F. E. IVES has this week returned to the United States for the purpose of introducing his photo-chromoscope to the American public. He hopes frequently to visit England, where his system of colour photography has become so much appreciated that we have little doubt of its achieving success on "the other side."

* * *

REFERENCE to colour photography leads us to reproduce the following items of news on the Sellé process that have been sent us. It appears that a newspaper representative "called upon Major-General Barwell and inspected a number of colour photographs by Dr. Sellé, a German amateur photographer resident at Potsdam, Germany. Major-General Barwell said the discovery took place about six years ago, and the results were exhibited at a *soirée* at the Royal Society some two years ago. Since then the Doctor has been engaged in perfecting it. Within the last few weeks Major-General Barwell had induced Dr. Sellé to visit England, and, in a small studio in Dover-street, to demonstrate the enormous improvements he has made. His results were so satisfactory, although carried out in a very amateurish way without assistance, that the Major-General went to Berlin and saw the photographs taken in London reproduced by Mr. Frische at the rate of one a minute, or, say, 500 per day. In the Major-General's opinion the process has a distinct commercial value, as Herr Frische, the well-known lithographer and art printer, has admitted. The Major-General, on being asked to explain the process, said it was very simple. The photograph was taken with an ordinary camera upon one plate, first through a yellow, then through a red, and lastly through blue glass, they being the three primary colours. The photograph is then upon the plate in natural

colours. In developing the negative, use is made in the same sequence of three baths containing solutions of these three colours, which help to bring out the colours already obtained by the medium of light. For purposes of reproduction, each colour may be printed off separately, and one printed over the other—a process which lays itself open to the charge of imitating the collotype method. This, however, does not affect the fact that the photograph is originally taken in colours on one plate, which preserves all the gradations and shades of colour to be found in nature and art. Among the specimens in Major-General Barwell's possession are colour photographs of pictures, landscapes, persons taken from life, tapestry, gold plate, fruit, and flowers, and some extraordinarily beautiful photographs of butterflies taken from specimens in the collection of Mr. Alfred Rothschild, at his request. There are two chemical secrets connected with the Sellé process—the composition of the original plate to be used, and the nature of the solution employed in developing the negatives. The Major-General said he was convinced that Dr. Sellé has at length solved a problem which is coeval with photography. He contemplates the establishment in England of a small factory for the manufacture of plates, which will be supplied to the order of photographers, the negatives being returned to be developed at the factory." We have reasons for refraining at present from commenting on the foregoing, but the statements tendered and the specimens to which allusion is made are not unfamiliar to us.

* * *

We are informed that, owing to the difficulty which has arisen of procuring a suitable exhibition gallery, the Committee of the Photographic Society of India have decided not to hold an exhibition of photographs in 1889. The Committee have, however, in contemplation a scheme for the construction of a gallery and club-house for the Society, wherein future exhibitions may be annually held, and it is hoped that the new building will be ready for this purpose in the course of next year, and available for an exhibition in the year 1900.

* * *

A considerable amount of interest must attach to Professor J. Emerson Reynolds's remarks upon a particular phase or acetylene illumination. He narrated at the British Association meeting how Mr. Goodwin, testing an indiarubber bag for leakage, blew air into it from his lungs, expelled this air, and then inflated the bag with acetylene. Using this gas afterwards, he noted that it gave an extra bright flame, and did not so readily choke up the burners in the manner too painfully familiar to workers with this gas. Upon investigation, he was led to the conclusion that the specific effects were due to the presence of carbonic acid. His experiments finally resulted in the conclusion that, with the carbon dioxide present in quantities from five to eight per cent., there was a diminution of the tendency of the flame to smoke, and much greater freedom from choking of the burners. It happens that this particular effect of the improvement of acetylene was brought to our notice more than a year ago, but our lips were sealed, as we were informed a patent was about to be taken out when full details were available.

* * *

Professor A. G. Vernon Harcourt has devised another new burner for producing a standard light, and, as it is stated to be easily made, it may turn out to be capable of adoption for photographic purposes. The "Standard Candle" and its deficiencies are too well known to need our dwelling upon them, and a practicable and workable substitute should be of great value, for plate-testing purposes, for example, if in no other photographic field. He exhibited his new standard light at the British Association meeting as the result of many experiments to obtain a ten-candle power light. The illuminant was a mixture of air and pentane supplied from a gas-holder placed about two feet above the burner. Professor Boys spoke of the "absolute justice" of the standard.

* * *

Although the ordinary weighted bulb form of specific gravity indicator is sufficient for every-day photographic practice, there are yet occasions where an instrument of great sensitiveness and exactitude would be of considerable value in photographic operations. The objection to the ordinary hydrometer is that its indications are liable to be incorrect through the varying capillarity of the different liquids it is immersed in. The new hydrometer, as described before the Royal Dublin Society by the Rev. H. O'Toole, is in form somewhat like an ordinary hydrometer, placed in the liquid upside down with a heavy bob at the top of the spindle and both bulbs empty. There is further a flat foot added to the smaller empty bulb representing the mercury bulb. When immersed it floats with foot upwards. To use the instrument, it is placed in any liquid and weights put on the "foot" or dish till it sinks to a marked point between the bulbs. Extra weights are then added till it sinks to a second mark between the foot and nearest bulb. The difference between the two sets of weights is evidently equal to a volume of the liquid, equal to the bulb between the two marked points. The relative volume of any two liquids can thus be calculated with extreme exactitude as there is no surface-tension error through there being two standard points. Further, for all liquids, from the heaviest to the lightest, it is not necessary to have more than two spindles, while, as is well known, the ordinary Twaddle hydrometer needs six for liquids alone heavier than water, and perhaps another six for lighter liquids.

* * *

It has been generally held that light met with absolutely no resistance in passing through a vacuum, but some experiments recently made by Mr. Francke Woodward of New York put an entirely different complexion upon what takes place when a beam of light is passed through an almost perfect vacuum. He used such a vacuum, produced in a glass tube covered with black paper except a circular patch at each end left free for the passage of a beam of light from an oxyhydrogen burner. When this beam left the second opening after passing through the vacuum, its intensity was only one-twentieth of what it was on entering the first aperture. It was found that the more nearly perfect the vacuum the more was the light reduced. In a further experiment cathode rays were sent through and suffered no diminution, thus showing, it is argued, that X rays can penetrate a vacuum when light rays were obstructed. We have no details of the experiment before us; hence, before receiving as a fact the obstructiveness of "vacuum to light radiations," we should like to be assured that every precaution was taken to ensure due measurement of the beam—that, for example, the rays were rendered parallel before they entered the tube, and so on.

ON THE ACTION OF LIGHT ON THE SALTS OF COBALT.

IV.—Experiments with Cobaltic Tartrate.

A solution of cobaltic tartrate was prepared by dissolving precipitated and washed cobaltic hydrate in a moderately strong aqueous solution of tartaric acid by the aid of a gentle heat. Arrowroot-sized paper was then coated with the almost colourless cold solution and dried in the dark. Probably, on account of the hygroscopic properties of the sensitiser, the paper, even after a two days' drying, was still damp to the touch, but this did not seem to interfere with its printing qualities.

A portion of the paper thus sensitised was exposed under a negative in sunshine for one hour. No image having been produced, it was next immersed in an aqueous solution of potassium ferricyanide. This caused it to assume a beautiful violet-pink hue all over, but no image was as yet with certainty discernible. A longer immersion produced a bluish staining at the margins. After washing and drying, the paper turned green. On immersing it next in a solution of potassium nitrite, made alkaline by the addition of a little ammonia, the green colour changed to purple-grey, and the image appeared with distinctness but with no great vigour. Washed, dried, and held before a strong fire, the details became still more apparent, but the colour gradually waned to a very delicate grey. Treated with a gallic-acid developer containing acetate of soda, the print became of a dark slate colour, but the image still remained distinct. On drying, the slate grey changed to a weak bluish-green.

The second experiment was made by exposing a sheet of the sensitised paper to the action of the solar spectrum for a period of thirty minutes. No visible image was impressed, nor was any change apparent when the paper was treated with a solution of potassium nitrite made alkaline with ammonia.

The third experiment was similar to the second, save that an aqueous solution of potassium ferrocyanide was now employed as a developer in place of potassium nitrite. In this case a weak greenish image was produced, cobaltous ferrocyanide being formed in the course of the reaction. The bands of the spectrum were not very well marked in the print, but still sufficiently so to show that the greatest effect was due to the green rays. An action was also apparent in the spaces that had been exposed to the blue and the violet rays.

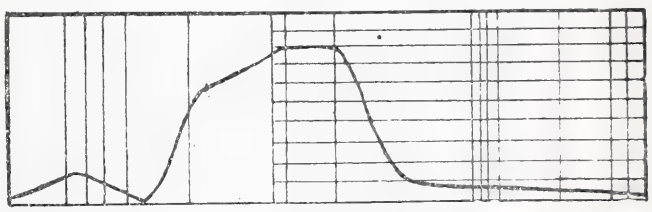
In the fourth experiment the tartrate paper was exposed for ten hours under the spectrum, after which the ferrocyanide developer was again applied. This lengthy exposure, however, had the unfortunate effect of producing a highly granular deposit of the pale green cobaltous ferrocyanide, whereby the details of the image were completely obscured. Transferred without washing to an aqueous solution of mercurous nitrate, the green hue was considerably intensified. At first no traces of the image could be seen; but, on allowing the paper to soak in the solution for upwards of two hours, very faint bands became visible.

Removed to a solution of potassium ferricyanide, the green colour changed to a uniform grey, and all signs of an image were destroyed.

In the next experiment of the series a sheet of the tartrate paper was exposed to the action of the spectrum for a period of no less than twenty-five hours. As, however, no image was visible after this exposure, the print was immersed for a few minutes in an aqueous solution of sodium sulphocyanide. No change could be detected on this treatment, but, on transferring the unwashed sheet to a second bath of the sulphocyanide solution previously acidified by the addition of a few drops of strong nitric acid, an image of an orange-brown hue was obtained almost instantly. The definition of the colour bands of the spectrum as exhibited in the print was far from perfect, for the quality and hue of the deposit were such as to render the task of determining the relative intensities of the rays a very delicate one. The position of the maximum chemical action was, nevertheless, easily pointed out, lying in the region of the green, and stretching with slightly diminished intensity into the space occupied by the yellow wave-lengths. The blue and the orange rays seemed also to have exerted a fair share of actinic influence, but the red, the indigo, and the violet little or none.

The sixth and last experiment with the tartrate was, perhaps, the most satisfactory of the series. The sensitised paper was again exposed for twenty-five hours to the action of the solar spectrum, and thereafter transferred to an aqueous solution of nitrate of lead. Little or no visible change ensued, but, on adding gradually to the contents of the bath a moderately strong solution of mercurous nitrate, a white precipitate was gradually formed in the developing dish, and at the same time a faint brownish-yellow picture made its appearance. By careful development a good photograph of the special tartrate spectrum was obtained, which is represented graphically in fig. 5 of the accompanying diagrams. Here it will be seen

Fig. 5.



Cobaltic Tartrate

that the actinic action is practically confined to the green and the yellow rays, the point of maximum intensity lying in the former. We may also note among the peculiarities of this spectrum the exceedingly weak action of the rays at the more refrangible end, the faint but stronger action of the red, and the curious position of the point of minimum intensity in the seemingly inoperative orange.

From a comparison of the several results above given, the conclusion may, it appears, safely be drawn that cobaltic tartrate is more sensitive to the green rays of the solar spectrum than to those of any other colourific refrangibility. It seems, also, not improbable that the blue and the violet rays may exercise a considerable influence in the earlier stages of the exposure, afterwards represented by a reverse or secondary action, as in the case of the experiments with the citrate described in the second of these articles. Due allowance must, however, be made for variations in the intensity consequent upon the employment of different developers.

It may be mentioned that, on soaking the well-washed print obtained in the last of these experiments in an aqueous solution of yellow or neutral potassium chromate, a precipitate of chrome yellow was instantly formed, showing that the image contained lead among its other constituents. The picture, however, was almost obliterated by this treatment.

Experiments with Cobaltic Gallate.

Cobaltic hydrate is very sparingly soluble in a saturated

aqueous solution of gallic acid, but, by continued boiling, a weak solution may be prepared, with which, whilst still warm, paper may be coated. This is probably the normal cobaltic gallate. Besides this salt, there is another compound of cobalt with gallic acid which possesses a slight degree of sensitiveness to the action of light. This latter may be prepared by digesting cobaltic hydrate in a cold saturated aqueous solution of gallic acid for several days, and then adding fresh gallic acid and water. On the application of heat, the mass will readily dissolve, forming a rich brownish-red solution with a peculiar odour. This solution absorbs the violet, the indigo, and the main portion of the blue rays of the spectrum. On cooling, this curious compound rapidly contracts to an opaque greyish-white gelatinous mass. When the hot solution is spread upon paper, the gallate coagulates almost immediately and becomes sticky, and, on drying, forms whitish flakes, which are very apt to detach themselves from the surface of the paper. In the following experiments with cobaltic gallate this compound will be designated gallate paste with the object of distinguishing it from the salt first mentioned.

A sheet of paper, having been coated with cobaltic gallate solution and dried in the dark, was exposed under a negative in bright sunshine for one hour. A brown image was produced, distinct in its details but somewhat lacking in vigour and density. A second experiment was made on a similarly sensitised sheet of paper, which in its turn was exposed in sunlight for a period of ten hours. A brown image again resulted, but the increase in density as compared with the former print was but slight, and not in proportion to the increase in the exposure. On immersing the half of this print in an aqueous solution of ferrous sulphate with the object of obtaining a stronger image by development, the surface of the paper became of an inky greyish-violet hue all over, and the picture was quite destroyed. The other half was then treated with a weak aqueous solution of platinic chloride, but no perceptible increase in the density of the image resulted.

In the third experiment, paper coated with the gallate solution was exposed for ten hours to the action of the solar spectrum. The print so obtained was, unfortunately, too faint and undecided in its outlines to be represented graphically. The point of maximum intensity could, however, be roughly determined, and was, as in the case of the tartrate, seen to be situated in the green rays. On treating the print with an aqueous solution of sodium sulphocyanide, it assumed an olive-green tint, but the image was thereby blurred beyond recognition.

Two interesting experiments were made with the gelatinous gallate of cobalt. A sheet of paper that had been coated with gallate paste and dried in the dark was exposed under the spectrum for about five hours. A faint brown image was produced, which was somewhat weaker than, but otherwise did not differ materially from, that obtained in the preceding experiment.

In the second case, paper coated with the gallate paste was exposed for twenty-five hours to the action of the spectrum. A brown picture was, as before, impressed at an early stage of the exposure; but the image, faint at best, was gradually weakened by the continued impact of the solar radiations, and was at last quite effaced. This unexpected result served to demonstrate the susceptibility of the gallate to a secondary or reverse action, such as has already been described at length in treating of the photographic properties of the citrate. The sheet bearing the effaced image was, on its removal from the spectrum slide, immersed in an aqueous solution of mercurous nitrate; but, although by this treatment an ochre-yellow surface deposit was instantly obtained, no signs of a fresh image could be discovered beyond some extremely doubtful indications of bands lying in the regions of the blue and the green rays.

TONING WITH SULPHIDE OF AMMONIUM.

The method of toning silver prints with sulphide of ammonium, as referred to at a recent meeting of the London and Provincial, has more than a passing interest for photographers, owing to the strong light it throws upon the question of permanency. Sulphur toning we know to be tabooed on all sides, and even combined gold and sulphur toning, as represented by the combined bath, is looked upon, and perhaps justly, with a good deal of suspicion; and yet here we have a process based purely and simply upon sulphuration in its most open form, which is said to give results that have stood without change for thirty years, and we have no reason to doubt the statement.

To come to the gist of the matter at once, it may be said that it is not the sulphur toning as such that constitutes the dangerous element, but the *complex reaction set up in most* of the sulphur-toning methods—reactions which, far from complete when the toning process is finished, pass on through further stages, which lead to, or end in, the total destruction of the image. It has been said that sulphide of silver is one of the most permanent substances in nature, and so, no doubt, it is when it has reached its definite and final stage. This we take to be the case when a pure silver image is treated with ammonium sulphide, or similar reagents, until no further change can take place; but even here it must be observed the change must be complete, *i.e.*, the whole of the silver must be converted into sulphide, or sufficient of it to produce a depth of colour beyond which it is impossible to go if the tone of the picture is to remain unchangeable.

But, supposing that these latter conditions are not strictly observed—that, in fact, the toning process is arrested at, say, a warm brown or purple colour when it is possible to push it to deep brown or to black—the worst that can happen, though we are not prepared to say that it *will* happen, to such a print is that the colour may slightly change or become darker by lapse of time. If the other conditions to success have been carefully observed, that is, if the print has been thoroughly fixed and washed, there will be no yellowing of the whites, unless, indeed, it proceed from the paper itself, as recently alluded to, and no weakening or bleaching of the lighter tones. The colour of the image will just simply change uniformly to a darker hue. But let us turn to a print toned in, say, the "combined" bath to one of the lovely purple shades so readily obtained by that method. The change that will occur in this case is distinctly one of fading, the first symptoms being the development of a strong yellow tinge throughout the whites of the picture, followed by the gradual bleaching or yellowing of the half-tones, and the disappearance of the finer details and the total loss of the purple tint that constituted the original charm of the print.

This result can scarcely be set down to one single and specific action, but is more probably to be traced to a variety of different causes. The yellowing of the whites must be set down unmistakably to imperfect manipulation, in one form or

another, resulting in the presence of silver and sulphur compounds where such ought to have been entirely removed. Whether the immediate cause be imperfect fixation, insufficient washing, or an inherent fault in the toning process itself, is not for us to discuss here, we merely mention the character of the result to emphasise the difference between it and a properly sulphur-toned print. The change of colour of the image, which by the way, under these circumstances, can scarcely be a *darkening*, may arise from the natural completion of an arrested chemical reaction, or it may be a secondary result of the faulty manipulation already referred to, or both combined. If the toning process be carried to such a stage that an intermediate or indefinite combination of silver and sulphur is formed having a warm purple colour, it is not difficult to imagine the molecules gradually rearranging themselves to form a definite and ultimate compound which may, with tolerable certainty, be expected to differ in colour from the original one. Then, again, if, in contact with such an intermediate compound, even supposing it to be permanency by itself, we have traces of another *decomposing* sulphur compound left in the paper, through carelessness or otherwise, we can scarcely wonder if the, at any rate, *unstable* compound be moved on a step further until it arrives nearer to finality or to a full degree of sulphuration.

To sum up the difference, it may be said that the image toned with sulphide of ammonium consists of pure silver freed from all foreign matter, and subsequently fully converted into sulphide. The very success of the operation at the outset is dependent on the most rigid care in the manipulations, and is, at the same time, a guarantee of permanence. But, in the case of a print toned in the combined or similar bath in which sulphuration forms part of the process, although we do not go so far as to say that permanence is an impossibility, we do say that its attainment is hedged round with so many uncertainties and so many loopholes exist for carelessness in manipulations, while the very composition of such baths is open to serious suspicion, that, granted a successful issue of the toning operation, we have very little guarantee, under the best circumstances, that the original image will be permanent.

We have, for very many years, employed sulphide of ammonium as a toning agent for transparencies—both collodion and gelatine—with the utmost satisfaction, and can secure tones in that manner that are not otherwise obtainable, nor have we ever had the least reason to complain of any want of permanence. On the contrary, we have always looked upon the mere fact of a successful result being achieved as the guarantee of permanence, since, as Mr. Banks pointed out, the sulphides form such a delicate test for slipshod manipulations, that if any carelessness has been permitted the slide is spoilt before finished. This is emphasised by the behaviour of sulphide of ammonium with collodion and gelatine plates respectively, for, whereas with the former it is comparatively easy to get a successful result, with gelatine, owing to the greater difficulty in washing the film, much greater trouble is involved.

The same rule holds good with prints, as we have recently proved in the course of some experiments made since Mr. Banks's remarks were in print. A number of waste albumen prints were washed and fixed, without toning, in the ordinary way; that is to say, they were fixed together in the average bulk of solution and afterwards washed in the ordinary manner without any special precaution. Four or five of them, however, after a slight rinsing, were passed through a second bath of fresh hypo and washed by themselves, the whole of the two lots being simply changed singly from one water to another, being allowed about five minutes in each. After twenty minutes of this treatment one print from each batch was placed in a very dilute solution of sulphide of ammonium—thirty minims to a pint of water—in which the toning proceeded slowly, but regularly. The print to which only ordinary treatment had been meted showed, as might have been expected, a strong tendency to yellowing; but, to our astonishment, the other, even at this early stage of washing, remained, if not perfectly white, so nearly so that we could not decide whether it was actually changed or it was only fancy. At half an hour the doubly fixed prints, however, were apparently perfectly washed, while the others at two hours still showed a slight tendency to yellowness, which, under the circumstances, was perhaps rather attributable to *imperfect fixation* than to insufficient washing.

A similar experiment was made with gelatine prints, but with the difference that, after two hours' washing, the doubly fixed prints showed a stronger tendency to colouration than the albumen prints that had received only ordinary treatment; those that were only fixed once darkened hopelessly in the sulphide solution at two hours, so, instead of increasing the washing, we essayed the use of an eliminator.

This constituted another little object-lesson. Theoretically, the hypo eliminator has been said to be at any rate a guarantee of safety, since, if a print will pass the ordeal of "elimination," it is supposed to be proof there is nothing dangerous present. In the present case the gelatine prints of both batches were treated with two eliminators, alum and persulphate of ammonia, and again well washed. Placed in the sulphide toning bath, they both discoloured quite as badly as the respective samples of either sort not so treated with the eliminator, so that not only is the hypo eliminator, as we have frequently argued, no use as *an eliminator*, but it is not even, as we have hitherto conceded, a respectable safeguard. If it does not, as has been previously supposed, immediately betray any carelessness or want of proper washing, it is still capable of leaving behind sufficient dangerous matter to be immediately exposed by suitable treatment; and, if the rapid action of sulphide of ammonium suffices to bring this exposure about instantly, we think it is pretty certain that the slower action of the atmosphere merely requires sufficient time to bring about a like result.

From an economical point of view, no less than as a ready means of getting uniform and pleasing tones, the sulphide of ammonium method will, no doubt, recommend itself to many amateurs, and, as our experiments tend to show, if proper care be taken, the process of washing need not be at all lengthy or tedious when albumen paper is concerned, but we doubt if it will be found practically workable with gelatine. Moreover, a wider range of tones will, no doubt, be available if Mr. Banks's method be slightly varied by partially, or wholly, bleaching the silver image before treatment with sulphide, as with transparencies at least a great variety of colours can be obtained, under these circumstances, by varying the bleaching agent.

What is a Silver Print?—This question suggests itself, inasmuch as, in the processes mentioned in the catalogue of the exhibits in the Royal Photographic Exhibitions of the last few years, the terms, "bromide," "gelatine-chloride," "collodio-

chloride," "albumen," and "silver" are quoted. Are not all these processes silver processes? During the last two or three years the term "silver print" seems to have become specially applied to prints on albumenised paper, but why? It is probable, when finished, they are less silver pictures than any of the others named, inasmuch as the image is, or ought to be, largely composed of gold, and probably is more largely composed of it than is the case with gelatine papers, though possibly less than in the case of collodio-chloride pictures. In the case of "bromides," and developed prints generally, the image consists entirely of silver, and no gold. Surely it is to them that the term "silver" is strictly applicable, and not to prints the images of which consist of both silver and gold, particularly when the latter predominates, as it ought to do.

Pictures and Processes at the Photographic Exhibition.—As the annual Exhibition of the Royal Photographic Society comes round, it is always interesting to note the processes by which they are produced. Although the numbers by the different processes must not be taken as representing proportionately the processes most in vogue for general work, yet they serve to illustrate what is thought of them for exhibition purposes. The catalogue shows that there are 423 frames on show; last year there were 436, or thirteen more, and for comparative purposes the number may be considered as equal. Now, out of this number, this year there are, out of the processes as given in the catalogue, 163 platinotypes; last year there were 189. Carbon pictures last year were 116; this year 128. Bromides this year are given as 51, and last year as 30. There are 11 by the gum-bichromate process as against only 2 last year, coupled with 3 by the Artigue method. This year there is but one gelatino-chloride print, and but one described as "silver." There are two frames of examples of new processes, "ozotype" and "metaloid." There seems to be but a solitary example of photogravure, and none of any other mechanical process. This is more than a little surprising, seeing the importance that photogravure has now assumed, and the perfection at which it has arrived both here and on the Continent, particularly the latter. The figures just quoted are those of the process given in the catalogue, but there are about a hundred pictures with no reference to the processes by which they were produced. Many of them, it may be assumed, are on the old albumen paper, and others by various processes.

UNFORTUNATELY the proportion of the different processes used for the Exhibition cannot be taken as any criterion whatever of those most employed for commercial photography. For example, out of the nearly 350 named in the catalogue, over 300 are by the two permanent processes, platinum and carbon. Yet we all know that by far the larger proportion of the commercial photographs turned out, even by some of the exhibitors, are not by these methods. The proportion of the pictures as given in the catalogue would seem to indicate that silver printing in its various form was killed. But it is not dead yet, and will not be for a long time to come.

Chemists and the Foods and Drugs Act.—Last week, at the Nottingham Guildhall, two pharmaceutical chemists were proceeded against under the above Act. The Medical Officer of Health wrote prescriptions containing iodide of potassium and syrup of ginger. Upon analysis it was proved that there was ten per cent. short of the iodide. Each of the defendants was fined twenty shillings. When iodide of potassium is required for photographic purposes, it is not advisable to buy it from the local druggist, as it may have been a long time in stock and not properly secured from air in the bottle. It is again noteworthy that the prosecution in the above case was instituted by the authority that looks after the purity of our butter, coffee, and the like, and not by the Pharmaceutical Society, which might be supposed to look after our interests in the matter of drugs.

The Coming Weather.—Forecasts of the weather, as issued by the Meteorological Department, have frequently been commented upon, and it has often been asserted that it is impossible to foretell the weather for more than twenty-four hours in this country. In a letter to the *Standard* of Saturday last, a physician, dating from Colchester, claims to be able "to forecast the rest of each lunar period from the first quarter's weather." As it has frequently been asserted that the moon has no influence whatever on the weather, it will be interesting to note how far the predictions in the present case will be verified. They are given for East Anglia and the South-east Coast: "From September 22 to 29, fair weather t first, with clear, cool nights; moderate winds, west or north-west; some rainfall and cooler weather during the last three or four days. From September 29 to October 7, cloudy or dull at first, rain threatening, probably some showers; clear, cool nights; finer weather afterwards. From October 7 to 15, fine clear weather, but cooler and more windy; no indication of rain; generally a fine lunar period, with probable moderate rainfall about September 26 or 27, and about September 30 or October 1; temperature high for the time of year. We may then expect dry, fine weather, except from September 26 to October 2, when there will be showers." From this prediction we are not to have anything abnormal of autumn weather, supposing it is fulfilled. The forecaster further adds: "(1) that next winter, like the last, will be mild; and (2) that the fall of lambs next spring will be large—*verbum sap.*" We quote the forecast just as it appeared in the *Standard* and wait to see how it comes off, particularly the lambing season.

Glover's Island.—Most of our readers know Glover's Island, though perhaps not by name. It is that little island in the river which so enhances the view from Richmond Hill. For some time past it has been advertised for sale, and it was rumoured in the neighbourhood that an advertising firm had offered something like 5000*l.* for it for advertising purposes. That in such a spot would, of course, be most unsightly, particularly in photographs. The Mayor of Richmond, who is agent for its owner, announced to the Corporation that the owner would dispose of it to the Corporation for the modest sum of 4000*l.* to save it from the unsightly use proposed. The Corporation declined the offer. Some meetings were held, at which were some lively discussions, and it was reported that such terms as "blackmailing," &c., were used. Also a subscription was opened to purchase the island to save it from the suggested desecration, but little was raised. Last week Glover's Island came "under the hammer," the Mayor of Richmond being the auctioneer. An evening contemporary gives an amusing account of the sale, under the heading of "Glover's Island. Only 200*l.* offered, and Richmond's Mayor gets laughed at." It says that the first offer was a "tenner." The next bid was 70*l.*, "the same as Glover gave for it." After some pleading by the auctioneer, 100*l.* was offered; then a bidder said, "I'll give you 200*l.* for it, and present it to Richmond." The Mayor then announced that he would "withdraw it at the reserve of 4000*l.*" Then, says our contemporary, "the people laughed." Since Glover's Island has been in the market, it has been a fruitful topic of "gossip" in Richmond, and it remains to be seen to what purpose it will be put if it finds a purchaser. Although this little piece of ground is private property, we are told that the Thames Conservancy have some control, directly or indirectly, over the purposes to which it may be put, and it is scarcely likely it will permit its disfiguring one of the finest views near London. Probably the Corporation of Richmond are fully aware of this.

Vesuvius.—Again this volcano is in active work, and according to the latest reports is increasing to an alarming extent; and the streams of lava are, as they have been before, threatening the observatory. Verily those who dwell in observatories on mountains, especially volcanic ones, like Vesuvius, do not quite live in clover. The observatories on Vesuvius, Mont Blanc, Ben Nevis, &c., are by no means such comfortable quarters as those at Greenwich, whether for photographic or other purposes.

ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

(First Article.)

Preceded by a private view on Saturday morning last (September 24) and the time honoured *Conversazione* in the evening of the same day, both of which functions struck us as being attended by fewer persons than usual, the Forty-third Annual Exhibition of the Royal Photographic Society was opened to the public on Monday, September 26. The characteristic features of this particular display are summed up in a very few lines. About a thousand photographs were sent in and of these nearly 600 were rejected. Compared with last year, the average size of the exhibits has increased, and the result is that the funereally draped walls at Pall Mall are better filled—look less "skimpy," in fact—than hitherto. The way in which the hanging has been done is very skilful. You get the idea that each panel has been carefully schemed out and the totality of effect is pleasing. We alluded just now to the funereal aspect of the antiquated drapery against which the photographs are hung. Conceive that on the left wall as the visitor enters the gallery there is a preponderance of black-toned photographs in dark wood frames—a "note" which more or less pervades the remainder of the room—and some idea is obtainable of the somewhat depressing aspect which the Exhibition as a whole presents. Indeed, on Monday morning last, we found ourselves almost involuntarily sighing after the good old times of fifteen years ago, when the bright, sparkling, silver print and wide white margin were in favour and the mere rejected print, such as a humble printer and toner at a weekly wage of thirty shillings, would not have dared to show his employer, had not yet become invested with artistic merit. Photographic exhibitions, nowadays, appear largely to exist for the purpose of housing slovenly work. There are some photographs hanging in Pall Mall just now which we should almost disdain to criticise in our weekly Answers to Correspondents columns.

Of the six medals awarded by the Judges, who have performed their office, difficult as of course it is, less satisfactorily than their predecessors for the last three or four years, two go to American Exhibitors. Personally we disagree with some of the awards, but nobody can grudge Mr. G. E. Thompson his medal for one of the most masterly productions of the camera that we have seen; a view of men threshing wheat, in which the effect of bright light on the outlines of the figures is depicted with marvellous realism. So far as we could discover there is no "fake" in this picture—it is pure photographic skill that has produced the effect, and we cordially congratulate the veteran medallist on his well-deserved triumph.

There are about eleven gum-bichromate pictures in the Exhibition; of these, three look like indifferent carbon prints, the remainder are spotty travesties of the photographic printer's art, such as their producers may affect to like, but which cannot possibly make a successful appeal to the sympathies of anybody else. After all that has been written about this process during the past few years, it is noteworthy that it makes very little headway. When the results hanging at Pall Mall are compared with ordinary carbon prints, this is not surprising.

Although it is unquestionably a very fine Exhibition, it offers few points of dissimilarity as compared with its immediate predecessor. Without the introduction of the *outre* or the absurd, it is difficult nowadays to produce photographic work which is very strikingly original. Writing this as we do after three visits to the Exhibition, an analysis of our impressions leaves us convinced that, while in all probability there are not more than six photographs that should have been rejected on account of their obvious poverty of quality, no one production makes itself so conspicuously good—unless we except Mr. Thompson's photograph referred to above—as to deserve an amount of recognition such as used to be bestowed on the picture of the year. This latter phenomenon is nowadays not known at Pall Mall. The levelling-up process, which has been going on at this Exhibition for years, has resulted in the manufacture, so to speak, of a large number of photographers all so near each other in ability that the task of differentiating between them is an exceedingly keen one. In two sections of the Exhibition, the landscape and architecture, this fact is made quite palpable. The influence of a worker such as Mr. Horsley Hinton, who, oddly enough, by no means does himself justice at Pall Mall, the treatment of his pictures with gum or varnish in order, doubtless, to secure shadow transparency, quite marring their effect by giving them a patchy, matt appearance, is manifested in some dozens of pretty landscapes that are hung here, each of which he himself might have produced, each of which is as good as anything he has done. The pupils rival their teacher, in fact. Again, look at the architectural panel. Carefully examining Mr. C. S. Baynton's *Interior of Norwich Cathedral* (No. 255), with all its massiveness of effect and exquisite gradation, we find it hard to say in what respects it excels work by John Stuart, C. H. Oakden, H. W. Bennett, and other masters of this department, which is hung near it. Criticism in such cases is obviously a mere matter of the expenditure of superlatives.

We look forward to the time when the illustrations in the Society's catalogue will either be reproduced in colours or have their tone values correctly translated. Excellent as this year's blocks are, it is apparent at once that they do not do justice to the originals. Notably so is this the case where great delicacy of effect is present in the latter. For example, the portrait head of a little boy by Mr. Harold Baker has a subtle effect of softness which is quite absent from the block, and the tone values of this and many others of the reproduced pictures are entirely lost. This question is well worth the attention of the Society, who, in illustrating the catalogue, obviously desire to make it of educational value, a respect in which at present it is clearly somewhat deficient.

We think there should be some limitation to the practice of the photographer putting his name or initials on a photograph. It is quite conceivable that for pictorial balance a group of letters, or a name in the corner, may have some value, but, when it comes to coloured monograms and hammered metal titles on the frames, the effect is distracting to the student of the photographs, and the intrusive letters have an unfortunate tendency to assert themselves too much. If this feature is not held in check, and some prominent exhibitors will not allow themselves to be persuaded to choose less sombre frames for their photographs, the old Exhibition will drift into the troughs of eccentricity, a departure which can neither do photography nor the Society the least good.

There are no stereoscopic transparencies shown this year, and only seven sets of lantern slides. The show of apparatus is larger than has been sent for some years, but most of it has recently been described in these pages. To the exceptions we shall return next week. We may here mention that surprise seems to be general that Messrs. Adams' very ingenious Tella hand camera should have escaped a medal.

The Judges in the Art Section were: Mr. Harold Baker, Colonel J. Gale, Mr. A. Horsley Hinton, Mr. J. B. B. Wellington, Mr. W. L. Wyllie, A.R.A.; and, in the technical Section, Mr. T. Bolas, Mr. J. Bulbeck, and Mr. Chapman Jones, and, in all, six medals were awarded.

The Medal Pictures.

Mr. W. J. Warren takes his first Pall Mall medal for a series of little views, *London in December* (No. 21). The effect of wintriness is well suggested by the tone and atmosphere of the prints, and we congratulate Mr. Warren on his success. He also has a pretty study of a child in *Meadow Sweet* (No. 14), printed in red carbon, and two other exhibits indicative of his versatility. All the same, we think the award a somewhat lucky one. To Mr. W. A. Fraser, of New York, a medal also goes for a night view, such as Mr. Paul Martin has made fashionable. *A Wet Night—Columbus Circle*, is a vastly clever bit of technical work, and the effect of gaslight in the rain swept streets is most striking. Of Mr. Baynton's picture we have already spoken, and without detracting from its merits we can say that, while it quite deserved distinction, other work is just as good. But Mr. Baynton thoroughly merits his success. He is one of the soundest and ablest workers in Birmingham. Of *Polly* (No. 329), for which Miss Mathilde Weil obtains a medal, we can only say that it is a pleasing portrait of a pleasing-looking little girl. That it won its distinction has caused some surprise. To Mr. G. E. Thompson's *Threshing Wheat* we have already referred. The remaining medal goes to Mr. W. E. Brewerton, for a natural colour result. It is a group of a lobster and some fruit printed in three colours from three negatives taken through screens. The blue print is made upon ferro-prussiate paper, the two other colours being printed by the gum-bichromate process, with transparent colours. The result is thoroughly successful and realistic, but it is probable that such a process may not have a chance of commercial success, although the scientific interest attaching to it is obviously very great. On the whole, while recognising the great difficulty of judging the Exhibition, the destination of some of the medals is open to some criticism.

The remainder of our notes on the Exhibition will appear next week.

NEW MEDIA FOR THE PREPARATION OF PHOTOGRAPHIC PRINTING SURFACES, AND THEIR PROPERTIES.

[From the *Photographische Correspondenz.*]

Until recently but few media have been used in the preparation of photographic papers, namely, collodion, gelatine, egg albumen, a few carbo-hydrates (of which only starch and agar-agar are important) and nitro-glucose. Only the first three of these substances have retained a permanent position in the practice of photography, whilst the latter have received but transitory attention.

It may be assumed as a well-known fact that albumen, collodion, and

gelatine meet with opposition on various grounds, more or less well founded, notwithstanding their undoubted advantages, and, briefly considering these substances as media for photographic printing-out papers, I must remark firstly, that albumen, by reason of its chemical composition and its properties of precipitation, is unsuitable for the preparation of a stable printing surface. It is well known that egg albumen, in neutral or acid solution with silver, produces insoluble amorphous compounds, and herein may be found the cause of the impossibility of making albumen emulsions. Moreover, an unexceptionable method of preparing a sensitised albumenised paper, that will keep, with ammonio-nitrate of silver has not yet been discovered. It is also impossible to use albumen with paper prepared with a substratum, and albumen has thus been supplanted by other media. The numerous experiments I have made for coating baryta paper with albumen, whether fresh or fermented in the Dresden manner, have all failed because the sensitised paper yielded impure measly shadows. The eye of the photographic world has become accustomed to the appearance of the surface of emulsion papers, and, this being dependent upon the baryta substratum, it must be taken as a great disadvantage in regard to the use of albumen. I need not refer to the advantages albumen possesses as a vehicle for silver printing. The richness of the half-tones, the glorious warmth and juiciness of tone, the robustness of texture, are all common knowledge amongst professional photographers.

Passing, secondly, to gelatine, it is only necessary to refer to its solubility as the great drawback attending its use as a photographic support. The solubility of gelatine in lukewarm water causes the films so prepared to swell, and renders work in the warmer months almost intolerable. From time to time remedies have been proposed, but they have been abandoned as illusory. I will refer to two. Alum hardens the film, but has two unpleasant after-effects in relation to sensitiveness, brittleness, tone, and depth of image. Formaldehyde, notwithstanding the universal delight manifested upon its introduction to photography, has also been discarded. Its fearfully unpleasant effects as a powerful reducer are sufficiently known, affecting as it does the strength and porosity of the film, with consequent effects upon tone and brilliancy of image.

Thirdly, as to collodion, a favourite support for printing-out pictures. Its flexibility and the evenness of its tones are almost unapproached; but, on the other hand, it possesses two defects, which often sorely try the patience of the printer; the first of these is the liability to injury of the film, and the second the rapid fading of the image.

These well-known considerations induced me to seek a medium, which should satisfy the ideal requirements of the professional photographer to the fullest extent. I have succeeded in finding two groups of albumens, which appear to possess qualities stamping them as ideal media for substances sensitive to light.

The first are to be found in the large group of albumens soluble in alcohol, and derived from cereals. These albumens were first studied by Von Rittausen, and are divisible into various substances according to their properties.

The most important are vegetable mucilage and vegetable fibrines. Vegetable mucilage is unsuitable for photographic purposes in consequence of its great solubility in water. But the vegetable fibrines, on the other hand, are highly suitable for the manufacture of photographic films. The fibrines fairly resemble albumen in their composition. (On an average they contain C 54·5, H 7·4, N 15·5, O 21·7, S 0·69.) When perfectly dry they are of a horny nature, yellowish colour, and of a tough character. They are insoluble in water, even if boiled with addition of alkalies, acids, and spirits. Strong spirit (eighty-four to ninety per cent.) dissolves them readily, and the solutions may be concentrated to the consistency of oil without much precipitation. Ten to fifteen per cent. solutions in ninety per cent. alcohol retain their clear condition for a considerable length of time. If several drops are poured upon a clean glass plate, and spread over its surface by rocking until a homogeneous fluid coating is obtained, after it has been allowed to dry for a few hours in a perfectly horizontal position, the dry mass may be stripped off with the aid of a sharp instrument, and will be found in the form of an almost colourless pellicle. These films are exceptionally strong, pliable, and elastic, and they may be made of almost any size free from fissures and pores. This property, combined with insolubility in water, led me to think of using vegetable fibrines in photography for the preparation of sensitive films. The alcoholic solutions of vegetable fibrines being free from liability to precipitation by silver nitrate, which may easily be proved, and as any desired amount of the salt may be added, I was soon able to prepare a serviceable emulsion.

The method I adopted for the preparation of a printing-out emulsion from vegetable fibrine corresponds largely with the usual composition of a collodion emulsion. But after a time I was convinced that paper coated with such emulsions suffered from two defects. In the first place, the slight keeping quality renders the paper almost useless for commercial purposes, notwithstanding the usual addition of citric acid. I examined this circumstance thoroughly, and soon discovered that the particles of vegetable fibrine contained a reducer, probably in the form of prosthetic carbo-hydrate groups. Without doubt this circumstance is the cause of the poor keeping quality of fibrine papers. I avoided this defect by separating the carbo-hydrate group by means which I need not here particularise, and using the remaining product for my emulsion. The second defect was also dependent upon the chemical property of the fibrine. Fibrine which has been kept a long time in the dry state becomes insoluble, and freshly prepared fibrine differs from old very considerably by its solubility. Fibrine, in the photographic film, seems to behave in the same manner. It becomes horny with age, and impervious to fluids. This gives rise to slow and unequal toning when prints have been made upon old paper. By the addition of acetic acid to the emulsion I have succeeded in giving the film great porosity, and by this means I have entirely removed the said defect.

At first I had much difficulty in preparing the primary material, as it was necessary to use large quantities of flour to obtain comparatively small quantities of fibrine; but, in course of time, I discovered a new method, which simplifies the production of the fibrine and augments the yield.

I will now pass on to the second class of substances which I have made available for photography, and of which I am the sole discoverer.

These substances also belong to the large group of albumens, and do not present themselves in the fibres or sap in the free state, but in combination with a substance containing phosphorus. Substances in which albumen is combined with groups of atoms of another kind are called proteids, and the group of atoms attached to albumen is called the prosthetic group. According to the chemical nature of the prosthetic group the proteids divide themselves into chromo-proteids, in which the prosthetic group represents a dye; glyco-proteids, which contain a carbohydrate as prosthetic group; and the nucleo-proteids, whose prosthetic group is an acid containing phosphorus, nucleine acid. The last class of substances is that which interests us, and, to facilitate comprehension of the following remarks, I add a few words in explanation of the constitution of the nucleo-proteids in general. The nucleo-proteids are divisible into two sub-groups according to the chemical nature of the nucleine acid, viz., the true nucleo-proteids and the paranucleo-proteids, or, as Hammarsten has called them, nucleo-albumens. The reason for this division is that the nucleine acid of the first gives, as products of decomposition, the so-called alloxure bases from the uric acid group, adenine, hypoxanthine, guanine and xanthine, when heated with mineral acids. In the second case the uric acid does not contain these bases in its group of atoms. The following table fully elucidates the relation of the nucleo-proteids to the paranucleo-proteids:—

Nucleo-proteid, treated with acid in the cold state, decomposes into

- Albumen.
- Nucleine, Treated with alkalies and alkaline earths, decomposes into
  - Albumen.
  - Neucleine acid, Heated with mineral acids, decomposes into
    - Phosphoric acid.
    - Alloxure bases (Xanthine, hypoxanthine, guanine, adenine).
      - Thymine.
      - Cystosine.

Paranucleo-proteid, treated with acid, decomposes into

- Albumen.
- Paranucleine, Treated with alkalies,
  - Albumen.
  - Paranucleine acid. Heated with mineral acids, decomposes into phosphoric acid and other unknown products of decomposition, but without any alloxure bases.

In the first rank of the nucelo-proteids may be placed nucleo-histon which was discovered by me in lymph glands, and which is largely distributed throughout the animal kingdom. It also includes the nucleo-proteid of yeast, &c. To the paranucleo-proteids belong vitelline, of the yoke of egg; ichthuline, of fish roe; caseine, of milk; legumine, of peas and beans, &c.

The substance which I have discovered and made available for photographic purposes can only be obtained from the paranueleo-proteids, consequently from the albumens containing phosphorus and free from alloxure bases. The process of preparation depends upon the decomposition of the highly composite group of atoms by means of strong alkalies. Whilst treatment of the true nucleo-proteids with strong alkalies results in the solution of the nucleine acid, which can be precipitated with hydrochloric acid after the removal of the albumen with acetic acid or metallic salts, precisely the contrary takes place when the paranucleo-proteids are decomposed with alkalies. The group of atoms containing phosphorus remains undissolved, and, upon neutralising the filtered solution, a precipitate of albumen soluble in alcohol is formed, for which I have selected the name protalbine. This substance possesses the following characteristics: It has a slimy consistency, when in the fresh state, containing water; a white colour; and a bright, silky appear ance when stirred. Upon removal of the water with alcohol, followed by ether, and subsequent drying *in vacuo* over sulphuric acid, a white, friable powdery substance is obtained. This is soluble at ordinary temperatures in seventy to eighty per cent. alcohol. The solubility is considerably increased by heat. Saturated solutions thus prepared precipitate a considerable quantity of the substance upon cooling. Absolute alcohol precipitates the substance in flakes from the cold solution.

Protalbine behaves very differently from fibrine in the presence of water. Although insoluble in cold water, it may be brought to a turbid, slimy fluid in warm water, and this milky emulsion, after long cooking, will remain in the same condition for weeks.

The alcoholic solution of protalbine when dried upon smooth surfaces will also produce thin, transparent, pliable, highly lustrous films.

Protalbine does not give any precipitate with soluble silver salts, and this property, combined with those just mentioned, renders it fit in a high degree for photographic purposes.

It is thus evident that protalbine, by a rather thorough chemical treatment, may be made to agree in a large measure with vegetable fibrine. This fact is of importance, because printing-out emulsions made with both substances are almost identical in their properties, they present the same appearance when coated on paper, and are scarcely distinguishable one from the other.

If I enumerate the qualities of such a protalbine paper, it is characterised firstly by exceptional robustness of film to a surprising degree. The photographic surface is not affected in the least by hot or cold water, neither by rubbing with the fingers, nor by an edged object. There is no swelling and no chance of abrasion. The film is also very pliable and elastic, so that the prints may be used unmounted with an exceptionally brilliant surface.

The finished print is remarkably brilliant. The shadows are exceptionally fine and the high lights are very pure. The general appearance of the image is soft, and the tone warm and juicy. The image is entirely on the surface, by which means increased relief is obtained.

Toning is equal and rapid. The bath I have used and tested consists of sulphocyanide of ammonium and gold without any other addition. The quantity of gold used in toning is absolutely normal.

I have already mentioned that I had to contend with great difficulties in respect to keeping quality. By getting rid of the reducing group of atoms, I have succeeded in raising the keeping quality of protalbine paper to such an extent that it is unsurpassed in this respect by any other emulsion paper. Protalbine paper may now be kept for months in the unprinted state.

The sensitiveness of protalbine paper, which at first was less than that of other emulsion papers, has been so far improved that it is now quite as rapid as any of the usual collodion emulsion papers. This I have proved by very careful tests with the sensitometer.

As a very important recommendation may be mentioned the permanence of prints made upon protalbine paper. My experience with it now extends to sixteen months. During the whole of this time I have had protalbine prints exposed to full sunlight, and I have left them in moist and damp places until the paper support has, in some instances, become rotten, but I have not found any alteration in the image. Neither the high lights nor the shadows have suffered, and a print exposed to the sun for fourteen months still presents the same appearance as when first made.

Although I do not close my eyes to the fact that protalbine paper is still capable of many improvements, for such is necessarily the case with a new invention, I can say, with strict impartiality, that the albumens soluble in alcohol present a medium indicating an important advance in photography, which, in the course of time, will assuredly find important uses in every branch of photographic work.

DR. LEON LILIENFELD.

FOREIGN NEWS AND NOTES.

Collodio-chloride Paper.—Hanneke, in a recently published book, *Das Celloidin Papier*, recommends the following formula for a print-out collodio-chloride paper:—

1.

Celloidine collodion (four per cent.)	650 parts.
Absolute ether	100 „

2.

Silver nitrate	24 parts.
Distilled water	25 „
Absolute alcohol (ninety-nine per cent.)	130 „

3.

Lithium chloride (crystal)	3 parts.
Citric acid	5 „
Distilled water	10 „
Absolute alcohol	70 „

4.

Castor oil	10 parts.
Glycerine	10 „
Absolute alcohol	20 „

Mix the solutions in the above order, and filter through wash-leather.

Stand Development.—For this kind of development Herr Rudolph Schlatter recommends the following, and states that, in the concentrated form, it makes a very good and clean working developer for ordinary work:—

Sodium sulphite	50 parts.
Hydroquinone	6 „
Metol	4 „
Potassium ferrocyanide	25 „
„ bromide	0·5 „
„ carbonate	100 „

For stand development dilute 1 part of the above with 50 parts of water.

International Exhibition at Munich.—An International Exhibition of Artistic Photography will be held at Munich from November 19 to December 31. There will be no medals or diplomas, but pictures may be sold. All pictures must be framed and bear the name and address of exhibitor. An illustrated catalogue will be prepared, and the latest date for receiving pictures is November 5. Full particulars may be obtained from Herr Mathies-Masuren, 7a, Wilhelmstrasse, Münich.

A New Lens.—M. Berthiot, the well-known optician of Paris, has constructed a new "satz," or casket of wide-angle lenses. It contains four single lenses, composed of three elements that have 24, 24, 31, and 39 cm. foci respectively, and can be used as single lenses, or combined they give 12, 16, 16, and 17·5 cm. foci lenses. On the authority of Dr. C. Fabre, the author of the well-known *Traité Encyclopédique de Photographie*, the doublets will include an angle of more than 100° without spherical aberration.

New Developing Substances.—Herr E. Votocek, of Prague, points out that it appears that all primary hydrazines, whether obtained from the fatty or aromatic series, possess developing powers, and that it is utterly indifferent whether they are substituted by more or less acid groups. It was also proved that slightly basic hydrazines possess developing properties. Tolyl-hydrazine CH_3-$NHNH_2$ and asymmetric diphenyl-hydrazine $\begin{matrix}C_6H_5\\C_6H_5\end{matrix}\!\!>\!N-NH_2$ and α and β naphthol hydrazine $C_{10}H_7NH-NH_2$ will also develop. Carbamide, $CO(NH_2)_2$, has no developing power, but amido-carbamide, $CO(NH_2)_2NH$, has, and guanidine does not develop, whilst amido-

guanidine, $C3NH_2NH$, will. Herr Votocek's experiments prove generally that compounds which contain the hydrazine group possess developing properties and that even hydrazo-benzole which may be considered asymmetric diphenyl-diamine possesses weak developing power. He also found that the sulpho group exerted no prejudicial action, and this is of importance, as most of the hydrazines are insoluble in water, whilst the corresponding sulphonic acids form salts readily soluble in water. The application of these to photographic work was not fully investigated but samples were handed to the K.K. Lehr und Versuchanstalt of Vienna for investigation.

PHOTOGRAPHING A SPIRIT.

Some interesting, if not wholly satisfying, letters have appeared in our contemporary, the *English Mechanic*, in regard to the photograph recently alluded to by "F. R. A. S." (the well-known contributor to that journal), which contained the portrait of a gentleman not visible when the exposure was made. We reproduce some of these letters, as showing how wide is the field of conjecture and theory opened up by a matter of this kind.

"With regard to what 'F. R .A. S.' tells us under this heading, I should like to ask him how long the plate on which the photograph was taken had been in the dark slide, and if it were quite certain that it had not previously been used to take the deceased gentleman's portrait. I do not believe in spiritual appearances, and, even if I did, I should think it very strange that the vision should have been able to excite the actinic rays necessary for portraiture when it was absolutely invisible to the eyesight. Laurence B. Tappenden."

"Three lines of inquiry might be followed for the solution of the difficulty if there were sufficient data. One would be purely from the photographic point of view. Another would depend upon a rigid cross-examination of the testimony of the history of the photograph. Thirdly, an examination into the origin of the particular interpretation assigned to the photograph by 'F. R. A. S.,' in which suggestion may play an important part. I do not, of course, mean that 'F. R. A. S.' may have been mesmerised. In my own case, who am somewhat short-sighted, I usually accept the interpretation of any friend who may be with me as regards distant objects; that is, their suggestion once made is apparently to me frequently verified by my own observation afterwards—found to be erroneous sometimes. I need scarcely remind a man with the general knowledge of 'F. R. A. S.' that the interpretation of our sensations plays as important a part in the formation of our perceptions as the sensations themselves. Hume's formula applies here as in all such cases.
"W. C. E."

"To attempt to account for this phenomenon, I note that the ladies did not see the supposed spirit; but the sensitised plate did, and reproduced it. There was a book published in 1863, entitled *Nature's Secrets; or, Psychometric Researches*, by Wm. Denton and Mrs. Elizabeth Denton. The latter was a sensitive, and, by applying any object to her forehead, had a vision of any one or more who had been connected with that object. Mr. Denton gives many instances of her great powers in this way, and shows the truthfulness of her visions. The result of it all goes to prove that all matter is capable of receiving, retaining, and giving off to a sensitive the history and *simulacra* of all who have been connected with it. As I take it, the place of the sensitive (Mrs. Denton) is here supplied by the sensitised photographic plate, and simply gives what had been impressed on the chair by its continual occupation by the deceased nobleman. W. A. A."

"Why not entertain as rational the simple explanation that the plate revealed a figure resembling the deceased nobleman sitting in his armchair, because he was actually seated there at the time the photograph was taken. A photograph of starry space seems to reveal more than is visible to the telescopic eye, and it is evident that the naked eye cannot detect everything that is close. The photographic process may do the same under some circumstances for things close as it is known to do for things remote. Being neither photographer nor chemist, I cannot pretend to say how.

"Why should the two ladies have been shocked and stupefied at all? And why should the narrator of a 'quasi ghost-story,' that he can apparently verify, so resolutely shut his mind to the possibility of nature being more comprehensive than his philosophy? There is no need to call in the supernatural. If there are ghosts, they, doubtless, belong to a province of nature that man has glimpsed, not mastered, and therefore knows very little about. But, inasmuch as he is perpetually finding something in nature that he did not know before, is it not really more irrational to assume such things are not as to assume that they may be, in the face of much evidence in their favour? L. C. Grubbe."

"Your valued correspondent, 'F. R. A. S.,' as a practical photographer, has, no doubt, considered many hypotheses to account for the abnormal negative he speaks of, and rejected them for various reasons. Now, had he given one or two attendant circumstances which caused these rejections, he would have saved himself some trouble, as well as prevented you, Sir, being deluged with correspondence of less than no value. To enable outsiders to form theories which will, at least, not be absurd, will he condescend to reply to the following:—1. Were either of the sisters in the house before Lord X. took ill? 2. Had either previously photographed the room? 3. Were the plates or films used from a newly bought batch, or did they belong to some one in the house who practised photography? 4. Does anything *show through* any part of the figure, or a double image of anything in the room show? 5. Were the plates used manufactured by a professional maker? Lastly, how was the room lighted? If 'F. R. A. S' hasn't the above data, he can neither be expected, nor expect outsiders, to solve the mystery. Agnostic."

"Your correspondent (41461) is, of course, aware that the photograph he refers to could easily have been made by a willing operator. Here, however, we have to deal with it as produced by a lady who had no thought or wish of creating anything of the kind.

"If the negative exists, a lantern plate should be made from it, and the picture thrown upon a large screen, when the mystery will, in all probability, clear itself up.

"A possible solution is that the plate which was used for photographing the room was one which had been long in the dark slide, and had been previously exposed on Lord X., but had been omitted to be developed at the time and quite forgotten. The long exposure necessary to be given for the interior of the room would obliterate all dim objects and dark background in the original exposure, leaving only the high lights the figure) showing.

"A pure coincidence must account for the figure being superimposed on the chair, and very probably, when the picture is seen on the lantern screen, the figure will not appear *exactly* in the position it should occupy if really *in* the chair.

"Is the figure precisely in the same focus as its surroundings, and is it lighted in the same way as a figure would be if sitting in the chair? I possess several examples of 'spirit' photography which I made some years ago. They do not lend themselves well to reproduction; but, if your correspondent cares to see them and will write me, he is very welcome. S. H. R. Salmon."

"The letter of 'F. R. A. S.' at any rate shows the fairness of the writer, who might otherwise have been led to keep the matter dark, which his well-known views on ghosts, and miracles, and spiritualities would naturally suggest. Some one has, I believe, remarked that it was only an ass who thought he saw a certain angel; but events proved that the ass was right. A photograph has revealed, I believe, the existence of stars that not even an ass can see; but they were there, or they could not have recorded their image; and the *form* was in the chair, or it could not have thus exhibited itself; but of what nature such form was is a question only to be solved by experiment. What suggests itself to my own mind is this: Photograph (snap-shot would probably be the best) the chair in which *paterfamilias* used to sit as quickly after his death as possible, or the bed in which he lay and in which he died as soon as possible after his removal, and see the result. Probably, if taken up in a scientific manner, very many of such photographs could be obtained, and the results compared together. I have long hoped that 'F. R. A. S.' or some equally reliable opponent of such phenomena would meet with a case in which the facts were undeniable, because it gives the only chance of fair investigation. The X rays have opened up a new field of research, and who can say what 'things unseen' may not yet be rendered visible?
"O. J. L."

"What was the exact appearance of the figure? Was it shadowy, or did it merely resemble the ill-defined image of an ordinary object?

"As regards the fading of the left side, was there anything peculiar to notice, such as an abrupt transition from the definite to the indefinite? What is the general character of the photograph, and have ordinary objects come out well? Had the lady ever photographed Lord X. before?

"To attempt a physical explanation seems almost impossible, but the following idea seems to me rather significant.

"We know that if a plate, contained in a cardboard box, has been exposed to the Röntgen rays for the purpose of securing an impression of various objects placed between tube and box, when a second (unexposed) plate is substituted, the objects removed, and the box and contents left entirely alone for some time, a second impression of the objects, which were formerly subjected to the X rays, but have now been removed, can be obtained, apparently by a kind of fluorescence.

"If by any chance the lady had employed the same dark slide to contain the plates which were used to photograph Lord X. (if she ever did so), and subsequently the library, an image of the nobleman might have been produced on the second plate, by some such means as in the instance above."

"I have consulted a practical photographer as to whether a closed camera on a shelf, that chanced to be directed on a person in a chair for any length of time, could possibly affect a sensitive plate which was in position in the camera if the cap on the lens were thinner than usual—say, of green cardboard, or some slightly actinic substance—such being, as it appeared to my mind, a possible solution of the mystery. He says that the least movement of the sitter would cause only an indistinct blur. I see a multitude of questions already awaiting answer, or I would ask, Was the camera kept in the study? Although I believe the result would

be *nil*, I should vastly like my previous suggestion of experiment carried out, because it is certain that, if it had been suggested to 'F. R. A. S.' that a photograph of the chair would have resulted, as it actually did, he would have ridiculed it greatly. Ten years ago the possibility of the X rays would have been ridiculed. O. J. L."

"It seems to me to require a considerable stretch of imagination to recognise in the blemish which appears over the armchair a likeness to any one, though there is a resemblance to an arm and hand on the right side.

"No doubt, the fact that the blemish appears on the armchair that Lord X. was accustomed to use suggested the idea that the indistinct figure was his; but does 'F. R. A. S.' think, if he had not heard the history of the photograph before seeing it, he would have recognised in the blemish the portrait of some one, or would he not have taken it for an accidental blemish due to a faulty plate?

"I have heard different opinions expressed by people who have seen this photograph, but most of them expressed the opinion that, though the blemish may in this case have some resemblance to Lord X., yet, if they had seen the same figure in any other photograph, they should not have seen anything remarkable in it, or have recognised in it the figure of a man. E."

To some of the foregoing criticisms "F. R. A. S." makes the following reply:—

"The story I told about the inexplicable appearance upon the photograph taken by Lady Z. has not, I am afraid, elicited much that is explanatory from the somewhat numerous contributors who notice it this week, so that I have at present but little to add to what I said on p. 92. *Imprimis*, if Mr. Tappenden (letter 41,506, p. 116) could see the photograph, he would at once dismiss his hypothesis from his mind. It is a very large one of a very large room, and the chair in which the mysterious image is visible is in the left-hand corner of it, and is a relatively small object. Photographers put their sitters in the *middle* of the picture, and make their images bear some consistent relation with the size of the plate. 'W. C. E.,' who writes the next letter, may rest assured that the interpretation of the personality of the (partial) figure in the chair is not mine, but that of the own daughters of the man whose *simulacrum* it is alleged to be. 'Agnostic' (letter 41,510) puts a string of questions, some of which I can answer, and others to which I can give no very definite reply. 1. The sisters had lived in the house for a long time. 2. No, they had *not* previously photographed the room. It was only when they were leaving it for good and all that they thought that they should like a memento of the scene of much past happiness. 3. The plate belonged to the lady who took the photograph. 4. The chair shows more or less through the left hand moiety of the figure, and no legs are visible, the chair front being perfectly distinct there. Had any one sat down in the chair for a trick, his legs must have been distinctly visible. 5. I do not know the makers of the plates, but it is pretty safe to believe that they were purchased in a batch, by the dozen or so. Finally, the room was lighted by brilliant sunshine. I can only repeat to Mr. Salmon (letter 41,511) what I have said above to Mr. Tappenden, that if he could see the picture he would at once dismiss from his mind all idea of the plate having been previously exposed. The figure is dark and shadowy, while parts of the chair are well lighted. I have myself seen many so-called 'spirit photographs,' but the imposture and the mode of its perpetration were at once visible on inspection."

A correspondent writes us on the subject:—

"Being also a disbeliever in ghosts, I beg to offer a very simple explanation of the mystery. It is, that the young lady used a negative which had been previously used to photograph her grandfather, and had not been developed!"

"Hussar," another correspondent, also writes: "*Apropos* of the story of the appearance of the ghost of Lord X. on the negative, as set forth in your issue of last week, I remember another case of something the same kind was related in a photographic journal which I came across when I was in India some eleven years ago. Two amateur photographers were taking views of the river near Ipswich, and, on developing one of the plates, there was the figure of a dead woman floating in the water. This was shown to the local dealer in photographic materials, who informed the police. Search was carefully made on that part of the river, but without finding any one. Three months after, a woman does actually drown herself at the spot. Having relations at the time living at Ipswich, I inquired as to the truth of the matter, and was informed that the story was substantially true. Perhaps some of your readers residing at Ipswich may remember the tale. Nearly every virtue possible has been attributed by plate-makers to their plates, *vide* advertisements, but I don't think second sight is one, and it certainly should take the cake if any one is successful in manufacturing it."

COLOUR PHOTOGRAPHY.

The following appeared in the *Daily Mail* of Tuesday last:—

Of inventors who claim to have solved the problem of colour photography there is apparently no end.

Since the statement was published a few days ago that a Mr. McDonough, of Chicago, had achieved success, a *Daily Mail* representative has seen a New York gentleman, who came to England last year with the intention of introducing the late Mr. McDonough's process to this country. He is one of a wealthy syndicate which had financed the Chicago inventor for fifteen years. Before proceeding to business, however, he was induced by a friend to visit Newquay, in Cornwall, for the purpose of seeing John Wallace Bennetto's productions in this art.

The result of this visit was the abandoning of McDonough's process, and the purchase of the New York, New Jersey, and New England rights in Bennetto's process for the sum of 50,000*l.* and certain royalties.

The *Daily Mail* representative has been to Cornwall and has found the inventor of the latest process in his out-of-the-world retreat.

Mr. Bennetto is a quiet, unassuming Cornishman. He has the appearance of an artist, and has little of the exaggerated enthusiasm of the typical inventor. His whole work and life are bound up in his invention, which has taken him eight years to perfect. His eye kindles as he shows the perfectly and delicately coloured pictures which he has reproduced so true to nature.

In answer to the representative's question, Mr Bennetto said:—

"My negatives are now taken in a special camera. The picture is obtained in the usual way, by uncovering the lens. Only one exposure is necessary, which varies from three and a half seconds upwards. The negative is then printed in a special frame upon prepared material. It can be printed by daylight or by electric light.

"After printing, the picture is subjected to a further process; but the whole special treatment takes less time than in the case of an ordinary silver print, and the results are permanent. The finished print, or transparency, may be obtained on glass or celluloid."

In answer to the question whether the great army of amateur photographers would be able to work in colours, Mr. Bennetto said they will have no difficulty whatever in doing so. His process is perfectly simple, and as easily manipulated as an ordinary silver print, while the expense will barely exceed that of taking monochromes.

To those who do not care to go to the expense of a special camera, there is a simple apparatus made, which may be fitted to any ordinary camera, which will enable colour photographs to be taken at will. Pictures up to twenty-four inches can be taken direct from nature.

The representative was shown an album containing numerous portraits, landscapes, and seascapes. The pictures were printed on transparent films, which, however, could be perfectly seen without actually holding them up to the light. The effect was marvellous, every tint of nature, however delicate, being faithfully reproduced in its natural purity of colour. The effect of these transparencies, when thrown from a magic lantern on to a white sheet, was exceptionally fine. Several sunrise scenes, with the rugged Cornish coast in the foreground and the open sea behind, were literally gorgeous. No gradation of colour is too subtle for reproduction.

Mr. Bennetto's work is not a photograph, as the term is recognised. There is a total absence of monochrome—only a mass of pure colour. The result resembles a mirror held up to nature.

When asked whether his pictures were colour photographs as opposed to coloured photographs, Mr. Bennetto maintained that his were colour photographs pure and simple, composed entirely of colour and containing no monochrome in them other than that which forms part of the subject picture.

A NEW TONING METHOD.

Before the London and Provincial Photographic Association, on September 22 (Mr. Robert Beckett in the chair), Mr. W. J. Hodges passed round some P.O.P. prints toned with platinum, and matted upon ground glass. The depth of printing was just about the same as for gold toning. The tones being somewhat admired, the formula was given as follows: Chloroplatinite of potash, 2 grains; chrome alum, 50 grains; water, 20 ounces.

Mr. A. L. Henderson prefaced his description of the method of toning he had worked out, dispensing with sulphocyanide, by reading a letter from Mr. Wicks, of Brighton, who had experimented with the method, both in Mr. Henderson's presence and on his own account. This letter confirmed the experiences of Mr. Henderson, and verified the results obtained when working in company. The method in question involved the use of soda formate, and the formula may be compounded either for combined toning and fixing, or for toning and fixing separately in the more usual way. The whites of the print are unaffected, and there is an entire absence of the double tones which were stated to be characteristic of the sulphocyanide bath. In passing round specimen prints, showing the capabilities of the method, Mr. Henderson spoke to the effect that the action of formic acid and formates was to reduce gold and silver, so that theoretically it was a substance likely to be useful in toning operations. The proportion of formate was placed at 20 grains to about 1 grain of gold and 10 ounces of water. The prints are best immersed in salted water followed by a slight washing in plain water (although the latter course had been found to be unnecessary), and transferred to the toning bath. Fixing is done in a ten per cent. hypo-sulphite solution, in which there occurs a slight yellowing, which, however, disappears. The method had proved successful, so far, with Lumière's "Cytos" paper and Wellington's paper. A modification sub-

stituting platinum was described. Bichloride of platinum, in the same proportion as the gold, was tried, also as a combined and a separate bath, and very beautiful tones were the result, the black tone existing prior to fixing changing to a chocolate brown when the print was fixed. Platinum and gold together were likewise used, and prints so toned were exhibited. Mr. Henderson considered sulphocyanide toning as an unscientific process. In a pint of toning solution containing, say, thirty grains of sulphocyanide, the first print put in is partly fixed as well as toned. Upon the next print the effect is different, the solution being weakened, and so on; how, then, could uniformity be assured? The toning bath should be such as to fix and tone right away, or it must have no fixing properties at all. To return to the subject, he found that, in the case of the gold bath, it was better that the gold should be neutral or slightly tending to alkalinity, whereas for platinum-toning the opposite was the case. It must be slightly acid, to procure which formic acid was recommended.

Mr. A. Haddon showed four prints, two being platinum-toned and two gold-toned. In the case of the gold bath the formate of soda was neutral; for the platinum it was acidified with formic acid. The gold bath was composed of 1 grain of gold, 15 grains of formate, and 10 ounces of water. The platinum bath had 30 grains of formate, and 6 to 8 drops of formic acid to the same quantity of water. Mr. Haddon steeped the prints in a dilute solution of sodium chloride, and thence placed them direct into the platinum or gold bath unwashed. The reason he advanced for this was that, unless the salt was thoroughly cleared out by washing, there might be a tendency, where it remained, to retard the action of the toning bath and produce unequal toning, which might be ascribed to the toning bath. This was obviated by taking the saturated print direct from the salt water to the toning bath. There was absolute freedom from double toning by either method, and he noticed no difference between gold and platinum-toned prints. The method gave a greater range of colour than did the sulphocyanide baths.

Mr. Henderson added that, in doing away with sulphocyanide, one removed that which had a great softening and mischievous influence on the gelatine of the print. Something of a hardening nature was wanted, and this formate had nothing of the dissolving effect possessed by the sulphocyanide.

Mr. W. D. Welford enumerated various preventives of double toning—a slight trace of chloro-platinite in the toning bath, immersion in salted water, toning with gold and platinum together, both being of full strength. Personally he never used sulphocyanide, but baths containing phosphate, acetate, borax, &c.

Mr. H. S. Starnes described a means of rapidly depositing gold upon prints, a method quite free from double action. The solution is very concentrated, and is made as follows: Fifteen grains of sulphocyanide of ammonium are dissolved in an ounce of water, to which is then added 1 drachm of gold solution (1 grain to the drachm), followed by a few drops of bicarbonate of soda (ten per cent.) until the solution clears. This is applied by a brush to the print straight from the frame, ten seconds sufficing for complete toning, and the last drop acts as rapidly and efficiently as the first. For variations in colour, use would have to be made of different emulsions or brands, and three prints of different colour from the same negative were shown.

Mr. Welford claimed some share of the origination of this method, except that he used no brush, and claimed for it absence of double tones. In place of sulphocyanide he used phosphate, acetate, borax, &c., the proportions being 4 grains of gold to 4 ounces of water, with 40 grains of whatever salt he was using.

PHOTOGRAPHIC COPYRIGHT UNION.

The Annual Meeting of the members of the Photographic Copyright Union was held on Monday evening last, September 26, at the St. James's Restaurant. Mr. Frank Bishop occupied the chair, and was supported by Mr. J. J. Elliott, Mr. J. Lillie Mitchell, Mr. Gambier Bolton, Mr. Alfred Ellis, Mr. W. Grove, Mr. Downey, Mr. H. Walter Barnsett, Mr. F. G. O. Stuart, and others.

The following report of the Committee was read and adopted:—

In presenting their Fourth Annual Report on the occasion of the fifth year of the existence of the Photographic Copyright Union, your Committee have pleasure in stating that the business of the Union continues steadily to increase, and that the membership also shows a satisfactory increase during the year just closed, several additional members having joined from foreign countries and the colonies, as well as the provinces.

Some idea of the work done by the Committee may be gained from the book of daily transactions kept by the Secretary, which shows the receipt of 430 business letters and inquiries throughout the year, all of which have received due consideration and answer. Twenty-two of these were from foreign and colonial photographers, and no less than 269 were from the provinces. With respect to the infringements of copyright, the Union have succeeded in obtaining compensation for several members during the last twelve months; in many other cases satisfactory results could not be obtained, owing to the members having neglected to carry out the conditions of copyright required by law.

During the year, your President (Mr. Frank Bishop) and Vice-President Mr. J. J. Elliott) together with Mr. Bulmer Howell, the Union's solicitor, have attended many meetings held at Mr. John Murray's, to assist in drawing up the new Copyright Bill (Lord Herschell's), "An Act to consolidate and amend the law relating to Copyright." Mr. Bishop and Mr. Howell attended the Select Committee of the House of Lords, where Mr. Howell gave evidence for over two hours on behalf of Photographic Copyright.

In accordance with Rule IX., requiring two members of the Committee to retire by rotation, Mr. Frith, of Reigate, and Mr. Lafayette, of Dublin, London, &c., have placed their resignation in the hands of the Chairman.

In accordance with the appointment made at the last general meeting, Mr. T. Bedding and Mr. H. H. Cameron have audited the accounts, and certify that the same are correct.

The working expenses of the Union will be exceptionally heavy in the ensuing year, mostly on account of legal work in connexion with Lord Herschell's new Copyright Bill, and your Committee feel justified in urging upon all members the necessity of making liberal donations to the funds, as it is inexpedient to trench upon the reserve fund, which should remain strictly intact for emergencies.

The following amendments to the Rules were carried:—

Rule XX., line 1, to substitute for word "case" the words, "claim for compensation." Line 8, to add after word "damages" the words "or penalties."

Rule XXIII. To add after first section the following: "The fee shall be charged upon the size of the reproduction, and not upon the size of the original photograph."

A new Rule was proposed and carried to read as follows: "If any Copyright photograph is reproduced in more than one colour, on the cover of, or embodied in the letterpress of a magazine or paper, the minimum fee shall be one guinea for cabinet and under, and two guineas above cabinet and up to 12×10 inches in size, or double the minimum fee which would be usually charged for a black-and-white reproduction as provided by Rule XXIII. For supplements or other purposes, including advertising, higher fees must be charged."

The Chairman, in the course of a brief statement on the work of the Union during the past twelve months, drew attention to the importance of photographers being clear as to the form in which permission is given to reproduce copyright photographs, and pointed to the recent action brought by Mr. Gambier Bolton as supplying an instance in which the Judge could not get away from the fact that the plaintiff had a clear case against the infringers. Mr. Bishop then said that the question of the relation of the sitter towards a photographer who made use of rejected sittings had recently been raised. The question was an interesting one, and required settlement. As to the registration of animated photographs, it had been ascertained that the attachment of about a foot of the picture to the form sufficed to meet the requirements of the Stationers' Hall authorities. After a reference to the desirability of photographers making a higher charge for photographs that are to be reproduced in colour, Mr. Bishop went on to allude to the future Copyright Bill, which would probably contain a provision that copyright would exist for thirty years after death, and that all photographs must be registered. As to colonial copyright, this could not be considered to be in a satisfactory condition, seeing that the power of the Privy Council was absolute, and it was uncertain how far colonial legislation could stand unaltered by the home authorities.

Mr. J. Lillie Mitchell, who followed, said that the amount of work done by the Union could be gauged by the fact that last year 430 letters were dealt with, and of that number 269 were from the country and twenty-two foreign.

Mr. Gambier Bolton also addressed the meeting, and said that in the new Bill an attempt was to be made to limit copyright to a period of seven years. The point must be fought tooth and nail. He (Mr. Bolton) regarded his negatives as increasing in value as time went on, and thought it unjust to decrease the term of copyright.

Mr. J. J. Elliott remarked that there were very many professional photographers who made use of the Union and were not members of it. He thought that was to be regretted.

The Auditors of the accounts were thanked for their services, the name of Mr. Gambier Bolton was added to the Committee, and the remainder of the evening was devoted to an informal discussion on many points of interest in connexion with copyright.

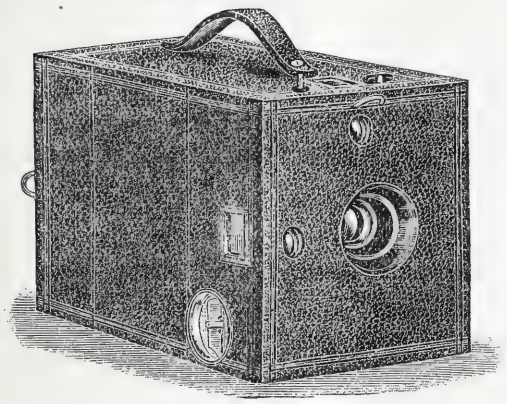
Our Editorial Table.

The No. 4 Special Bullet Kodak.

Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

This camera, like the other Bullets, is adapted for the use of glass plates as well as roll films, but possesses a novel feature in the fact that the film is used in a detachable daylight loading roll-holder which is immediately interchangeable with the double plate-holders. This arrangement permits of changing from film to plates at any point on the spool of film and of focussing upon the ground glass, when desired whether using films or plates. The No. 4 Special Bullet is equipped with a rectilinear lens, having iris diaphragm stops and triple-action shutter

and is provided with focussing scale, view-finders, sockets for tripod and screws, &c. The shutter has an original device for transmitting power in setting the shutter from the outside fixed lever to any point of travel



in focussing. This new camera is on view at the Royal Photographic Society's Exhibition.

CATALOGUE RECEIVED.

Vanguard Manufacturing Company, Maidenhead.

THIS little list of sixteen pages deals with the now well-known productions of the Vanguard Manufacturing Company, which includes mountants, intensifiers and reducers, photopake (for spotting out, &c.), nigrogene (a dead black varnish), caramel plate backing, toning baths, developers, varnishes, &c. All these are made under the superintendence of Mr. W. Ethelbert Henry, an able photographic chemist whose qualifications for work of this description go without saying, and, besides, have long been practically demonstrated.

MESSRS. F. F. & ARTHUR WILSON, of 219, George-street, Glasgow, have introduced an ingenious and serviceable wrapper for transmitting photographs through the post. It is made of thin cardboard, and is sent out in the form of an open flap. It is perforated, or rather indented, round four sides, so that in closing it up it may be folded over to take one or several photographs. Messrs. Wilson also supply envelopes to a variety of artistic designs, so that photographers may exercise a choice in the matter.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, October 5, at eight o'clock. Trade Night. Exhibition of novelties.

LUDLOW PHOTOGRAPHIC SOCIETY.—The Exhibition of this Society will be on Thursday, November 24, not on Thursday, November 17, as previously announced.

A SECOND series of practical lessons in photography will be given by Mr. C. W. Coe, of Messrs. E. G. Woods, at the Cripplegate Institute, Golden-lane, E.C., commencing Monday, October 3, at seven p.m.; full particulars of the Manager of the Institute, Mr. E. W. Cappes.

THE *New Penny Magazine* is the title of Messrs. Cassell & Co.'s new weekly periodical, of which the first number is to appear on October 19. It will provide a greater amount of reading matter and illustrations than has been hitherto given for a penny in any magazine. Each issue is to contain sixty-four large pages, fully illustrated.

THE illustrated post cards, first "made in Germany," have attained such a wide circulation, and are now so popular in France, that the collectors of them in Paris have formed themselves into a society, which they style the International Post-carte Club. The society will issue early, to members only, twelve post cards, with original compositions by Parisian artists. This post-card fad is increasing rather than declining, and threatens to rival philately as a fine-art pastime.

COLLOIDAL GOLD.—By reducing a faintly alkaline solution of a gold salt with formaldehyde solution, and then submitting it to dialysis, Zeigmody has succeeded in obtaining gold in a colloidal condition. It is soluble in water, forming a ruby-red solution which leaves a brilliant residue of gold on evaporation. The metal is precipitated on the addition of sodium chloride, and is deposited on the positive pole on submitting the liquid to electrolysis. —*Chem. Zeit.* xii. 332.

PROFESSOR A. GRAY has been devoting a considerable part of his time to determining the circumstances which affect the conductivity and specific conductive capacity of glass. From manufacturers in London and Jena various specimens of glass were obtained. These were all richer in lead, and freer from soda, than glasses formerly available. Specimens of glass used for thermometers, and a barium crown glass, were tested also. It was sought to ascertain whether, by increasing the lead oxide and diminishing the amount of soda, the conductivity would go on diminishing. The resistance was taken after five minutes' electrification. The "Jena glass" showed considerable effects of dielectric polarisation. Powell's glass did the same. The barium glass showed hardly any, but it had a very high resistance, and behaved like lead and lime glasses. The Jena glass had low resistance, from its high percentage of soda and complex composition.

THE CAMERA CLUB.—The winter series of lectures at the Camera Club will commence on Thursday next, October 6, when the President (Captain W. de W. Abney, C.B., D.C.L., F.R.S., &c.) is expected to read a paper. Many well-known gentlemen have kindly consented to lecture during the season, among them being the Earl of Rosse, F.R.S., Sir Norman Lockyer, Captain Hills, R.E., Mr. Linley Sambourne, Mr. Alfred East, R.I., Mr. Law Bros, Mr. Savile Kent, F.Z.S., and a number of others, who will, no doubt, contribute interesting and instructive matter.

AN IMPUDENT THEFT.—At a criminal court at Douglas on the 22nd inst., before Deemster Gill, a young Englishman, named Walter Seymore, was charged with having stolen a camera lens, twenty-four negatives, and a pair of boots, the property of Arthur Hadley. It appeared that Seymore had been employed by Mr. Hadley for the season in a Ramsey photographic studio, and during the temporary absence of his master he took the articles named. He was caught by a police constable just as he was departing from the island on board a steamer. The prisoner pleaded guilty. His Honour said the prisoner had been found guilty of a similar offence in England, therefore he could not impose a less sentence than three months imprisonment with hard labour.

SOUTH-WESTERN POLYTECHNIC, Manresa-road, Chelsea. The following are the particulars of the course in photography given at this Institution. Teacher, Mr. E. Senior (honours medallist, City and Guilds Institute). Saturdays: Lectures 7.30 to 8.30; practical work, 8.30 to 10. Fee for lectures and practica work combined, 15*s.*; trade students, 10*s.* A course of about twenty-five lectures will be given on Saturday evenings at 7.30, commencing October 8, followed by a course of practical instruction in negative-making, enlarging, platinum, carbon, and silver printing and general studio work. The photographic department contains a large studio fitted with powerful arc lamp, and every appliance for work at night, together with spacious dark room and electric light enlarging plant. All chemicals and necessary apparatus will be provided. During the session demonstrations of obtaining photographs in natural colours will be given.

THE Congleton Photographic Exhibition to be held on November 2, 3, and 4. Prizes (first, a silver medal; second, a bronze medal) are offered in each of the following classes: *a.* Landscape. *b. Genre.* *c.* Portrait and single figure studies (for amateurs only). *d.* Hand camera (snap-shot photographs only). *e.* Lantern slides The office of Judge has been undertaken by Mr. E. R. Dibdin, Vice-President of the Liverpool Amateur Photographic Association, who will be assisted by one or two members of the Council of the Association. Exhibits may consist of one or more photographs mounted together. They must be mounted but not framed. They must be marked with a motto, and accompanied by exhibitor's name in a sealed envelope bearing the same motto. They must be sent to the Hon. Secretary. Mr. A. C. Conder, J.P., Congleton, on or before Thursday, October 27. The entrance fee for each exhibit will be sixpence, and must be forwarded at the same time.

THE *Daily Chronicle* last week printed the following anecdote of the late Empress Elizabeth:—"From Nanheim comes a characteristic story of the late Empress Elizabeth, who submitted herself for some weeks this summer to the treatment of Dr. Schott for enlargement of the heart. At the end of her stay the physician assured her that her heart had resumed its normal dimensions, and begged her to confirm his diagnosis by allowing a photograph to be taken of the organ through the agency of the Röntgen rays. 'No, no,' exclaimed the Empress, 'you shall not do it!' 'But, your Majesty,' urged the doctor, 'it is of the highest importance——' 'For you, perhaps, and for my brother at Tegernsee (the Duke Karl Theodor), but not in the least for me. I will not be dissected alive. Get any peasant to sit for the photograph, and send it to my doctor brother, with an assurance that it is a picture of my heart. Besides,' added the Empress, 'every time I have been photographed some misfortune has befallen me.' The photograph was never taken, but the misfortune was not averted."

THE following is the programme of Lizars' "Challenge" Photographic Exhibition:—Monday, October 3: Opening by Bailie John Ure Primrose, J.P., D.L.; music by Paterson, Sons, & Co.; cinematograph. Tuesday, October 4: Lecture by Mr. T. N. Armstrong, "Cuba and the Cubans." Wednesday, October 5: Exhibition of lantern slides kindly lent by members of the West of Scotland Photo Society. Thursday, October 6: Lecture by Rev. A. H. Geyer, "Amongst the High Alps." Friday, October 7: Lecture by Mr. Charles Reid, Wishaw, "Animal Studies." Saturday, October 8: Lecture by Mr. T. N. Armstrong, "The Clyde, from its Source to the Sea." Monday, October 10: Lecture by Mr. Carruthers, Liverpool, "A Trip to the Canary Islands." Tuesday, October 11: Exhibition of lantern slides kindly lent by members of the *Evening Times* Camera Club. Wednesday, October 12: Lecture by the Rev. A. H. Geyer, "A Visit to the Carpathians, and other Eastern Heights." Thursday, October 13: Lecture by Mr. G. Middleton, M.A., LL.B., "A Chat on Arran." Friday, October 14: Lecture by Mr. T. N. Armstrong, "Peoples of the Czar." Saturday, October 15: Exhibition of novel and interesting lantern slides by Mr. J. Lizars.

MESSRS. FUERST, BROS., 17, Philpot-lane, London, E.C., inform us that the following are their latest cinematograph film views:—*Soudanese Pictures* (about 55 ft. each in length)—Charge of the 21st Hussars (now the 21st Lancers); Macdonald's Egyptian Brigade; Panorama of the Nile; Gunboats on the Nile; Khalifa praying for Victory; War Correspondents arriving in Camp. *Various* (from 60 to 75 ft. long)—Diabolic Magic (two lengths); The X Rays; Explosion of the *Maine* (two lengths); Divers on the Wreck of the *Maine*; Divers under the Sea with living Fishes; Collision between a Steamer and a Sailing Boat; Sword Fencing; Battle of Manilla; Comic French Military Scene, The Salute; The Magician (apparitions); Comic Military Scene, Deserting; The Clowns (Phantasmagorical illusion); Pygmalion and Galatea (illusions and apparitions); The Moon at one yard (three lengths, very comical and amusing); Wet Paint; A Dream of a Painter; A Painter's Studio; The Cursed Cavern; Contortionist; Fishermen and a Keeper; American Clown Cyclists; American Thieves; Gigolo and Gigolette. "*Gathering of the Clans*" *at Balmoral, September*, 1898, Arrival of Her Majesty the Queen; March Past of Highlanders; Highland Fling, Dance I.; Highland Fling, Dance II.

Re RICHARD JAMES WHITEHEAD & JOHN COX, camera-manufacturers, 54, Irving-street, Birmingham.—The public examination of these debtors was held at the Birmingham Bankruptcy Court, before Mr. Registrar Glaisyer, on September 22. The statement of accounts filed by the debtors showed liabilities amounting to £187, and assets estimated to produce £66, after deducting the claims of preferential creditors payable in full. The debtor Whitehead, in the course of his examination by the Official Receiver, stated that he began business in 1835, when he took over a concern that was formerly conducted by his father. He was joined in partnership by Mr. Cox, in 1891, who then put £100 into the business, and afterwards he put another £75 into the concern. They used to draw £2 per week each from the business, but during the last twelve months they had drawn less, and they had also worked at the bench as ordinary workmen. Their present position had been brought about through the price of materials and wages going up, and the prices they obtained for their goods remained stationary; the consequence was that their profits were not sufficient to enable them to continue the business, and they came into the Bankruptcy Court. The debtors were allowed to pass their examination.

Re JOHN HENRY PREECE, photographer, Bold-street, Liverpool.—The public examination of the above-named debtor took place at the Liverpool Bankruptcy Court on the 22nd inst., before Mr. Registrar Bellringer. In answer to questions put by the Official Receiver, the debtor stated that he purchased the business of the late Aaron Vandyke in March 1897 for £1000, and he now came before the Court with a statement of affairs showing liabilities amounting to £2174 7*s.* 9*d.*, and assets estimated to produce £523 12*s.* 3*d.* The business had done very well since it had been in his hands, and his present difficulties were solely due to loans made to, and guarantees entered into, on behalf of Frederick Davies, of High-street, Cheltenham, clothier and outfitter. Without any consideration or offer of consideration, he had lent Davies £296, and when Davies had to compound with his creditors he not only refrained from appearing as a creditor, but guaranteed Davies's offer of twenty shillings in the pound, involving a liability of £1457 17*s.* 9*d.* Davies was now in the hands of the Official Receiver at Gloucester, and the two estates were in the course of adjustment. The Official Receiver asked that the examination might be adjourned, as the trustee of the estate, Mr. Mahon, would require some time for investigation. Eventually the examination was ordered to be adjourned for a month.

Re GEORGE HENRY SHEARS, trading as Shears & Sons, photographic printers, Bulwer-road, New Barnet.—The public examination of the above-named debtor was held at the Barnet Bankruptcy Court before Mr. Registrar Boyes on September 22. The statement of affairs filed by the debtor disclosed liabilities amounting to 257*l* 15*s.* 8*d.*, and assets estimated to produce 40*l.* 5*s.* 10*d.* Replying to questions put by the Official Receiver, the debtor stated that he was assisted in his business by his two sons, but they had no interest in it whatever. He had used the title "Shears & Sons" simply to make it look a little larger. He had estimated the turnover of the business, in which he had been engaged for over twenty years, at between 3*l.* and 4*l.* per week. He had borrowed several sums of money, amounting in the aggregate to 100*l.*, from a cousin, and he spent the money chiefly in the maintenance of his wife and family. He had given a bill of sale over his furniture as security for a loan, and among the things enumerated in the inventory were a number of articles which he had obtained on the hire-purchase system. Those articles were included unintentionally. He had also pawned a gold watch which he had not entirely paid for. He knew he had no right to do it, but he was in want of money at the time, and he hoped that his trade would improve and enable him to redeem the watch. He did not think matters would have turned out so badly. The Official Receiver said he had no further questions to put to the debtor, and the examination was accordingly closed.

ALLEGED WHOLESALE FRAUDS.—A respectably dressed young man, giving the name of John Charles Cooper, was charged before Mr. Lane, at the West London Police Court, on the 21st inst., with obtaining a camera, value £5, the property of Henry Smith, now residing at Arroby-green, Carlisle, by fraud. Mr. W. Lewis, who appeared on behalf of the Treasury, said the case had been taken up on account of the gross frauds committed by the prisoner, who advertised in the *Exchange and Mart*, his practice being to have his letters and parcels received at some respectable shop having a good address. During the last twelve months he had obtained various articles of considerable value, and in ten different names, but on that occasion evidence would only be given in three cases. In the first case, the prisoner stated that in October last he advertised for sale, in the *Exchange and Mart*, a half-plate outfit, giving an address in Quarry-street, Batley. He received a letter in the name of Charlton, and an address in Blenheim-crescent, Notting-hill, enclosing a card, describing the writer as an Excise officer. He sent the camera by passenger train to the address in Blenheim-crescent, and received an acknowledgment, also stating that a remittance would be forwarded after it had been tested. Not receiving the remittance or the camera, he went to the address in Blenheim-crescent on October 20, and found it was a newspaper shop. Witness, on being questioned as to his motive in parting with the camera, said he did so knowing Blenheim-crescent to be a good address, and he supposed that the writer was an Inland Revenue officer, residing there, therefore he thought it was *bonâ fide*. After two other cases of a similar character had been gone into, the prisoner was remanded.

Patent News.

THE following applications for Patents were made between September 12 and September 17, 1898:—

FINISHING PHOTOGRAPHS.—No. 19,433. "A New or Improved Method of finishing Photographic Prints and the Like." T. R. WATSON.

FRAMES AND MOUNTS. No. 19,435. "Improvements in and relating to Photographic and other Picture Frames and Mounts." G. H. BRADLEY.

PHOTOGRAPH STAND.—No. 19,453. "A New or Improved Self-righting Stand or Holder for Photographs, Bills of Fare, and the like." S. HAHN.

AUTOMATIC MACHINES.—No. 19,519. "Improvements in and relating to Coin-freed Automatic Photographic Machines." P. MUSHET.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

October.	Name of Society.	Subject.
3	Rotherham	Annual Meeting.—*Velox Paper.* E. Isle Hubbard.
3	South London	*Halation: Suggestions for its Prevention and their Effectiveness.* C. H. Oakden.
5	Leeds Camera Club	*Portraiture.* Harold Baker.
5	Photographic Club	Trade Night: Exhibition of Novelties.
6	Leeds Photo. Society	*Photographing of Birds' Nests and Flowers.* Arcad. C. Beilby.
6	Liverpool Amateur	Smoking Concert.
6	London and Provincial	*Pyro-soda Development for Negative and Lantern Slides.* Ben Edwards.
8	South London	Excursion: Carshalton. Leader, C. H. Oakden.
8	West London	Excursion: Richmond Park.

ROYAL PHOTOGRAPHIC SOCIETY.

SEPTEMBER 27,—Technical Meeting,—Mr. J. J. Vezey in the chair.

APPARATUS AT THE EXHIBITION.

In accordance with custom, this meeting, being the first technical meeting after the opening of the annual Exhibition, was devoted to the demonstration of the apparatus included in the show, most of which has already been noticed in these columns.

Mr. F. O. BYNOE explained the exhibits of Messrs. R. & J. Beck, Ltd., comprising the No. 22 Frena camera and the Bivex dark-room lamp. With regard to the former, he said the success of the Memorandum Frena, fitted with a single lens, had induced his firm to issue a quarter plate camera with a single achromatic lens in place of the R.R. formerly supplied with the Frena of that size, and he passed round an album of prints to illustrate the fact that the distortion produced by a single lens on a small plate, except in critical architectural work, was so slight as to be a negligeable quantity. The special point of novelty claimed for the apparatus was that it was provided with brilliant finders, with which the area of view would not alter as the position of the eye of the observer was changed. In other respects the camera was of the well-known Frena character. The Bivex dark-room lamp was made for use with oil or candle, and had two faces fitted with either double ruby glasses or ruby and orange frosted glass, as desired, the faces meeting at an angle in front and sloping inwards towards the bottom, a method of construction adopted so that the accumulation of heat should be at the largest part of the lamp.

Mr. CHAPMAN JONES asked for an explanation of the means by which a stationary image was obtained in the Frena finder.

Mr. BYNOE replied that the method was the subject of a patent, but he gave a brief description of the instrument, from which it appeared that the method depended upon the observance of the greatest accuracy with regard to the focus and adjustment of the lens and reflecting mirror.

Messrs. NEGRETTI & ZAMBRA exhibited Richards' Verascope, a small stereoscopic hand camera with magazine for twelve plates, $4\frac{1}{4} \times 1\frac{3}{4}$ inches, and with time and instantaneous shutter; also a stereoscope for viewing the positives, the lenses being of high magnifying power, so that the effect was the same as that obtained by viewing stereoscopic pictures in an ordinary stereoscope. The remaining exhibits of the firm were also explained, including a larger Verascope, and Richards' Homeoscope, a stereoscopic hand camera with changing action for twenty-four plates, $3\frac{1}{8} \times 3\frac{1}{2}$ inches.

The EASTMAN PHOTOGRAPHIC MATERIALS COMPANY exhibited the Folding Pocket Kodak, the No. 2 and No. 4 Special Bullet Kodaks, the Nos. 4 and 5 Cartridge Kodaks, roll-holders (quarter-plate and half-plate) for daylight loading film cartridges, and a cycle case for Cartridge Kodaks, all of which are too well known to need description here.

THE PATENT PHOTO-CONCHA COMPANY, Limited, exhibited the "Photo-concha," a changing bag, combined with a box, intended for use as a portable developing chamber.

Messrs. ADAMS & Co. showed the Rectiflex Finder, a finder of the brilliant pattern, arranged to give both horizontal and vertical pictures, not only the right way up but also correct as regards right and left. The Adams "De Luxe" hand camera and the "Tella" hand camera were also passed round for examination.

Messrs. J. H. DALLMEYER, Limited, exhibited a new stigmatic lens of simplified construction, having only four glasses, working at *f*-7·5, and embracing a medium angle equal to that of a rapid rectilinear, but yielding a perfectly flat field and entire freedom from astigmatism. Mr. CLIFTON, who described Messrs. Dallmeyer's exhibits, explained that the block supposed to illustrate this lens in the Exhibition catalogue, and showing five glasses, was not correct, and was not supplied by the firm for this purpose. The Dallmeyer Hand Camera, provided with a changing box, stigmatic lens, and Bausch & Lomb shutter, and a model of a new pattern camera for tele-photo and other long-focus lenses, arranged for use in the hand or on a tripod, were also exhibited and described.

Messrs. TAYLOR, TAYLOR, & HOBSON'S exhibits, described by the assistant Secretary, were as follows: the Cooke Portrait Lens, Series II.; full aperture, *f*-4·5; equivalent focus, 13 inches for half-plates; this lens was said to give fine definition and a flat field, with freedom from astigmatism, at full aperture;

an adjustment was provided for the introduction at will of spherical aberration evenly over the plate. Cooke Process Lens, Series V. ; full aperture, *f*-8 ; equivalent focus, 24 inches ; the lens was adjusted to secure identical size and sharpness of each colour image for three-colour process work, with a flat field free from astigmatism. Also a Cooke Casket, a lens of 7·5 inches focus (*f*-6·5) and a landscape lens of 10·5 inches focus, in a silk-lined, morocco-covered case, each being designed for use on half-plates. This firm also showed an improved circular spirit-level, the spirit-chamber being made in one close-grained homogeneous piece by squeezing from a flat sheet of German silver.

Mr. T. ILLINGWORTH (Illingworth & Co.) exhibited several forms of the "Poco" camera, an instrument manufactured by the Rochester Camera Company (U.S.A.), and of very compact and neat construction.

Messrs. W. WATSON & SONS showed the "Fram," a new patent hand camera for twenty-four unnotched films, the operation of changing being described as follows :"The magazine is pivoted at the top, and, by a swinging motion backward, a film and backing card are together released, and fall into a reservoir below, another film being projected into position for exposure when the magazine is pushed forward into its vertical position. Messrs. Watson's combination studio, copying and enlarging camera and stand, also described, was a very fine instrument specially introduced to compete with foreign studio cameras, and was calculated to fully maintain the reputation of English work. Stringer's photo-micrographic apparatus, included in Messrs. Watson's exhibit, was not sufficiently portable to admit of examination in the usual way, but was described informally at the close of the meeting.

The whole of the apparatus was inspected with much interest, and the cordial thanks of the Society were given to the exhibitors for their explanations.

PHOTOGRAPHIC CLUB.

SEPTEMBER 21,—Mr. R. R. Beard in the chair.

Mr. W. R. STRETTON showed some film negatives which had not been developed until twelve months had elapsed since their exposure in the camera. The latent image had not apparently suffered during this period, except where a number of spots were distributed over the negative. The cause of these defects lay unquestionably with the celluloid support, as could be seen by raising a corner of one of the negatives where the gelatine had been split from the celluloid, spots on the negative coinciding with others in the substance of the celluloid base. The spots also manifested themselves in the same manner upon unexposed films.

The CHAIRMAN exhibited upon the screen by means of the lantern a photograph in colour by Joly's method. The subject of the photograph was a brilliantly plumaged parrot, and the members were shown how readily this process allowed of a variety of tints being given in turn to the bird, as seen upon the screen. The photograph is taken through a screen, ruled in narrow bands in orange-red, green, and violet-blue, repeated again and again over the whole area of the screen, each line being in touch with its neighbours. In this way, the three screens necessary for three-colour processes are, in Joly's process, combined in a single screen. The resulting negative, which has all the essentials to the reproduction of the original in colour, is built up of these lines reproduced in monochrome, and it only remains to mount a positive from this negative in contact with what is known as the viewing screen, ruled in slightly different colours to the first screen, to produce a slide which shall give a more or less perfect representation of the original object. Upon the position of the viewing screen with regard to the positive lies the truth of the representation obtained. Each line in the positive obstructs a certain portion of the coloured lines in the viewing screen, so that it is obvious that each line in the positive has to exactly cover a certain coloured line in the viewing screen, otherwise a line which should be opposing, say, a red line, might be mounted against the green, and, the error being throughout the series of lines, the effect upon the lantern sheet would be incorrect. The effect was shown in the lantern by slowly moving the positive over the stationary viewing screen, the bird assuming all manner of colours as the relative positions changed.

Mr. I. ABRAHAMS passed through the lantern a small selection of hand-coloured slides from photographs taken on a visit to the Holy Land. Included amongst the pictures were views in the streets and suburbs of Jerusalem, the city walls, and other historical Scriptural places of interest. The colouring of the majority of the slides was the work of residents in Palestine, and for that reason likely to be fairly true to nature.

Borough Polytechnic Photographic Society.—September 21, Mr. A. Bedding presiding.—A practical demonstration on

LANTERN-SLIDE MAKING BY CONTACT AND REDUCTION

was given by Mr. L. E. COTTERELL. The reduction was made from a half-plate negative in an ordinary reducing camera by the aid of six inches of magnesium ribbon, a piece of ground glass being placed in close proximity with the negative in order to produce even illumination. The plate was then developed with a weak pyro-soda solution, and the exposure was found to be fairly correct. Several makes of plates were tried under varying conditions, and some interesting hints were thereby obtained.

Leeds Camera Club.—September 21, Mr. W. J. Warren (the President) in the chair.—There was an exceptionally large attendance, numbering over ninety, the occasion being a lecture and demonstration by Mr. JOHN H. GASH on

THE RÖNTGEN RAYS.

In introducing his subject, Mr. GASH said it would be his purpose to show that, whilst the actual discovery of these rays appeared to be due to chance, they were in reality the outcome of careful scientific research extending over a period of over sixty years. He would endeavour to show that, by passing a current of high potential electricity through a glass tube which had been partly exhausted of its air, certain effects were produced, that successive degrees of further exhaustion gave effects peculiar to each degree, and that it was the study and investigation of each particular stage which led on to the discoveries of the next, until an exhaustion was reached at which no further effects were attainable. This was probably due to the imperfect nature of the apparatus at command at that time. The invention of the mercury air pump, together with other improvements in scientific apparatus opened out a new field of inquiry, and studies in a highly increased vacuo now became possible. Amongst the many who took up the investigations of this discharge in high vacuo was Mr. William Crookes (now Sir William Crookes, and this year's President of the British Association). He made different forms of tube, which still bear his name, and from them obtained extraordinary results, which laid the foundation of what was to follow. In these tubes the discharge from the cathode assumes entirely new properties, and to these cathode rays, or discharges, he gave the name of "radiant matter"—a something as far removed from a gas as a gas is from a solid. It was whilst experimenting with various forms of these tubes that Professor Röntgen made his discovery. Some fluorescent material smeared on a piece of paper near to one of the tubes he was using glowed visibly, even through the tube itself was enveloped in a light-tight covering, proving that this was a radiation from the tube hitherto unknown. He did a great amount of work with these rays before making his public announcement. He found they would easily penetrate substances impervious to any known light ; he found they would also affect a photographic plate, his results all culminating in his remarkable photograph of the bony skeleton of a living being. Mr. GASH then demonstrated the effects produced by different degrees of exhaustion through a full series of tubes, showing each successive stage and development—from the discharge in the partial vacuum to that of the highly exhausted X-ray tube. He next dealt with the different opacities of various substances, showing amongst other things that these X rays would pass through dense carbon with greater facility than through clear plate glass. The bones of the hand and arm were clearly shown, a radiograph of a hand was made and developed in the presence of the members, and a series of prints illustrating its value in surgical work was passed round for inspection. The last monthly excursion of the sesson will be to Adel on Wednesday, October 5, and Mr. W. E. Tindall, A.B.A., who was present at the above lecture, cordially invited members taking part to tea at his studio at Adel. The excursion was deferred to this date, with a view of the members being accompanied by Mr. Harold Baker, who is to lecture to the members in the evening on "Portraiture."

FORTHCOMING EXHIBITIONS.

	1898.	
Sept. 30–Nov. 5	.....	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
,, 30–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
	1899.	
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

"ORTOL."

To the EDITORS.

GENTLEMEN,—The accounts I have seen in your JOURNAL of the virtues of ortol induced me recently to purchase a small bottle, and I proceeded to make a solution. To my astonishment the powdery substance was dark grey instead of pinkish white as described, and the result of shaking up the salt to dissolve it was a fluid which appeared to be a writing fluid, but which after a time deposited a black powdery precipitate estimated as about one quarter the volume of the ortol used, a clear solution of the colour of sherry remained. Evidently *this* was not the ortol recommended in the JOURNAL, and I returned the bottle to the dealer, who will, doubtless, settle matters with those from whom he procured the defective article. My object in addressing you is to call attention to the fact that caution is requisite in buying ortol. If ortol is liable to change in this way before it gets into the worker's hands, it is probable that a much slighter change has in many cases taken place which is not noticed, and such change may cause some of the anomalous results you have published.

I should mention that I have since obtained some ortol from the same agents who supplied you and Mr. Bothamley, and who kindly let me

have a small sample; *that* is apparently all right, and I hope soon to prove its efficiency as a developer.

One property I cannot confirm. In shaking up the bottle some of the solution got on to my hands; the result is that I can recommend it to young ladies desirous of emulating "rosy-fingered morn," the tint does not match my hands. J. F. T.

MR. BARBER'S STEREOSCOPICS.

To the EDITORS.

GENTLEMEN,—It is sad to see a man at this time of day denying that binocular vision with two different views is necessary to obtain stereoscopic effect. Let Mr. Barber sit at a table covered with a dark non-figured cloth, and, keeping his hands off the table, ask a friend to place thereon a cup or tumbler within arm's length of Mr. Barber, he meanwhile averting his eyes. Then, first closing and covering one eye, let him look round and immediately quickly put the tip of his finger, with one movement and without hesitation, on the edge of the cup. *The chances are about equal whether his finger-tip alights on the edge or goes beyond it, or misses it altogether on the near side.* If he succeeds, let him look away while the friend moves the object, and try again; for, once he succeeds and the object remains unmoved, he can do it over and over again, because he has the distance by virtue of what physiologists term "muscular sense." The experiment speaks for itself.—I am, yours, &c., R. B. HUGHES.

Min-y-don, Llanfairfechan.

SLIDES LENT FOR THE PHOTOGRAPHIC CONVENTION.

To the EDITORS.

GENTLEMEN,—At the request of the Sub-committee responsible for these slides, I undertook their return. From the fact a great number of them bore no name or other intimation of their makers, it has been difficult to trace the owners in all cases, and I still have twelve slides (of which six are possibly by one worker) for which I can find no owners. If the owners see this, will they kindly communicate, and oblige—I am, yours, &c., H. SNOWDEN WARD.

6, *Farringdon-avenue, London, E.C., September* 27, 1898.

P.S.—This does not apply to the large number of American slides kindly lent, and which are being retained for exhibition at one or two of the London societies before returning.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

W. M. Harrison, Photographer, Falmouth, Cornwall.—*Three photographs of George Appleby Jenkins, Esq., of Penryn, Cornwall.*

W. Waid, Strathellen-crescent, Douglas, Isle of Man.—*Photograph of Groudle Beach, Isle of Man. Photograph of Sunday service in Kirk Braddon Church Yard, Isle of Man.*

A. Lipschitz, 41, Cheetham Hill-road, Manchester.—*Photograph of the late Rabbi Goshua-Liel Diskind from Jerusalem. Photograph of the late Rabbi Samuel Mohlever from Bi lostek, Russian Poland.*

SYSTEMATIC.—You were incorrectly advised. You can fill up the form yourself, and are not obliged to employ a patent agent. This is very commonly done.

COLONEL GUBBINS.—Yes; it is a branch of the free portrait swindle, which we have many times exposed. The idea is to get you to purchase an expensive frame, although the fact does not appear in the prospectus.

WILLIAM DREW.—We do not quite understand your query, and what you mean by "a telescope attachment." Do you wish to use the R.R. lens as a tele-photo one? because, if you do, and have a properly constructed attachment, the instrument will be all right.

ALBUMEN PAPER.—C. WARDELL. So far as we are aware there is no agent for the paper here, or at least under that name. The name is that adopted by the American firm, but it is very probable that the paper is made in Germany and coated with albumen there, probably in Dresden.

TACKY VARNISH.—S. HOPKINGS. If the varnish was compounded according to the formula, it would not be tacky a few days after it was applied. The only way we can account for the tackiness is that the film contained some hyposulphite of soda. If that were the case, it would, if in quantity, prevent the varnish from becoming hard.

R. T. WATSON.—Send our publishers one-and-sevenpence and three copies of the photograph, and they will effect registration for you.

DEVELOPING BROMIDE PRINTS.—H. SMITH. The developer quoted is an excellent one for the paper you have been using, but it by no means follows that it is the best, or indeed suitable, for that you are desirous of employing, and your experience proves the case. Better adapt yourself to the developer specially recommended by the makers of the paper you prefer.

GASOLENE.—S. R. (Clapham) asks where he can obtain gasolene. He says he has applied to several large oilshops and cannot obtain it, and also to chemists, and none of them seem to have heard of it. We should advise our correspondent to apply to some of the petroleum-refiners. We imagine there will be some difficulty about its carriage on account of its highly inflammable nature.

WET COLLODION.—R. ROLFFS puts the following question, "What is the sensitometer number (Warnerke's) of wet collodion?"—That is a question impossible to answer, as all will depend upon the collodion, the bath, and the developer used, and their condition at the time. Wet-collodion plates are not of a standard rapidity any more than are gelatine plates, though their variation is not so wide.

CURTAINS FOR STUDIO.—NIMROD asks: "Will you please answer me these questions in JOURNAL: Enclosed patterns for curtains. Will the dark blue do for the top curtains and the fawn and green for the side curtains? I have a north light to studio. See sketch of studio, size 26 ft. long, 9 ft. 6 ins. high, 5 ft. 6 ins. at sides?"—The materials will do very well; but, if the sun is much on the roof of the studio, we should recommend rather a thicker material, for that, than that enclosed.

OWNERSHIP OF NEGATIVE.—G. P. L. says: "Could you inform me if it would be legal to claim the negative of a person whose photograph has been taken by a photographer in the ordinary course of business (*i.e.*, whether by law it becomes the property of the sitter)?"—The negative is the property of the photographer; that has been decided over and over again in courts of law. Although the negative belongs to the photographer, it has also been decided that he has no right to use it except to the order of the sitter.

TONES.—PRINTS says: "I find I cannot get good purple tones with my gelatine prints. I have used both the acetate of soda, 60 grs.; gold, 2 grs.; water, 20 ozs., and the sulphocyanide ammonia, 30 grs.; gold, 2 grs.; water, 32 ozs., and can get beautiful purple tones, but, as soon as they are in the hypo, 6 ozs. to 60 water, they turn a miserable, leathery brown. My dishes are kept very clean. Can you please give me any advice?"—In all probability the prints are under-toned. Tone them until they look purple by transmitted light.

STUDIO.—T. W. H. says: "Could you give me the following information? I have a square piece of ground behind our new premises about 25 × 20 feet, and wish to move my studio to this plot. On the south side of the plot are buildings; north side, east and west, is open. I notice the sun strikes on the land pretty well all day. Now, this is the question I should like to know, Will the studio do as a lean-to to the buildings, which would get no sun, and the roof and glass sides would face direct north?"—Yes, a lean-to would do admirably. Indeed, you could not have a much better position for a studio.

LANTERN-SLIDE MAKING.—E. MOORE writes as follows: "In making lantern slides by contact, exposure under negative three seconds in diffused daylight, I found, on developing, I got a well-defined negative. I tried the second with the same result, so I had to give up on those lines. I used the Ilford lantern plate, and hydroquinone and hydrate developer (as directions). I have since made several lantern slides by reduction, using the same formula; this is my first try by contact. Will you kindly give me some explanation?"—The contact prints were very much over-exposed, which produced a reversed action of light, and so a negative resulted instead of a positive image.

STAINED NEGATIVE.—J. MILNE asks: "Will you kindly inform me how to remove a mark or stain from an unvarnished negative? I was printing on a damp day on P.O.P., and next day printed platinotype, a little old, when part of the yellow surface of the paper stuck to the negative, and when washed off left an ugly mark, which spoils the look of the prints. I have tried washing in distilled water and hydrochloric acid, as advised by the Platinotype Company, but it had no effect. Can you suggest a remedy?"—We should have fully expected that the treatment would have removed the stain. It having failed, however, we should suggest that a weak solution of cyanide of potassium be tried, as the stain may be really due to the silver paper and not the platinotype paper, though we are not sanguine of success with the cyanide.

ARTIFICIAL LIGHT.—FERROTYPE writes: "Kindly give your advice on following in next issue. I have been in the habit of using white fire burned in a specially constructed lamp for ferrotypes (wet-collodion process) for a New-year carnival, but there is a supply of electricity in the hall, which I could avail myself of, by payment of course. What candle power would be best, and would the ordinary arc lamps be suitable? I imagine I should (to obviate shadows behind sitter) require at least two lamps, although I only use one lamp for exposures, and duration of exposure, all things being favourable, bath, &c., about five seconds. On the score of economy, I think the pyrotechnic compound would pan out the cheapest, although it requires an attendant to light it up for each exposure. I am afraid the various incandescent systems would be too slow."—An arc light will be required, and one of 6000 candle power at least would, we suspect, be necessary with wet collodion to obtain a reasonably short exposure. One lamp will suffice if reflectors be judiciously used to light up the shadows. Incandescent lamps would not suffice. On the other matter, all you can do is to sue the man in the County Court for the money paid and the value of the negatives.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
The British Journal Photographic Almanac for 1899	641
Ex Cathedrâ	641
Discursive Notes on Paper—Photographic and otherwise	643
Pyroxyline Varnishes	644
The Photographic Salon	644
Foreign News and Notes:—Negatives Changed to Coloured Positives — The Cure of Astigmatism — Ammonium Persulphate — The Dangers of the Flashlight — Writing and Drawing upon Glass — Electrical Action in Development — Aluminium *versus* Magnesium	646
Royal Photographic Society's Exhibition	647
Photographic Economy.—III. By T. N. Armstrong	649
"Spirit" Photographs: where they may be Obtained	649
A Few Reflections on American Amateur and Artistic Photography. By Sadakichi Hartmann	650
The Lizars' Exhibition	651
Photographic Wreck-wherfzebets for Cabinets and Carte-de-visite, or Photographic Requisites. By Rev. R. Gentus	651
A Comparison of Plate Backings	652
Exhibition at Edinburgh	652
A New Quarter-plate Frena Camera	653
Our Editorial Table:—Specimens of Half-tone Engraving — Coloured Photo-medallions — Christmas-card Mounts — Catalogue Received	653
News and Notes	654
Patent News	654
Meetings of Societies:—London and Provincial Photographic Association — Photographic Club — Hackney Photographic Society — Plymouth Photographic Society	654
Forthcoming Exhibitions	655
Correspondence:—Copyright Fees — The Ammonia Accident — Hackney Photographic Society's Exhibition	655
Answers to Correspondents	656

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRA.

We understand that Mr. George Eastman has arrived in this country from the United States. We have authority for stating that the preparations for the flotation of the new Eastman Company have been completed, and that the prospectus will very shortly be in the hands of the public. The business of the Company during recent months has shown a great advance on previous records, so that the formation of the new Company takes place in the happiest circumstances.

* * *

Last week we published a newspaper statement regarding the Sellé process of colour photography the obscurities of which statement we refrained from criticising, for reasons of our own. Those reasons no longer exist, and, as we see that the matter is referred to in so important a paper as the *Daily Telegraph*, which, while giving its readers no intelligible idea of what the Sellé process really is, yet goes the length of saying that "such inquirers as Ives and Lippmann have arrived at the stage at which, by means of the use of various-coloured films, they have secured striking results. But these are not what is intended by the term "colour photography," which is understood to mean sun pictures which, when taken in the direct manner which now gives us black-and-white prints, will appear in the hues of nature"—two absurd mis-statements implying ignorance of what the Ives and Lippmann processes really are, and of the fact that "colour photographs" as in the last-named *have* been taken "in the direct manner," we may inform our readers what the Sellé process actually is in its latest developments. Briefly, then, it consists of the application of the three-colour process (by staining films) to the production of glass and paper positives and of three-colour collotypy to the production of paper prints. It is claimed that in the latter process some improvements have been made which render it

commercially practicable. We may have something more to say on the subject at an early date.

* * *

An electrical contemporary states that Professor Zickler, of Brünn, has conducted an elaborate series of experiments, which show that a telegraphic instrument can be actuated at considerable distances by a beam of ultra-violet light. He employs a powerful arc lamp as his transmitter, using a screen of glass to produce intermittent flashes of the ultra-violet beam, which embody themselves as dot and dash signals on his receiver. The receiver is an air gap in a circuit containing an induction coil regulated to an electro-motive force just below the sparking point at the air gap. As Hertz long ago has shown, a beam of ultra-violet light falling on the cathode of a strained air gap, near its breaking-down point, will immediately provoke a discharge. Zickler started by producing this effect over a distance of two miles. Then, by improving the shape and material of his electrodes, and enclosing them in a chamber of compressed air, he was able to increase this distance to 200 miles. This is a remarkable result, and it is extremely interesting to physicists to learn that the short and easily absorbed ultra-violet light can influence a spark discharge at so great a distance.

* * *

Two "hardy annuals" have recently found their way upon our table. The first is a batch of printed matter relating to the Socié é Artistique de Portraits, of 9, Rue de St. Pétersbourg, Paris, presided over by "M. A. Tanquerey, Directeur." Of this gentleman and his methods of doing business we had a few criticisms some months ago, while, since the year 1891, we have had so many references to the various free-portrait systems that have been from time to time introduced, that we have acquired the feeling that our readers must be tired of the reiteration of our objections to these plans of supplying "free" enlargements contingent upon the purchase of expensive frames for in expensive productions. The only novelty about the present collection of Tanquerey circulars that has been sent us is that there is a quotation from a recent issue of *The Morning Leader*, eulogistic of M. Tanquerey's Paris establishment. We wonder if our Stonecutter-street contemporary is aware of the nature of the business carried on by its *protégé*, and if it has read what Mr. Labouchere, in *Truth*, has lately said about M. Tanquerey?

* * *

The other batch of circulars deals with the *British Almanac* (not the volume alluded to on our first page, but a book resembling *Whitaker*, and published by Messrs. Charles Letts & Co., 3, Royal Exchange, E.C.). Messrs. Letts are asking photographers to take free photographs of owners of the book, on presentation of a coupon placed in that volume. In their regulations Messrs. Letts say: "The owner must, between January 1 and June 30, 1899, present the volume to the nearest photographer, who will tear out the coupon, and, having taken the necessary negative, will supply a well-finished copy free of all cost if *carte-de-visite* size, or on payment of 2*s.* if cabinet size. The photograph so supplied is copyright, and may not be used for purposes of reproduction without the consent of the photographer."

* * *

As we pointed out last year, Messrs. Letts's idea of copyright, applied to photographs, is erroneous. This is the actual case: The photograph not paid for by the sitter is the copyright of the photographer; the copyright of the photograph paid for belongs to the sitter. If this should meet the eye of Messrs. Letts, there is plenty of time for them to correct their mistake before the publication of their annual.

* * *

We have received the prospectus and list of officers of the Young Women's Camera Club, of Minneapolis, Minn., U.S.A. The Secretary, Miss M. Eva McIntyre, says: "We are arranging for prizes for our 'fall contest,' June 17, 1899. Have you anything to offer? It would enhance the value, and perhaps cause the girls to work harder, if a prize was offered from across the water by our 'British cousins.'" We are sorry to say that we ourselves have no prizes to offer for competition by our fair American cousins; but, doubtless, some of our chivalrously inclined readers may feel inclined to respond to Miss McIntyre's invitation. We have no ladies' photographic societies in Great Britain, so that possibly the opportunity will, by many admirers of female enterprise, be welcomed of supporting such an interesting institution as that referred to by Miss McIntyre, whose address is 1833, Portland-avenue, Minneapolis.

* * *

The Second Annual International Salon and Exhibition of the Pittsburg Amateur Photographers' Society will be held in the Carnegie Art Galleries, Pittsburg, U.S.A., from February 1 to February 20, 1899. As heretofore, there will be three separate and distinct divisions or exhibitions: the Salon, the General Exhibition, and an exhibition or division open only to members. Both the first and second divisions will be open to all artistic workers throughout the world. All communications must be addressed to Mr. Joseph H. Hunter, Secretary, 520, Green-street, Pittsburg, Pa., U.S.A., of whom full prospectus may be obtained.

* * *

The Polytechnic winter trade classes in Photography and Photo-engraving commence this month at the Polytechnic, 309, Regent-street, W. The opening night and social reunion will be held on Tuesday evening, October 18, in the large hall of the Polytechnic, Mr. J. D. Geddes, F.R.P.S., in the chair. The following is the programme: 8 p.m., The work of the ensuing session, Mr. Howard Farmer; 8.15, Selection of vocal and instrumental music; 8.40, Display of animated photographs (including the latest production); 9.0, Short address by the Chairman, entitled "The Application of Photographic Methods to Modern Colour Printing." There will be on view an exhibition of students' work in photogravure and process engraving. Admission is free to photographers, engravers, and lithographers, and those interested in these trades.

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Among the new features for the ensuing season may be mentioned technical investigation and colour photography. A most important advance in this section has been made by Mr. Tallent in his classes. Mr. J. F. Sleap will show the application of the three-colour process to photo-lithography. Mr. E. Senior will demonstrate Professor Lippmann's method of colour photography, and Mr. Peake, who has worked under Professor Joly, will lecture on the Joly process. The lecture course will be brought up to date by demonstrations showing the recent advances in photography. In photo-lithography, Mr. Sleap will, this session, devote the whole of his attention to the

various processes of photo-lithography. The principal features of previous sessions have been retained in the programme.

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A VOLUME of great interest, entitled *The Illustrated Guide to the Madras Railway*, has just been published by Messrs. Higinbottom & Co., of Madras. It is compiled and illustrated by Mr. F. Dunsterville, the Company's chief Auditor, who is also, as our readers know, an able photographer of very long experience. Besides a great amount of interesting letterpress on the country traversed by the line, there are forty photographs made by Mr. Dunsterville perfect of their kind, and, moreover, exceedingly well reproduced in collotype by Messrs. Morgan & Kidd, of Richmond. A special article on "Sport in India" is given in the book, which is a handsome production and should be welcome to intending tourists in southern Paris. We congratulate the Madras Railway Company on its enterprise and Mr. Dunsterville on the signally fine work he has put into this well-produced book.

DISCURSIVE NOTES ON PAPER—PHOTOGRAPHIC AND OTHERWISE.

IN a recent article we dealt with paper as directly employed for photographic purposes, that is, where the picture is formed immediately on the paper itself, or on the baryta, or other material with which it is surfaced for emulsion photography—collodio-chloride, gelatino-chloride, or the like. Now, the composition of these papers, or the coating upon them, may, or may not, have a material effect upon the life of the print; with that subject it is not, however, our purpose at present to deal. What we now intend to do is to point out how some papers that are not used directly for the picture itself may, however, have a marked effect upon its future. It follows as a matter of course that, if a silver or other photograph is mounted upon a support or is kept in close contact with anything that contains an agent which has any influence whatever upon the image, the picture will be affected in some way or other by it; of that we have too many evidences in the way of injurious mounts.

The paper itself may, however, change quite irrespective of the image upon it or that with which it is brought in contact. We know that some papers change in colour spontaneously, even when kept in the dark, while others change only with exposure to light, and some not at all. Take, by way of example, an engraving that has been printed a number of years, and it will be seen, in most instances, that the paper has usually lost its pristine whiteness and become "mellowed," a condition much appreciated by connoisseurs in engravings.

At the present time some photographers do pay attention to the character of the mounts upon which they put their prints so far as the smaller sizes are concerned, though not often to the larger and more important ones, plate paper, and the thin India paper, or imitation thereof, so largely used for "plate sunk mounts." These papers are not specially made for photographic, but for printing, purposes; yet few photographers, we imagine, take the trouble, trifling though it be, to test their suitability for the uses to which they are put, although they may have a material effect upon the life of their pictures.

The mere changing of the colour of the paper mount is really of little moment provided it does not affect the picture itself. But the case is different if the lights of the picture are affected. This is frequently the case with the tinted papers, albumenised and emulsion. The tints on these are usually given by one or other of the coal-tar colours that are fugitive if exposed to continued strong light. Then the colour is discharged, and, instead of leaving the paper or its coating of its original whiteness, it generally leaves an unpleasant yellow tint behind. We once had a sample of rose-tinted paper (albumen and unsensitised) upon which a marked effect was produced with only a few hours' exposure to strong sunlight. Some of the pink-tinted evening newspapers, it may be mentioned, will have their colour quite discharged by only a day or two's exposure to strong light, and thus reveal the commonness of the paper which the colour was used to conceal.

So far we have only attended to papers concerned with silver printing proper, but the same thing obtains in other processes in which papers, not made for photographic work, are employed. Comparatively little paper, for ordinary purposes, is now made from rags as it used to be in times past. It is now generally made from wood, esparto and other grasses, straw, &c., and is generally more or less affected by light, being darkened by its action to a more or less dirty yellow tint. Some, indeed, are very sensitive, and a pronounced impression may be printed upon them with only two or three days' exposure to sunlight. The better kinds of wood-pulp paper are, as a rule, less sensitive than the commoner sorts, and we believe that the wood, and other pulps, may be so treated that the paper made with them is as unchangeable as that made with rag; but we are told that it then becomes as costly as that made from rag. Most woods in their natural state, it may be incidentally mentioned, are sensitive to light; for example, if we take a freshly planed deal board, and cover up a portion and expose the rest to light, the exposed portion will be darkened, sometimes in a very short time. It is not at all uncommon to find a board upon which a printed announcement, such as "a house to let," has been fastened to have the printed matter impressed upon it as a negative.

If a paper such as that just referred to be used, say for collotype prints or as the transfer paper for carbon pictures, its change is often attributed to the process itself. Some little while ago we were shown some collotype prints which were alleged to have "faded"—*i.e.*, they had become yellow in the lights—together with others of the same series that had not. We found, however, that those which had changed had been framed and hung in a shop window for a month or more. Of course, the ink of the collotype had not altered; it was only the paper that had changed in colour by the exposure.

Quite recently we have seen some carbon pictures that have manifestly changed in the lights by exposure. They were mostly blue and green prints, and the yellowing of the lights was very palpable. Many years ago attention was called to the fact that some carbon prints that had been long exposed to the light had "faded," that is, the lights had become discoloured; which, in photography, is generally termed *fading*. On investigation it was found, as might have been anticipated, that it was the paper only which had been affected by the light's continued action, and not the pigmented image. That is the case with the prints referred to above, just as it was in that of twenty or more years ago. All this, and that in the former article, shows how completely photographers are, and photography is, at the mercy of the paper-makers.

PYROXYLINE VARNISHES.

Solutions the main constituent of which is a nitro-cellulose have long held an important place in photographic technics, the now almost superseded bromo-iodised collodion being, it need scarcely be said, the most conspicuous example. Since the comparative disuse, however, of this once indispensable liquid, nitro-cellulose as a varnish base has come into very general favour, the particular form most affected by photographers being the amyl-acetate solution of celluloid, which, as is well known, consists mainly of so-called gun-cotton and camphor. Incidentally it may be remarked, that the extent to which photography has become a power in the land may be gauged by the effect which the demand for celluloid (largely photographic) has had upon the market price of camphor. One grave defect of this particular solution is the penetrating odour of the amyl solvent, which, not by any means unpleasant of itself, becomes very objectionable when the presence of its vapour pervades the whole of the premises where it is used. It may be argued that, if the odour is objected to, there are many other solvents free from any offensive character of this kind, and such an argument would be sound were it not for the fact that other defective qualities are attached to many of the solvents. We may take for example the di-methyl-ketone, usually known as acetone, the substance so recently introduced as a developer constituent; it will readily dissolve celluloid, but, when the liquid is then tried as a varnish, it will be found wanting, from the fact that it dries to an opalescent or papery-looking film, quite useless for the purpose. As some of the lore of the old collodion-workers is in danger of being lost to modern workers, it may be well to point out some of the peculiarities of pyroxyline when dissolved. This chemical has been termed a tri-nitro-cellulose, but its exact formula varies according to the degree of nitration it has attained, and its physical properties are equally varied according to the heat at which it was made and the extent of dilution of the acids. With a maximum dilution the fibres of the cotton will be short and powdery and soft to the touch. With less water the fibre is stronger and quite unbroken, and feels quite harsh when handled. An expert can almost tell with his eyes shut what kind of solution a particular sample of the gun-cotton will make. The first-described will give a beautiful limpid solution, flowing well and showing no structure when dry. If a certain maximum of water has been passed in its manufacture, the film left after drying will be dead and papery-looking. When the other class of pyroxyline is dissolved, it will be found that a far smaller quantity has to be dissolved before the liquid becomes too thick to pour and flow. Further, the harder and harsher the fibre of the cotton, the more will the film dry with a "grain" or structure, though it will be very clean and brilliant. Exactly the same peculiarities attend the collodion, as the solution in ether and alcohol is called by photographers, and upon the nice adjustment of these various qualities depends the working character of the collodion.

A mixture of this liquid with ordinary alcoholic varnish will also not dry clear—will produce, indeed, a dead white film, which has been proposed as a substitute for ground glass.

If we now pass from these better-known solvents to others of more recent introduction, we find very marked differences in the solutions of the nitrated celluloses. Thus Herr Hugo Flemming, in a foreign journal, finds both dichlorhydrin and epichlorhydrin excellent solvents for the pyroxylines and for such compounds of them as celluloid. Herr Flemming explains that gun-cotton (presumably the photographic kinds, as the true gun-cotton—di-nitro-cellulose—is quite insoluble) is readily soluble in epichlorhydrin, but that even a twenty per cent. solution is so thick that it requires diluting with alcohol before being used as a varnish, though the resulting varnish possesses several advantages over the usual solvents for nitrated cellulose products; but in this regard it is necessary to draw attention, before arriving at any decision on this point, to our remarks upon the nature of the pyroxyline and its effect upon the solution. An ether-alcohol solution would be, with the very best sample obtainable as regards free-flowing character and complete transparency of film after varnishing, very thick indeed, and quite useless as a varnish. Hence Herr Flemming's objection is really without grounds.

In conclusion, we may now recapitulate the characters a good nitro-cellulose should possess if it be desired to use it as a varnish. It should have short, broken fibres, and feel soft to the touch. Such a kind dissolved to the extent of five grains to the ounce will give a clear, limpid liquid, free-flowing and bright-drying.

THE PHOTOGRAPHIC SALON.

The Salon is getting a big boy now, for it has entered the seventh year of its age. With one exception, pointed out below, the eccentricities of its earlier days have disappeared, and the habitual visitor and student of Salonic photography, like ourselves, goes to the Annual Exhibition nowadays quite confident that he will be no longer startled or amused. Gone are the aforetime "Cricketers," the Astigmatographs, the formless blurs, the green-painted frames made out of the tops of fowl-houses—gone, we suppose, never to return. Gone, too, are the white wood ledges, the stencilled designs and brown canvas hangings of only a year ago. These things served the purpose of attracting just so much ridicule to the Salon as would force it into notoriety and prominence without destroying it outright, and, having served that purpose, have been wisely dropped. Even the gum-bichromate process, of which there are between forty and fifty examples in the present Exhibition, has quite sunk to the level of the usual thing, so signally do the sensations of one year fail to sustain their special attributes for another. Why, we go the length of hazarding a prophecy that the gum-bichromate process will be as dead as doornails ere long, that, in fact, it will soon share the same fate as Artigue printing, which some four or five years ago was trumpeted forth as a Salon speciality by the ingenious Mr. Alfred Maskell, and of which, throughout the whole of the country, there are to-day probably not two exponents. And, if a beautiful process like the Artigue could not survive, what hope is there of such an abominable burlesque of the carbon process as "bi-gum?"

Still the Salon has not yet fallen into the commonplace. On the contrary, some of the examples of photography shown this year are amongst the ablest we have seen, and the Exhibition as a whole is unquestionably the best held at the Dudley Gallery. Moreover, it is hung with undoubted skill against a suitable green background, the light upper drapings of last year being retained, and the effect, from whichever point of view the walls are looked at, is always harmonious and well balanced, while there are no unrelieved black patches as at Pall Mall. Mr. George Walton, who, we believe, is responsible for the hanging, has certainly scored a success.

The Sixth Exhibition of the Salon will, doubtless, be remembered by the fact that some half-dozen men—British exhibitors all—have shown work a long stride in advance of their previous efforts, good as those have undoubtedly been. These men are William Crooke, A. Horsley Hinton, Harold Baker, J. Craig Arran, Baron A. de Meyer Watson, Reginald Craigie. Taking Crooke's exhibits first, if, in his imposing and strikingly bold portrait of Mrs. Patrick Campbell (No. 52), he has been helped by the sitter's interesting individuality, there is no such "discount" to be deducted from No. 180, the late *Sheriff J. Comrie Thomson.* Passing over its defects of being too low down in the field and a suggestion of squattiness or squareness, due to the unavoidable disposition of the sitter's robes, this must be regarded as the finest and most firmly handled bit of portraiture Mr. Crooke has shown us. The late Sheriff is seated, and the robes are so disposed that you become unconscious of the sitter's feet—always a weak point in photographs of this nature. The pose is

dignified to a degree, and the whole work powerfully impressive, while having all the simplicity of masterliness.

Mr. Harold Baker's *Countess of Warwick* (No. 57) is exceedingly beautiful: the soft draperies of the lady arrange themselves in gracefully falling curves, and the easy attitude and delicate lighting adopted combine to make a charming study. *A Pleasant Story* (No. 59), a girl reading, is another of Mr. Baker's successes; but, of his two portraist of Miss Lily Hanbury, we think No. 108 has a certain flatness and lack of distinction as compared with No. 175, a very pretty portrait in full length; but Mr. Baker is rapidly placing himself beyond the pale of mere photographic criticism.

Mr. Horsley Hinton this year sharply cuts himself off from the style of subject to which he has accustomed us during the last five or six years, and with the happiest results. His *Pathless* (No. 53), a rugged mountain view with the light sweeping down from the summit, and *Summer Clouds* (No. 228) show him in his transition stage; but in *The Headland* (No. 63) he has a sure grip of his theme. Here you have a fine study of a rugged headland reflected on the rock-dotted waters of the foreground, which we should reckon the best and most broadly handled and treated of Mr. Hinton's contributions. The lighting of *Sylvan Solitudes* (No. 79) is perhaps hardly correct, as, writing from memory, it strikes the picture from two different directions; but, in *Suffolk Meadows* (No. 85), he has a pastoral study rich in beauty of effect and mellowness of interpretation, while in No. 126, *The Harbour*, a quite new departure, he shows a very delightful view of craft lying on placid waters. It is quite evident that Mr. Hinton's photographic versatility has only just begun to assert itself; and he appears to have the ball of success at his feet.

Of Mr. J. Craig Annan's seven contributions, two in our eyes, at least, are commonplace (Nos. 7 and 83); and, when we say this, we are judging Mr. Annan by his own very high standard; but other two (Nos. 134 and 224) show him at his best. The first, *The Burgomaster's Daughters*, is the best bit of portrait grouping in the room. The ladies are costumed to the characters assigned, and they are seated side by side looking out of the picture, which only needs colour to appear the production of a Dutch master. We think Mr. Annan will find it difficult to excel this grand piece of work. The other picture, *The Lady with a Fur Cape*, is a very graceful study of a full-length figure with a dark cape. It is a simple, unpretentious theme, pleasing by its very naturalness.

The wall to the left of the visitor entering the gallery is covered with about fifty small exhibits, and of these nearly half are gum-bichromate prints. Nothing will ever persuade us that this process is suitable for small work, and in general, taking the whole of the gum exhibits, large and small, at the Dudley Gallery, we think that from all points of view much more satisfactory results could have been secured by the ordinary carbon process. Mr. George Davison has fallen a victim to "bi-gum," and has ten examples by it here. His eleventh picture, *From Conway Mountain* (No. 93), a very fine panoramic view, is not, we believe, printed in this medium. As a matter of personal preference, we think all Mr. Davison's pictures would have looked more convincing, more compelling, so to speak, in some other medium than "bi-gum," particularly his large and characteristic view of *Walberswick* (No. 165), but the phrase "tot homines quot sententiæ" obviously very strongly applies to the matter of photographic printing processes.

Mr. Clement Hopkins sends an unconventional *Portrait of himself* (No. 4), and some charming little studies come from M. Demachy, one very much like his last year's *Fan*. Miss F. B. Johnston's little portraits have a welcome depth and richness of tone in a crowd of measly gum bichromates, but we do not like Mr. Calland's *Barley Mowers*, somewhat poor and weak, we thought, compared with the very fine lifelike things of the same character which Lindsay Miller of Glasgow does. In *A Sunny Window* (No. 51) Ralph Robinson has a pleasing and harmoniously lit study of a lady at a window, and in No. 58 Mr. W. Thomas has one of his well-known birch and bracken effects. But a couple of years of this sort of thing, charming though it is, is quite enough, Mr. Thomas. The "pictorial" quality of a commonplace street view in Algiers (No. 60) would puzzle the Salon Selecting Committee to define, we will be bound. *Kenneth Grahame* (No. 72), by Mr. Craigie, is a quite excellent bit of portraiture, and in *The Golden Close of Evening* (No. 81) Ralph Robinson has a very happily chosen and treated effect. Baron A. de Meyer Watson has several very attractive portrait studies—Lady Granby, Mrs. Patrick Campbell, &c.; but perhaps his most successful contribution is No. 140, *A Study*, in which the flesh of the partly undraped figure is suggested with wonderfully good effect. It is realistic to a degree; indeed, as you look, you find yourself thinking that if you pierced it with a knife it would bleed. Mr. Hollyer's *Portrait of Mr. Craigie* (No. 94), presumably engaged in his secretarial work, for he is seated writing, is a happy thing, free of Mr. Hollyer's mannerisms. *Mrs. George Batten* (No. 101), by Baron A. de Meyer Watson, is a *tour-de-force* of brilliant and effective lighting; and we like the rustic prettiness of *At Litlington* (No. 102), by Viscount Maitland, of whom it may be said that, if he would confine himself more to one particular kind of work, he could easily win a higher place for himself in the ranks of "pictorial" photographers. About Hollyer's portrait of *The late Sir Edward Burne-Jones* (No. 110) there is an eerie, uncanny, drawing look which not everybody would appreciate, but it is undeniably powerful. Of *Noontide* (No. 116), by Mr. Craigie, cattle under trees, we can say that it has all the suggestion of summer afternoon drowsiness. You can almost hear the hum of the insects. *G. Sauter* (No. 124) is a ghastly, cadaverous Hollyerism, though possibly it fits the individuality of the sitter. But how is the Piccadilly wayfarer who, knowing nothing of "pictorial" photography, meekly lays down his shilling at the Dudley Gallery, to know these things? And will the Rev. F. C. Lambert solemnly take oath and say that he really believes his *To Speed the Parting Guest* (No. 144) to possess any pictorial quality whatsoever? It is simply an ordinary view of some persons from the steps of a house seeing somebody off in a cab. The photograph is cut down to represent a long narrow slip of a print, and frankly we cannot discover that it possesses any other distinctive quality. Mr. Ralph Robinson is again successful with *The Clyde at Glasgow* (No. 157), the oily-like quality of the water being well suggested; and in *A Nile Landing* (No. 178) Mr. E. R. Ashton sends one of his admired Egyptian views, full of life and go. Miss Zaida Ben Yusuf has given her photograph of *Anthony Hope* (No. 189) far too much top light, and, if the old ascetic in *The Burden of Life* (No. 197) is really tired of existence, there is no excuse why Mr. Bhedwar should have given the photograph such a horrible hardness and harshness of contrast. Mr. H. P. Robinson's contributions are welcome by the very glow and brightness which characterise them. It is a positive pleasure, after so much Salonic murkiness, to contemplate *Asking the Way* (No. 208), one of the sunniest of cloud-capped landscapes (with figures) that we have seen. Such photographs as this can be *lived* with; with nearly all the forty odd gum-bichromates here it would be impossible for most people to do more than *exist*, and that only at a pinch. Mr. A. Jones Roberts has a photograph called *The Monk* (211); he is a very self-assertive-looking person, and he wears a moustache and beard. We have known many monks in our time, but they were not of the kind portrayed by Mr. Jones Roberts. They were all very meek-looking gentlemen, and their faces were usually destitute of hair.

Lack of available space forbids us carrying this review to greater length; but a word of praise is undoubtedly due for their exhibits to, besides those already mentioned, Mr. W. J. A. Hensler, Miss Weil, Messrs. C. H. L. Emanuel, G. Walton, F. H. Day, M. Bucquet, H. Walter Barnett (for a very fine portrait of Mr. J. W. Taber—the most striking bit of work we have seen from this artist), C. S. Baynton, P. Lund (for a capital little portrait study), H. H. Hay Cameron (somewhat old-fashioned but very sound portraiture), Arthur Burchett (a glowing and animated fanciful study of a charming lady with a parasol), Paul Bergon (figure studies), &c., &c. If we could only eliminate about thirty of the gum pictures, there would not be much left at this Exhibition for us to find fault with.

And there is another respect in which we can scarcely congratulate the Salon on having acquired an amount of wisdom commensurate with its experience. We allude to the tone of its official literature. The earlier "Forewords" to the catalogue contained a shrill note of defiance such as might be forgiven a young bantam shaking its feathers for the first time in the sunlight; but what are we to say to the following after six years:—

"Of the whole field of photography the Photographic Salon takes but a small portion—its pictorial application as a means of expression. The aim of the Salon, since its inception six years ago, has been to discredit ingrained traditions based on a narrow misconception of the true method of interpretation possible in pictorial photography, and to change, or at least to modify, the harmfulness which the following of these traditions had brought about. The evolution of ideas involving a radical change has of necessity been a matter requiring time for development. In opposition to the order of things which existed in earlier days, it is sought to emphasise the decorative and imaginative and to minimise the purely imitative. Means towards this end are a persistent striving for effect and for strength of interpretation, and the recognition of the small importance of the negative sketch in comparison with what may be got out of it in the printing frame. Realism, in the sense of recording facts in a documentary manner, does not imply absence of the decorative. It is not the mission of the Salon to teach photography, but to show by examples

what can be done by it, and that the branch which is called pictorial is able to stand alone without hanging on to the skirts of other departments whose glory lies in abstruse calculations, in chemical analysis, and in the minutiæ of the science of optics. It is towards this end that it has set up a standard of excellence which consists in the evidence of personal artistic feeling and execution, and it is its desire to show that there is not, of necessity, a special æstheticism to be applied to pictorial representation through the arts of drawing, painting, or engraving, nnd another to methods of expression by means of photography."

Such nonsense as this does the cause of pictorial photography (which existed long before the year 1893) more harm than good by the contempt it excites in the minds of the educated public at the attitude of superiority taken up by the Photographic Salon towards the other branches of the photographic production. The Salon did not create pictorial photography; it does not enjoy a monopoly of it; and we are bound to add that its annual exhibitions admit many examples which are neither pictorial nor photographic. The present supplies several cases in point. On the other hand, these unfortunate "Forewords" actually constitute a plea for the neglect of exact photographic knowledge a respect in which many prominent exhibitors at the Salon have long and obviously shone. We wonder if such men as Harold Baker, William Crooke, Rev. F. C. Lambert, A. Horsley Hinton, R. W. Craigie, R. W. Robinson, J. B. B. Wellington, and others are really satisfied to be told that they know nothing at all about photography. The Salon "Forewords" can certainly be read to include such an imputation. By all means let the Salon people write in praise of pictorial photography and do all they can to promote it; but, if they are at all anxious to win respect for their excellent efforts, we would seriously counsel them to make their "Forewords" less equivocal and less ridiculous in future.

FOREIGN NEWS AND NOTES.

Negatives Changed to Coloured Positives.—Dr. R. E. Liesegang, in the *Photographische Correspondenz*, describes an application of the persulphate of ammonium process to the production of coloured transparencies. It will be remembered that a few months ago he recommended immersion in a solution of this salt, with subsequent friction, for converting negatives into positive reliefs. A saturated solution is used, and, when the negative is quite bleached, it is immersed in warm water or gently rubbed with the warm hand until those portions which were originally black are removed. A relief is thus obtained, which may be stained with any suitable aniline dye, and a coloured positive thus produced. The process is easier with paper negatives, and Dr. Liesegang recommends this support for first attempts. Vigorous pictures should be used, and friction should not be applied until the print has been taken from the bleaching bath and washed. After publication of the relief process, Dr. Liesegang was informed by Colonel Waterhouse that he had made repeated trials of the same and had failed. Dr. Liesegang also had a similar experience. After making a considerable number of reliefs, he suddenly found it impossible to produce any more. In the first instance he had used an old solution of persulphate, and in recent successful experiments he again used a solution that had been exposed to the air for a considerable time. On the other hand, a freshly prepared solution was useless for the purpose. It is preferable to make a saturated solution and leave it exposed for a fortnight in an uncorked bottle. If too old, the solution may dissolve the entire film. The negatives must not be intensified, and will give better results if rather under-exposed and developed with a non-staining developer.

The Cure of Astigmatism.—At the recent International Congress for Applied Chemistry, Dr. Miethe read a paper on the "Influence of the more Diverse Chemical Composition of Modern Optical Glasses in Practical Optics, with Special Reference to Photographic Lenses." The following general proportion was attributed to Dr. P. Rudolph as to the necessary condition for obtaining an anastigmatic picture plane: "That, at some part of the combination, the convex surface of a high refracting medium must be turned towards a low refracting medium." As Dr. Rudolph has no recollection of having given utterance to a general proposition concerning the elimination of astigmatism, but has preferably confined his remarks to special types of anastigmatic combinations, he asks Dr. Miethe whence the quotation was obtained. He bases the inquiry not only on historical grounds, but for the reason that he cannot acknowledge the condition as universal and essential.

Ammonium Persulphate.—In an article published by *Der Photograph* concerning this salt as a reducer, it was stated that persulphate was not the correct denomination, but that the salt was rather the acid sulphate of ammonium. E. Merck, of Darmstadt, replies in the *Photographische Correspondenz* that this salt with the chemical formula NH_4HSO_4 cannot be used as a reducer, but that the suitable compound is a quite different ammonium persulphate with the formula $(NH_4)_2S_2O_3$. This salt is not difficult to prepare, and it is produced in large quantities for many purposes. Its commercial value is considerably less than seven shillings per kilo, the price which was quoted.

The Dangers of the Flashlight.—Herr Max Jaffe, of Vienna, has had a narrow escape from imprisonment. It appears that he was engaged to photograph a number of persons present at a meeting. The hall was lavishly decorated, and a number of paper garlands were suspended from the roof. Herr Jaffe had posted himself with the camera outside the hall at the entrance, and his assistant, Herr Nussbaum, had charge of the flashlight apparatus in the hall. Herr Nussbaum, unfortunately, was too near the receptacle containing the stock of flashlight mixture, which became ignited. The flames attacked the paper garlands, and considerable damage was done to the hall. The Judge who heard the charge of negligence brought against the two, condemned Herr Nussbaum to forty-eight hours imprisonment and acquitted Herr Jaffe. The claim for damages was referred to a civil court.

Writing and Drawing upon Glass.—According to the *Deutsche Photographen Zeitung* a patent has been recently granted in Germany for writing upon glass with an aluminium point. The surface of the glass must be wetted with vinegar. Fine particles of aluminium adhere to the glass, and the surface, when dry, exhibits the writing or drawing in silvery lines that cannot be easily removed by friction.

Electrical Action in Development.—Professor Hermann Krone recently published an article in the *Allgemeine Photographen Zeitung* concerning Captain Abney's experiment of coating an under-exposed gelatine plate partly with an unexposed chloro-bromide emulsion and developing the same with an alkaline developer. On the recoated half a well-exposed, plucky negative was obtained, but the other half of the plate gave merely an under-exposed image. By stripping off the second film it was shown that the well-developed image was principally contained in the chloro-bromide emulsion, and not the original bromide film. Krone explains this peculiarity as due to a not quite clearly defined inductive action upon the second film produced by electrical oscillations excited by exposure in the original film. In the *Deutsche Photographen Zeitung* Herr Klepp dissents from this view and thinks the phenomenon is easily explained by the electro-chemical theory of development. According to this theory the reduction of the silver haloid proceeds with greater energy as the difference between its absolute potential and that of the developer increases. The second film contains silver chloride with an absolute potential in water of ·80, whilst that of silver bromide in water is ·73. The absolute potential of a strong alkaline developer, say pyrogallol and caustic potash, is ·08. Consequently there is a greater difference between the potentials of the developer and silver chloride as compared with silver bromide. It follows therefore that, if galvanic connexion is established, the exposed silver chloride will be more rapidly reduced than the exposed silver bromide per unit of time. Captain Abney's experiment should, under certain circumstances, be of considerable value in practice, for a better result might be obtained in that way in the case of very short exposures. This might lead to fresh developments in the sphere of instantaneous photography; but this is music of the future.

Aluminium *versus* Magnesium.—At the Congress for Applied Chemistry, Herr H. Kessler of Vienna made known the results of some experiments in which the powders of these metals were used for flashlight photography. Similar experiments, instituted by Professor Glasenapp, gave but a slight advantage to aluminium mixed in equivalent proportions with chlorate, but, as the flash lasted $\frac{1}{5}$ second, it was useless for portraiture. Herr Kessler took the well-known mixture of 1 gramme of magnesium to $\frac{3}{4}$ gramme of permanganate of potash as standard, and for each trial used 1 gramme of magnesium, or aluminium in the tested mixture. Aluminium powder, when blown through a flame, is only partly consumed.

Villon recommended the addition of $\frac{1}{4}$ lycopodium and $\frac{1}{20}$ ammonium nitrate, but with these additions the aluminium is not all consumed, and it is not surprising that only $\frac{1}{16}$ part of the light was obtained as compared with 1 gramme of magnesium. Another mixture by Villon, containing 20 parts of potassium chlorate, 8 parts of aluminium, and 2 of sugar, ignited with a slow match, gave a light equal to magnesium, but it should not be used, as chlorate of potash and sugar are highly explosive under concussion. One part of aluminium and 2 parts of permanganate, as recommended by Glasenapp and Demole, give less light (only about one half) and produce as much smoke as similar mixtures of magnesium. Ommeganck's mixture, 5 parts magnesium, 3 parts aluminium, 1 part red phosphorus, gave only $\frac{1}{10}$ light of magnesium. In general the rapidity of combustion was no greater in the case of aluminium. The most favourable result was obtained with the mixture of aluminium and permanganate, which was consumed in $\frac{1}{8}$ to $\frac{1}{10}$ second, but the magnesium mixtures were consumed in $\frac{1}{10}$ to $\frac{1}{30}$ second. As these results were all in favour of magnesium, other substances were mixed with magnesium for trial. The addition of 2 parts of persulphate of potash to 1 of magnesium reduced the time to $\frac{1}{30}$ second with about the same amount of light and smoke as the permanganate mixture. Röhmann and Galewsky's mixture, consisting of 13·8 parts anhydrous perchlorate of potash and 9·6 parts of magnesium, gives rather more light than the persulphate, much more smoke, and a rapidity of $\frac{1}{20}$ second. The mixture recommended for use with orthochromatic plates was also tried. This is composed of 10 parts of Röhmann & Galewsky's powder with 1 part of another mixture containing 5·7 grammes of tartrate of barium, 2·7 grammes perchlorate of potash, and ·5 gramme chloride of sodium. The mixture was ignited by addition of 1 part of milk sugar and 3 parts of chlorate of potash. The light was reduced by half and the rapidity to $\frac{1}{5}$ second only. The flame is yellowish and suitable for orthochromatic purposes where speed is unimportant. As less brilliant and slower of combustion may be mentioned the mixture for orthochromatic work, composed of 1 part magnesium and 5 parts barium peroxide. Of the various magnesium mixtures, that containing potassium persulphate (anthion) seems especially valuable. Müller's mixture, containing 3 parts perchlorate of potash, 3 parts chlorate of potash, and 4 parts magnesium, comes next, and with it may rank a mixture of 3 parts finely powdered permanganate of potash and 4 parts magnesium, which is scarcely explosive at all.

ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

(Second Article.)

One of the pictures earliest in the room to strike our notice is *The Pond* (No. 2), by Mrs. Welford, a rustic view glowing with sunniness, and admirably composed. In Mr. C. C. Branch's *Sahara* (No. 11), loaded camels passing across the desert, a very striking effect of solid-looking black masses against a light ground is obtained. *On the Lagoon* (No. 16), by E. G. Boon, despite a by no means suitable yellow tone, is an effective study, the reflection of the craft in the water giving an air of reality to the scene. We soon come to the portrait panel, which, despite its sombre totality of effect, contains some sterling work. Nothing is better in lighting and modelling than Von Schoeller's *Rembrandt Study* (No. 24). It appears to be an Artigue print, and it is full of the concentrated mastery in portraiture which we are accustomed at the hands of this photographer. We entirely object to C. W. Richardson's *Study of a Head* (No. 25). It has a gruesome reddish-black tone, and is ugly and unsuggestive. The author possibly had an idea in his mind, which he certainly has not conveyed to the visitors to the Exhibition. Such results ought to be descriptively labelled. Much the same remark applies to Mr. J. D. Ritchie's *Portrait* (No. 29). The object of a weak and ghastly production of this nature, which gives us the idea of a moderately good portrait that was spoilt in the printing, is impossible to guess. No. 26, by Mr. P. S. Lankester, has all the delicacy of a fine pencil drawing, and there are charm and brightness in Harold Baker's pair, *Geoffrey* (No. 34), and *Gladys* (No. 45). In the representation of unaffected juvenile simplicity and matured character Mr. Baker grows more successful every year. Ralph Robinson deserves our thanks, in more senses than one, for his portrait group—*Mother with Children* (No. 33). It is a well-composed, vividly lit study, and its "sparkle" is decidedly welcome amid its dark surroundings. We have already seen Mr. R. Eickemeyer's *The Vesper Bell* (No. 40), an old lady seated at her devotions, a crucifix on the wall, in an American magazine. In lighting, composition, and treatment this is a fine bit of work; moreover, the sentiment of the thing is perfect. A group of four portraits (Nos. 36–39) comes from Mr. H. Walter Barnett. These are uncommonly good little pictures all round; but we are confident Mr. Barnett will ere long touch an even higher level at the London exhibitions. *The Ring* (No. 32) shows the graceful art of Mr. W. Gill at its best. It is a pretty child study, work which, when well done, always commands admiration. *Pauline* (No. 41), by Mr. W. M. Warneuke, is a very fine portrait, having, in our eyes, a too acute curve of the neck on the right side of the head. In its dead black frame the exhibit is certainly striking; but there are other things in the room by the Glasgow master which we much prefer to it. Mr. John Stuart comes out well with the easy and unconventional pose which he has given to his *Portrait of a Gentleman* (No. 42), although the eye of the observer becomes somehow conscious that the right hand is detached from the body, in virtue of the fact that the right arm is not sufficiently prominent. Where, in large half or three-quarter lengths, prominence is given to the hands almost equal to that imparted to the face, it is impossible to ignore such points as these. We protested last year against such work as Oscar Hardee's profile study (No. 35). Where the art comes in by slicing off the back part of the head, we don't know. Will some one supply us with an apology for this sort of thing? It made its appearance at the Salon last year, but it seems to have been killed there, as it does not assert itself this year. The model in *A Siesta* (No. 54) much resembles the lady who has so often appeared in Mr. Bhedwar's religious pictures. Here she is depicted asleep, and it is a decided tribute to the artist that she really appears so. One of her arms strikes a somewhat too acute angle, which rather mars the composition. Mr. Hermann Schervee's large portrait (No. 57) would have been better if the lower portion had not been left so dark. It makes a mass of unrelieved blackness. Nos. 48 and 60 again show Mr. Lankester successful in child portraiture—nothing could be more attractive. Mr. G. Lafayette touches for him a somewhat unusual note in No. 63, *A Study*, showing a lady with a violin. The composition of the work is decidedly graceful, but the black colour of frame and print give the whole thing a very sombre aspect. Mr. Charles Sweet, who has so rapidly come to the front, is well represented here. His *Head of an Old Man* (No. 77) is full of power, though the colour, a peculiar shade of reddish brown, is not quite pleasant. Here we are giving off a purely personal expression. In the matter of the colour of photographs a wide diversity of taste may, it is true, be allowed to exist; but in the present case we think a darker pigment would have suited the subject better. Alike on account of the process employed and the subjects, the exhibits of Messrs. Hofmeister at once attract attention. They are large, striking, and ambitious, and they are printed in gum bichromate. The process here comes out miserably; it signally fails to suggest breadth of effect, the prints are weak, uneven, and patchy. We think that, if the exhibitors had employed ordinary carbon printing, much more satisfactory results would have been obtained. *Great-grandmother* (No. 124) is a cottage interior with an old lady bending over an infant in a cradle. It is so good, that with greater decision of treatment a striking success might have been assured. A study of a jovial-looking *Fisherman* (No. 125) and *Working Woman* (No. 148) are the firm's other exhibits. They show undeniable artistic power. To Mr. R. S. Webster for his portrait of a lady, *A Violinist* (No. 137), we give real praise; it has all the charm of nature in pose and lighting, and is an exquisite carbon print. *An Interesting Article* (No. 186) does the highest credit to Mr. N. S. Kay. It depicts an old gentleman reading a newspaper. The expression of interest is capitally secured, and the work as a whole is well done. We can recall the time when such a picture at Pall Mall would have been most enthusiastically received by the critics.

Times have changed with a vengeance when one contemplates two or three of this year's awards which have gone to productions upon which not one-tenth of the time has been taken over the work as by exhibitors like Kay, Lafayette, W. Gill, Webster, Sweet, F. Hollyer, Percy Lankester, John Stuart, W. M. Warnerke, Ralph Robinson, and other first rate professional men who are strongly supporting this year's Exhibition. Indeed this kind of support is, if we mistake not, the most gratifying that the Exhibition has had for a long time. It is surely one of the keenest ironies of the whole thing that an irrepressible and buoyant amateur may send in two or three little "faked" hand-camera shots to the Pall Mall Exhibition, and secure a medal at the first time of asking, while men such as those we have named may year after year put in weeks of work to their portrait exhibits and yet entirely fail to catch the judicial eye. We are sure we shall have with us the sympathies of the entire profession when we express regret that of this year's medals not one has gone into professional hands, notwithstanding the undoubted fact that, in an experience of nearly twenty years of this Exhibition, we do not remember to have seen an abler collective display of portraiture, and one, moreover, giving promise of still better things in the future. As we wrote last week, the landscapes are in the main mere repetitions, we saw the same thing last year and the year

before, and they come from persons to whom encouragement at the hands of the principal Society in the world is of far less importance than it is to an entire profession. We do not want to start any discussion on the subject of amateurs *versus* professionals, far from it, but our direct personal relations with professional photographers all over the country enable us to perceive that the little or no encouragement given to professional portrait work at Pall Mall has a decided retarding influence on the prospects of professional photography. Let us, however, return to the exhibits, still confining ourselves as far as possible to the portraiture.

No. 179, one of Mr. Lafayette's portrait studies, errs perhaps on the side of flatness, but is otherwise excellent. *Mauri* (No. 198), the first contribution we can recollect seeing from Mr. R. M. Evans, is a very bright piece of child portraiture. Fred Hollyer has a portrait of Laurence Hutton (No. 201). The well-remembered panelled background at Pembroke-square appears in the photograph, the subject of which is also turning over the pages of a not unfamiliar book. We know that book—it comes a poet. Like all Mr. Hollyer's portraits, this is unconventional and full of character. Considering how easy it is to fail in electric-light portraiture, Mr. G. W. Morgan is distinctly to be praised for his *Portrait of a lady* (No. 220), *by electric light*. There is, however, an abrupt line of light and shadow on the arm which might have been prevented or removed, and the surface of the print appears to have a not inconsiderable quantity of Chinese white upon it. Nos. 307 and 308 are by Mr. Sweet. The first is a portrait of the Rev. Hugh Black, seated at his table, and is a natural unstilted piece of work. Commend us, however, to No. 308, *The Scotsman*, an old gentleman with a magnificent head, "wrapped up" in our northern contemporary. Nothing more convincing or lifelike than this is hung at Pall Mall. Mr. John Stuart attracts notice with No. 343, *Portrait of a Lady*. The fair sitter is attired in pseudo-classical garb and she stands in a very graceful attitude. The light on the face is perhaps the least bit too strong, but the expression of complete non-self-consciousness has been well secured, and one gets the idea that here one is looking upon a capital example of that rare class of photographic portraiture which, in a manner of speaking, is more than skin deep. It is the best bit of portraiture Mr. Stuart has shown us. Mr. A. F. Mowll sends a very ambitious production. It is a portrait of a lady in a circular hat against a background in which there are a number of repeating circles. The work is striking, but we expect the genial "A. F." to do better.

If we are devoting less space than hitherto to the landscapes and waterscapes, it is for the reason that we have already given, viz., that, in our eyes, so much of it is repetitional in character. Men like W. Thomas, Horsley Hinton, J. H. Anderson, C. F. Inston, Mummery, and many others, show us practically what they have shown before. Here and there, however, we get a little departure from the usual thing, and some of these welcome changes have been recognised in the catalogue, notably *Calling the Ferryman* (No. 224), by John E. Dumont. There is real power in the disposition of the figure of the woman in the boat. The composition and treatment are capital. Mr. Marriage's *Oh hey for Somebody* (No. 159), an oddly named study of a lady at a doorway looking from darkness into bright light is a happily conceived bit of photography; and Mr. Craigie gives us all the sensuousness of the scene in his study of cattle under trees—*A Midsummer's Day* (No. 123). Novelty of theme certainly characterises *The Bishop of Balbianello* (No. 107), by Mr. C. C. Branch. The dark and lofty statue of the Bishop with outstretched hands looks over the water, with a fishing-boat in the foreground. Great contrast secures a most powerful effect in this case. *Grey Avon's Peace* (No. 221), by Harold Baker, has all the charm of a drowsy summer afternoon, the atmospheric effect being perfect.

We do not wish to make Mr. F. E. Corin unhappy, but his print *When Mountain Mists*, &c. (No. 232), should not have been hung, it is very dirty and spotty. As a matter of interest in connexion with the subject we may note that Mr. T. Coysh, in *An Essex Streamlet* (No. 223), shows perhaps the best example of gum-bichromate printing in the room. It closely resembles an ordinary carbon print. The other gums, as we said last week, are not successful, unless we except Von Schoeller's *At Skagen* (No. 382), a charmingly rendered seashore view with a foreground figure. Miss Muriel Bell, who always does refined and pleasing work, sends among other interesting contributions *A Magdalene* (No. 317). This is a delightful portrait of a lady in fancy costume, but the calm, young face is scarcely that of a Magdalene—a repentant woman with a past, if ever there was one. But Miss Bell may be allowed the licence always claimed by and cheerfully conceded to ladies in disregarding probabilities. Some years ago at the Salon there was a Magdalene, skull and all. This, however, is a subject upon which a wide diversity of idea prevails, although, frankly, we do not think these profoundly devotional or sacred subjects are feasible by photography.

The contributors to the Architectural Section include Messrs. H. W. Bennett, J. T. French, C. S. Baynton, Branch, Holcroft, Baker, E. Marriage, J. Stuart (with a very fine view of the old castle at Knaresborough), and others. Messrs. Bulbeck and Bolas do not exhibit this year, and thus the section is smaller than hitherto. The work is so evenly good that it scarcely calls for critical comment.

The Technical Section, which is prefaced, so to speak, by an exceedingly good enlargement by Messrs. Elliott & Son, Barnet, of St. George's Chapel, Windsor, from a negative by Bulbeck, contains no very striking novelties, although there is a great deal to interest the student of scientific photography. The metalloid photographs on dark supports, shown by the Metallic Photograph Printing Syndicate, have a very agreeable decorative effect. Photo-micrographs, once a strong feature at Pall Mall, are shown only by Mr. J. T. Holder; radiographs by Dr. Hall-Edwards; and bird photographs by Messrs. R. B. Lodge and Dr. Schufeldt, an American worker, who has long made a special study of this fascinating branch of photography. Reproductions of pictures are exhibited by the Autotype Company (who only show one example, their smallest contribution for years, we should think) and F. Hollyer. Mr. Thomas Manly exhibits examples of ozotype printing in pigment, being carbon printing without actinometer, transfer, or safe edge, and in which the pigmented gelatine does not come in contact with a chromic salt: (*a*) A print from a negative. (*b* and *c*) Two similar prints pigmented with autotype carbon tissue. Examples of printing with the aniline colours. (*a*) A print from a negative. (*b* and *c*) Two similar prints treated with a soluble salt of aniline and sulphuric acid, *b* being afterwards treated with ammonia. We await particulars of this process.

The lantern slides perhaps do not call for comment at our hands, and of the Apparatus Section it cannot be said that it contains much that is novel to habitual readers of these pages. One or two of the exhibits are, however, described below.

On the whole, we take leave of the Exhibition with feelings which may be thus analysed: (1) The medals are commendably few, but they have not been well distributed. (2) Professional portraiture shows a very marked advance on previous year. (3) Architecture, landscape, and the other branches of work practically show no difference or advance. (4) There is too great a tendency to sombreness of colour of frame and tone, especially among professional photographers. (5) The Apparatus Section, taken all in all, is the best for some years.

The exhibit of J. H. Dallmeyer, Limited, 25, Newman-street, W., consisted of a new stigmatic lens, Series IIIa, working at *f*-7·5, and embracing a medium angle. It is intended to be used intact, and is designed to replace the rapid rectilinear. It differs from most anastigmats in that there is a considerable distance between the combinations, thus permitting any form of diaphragmatic shutter to be fitted without difficulty. It is, of course, free from astigmatism, and has a very flat field. The specimen shown (5 in. equal focus) is the only size now ready for delivery; larger sizes are being manufactured, and will be ready in a few months. The price will be but little in excess of the ordinary rapid rectilinear.

The Dallmeyer hand camera fitted with the new automatic changing back; an illustration of this appeared in our notice of Messrs. Dallmeyer's exhibit at the Crystal Palace. This hand camera can now be had with a magazine holding twelve plates, perfect in action and yet instantly removable, thus permitting the use of a focussing screen. The changing is instantaneous, and there is no bag to leak, and no possibility of scratching or injuring the sensitive surfaces.

A new model long-focus camera for hand or stand. This is perfectly rigid and in the half-plate size here shown gives a bellows extension of nearly twenty inches. It is designed for use with tele-photo lenses or long-focus single ones, *e.g.*, the separate combinations of the Stigmatic. It is fitted with a rising and swing front, thus obviating the necessity for a swing back. There is a very convenient form of reversing back carrying a spring focussing screen. The whole is very solidly made, and for hard wear will compare very favourably with any camera giving an equal length of bellows. It may be worth mentioning that it is equally available for use with very short-focus lenses, the front baseboard being jointed so as to drop out of the way.

The Dallmeyer popular hand camera fitted with the Stigmatic lens, Series IIIa. This is a well-known type of camera, in which the plates fall from a vertical to a horizontal position after exposure. It is provided with a rack and pinion for focussing; has an everset shutter with adjustable speeds, two ground-glass finders, and a lens which covers perfectly at full aperture.

PHOTOGRAPHIC ECONOMY.

III.

To any enthusiastic amateur, or one who it may be said has for the time being "the fever very bad," perhaps there is no more fascinating corner on the face of the globe than the interior of a first-class photographic store, where everything that can possibly be imagined as requisite to make photography comfortable is displayed in the most enticing manner. It would, indeed, be impossible to describe the thousand-and-one articles that are now to be met with in any up-to-date photographic store. In olden times a photographer was invariably looked upon as a man of many resources, and for the most part had to tinker up much of the accessories that were found necessary in his practice, and a look into any of the little working corners, facetiously termed museums, such as the drawers of a work table did, and very probably in many instances would still, reveal a state of matters giving lessons in resource and ingenuity little dreamt of by those who are in the habit of rushing madly after every new toy that is placed upon the market in connexion with photography. In those early days of working there was very little comfort about photography but a jolly lot of sheer hard work and anxiety, and there are still those living who can speak of the trials and hardships incumbent upon a photographer, who in many instances, to prepare the necessary requirements for the day's proceedings, had to rise as early as 4 a.m., for nearly everything connected with a daily routine had to be, as it were, home-made, or self-prepared, and, as a natural consequence, "economy" bulked largely in such experience. Nor was this sort of thing confined merely to professional workers, for we have still among us a few of the pioneers in dry-plate working who regularly prepared their own wet and dry collodion plates preparatory to an outing; and, when amateurs in the days that are long gone by had to undertake a field day, it was a matter of no light moment to prepare even three or four fifteen-by-twelve collodion dry plates for some special picture that it was decided should be photographed.

In every case a worker had to depend upon his own resources, but then, as a return, what an amount of satisfaction in the results as compared with those obtained by that mechanical press-the-button routine of the present day. And not only was it in such items as the preparation of one's own sensitive materials, both for making negatives and the printing thereof, that a photographer was expected to provide his own requirements; his skill had to be shown in many other ways, even to the making of his own printing frames, as well as that of constructing his own dishes or trays for some portions of his work. In this latter item alone the question of economy, even at the present day, is one of some importance. Vulcanite, papier-mâché, or porcelain dishes are at all times an expensive item in a photographic outfit, particularly where work of any size beyond the modest quarter or half-plate is concerned, and especially so where enlarging has to be conducted. Yet how many amateurs are there at the present time who could be found in possession of a supply of large wooden dishes for enlarging purposes that have been constructed by their own hands? Very few, I fear. The making of such is by no means a difficult operation, and, once such has been provided and brought into general use (except, possibly, for one or two special classes of work), good-bye will be said to ready-made articles. A few pieces of well-seasoned wood are easily cut to sizes so as to form bottom and sides, and these are, when trimmed nicely, easily secured together with trap screws; the joints are then filled in with a quantity of melted paraffin (old candles do first-rate), to which is added a small quantity of resin. Dishes made in this homely form are miles away in advance of the heavy porcelain articles, and, what is of greater moment still, are practically unbreakable, and, in the event of their leaking a trifle through rough usage, they are easily coopered up by running fresh paraffin along the seams, or even by passing a hot poker over the wax they already possess.

Such dishes are invaluable for the purpose of development both of large glass negatives and for enlargements, as well as washing, toning, and fixing of prints, a separate dish being kept for each operation. If it be desired to give such a waterproof coating, this is easily done by dissolving shellac in methylated spirits, which may be well rubbed in with a pad of old muslin. Black varnish may also be used for this purpose; but in my opinion the shellac varnish is to be preferred, chiefly on account of its colour, for, when such has been used, it is not so difficult to tell when a dish is dirty.

In olden times it used to be said that a cutting or glazier's diamond was the most useful tool to be found in a studio; but these were the days when new glass had to be purchased, and there was much cutting and trimming to be performed, and on dull days the opportunity of having a wash off was never neglected. A good piece of glass was prized and made to do duty over and over again, chiefly on economical grounds. Yet how many workers with the present-day dry plate ever think of this value or turning them to some useful purpose.

Half-a-crown is frequently given for an enamelling slab, upon which the utmost number possible of small artists' prints are squeegeed by means of that modern abomination termed a "rubber roller," which in turn is another costly but useless item. The practice of trying to get the utmost number of prints upon one slab is, doubtless, attributable to the limits of the vulcanite papier-mâché or ferrotype supports provided for such purpose, and is a practice to be condemned. Were all the old glass of break downs, or failures in negative-making used for this same purpose, and only a reasonable amount of prints used on each support, there would be less failure and better glaze afforded to the prints.

When discarded negatives are used for this purpose, they should be stored away and used for no other. It is also unwise to clear their films off. When kept on, there can be no errors made in selecting the proper side, whilst, as to that abomination termed a roller squeegee, they should be all gathered in a heap and burned. The proper article is the first or original pattern, viz., a *small* flat piece of rubber let into a wooden support, and such ought not to be more than four inches long, for a small squeegee will work more level and better in every way than a long one, and, of course, is often less than half the price.

There is more economy in saving old negative glass than many imagine.

I knew one enthusiastic amateur worker whose weakness lay in a craze for dark-room lanterns, and I am certain he possessed lanterns that burn oil, lanterns that burned gas, and lanterns that had the electric lamp introduced into them; yet in no case, he declared, had he ever the satisfaction of working in a light that equalled a lamp that was home-made, in fact, constructed out of an old packing box. In my opinion there is no lamp to equal that produced by means of a wooden box of, say, twenty inches by fifteen, in which square apertures are cut out of its three sides, and into which is glazed suitable ruby glass; the door permits any radiant being inserted; a small hand-lamp or common candle is inserted at will. Such any one can make for themselves in half an hour; the ventilation is provided by cutting a hole about six inches square out of the bottom, and placing over the cut-out portion a larger flat board standing on four legs, upon which the radiant rests. The top is an old tomato tin; it works fine when let into the wooden top. I know of one such lamp that has been in daily use for the last eight years, and is as good to-day as the first day it was made, and looks good for another twenty years to come yet. For changing plates on tour or any odd jobs away from home there is nothing to beat a long stick of cardboard, say twenty-four inches long by eight inches high; this is ruled with a pencil into four equal divisions, and such parts are folded; out of one of these panels is cut a round or square aperture, over which is glued a piece of orange-coloured paper or ruby fabric. A flat asbestos card laid on the top is quite sufficient to exclude all light, and when a *small candle* end is provided the light is kept low, and this useful lamp may be folded up and stored even inside the camera, or in a breast coat pocket. Ventilation is easily provided by inserting the end of a pencil or match underneath the back panel. The whole thing can be made for a copper, and will prove quite as effectual as a lamp costing several shillings.

Then, again, in shutters, what a lack of economy used to be exercised. Within recent years, however, or since the introduction of the roller-blind pattern, and that of the more recently introduced diaphragm form of shutter, there may be said to have intervened a lull in the number of new forms; but for many years the variety of shutters that were placed upon the market, all of which seemed to find eager purchasers, was very great indeed, yet the best shutter I know of, speaking from the point of view of the same being capable of all-round rough and ready working, and thereby being free from any liability to break down by reason of delicate mechanism or fragile material used in its construction, is one that was made out of an old cigar box, and which can be made for the cost of its brass screws, and work at any desired speed. Then, again, the old form of drop shutter for many years did yeoman service, and, with some who have utilised aluminium on account of its lightness, is still preferred for stand exposures to all others, especially when the plunger is made to work upwards in the slot of the lens. In short, the simpler a shutter is the better, and a simple article is never far beyond the capabilities of being made by any one possessed of a few homely tools as well as a little neat-handedness.

T. N. Armstrong.

"SPIRIT" PHOTOGRAPHS: WHERE THEY MAY BE OBTAINED.

In connexion with the correspondence on "Photographing a Spirit" that has recently been appearing in the *English Mechanic*, Mr. J. O. Starling, of 156, Iverson-road, West Hampstead, N.W., writes to that journal: "If any of the readers of the *English Mechanic* will send me name and address, I will send him a cabinet-size photograph of myself (a medium) and a spirit standing by my side; and also accompany the gift with a printed circular having particulars as to the nature of the phenomenon as far as investigation has hitherto penetrated; and to those who desire it, I will send the name and address of the photographer in London who took my series of about forty pictures of different visitants. They were taken in broad daylight, and under strictest conditions. I bought the negatives of him, and have them here at home, and any of your readers who would like to honour me with a call can see them. I paid the photographer six shillings for each negative, and your readers can depend upon it that I, a poor man, would not allow myself to be defrauded forty times over, which would be the case if the photos were faked. When I say I am a medium, I must explain that my friends call me a photographic medium, as it is considered the pictures were obtained by two men, the photographer and the sitter, by means of some influence

attraction, or quality which they possess, either normally or at the time of the experiments. The photographer undertakes to experiment with any one who brings his own plates; he must bring four own plates and mark them, and if a visitant, spirit, form, spook, or call it what you like, is seen to pose beside the sitter at one or more of the four exposures, the photographer will see him or her, and will describe what he sees, and invite the sitter to verify his description when he sees the form on the plate, and afterwards on the print beside his own photograph; and experimenters may enter the dark room to carefully watch the operations both before and after the exposures of the several plates. A large number of investigators, including several members of the Society for Psychical Research, have been to Mr. B.'s studio to experiment with him, and have obtained photographs of invisible beings, visible only through the intermediary of the lens and sensitive plate, and not one of them has entertained any degree of doubt as to the superhuman nature of the results obtained. Nature reveals her secrets to whom she will, and I strenuously contest the claim of science in the sense of clique to be her exclusive confidant."

Possibly those persons who are interested in this matter may care to avail themselves of Mr. Darling's offer, which we trust that gentleman may find it convenient to extend to our own readers as well as to those of the *English Mechanic*.

A FEW REFLECTIONS ON AMERICAN AMATEUR AND ARTISTIC PHOTOGRAPHY.

[*Camera Notes.*]

An over-production is at present noticeable in all branches of human endeavour, and at no time have the various art professions suffered from over-crowding as at present. Amateur photography, apparently accessible to every one who can press the button, and reminding one, even with the crudest handling, somewhat of pictorial art, has taken hold of the public taste to such an extent that the Kodak fiend has been made into a typical figure, and has had to play his ridiculous part on the stage and in the comical magazines for years.

Since amateur photographers are as plentiful as bicyclists, the more astonishing it seems to me that those men who really produce something artistic can be counted on the fingers of one hand.

Of course, I am aware that the majority photograph for a pastime, merely to show that they are clever fellows and can "also do it."

If that is the height of their ambition, very well; one can surely find no fault with it—we all like to amuse ourselves. But why are these men, who do not even lend it a thought as to whether they have any special gift for photography or not, so persistent in continually showing their efforts of photographing their dog, or their grandmother, or some uninteresting place they have visited, to everybody they can seize upon unawares? It may be great fun to Aunt Nell or Cousin Anne, but to an intelligent man such provincialism is not short of an affront.

They may be satisfied with photographing up to a certain point when the days are long and they are out for a summer holiday, but they should not try to get such things published in some professional magazine, to frame and exhibit them, and to add to the mendacity of some minor exhibition; least of all should they have any grievance against juries and successful men. They should be dignified enough to wait until some one who knows, and has the courage to be honest, tells them that photography is in their line.

The reader may ask why amateur photography should be taken so seriously; it is only a kind of sport, not business.

It is an old saying, If a thing is worth doing, it is worth doing well. Besides, it has a message to convey. Each new movement of such wide-spread tendencies necessarily has. Common sense, without any theoretical argument, should tell us so.

Far be it from me to advocate that the fierce business competition of to-day should also enter amateur photography; its unmercinariness is to me its saving grace, which could make it, if handled more consistently, the best-adapted medium to keep alive the artistic qualities of mankind. The possibility for such a vocation is certainly there, because of all art expressions it is the most universally liked, and therefore the correct one to instil with influences that would arouse live interests.

If I were asked, "Why does a man photograph?" I would answer, "The average man photographs because life is so interesting to him that he would also like to show it to other people." And of such a picture one can surely demand that it speaks to one, or conveys something. A picture should show that the man who made it got at least as far as being able to reproduce a piece of nature, or a figure subject, interesting to him, with a certain degree of originality and taste. If it doesn't do that, what is the use of it? Even if he photographs his own children, one would think that it should be only a natural desire to have the likeness as artistic and picturesque as possible.

In higher stages photography can reflect all the subtleties of a man's mind; but then it is no longer a pastime, but the strenuous study of a lifetime.

An anecdote will illustrate better what I mean than all didactic theories.

The philosopher, Herbert Spencer, whose only exercise is playing billiards, strolled one afternoon into a public billiard-room, and promptly challenged a man he found lounging there to a game of billiards. They banked for the first shot. Mr. Spencer won and led off. When his opponent came to play, he put the chalk in his pocket and went at it in professional fashion, running out the game before he missed. Mr. Spencer walked to where his coat was hanging, and as he passed the stranger he said to him, "Sir, I have always considered the game of billiards an innocent amusement, and a game well adapted to the recreation of a student. But, sir, when a man plays as you play, it bespeaks a wasted youth. Good afternoon, sir!"

Not everybody can be a great photographer, but, while one is about the matter, he should put his whole heart into it, live for nothing else for the time, unless one is contentedly narrow, and has no care for others.

Technically, I believe, there is but little cause for complaint. Most amateurs understand how to focus fairly well, and are not specially harassed by the various processes of developing, printing, retouching, &c. All American photographic clubs seem to strive for technical perfection. It is their only academic rule.

They are, perhaps, not conscientious enough—too easily satisfied. They are not willing to stand three hours during a blizzard on Fifth-avenue until the right moment for a successful snap-shot has come. They do not consider that, out of twelve prints, perhaps only one is faultless. For that only patience and perseverance are necessary, and nobody can expect to have them to such a degree except he is truly devoted to the work he is doing.

Clearness and correctness, which are absolute necessities in photography for scientific purposes, are by no means of the same importance in pictorial photography.

The spectator does not examine closely to see if every blade of grass or every tuft of foliage is minutely defined; it is the appearance of the whole which touches and entrances him. The mere detail is not art; it is imitation without life, a cold mechanism deprived of its utility.

What our amateur photographers principally lack is a cultivated taste; cultivated by reading, thinking for oneself, seeing things and acquiring an historical and contemporary knowledge of art. This belongs to the general education of every intelligent man in Europe. That is the advantage the English, French, and Viennese photographers have over our men.

That such cultivation is no superfluous baggage, one can readily see when our men attempt composition and the expression of sentiment. They stand helpless, experiment without definite aim, and at last pacify their conscience with some mawkish sentimentality that reminds one of a fashion magazine poem. The bootblack and newsboy portrait-painters have their counter types galore among amateur photographers.

Never listen for a moment to such nonsense that composition is of no importance. Composition is almost everything; through a thorough understanding of it, even the method of the newsboy painter can be elevated into art, as Dumont has shown in his *Clarinet Player*.

How can such knowledge be acquired? Advice is difficult, as good taste cannot be taught. Japan, who with her exquisite industrial art triumphs over the achievements of all other nations, had no art schools and no art critics until Occidental civilisation introduced them. (Art critics only become necessary when the artists themselves don't know where they are at.)

It is largely a matter of temperament; if one has the right temperament, everything that happens in one's life is grist for the mill.

Living among dainty surroundings alone does does not accomplish it; rather a hard and severe training of the eye, and no sparing of time and study in manifold directions.

The good fates be thanked that there is not yet any gratuitous school of artistic photography. The man of originality always teaches himself, pegs away at his own salvation.

Why does Eickemeyer succeed? Because photography is to him a science. More than in any other art, everything is calculation in photography.

The photographers remain too much specialists. A painter, after having studied for several years here and abroad, continues to study independently. An amateur photographer, however, thinks that, as soon as he has mastered the mechanism of his craft there is no room for improvement.

In France a photographer might profit greatly by associating with artists, but here, where the social element among artists is still undeveloped and where the best ones are hermits, not much can be gained by it, especially as the artists are not willing to acknowledge the artistic side of photography.

I would recommend the study of good works of art. Of course, there is the danger of imitating certain characteristics of composition. This was all of the criticism I had to make of Day's portraiture; it reminded me too much of the reproduction of modern paintings in current art journals. To make a photograph and lend it a certain originality by cutting away certain parts and giving it an odd shape is not strictly legitimate. The method of work should always be as simple and direct as possible.

Retouching, in my opinion, should be entirely abolished. To retouch successfully, the photographer must be a draughtsman, and that

can hardly be expected from him. Besides, very little is gained by making a photograph look as if it were done in some monochrome art process. As soon as it resembles an etching or a wash drawing it outsteps its true vocation and challenges comparisons, which will hardly be to its advantage. The scope of photographic reproduction is large enough without using other mediums of expression as helpmates.

You may ask, What is going to be done with all these artistic photographs? There is no danger that there will ever be too many; besides, there is room enough for good works.

I know how many square acres of interior walls are still bare, or hung with maudlin absurdities, on the East Side and Harlem flats. Make war on pot-boiler art. As the painters fail to raise the standard of art among the middle class by asking unreasonable prices for mediocre work, give them photographs of a broad human interest, make only a few prints of each successful picture, frame them artistically, and sell them at democratic prices that are within the reach of all. There are many others besides me who would rather have Breese's *Yvette Guilbert*, a landscape by Eickemeyer, a decorative study of Day, or a night scene of Frazer on their walls than a worthless daubing in oil or water colour, encased in a golden frame two feet deep.

There is also much room for improvement among the professional portrait photographers; they should be entirely replaced by amateur photography, which is always—I must pay it that compliment—no matter however unsatisfactory at times, vastly superior to their smiling, touched-up atrocities. The Daguerreotype era should be nearly over by this time. We want more Coxes, Breeses, and Hollingers.

Also in illustration photography could play an important *rôle*. It has already found an opening in newspaper illustration; why not also in magazine and book illustration of a superior order? It would surely not be very difficult to surpass the efforts of the designers employed by the magazine publishers. I am convinced that a Photographic Illustration Company, capable of issuing conscientious artistic work for the illustration of novels and poems, would prove successful after a few years of hard work.

Yet, before I do any more prophesying, let some amateur photographers first follow my advice and cease throwing their maudlin efforts broadcast upon an indulgent world. SADAKICHI HARTMANN.

THE LIZARS' EXHIBITION.

(*From our own Correspondent.*)

To say that the large body of photographers in and around the West of Scotland have been looking forward with no small amount of pleasure to this fixture for many months past is by no means over-stating the case, and there is likewise in Glasgow a feeling of great satisfaction that the season should not be allowed to pass without a series of those delightful limelight lectures being provided which formed such a source of attraction last year at the instance of the Glasgow and West of Scotland Amateur Association.

The Messrs. Ballantyne, sole proprietors of the extensive business carried on under the name of Lizars, must be congratulated upon the unqualified success which has attended their bold scheme, for it has been the means of bringing together what is, without doubt, the finest collection of amateur photography ever seen in this or any other country, and it looks as if the awarding of money prizes in connexion with photographic exhibitions is destined to mark a fresh departure in photographic competitions.

The Exhibition is held in those admirably suited rooms, the Fine Art Institute, where the recent Photographic Convention met, and no less than 1014 frames, representing over 3000 photographs, were contributed by workers from all parts of the kingdom.

The walls of the large rooms of the Institute, and likewise the smaller ones, are completely filled with the work that has been contributed, and Messrs. Lizars deserve great praise for the complete and admirable manner in which all the arrangements were made by the time the doors were thrown open to the Judges on Monday morning last. There being so many classes, and so many prizes in each class, the judging proved a most laborious task, and it took the five gentlemen who had these onerous duties to perform no less than seven hours to accomplish their work. The Messrs. Lizars very wisely arranged for the rooms being placed at their disposal last Thursday, so that plenty of time was secured for the judicious hanging of the frames. This has been carried out in a very pleasing and effective manner, the walls being tastefully draped throughout their entire length.

In response to the invitation of Messrs. Lizars, there was a very large gathering of ladies and gentlemen on Monday night at the opening ceremony, and Sauchiehall-street, bathed in moonlight, and lighted as usual with a bountiful flood of electric light, presented a very gay aspect as the various visitors approached the Institute, there being a continuous string of carriages arriving and departing the entire evening.

The important task of opening the Exhibition was admirably performed by Baillie John W. Primrose, and a better representative could not have been provided. Baillie Primrose is one of the best-known amateur workers in the West of Scotland, and as a platform speaker stands in the very front rank. His address was listened to with great pleasure indeed, and during the course of the evening the decision of the Judges was made known.

Their awards are as follows:—

OPEN COMPETITION.

Class A.—First prize, 30*l.*, W. M. Warneuke, Glasgow; second prize, 14*l.*, Charters, London; third prize, 7*l.*, M. T. Clarke, Glasgow.

Class B (Cyclists).—First prize, 10*l.*, C. Chapman, Pollockshields, Glasgow; second prize, 5*l.*, Heward; third prize, 3*l.*, Robert Mann, Glasgow.

Class C (for Ladies).—First prize, 10*l.*, Mrs. Aird, Mount Florida, Glasgow; second prize, 4*l.*, Miss Fleming, Greenock; third prize, 2*l.*, Miss Haslett, Belfast.

Class D (for Boys and Girls under 15 years).—First prize, 5*l.*, Miss Graham, Irvine; second prize, 3*l.*, Master Wilson, Paisley; third prize, 2*l.*, Master McLeod, Maryhill, Glasgow.

Class E (open to Beginners in 1898).—First prize, 5*l.*, P. Munroe, Jamestown; second prize, 3*l.*, W. Gilmore, Glasgow; third prize, 1*l.*, J. Phillips, Glasgow.

Class F (Open Snap-shots).—First prize, 8*l.*, W. McLean, Belfast; second prize, 4*l.*, Dr. C. E. Shaw, Belfast; third prize, 2*l.*, Jas. Gibson, Edinburgh; fourth prize, James M'Clerry Belfast; fifth prize, J. L. Coulson, Glasgow.

Class G (Confined to Cities).—First prize, 10*l.*, W. L. Primrose, Glasgow; second prize, 5*l.*, W. M. Warneuke, Glasgow; third prize, 3*l.*, W. L. Primrose.

The Exhibition will remain open until October 15, and a very attractive list of lectures will be given nightly, in addition to a cinematographic display.

PHOTOGRAPHIC WRECK-WHEEZE-EETS FOR CABINETS AND CARTE-DE-VISITE, OR PHOTOGRAPHIC REQUISITES.

"Nothing X-10-U-8 nor set down 0 in malice."

To all and sundry (even photographic sundries) this is pure "phun." If any reader should discover any real or fancied resemblance to himself or herself or anybody he or she knows, will he or she or they kindly accept an apology in advance, and the assurance that no personalities are intended? I said this was "phun." Perhaps there is not any of *that* article in *this* article at all, but—to proceed.

The first requisite is that you must be a photographer, or you will not require any requisites. You must then determine whether you will be a photographer "de jure" or a photographer "de facto."

In the latter category are those who will tell you they are old wet-plate workers; in the former are those who put money into the concern and are never themselves inside the doors of the establishment.

Having become a photographer, whether by twenty-five years' standing or by virtue of gold (not the fifteen grain sort, but the harder and more sordid kind), the next requisite is "a studio." Oh, yes, you *must* have this.

Sydney Smith once said photography must be a high art, because the workshop of a photographer was always near the roof; but, then, electric light studios were unknown in his day.

Then, you must have a name. This is very important. The names may be your own or any one else's. You may also sink all personality, whether your own or borrowed, and name the studio.

Let us try the first plan second, and begin with the name of the studio. "*Wel*sbach" Studio would sound *well*, especially if you used ———'s light (the thought of how a blush might *mantle* his cheek forbids me to give the name of the inventor of this mode of illumination) or "Studio Acety*lene*" (especially if you were rather *stout*) would look well on the mortgage over the door—I beg pardon, I mean the portico.

Suppose Baker to be your name. How would "Boulanger," Art Photographer, suit? Or "Forgeroni" would fit a gentleman of the name of Smith, and so on *au goût*.

Having decided on the studio and the name, you must attract customers. There are a lot of hungry commercial travellers hanging round, and so you can easily get an enlargement or two to put in the windows, and a few Japanese fans, and there you are. Oh, don't forget a pot of maidenhair fern. Young ladies dote so much on maidenhair fern—"it is so sweet." And then the circulars! And you must have some specimen prints. Oh, I forgot!—there's the operator. Fancy forgetting him! Of course, you must have an operator. He is a requisite, but he can be a *multum in parvo*. So out with your advertisement:—

"WANTED [let this be in big capitals, Mr. Printer, for it's a big want] IMMEDIATELY [more capitals, for the need is great].—A capable operator. Must be good at midget and 24 × 18 work, able to retouch, work albumen, platinotype, gelatino-chloride, collodio-chloride, carbon, enlarge, and finish in black and white. Must be exceptionally good at outdoor work, and patient with children, and even treat club clients [this alliteration is lovely] cleverly. Apply at once, with copies of testimonials and specimens of work, to X Y Z, office of this Paper."

You may get such a man, or you may not. I leave it to you to find out. Let us suppose you have got him.

Now for the specimens! Get a printer (the "devil"-ish kind, not photographic), and get him to reserve you his type for twenty-four hours

and have 10,000 circulars printed, and say to the British public you are prepared to present them within a limited number of days a cabinet portrait and a free sitting, and the trick is done. Artless! generous creature! so guileless, so ingenious, are you not. Oh, yes! That *one* cabinet! and you have the negative. Of course, there is the material for your specimens, either reduced or enlarged, but that sitter is not content with the one cabinet, and so you get a rush; a rush! did I say? Yes, a rush. Now, do not think I am slangy and mean that you are "rushing" the B. P. Oh, no, I mean the B. P. are trooping to you in their thousands, and their clothes for their counterfeit presentment. But who is to withstand the rush? Shall the operator? Perish the thought! Shall you? Oh, no! That is not the game. No! you are very rarely seen. You are a photographic artist, remember, and have got a velvet coat and long hair, and a smoking cap, and, when all is ready and the victim is gibbeted in the chair, you come forward and press the pneumatic ball with a smile, and the proofs are sent home in a week.

Who shall keep the bridge? Who is the Horatius? We have her! we have her! This time it is an "Horatia." I allude to *the reception room young lady.*

Don't forget the reception room. Who said "deception room?" (Where's that brick?) Yes, here she is, the photographic artist's first line of attack and last line of defence. She is the commercial traveller's friend. What an angelic smile greets your uplifted hat as you inquire for the manager! How you envy that horrid, disgusting speaking tube touched by her ruby lips, which assumed the merest suspicion of a pout as she agitates with her caramel-ladened breath the whistle at the other end, which you can distinctly hear, and, if not very deaf, the answer as well in the manager's voice, and she comes forward, and, with a seraphic beam, says, "He is out."

Watch her, however, with a client. How ready she is with all prices, and with what earnestness she enters into an argument to prove that there is no exception to the rule that a person must be present when being photographed. There were two duties left out of the operator's qualifications, and, of course, our heroine must be pressed into the service. They are "spotting" and "mounting." Yes, she can spot. She can spot a dun or a man with a squint. The dun is easily managed, but to the latter how delicately she suggests a profile picture, so that his "fool face" (I mean, full face) is not presented point blank at the camera. She can also mount. Not only the prints, but on her dignity as well when an unfortunate individual suggests being photographed at once. Oh, no! An appointment is the thing. The only parallels to a "photographic appointment" are a doctor's visit to church, to be called out during the service, a *bonâ-fide* traveller, and an illiterate voter. There are many genuine instances of all, but the many others! Well!

There are other requisites, such as cameras, lenses, plates, papers, &c.; but this mighty organ is not run on philanthropic lines pure and simple, and so I must point you to the advertisement columns, as free advertisements are not given.

There is, however, one requisite, that a few remarks might be made upon, which I have kept in the background. Ah! there it is—the background. You see, it has come upon me all at once, so to speak, and yet in a photograph it is so retiring and so receding; but, if this is inappropriate, where is the picture? *Punch's* advice to some people was summed up in the word "Don't." Let me "don't," then.

Don't use a black background when photographing a cherry-coloured cat or an Ethiopian.

A pretty picture is made of a child in bathing suit standing on a rock.

Don't have the foam of the sea at the back of the—ah! you thought I was going to say "sitter," but I was not. Well, you know what I mean.

Don't surround the victim with high terraces of flower stands and tables, and stools, and give him big books to hold; *he* wants to be photograph, not all your furniture. You can amuse yourself with these when the sitter is gone.

Don't employ an artist to work up your enlargements, but get a wheelbarrow full of pumice powder, a few rotten eggs, a bottle of gum, and a penny stick of crayon, and your finishing outfit is complete, unless *you* get finished.

Don't forget to have a pure supply of H_2O. It may spoil your prints, but it is sure to do so to your "spiritus Hibernicus aut Caledoniensis." For special brands of these two latter kinds consult Gilby or Dewar, or yours truly, REX. R. GENTUS.

A COMPARISON OF PLATE BACKINGS.

SOME useful information on the comparative efficiency of the numerous backing mixtures which have at one time or another been recommended for the prevention of halation is given in a paper by M. Ch. Gravier, read before the Société Française de Photographie and reported in the current issue of the *Photo Gazette*. There is no doubt that much of the conflicting opinion with regard to backing materials is due to the widely differing conditions of plate, emulsion, or subject under which the backing is used by individual workers, who, on the strength of their trials, put forward claims which other photographers, working under more difficult conditions, cannot support. M. Gravier has made a series of tests in such a manner as to eliminate variable factors such as these. Taking a good-sized plate, he backs various sections of it with different mixtures, and places in front of it an opaque screen, having in it a number of holes, of equal diameter, in such positions that each hole occupies a central position over one of the various strips of mixture on the back of the plate. One section he leaves unbacked, so as to show the extent of halation on an untreated plate. The arrangement is quite simple, and, if photographers generally were to avail themselves of the information to be derived from easily applied tests of this kind, many difficulties in practical work would disappear and the standard of photographic excellence would be raised.

Sensitive plates arranged as above were given twenty times the exposure necessary to produce a halo behind an aperture one-fifth of an inch in diameter. This meant an exposure of five minutes, after which the plates were developed together. The backings experimented with included Mackenstein's (a mixture of sienna, caramel, gum arabic, and alcohol); Drouet's (ochre and dextrine), a special mixture of sienna and gum, dyed alcoholic varnishes, black paper, and a particular form of backing tissue made from "*feuille merveilleuse*" (*vide* later), consisting of paper coated with a paste of gelatine and glycerine (such as is used for chromograph mixtures) stained with blue or black ink. The trials showed that Mackenstein, Drouet, and special backings, as also the spirit varnishes, were excellent preventives of halation. The *feuille merveilleuse* also gave good results if care was taken to roll it down well to the glass with a soft rubber roller in order to expel all air bubbles. Thin black paper coated with gum was found to be a backing medium which might, in default of others, be called into requisition, and which with thin plates and short exposures proved efficient. The best way to apply it is to spread the gum syrup on the back of the plate with a rubber roller, and afterwards rub down the paper into contact. The various dark-coloured tissues or papers applied to the glass without any backing medium proper are absolutely useless as preventives of halation.

The author concludes by describing two practical methods of backing plates, to the first of which he gives decided preference. A strong thick syrup of gum and caramel in water is made, and a little alcohol added drop by drop while the mixture is stirred. A thin film spread on a piece of paper ought to dry in about a minute. A few drops of the mixture are poured on to a sheet of glass and spread with a rubber roller, which is then used to coat the back of the plate. A thin film should be applied, a piece of thin black paper rubbed down over it with a roller and the plate placed in the slide. Before development the plate is laid (face up) on a piece of moistened linen or felt for about half a minute when the paper can be easily detached. The second method is the use of the *feuille merveilleuse* before mentioned. A suitable paper is sold by the Autocopyist Co., and has only to be coloured with ink to form a good backing tissue. Before use it is moistened with a sponge and rubbed down with a soft roller. It can be removed after exposure and used some twenty times before it need be discarded.

EXHIBITION AT EDINBURGH.

THE Second Annual Industrial Exhibition was held at Edinburgh last week in the Waverley Market. The Exhibition was a huge affair and comprised 2570 entries. There was a Photographic Section, with fifteen classes and 175 entries. The Exhibition, while yet in its infancy, offers an introduction, from the large attendance of visitors, to a circle to a very large extent outwith the usual run of visitors at a photographic exhibition. True it is that the prizes are small, but it is surprising that, at least, local photographers did not take this opportunity of increasing their *clientèle*, which this publicity would have afforded. This is all the more noticeable as we see in other classes that the "professional" has taken full opportunity of the publicity offered. We might, however, suggest to the promotors that, if instead of giving three money prizes in each class they had given, say, two medals, even though at increased cost—and this could have been met by reducing the number of the classes—the popularity of the Exhibition with exhibitors would have been increased. It would also have tended to the comfort of the visitors if the exhibits had been "hung," instead of being displayed on a table; but, at the same time, we hail this endeavour to widen the popularity of, and increase the interest in, photography. The Photographic Section seemed very popular with the visitors, who came in their thousands, and there was always a crowd of admirers and critics round this section, which we trust to see more popular in another year. The Judges were Messrs. Crooke, Patrick, and McKean, Edinburgh, so that we see the promotors had the countenance of the Salon, or at least one of the more distinguished members of that august body. The principal feature was the success of Mr. Alexander Allan, Edinburgh, who, it may be remembered, we commended specially for his work at the Edinburgh Photographic Society's Exhibition last January. His *Old Bachelor*, which was the strongest picture at the Waverly Market Show, and which was awarded the champion watch in the Open Section, although not medalled at the January-February Show, was noticeable enough to secure the attention of our representative. It depicts an old working man seated at a window scanning a newspaper, and, although some fault may be found with the lighting, the picture, as a whole, is well worthy commendation. As might be expected in an Exhibition embracing many new exhibitors,

some of the framing and mounting was not all that could be desired, yet it says much for the rising generation of photographers that the general trend was in the way of suitability and good taste. Messrs. W. F. Slater and W. D. Welford, London, also exhibited and secured places in the prize-list. The latter seems to have made a new departure and exhibited a print or two quite in the "Horsley Hinton" style, with which he secured awards. His *Children Swinging on a Gate* was a charming little subject, although the shadows were rather hard. Another exhibitor who came well to the front was Miss M. McLauchlan, Edinburgh; she has taken part in a number of competitions in our contemporaries with varying success, and her work here betokens that, with due care, she should yet be a prominent factor in our exhibitions. In the novice classes there are some promising workers. We might instance—not so much for the actual quality of the work exhibited as for the promise of better things displayed in it—Miss Mary C. Eames, Llangollen; Mr. John R. Murray, Edinburgh; Mr. H. C. Leat, Bristol; and Mr. John Cairns, Edinburgh.

The following is the complete prize-list :—

PRIZE-LIST.

Open to all :—

Photograph of Autumn or Winter Landscape.—1. Alexander Allan, Edinburgh; 2. Thomas Somerville, Leith; 3. W. F. Slater, London.

Summer Landscape.—1. and 2. Alexander Allan; 3. W. D. Welford, London.

Animals.—1. Miss McLauchlan, Edinburgh; 2. Alexander Allan.

Children or young people not less than three in a group.—1. John Cairns, Edinburgh; 2. W. D. Welford; 3. Mrs. Allan, Edinburgh.

Shipping or Landscape of Scottish Scenery within a radius of twenty miles from Edinburgh.—1 and 3. Alexander Allan; 2. W. D. Welford.

Enlargement, Animals or Figures.—Alexander Allan; 2. Miss McLauchlan; 3. W. T. Slater.

Enlargements, any other subject.—1. W. F. Slater; 2. W. D. Welford; 3. Miss McLauchlan.

Open to non-prize-winners :—

Autumn or Winter Landscape.—1 and 3. W. C. Carplin, Brighton; 2. Miss Mary C. Eames, Langollen.

Summer Landscape.—1 and 3. John R. Murray, Edinburgh; 2. R. Chapman, Edinburgh.

Animals.—1. J. F. Smith, Edinburgh; 2. Miss Mary C. Eames; 3. H. C. Leat, Bristol.

Children or young people, not less than three in a group.—Miss Mary C. Eames; 2. H. C. Leat; 3. John Cairns.

Shipping or Landscape, within a radius of twenty miles of Edinburgh.—1. John R. Murray; 2. Miss Buchanan, Edinburgh; 3. John Cairns.

Photograph of child under ten years.—1. H. C. Leat; 2. John Cairns; 3. W. C. Carplin.

Enlargements, Animals or Figures.—1. John Cairns; 2. W. H. Waite, Edinburgh; 3. Miss Edith Haslett, Belfast.

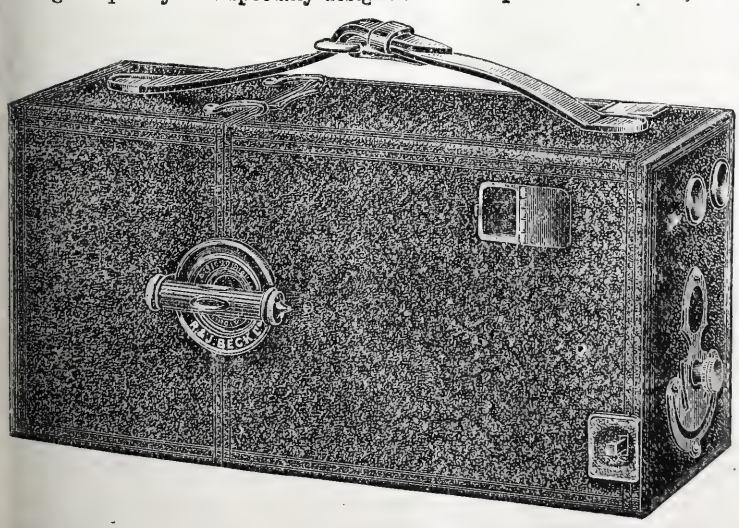
Enlargement, any other subject.—1. Miss Mary C. Eames; 2. Mrs. Maclachlan, Blairgowrie; 3. Miss Cox, Edinburgh.

The *Evening News* watch in the "open to all" was gained by Alexander Allan, and not confined by John Cairns, and the special prizes were respectively gained by Alexander Allan and Miss Mary C. Eames.

A NEW QUARTER-PLATE FRENA CAMERA.

R. & J. BECK, 69, Cornhill, E.C.

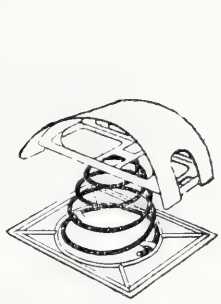
THOSE who have seen specimens of the work done with the new camera will be obliged to admit that a single achromatic lens in a hand camera, if of good quality and specially designed for the particular camera, will

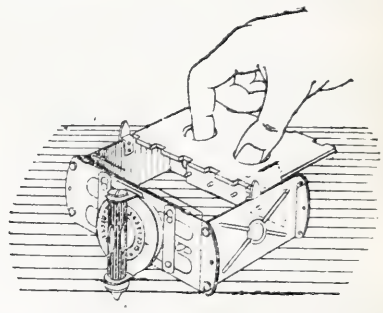


hold its own very favourably with the rectilinear form of lens. Messrs. Beck claim that in this new quarter-plate Frena the work produced is in every respect equal to that of the more expensive model Frena, with the single exception that the lines at the extreme margins of the film, if closely examined, will show a slight curvature, but it is so slight that a critical examination is required to discover it.

Another feature possessed by this camera is a new form of brilliant view-finder. The drawback of some brilliant view-finders has hitherto been that, when observed at different positions, they include different portions of the view, and, unless the eye was exactly above the centre, the image did not correctly represent the amount of view included by the camera; moreover, the picture seen with both eyes was different to that obtained when one eye only was used. In Messrs. Beck's new view-finder the image is stationary, and is the same at whatever angle or in whatever manner it be observed. It combines the advantages of the clear vision of the brilliant form with the accuracy of the ground-glass finder, and is sunk below the case in such a manner that unpleasant reflections from the lens surface are avoided.

The film-changing system embodies all the latest improvements of the Frena system, whereby forty films are placed in the camera in a pack,





exactly as received from the makers, without any manipulation, "like a pack of cards," and are dealt with automatically one by one after exposure.

The shutter is on the patented Frena shutter type, giving exposures $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{40}$, $\frac{1}{80}$ second, and time exposures. It depends for its action upon no brakes or retarding springs, the variation in the speed being regulated by the alteration of the size of the aperture that in passing over the lens makes the exposure. The speeds are therefore constant and in exact proportion, and may always be relied upon.

The lens has stops for varying the aperture. The swing back and level are also provided. An automatic counter indicates the number of films used, a handbook of instructions accompanies every camera, and the make of the instrument, the finish, and all the details are in every respect equal to the most expensive Frena.

Frena magnifiers may be added to fit the camera, enabling objects even as near as nine inches to be sharply photographed, thus giving universal scope.

Our Editorial Table.

SPECIMENS OF HALF-TONE ENGRAVING.

By the Meisenbach Company, Wolfington-road, West Norwood, S.E.

THE Meisenbach Company forward us a most elegantly produced little book of examples of half-tone engraving. The cover is a specimen of their own design for diploma work, and it is a very refined effort. There are two views in what the Company term "half-tone photogravure," and these, besides having a striking richness of colour, also possess very fine gradation combined with great delicacy. We have seen nothing better than these specimens of phototypy.

The Company also enclose a facsimile reproduction of a photograph of a machine as supplied by a client. The vignetted half-tone of the same machine shows the result obtained by the special treatment given to an inferior copy, and which can be applied generally to bad photographs, &c.

The Company adds : "For book and magazine illustration it appears to us something more ought to be attempted than the usual square shape finish, and we submit this view as an example. Reproductions of fabrics, &c., as backgrounds, combined with artistic designs, portraits, views, &c., for covers of price-lists and catalogues, yield beautiful and novel effects. Any kind of fabric or material may be used for this purpose. We offer these specimens by way of suggestion as to what can be done by the skilful handling of subjects supplied for half-tone reproduction."

The admirable specimens should be in the hands of all those who demand excellence of result in half-tone work.

COLOURED PHOTO-MEDALLIONS.

The Artistic Portrait Company, Kentish Town-road, N.W.

THE Artistic Portrait Company are introducing a very attractive novelty in the shape of what they term coloured photo-medallions. These are delicately coloured with permanent Winsor & Newton's opaque water colours. By a new method the colours are fixed and protected by a hard glazed surface rendering them impervious to the action of air, moisture, or atmo-

spheric changes. The delicacy of colouring is heightened by the fact that the glazed finish renders the colours quite as brilliant as a picture on glass, ivory, or porcelain. Another very essential feature is that the medallions are unbreakable through any ordinary accident. They are mounted on velvet mounts and framed in ornamented gold-plated frames, which are well lacquered and do not tarnish. The Artistic Portrait Company have an assortment of a number of different styles of frames, all of their own design, specially brought out for these medallions, and it is the policy of the Company to keep these frames exclusively for the photographic trade and not put them into the hands of the ordinary shopkeeper. From an inspection of a number of these medallions we are in a position to accord them great praise. They are admirably executed coloured photographs such as possess a high decorative effect in the drawing-room, and they are wonderfully cheap. We do not doubt that they will be popular with photographers, to whom we unhesitatingly recommend them.

Christmas Card Mounts.

George Houghton & Son, 89, High Holborn, W.C.

As usual, Messrs. Houghton are early in the field with samples, of Christmas card mounts for the forthcoming season, and those submitted to us are if possible even more refined and delicate than those of past years. Alike in elegance of design and neatness of manufacture, these cards are eminently calculated to enhance the effect of photographs mounted upon them. The inscriptions are brief and in good taste; and the series of mounts should be very popular with photographers.

Catalogue Received.

James Buncle, 21, Maitland-street, Edinburgh.

Mr. Buncle's well-printed and illustrated catalogue of thirty-two pages particularises a varied assortment of photographic apparatus and sundries especially suited to the requirements of the amateur photographer. The apparatus appears to be of the newest types and designs. Mr. Buncle, being a practical photographer, is well qualified to cater for his *clientèle*.

News and Notes.

Royal Photographic Society.—Ordinary Meeting, Tuesday, October 11 at 5A Pall Mall, E., at eight p.m. The President will deliver his annual address Presentation of the medals awarded at the Exhibition.

Notice of Removal.—Mr. C. A. Rudowsky has removed to 22, Coleman-street, E.C., as the premises, 3, Guildball-chambers, in which he has carried on business for the last twenty-one years, are required for street improvements.

London and Provincial Photographic Association, White Swan, Tudor-street, E.C.—On Thursday next, October 13, at eight o'clock, Mr. S. Herbert Fry will read a paper, "Fifty Years Ago." The Hon. Secretary will be pleased to see any one interested at this or any of the meetings.

Art Forgeries.—Discussing art forgeries, a writer in *Pearson's Magazine* states: "There was recently, and for all I know there still exists, a manufacturer of spurious pictures in London. No fewer than six painters were employed upon copies of a picture the principal had acquired with the copyright. A number of canvases lay ready at hand, with the outline traced upon each; the first man put in the skies, the second the mountains, the next the middle distance; after that, the tree artist and the foreground artist took up the painting, and, last of all, the cattle man put in the sheep and cows. Each picture would be completed in about six hours. Of living painters," concludes the writer, "none have been more forged than the veteran, T. Sydney Cooper, the animal-painter. So often have pictures been brought to him for verification that he now charges a fee for giving his opinion."

According to *Nature*, Dr. H. Carrington Bolton has discovered, in a cavern at Lake Minnewaska, New York, a grotto, in which are reproduced on a small scale many of the beautiful phenomena seen at the celebrated Blue Grotto of the island of Capri. The lake is situated on the Shawangunk range of mountains at an elevation of about 1700 feet; it lies in a basin, excavated in glacial times, about half a mile long and less than a quarter in width, and of a depth reaching seventy feet. The rock on all sides is a white quartzite, which rests upon shale, but no outcrop of the latter is visible at the lake. The water varies in colour from Nile green, through turquoise blue and sky blue, to deep indigo blue, and in all these shades exhibits the silvery appearance, when agitated, characteristic of the grotto at Capri. A body immersed in the water has a beautiful silvery sheen, similar to the reflection of moonlight. The water has these colours at all hours, but they are strongest when the sun is in the zenith; late in the afternoon the slanting rays of the sun enter the opening and light up the cavern, greatly diminishing the optical effects.

Gum Arabic.—The gluing agents which are found in commerce under the name of gum arabic consist only for the smallest part of genuine Arabian gum, and we mostly receive in their stead substitutes containing dextrine; partly also gum resins resembling gum arabic; for instance, the gum exuding profusely from the Flinderria maculosa, indigenous in Australia. The fact that the powder of gum is frequently adulterated with entirely worthless substances, such as pulverised cherry pits, also deserves mention. Rock sugar mixed with milk and soda, waterglass is likewise sold, in lumps and powder form, as gum arabic. Such a surrogate anybody may prepare at home by very finely powdering 3 parts (by weight) of rock candy and dissolving by boiling in one part (by weight) of fresh cow's milk, which must not be skimmed. To the boiling solution add 7 parts (by weight) of soda waterglass of 33° to 36° B. Cause a thorough mixture by stirring, allow the whole to cool off to 36° to 38° Réaumur (=115° to 118° F.), pour out on a tin plate with upturned edges, allow to harden and knock with a hammer on the back of the tin, whereby the gluing material separates in grains.—*Maler Zeitung*.

Patent News.

The following applications for Patents were made between September 19 and September 24, 1898:—

Natural Colour Photography.—No. 19,956. "Improvements in Natural Colour Photography." A. Werner.

Plate-holder.—No. 20,001. "A New Magazine Photographic Plate-holder." P. Wallis and E. F. Wallis.

Shutter.—No. 20,002. "An Improved Photographic Shutter." P. Wallis and E. F. Wallis.

Half-tone Ceramic Process.—No. 20,100. "A Process or Method of Printing Designs upon Tiles and other Clay Ware from a Photographic Half-tone Process Block or Plate." C. H. Temple.

Slide Lock.—No. 20,155. "An Automatic Lock for Camera and Slides for Photography." J. Bush.

Vignette.—No. 20,243. "A Machine to Vignette Photographs." W. Anderson.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

October.	Name of Society.	Subject.
10.....	Oxford Camera Club	*Latest Views on Development.* Mr. Cadett.
11.....	Birmingham Photo. Society ...	*Hints upon General Working.* E. C. Middleton.
11.....	Royal Photographic Society ..	President's Annual Address.—Presentation of the Medals awarded at the Exhibition.
12.....	Ashton-under-Lyne.....	*Negative-making.* Chapman Jones, F.R.P.S., &c.
12.....	Kingston-on-Thames	*Portraiture.* Harold Baker.
12.....	Leeds Camera Club.....	*Flashlight Photography.* A. C. Homburg.
13.....	Ashton-under-Lyne.....	Meeting for Conversation, &c.
13.....	Liverpool Amateur	Demonstration: *Carbon and Gum-bichromate.* Jos. Appleby.
13.....	London and Provincial	*Fifty Years Ago.* S. H. Fry.
15.....	Bootle	Excursion: Ince Woods.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

September 29,—Mr. A. Mackie in the chair.

Mr. Robert Beckett stated that he had made a few trials with Mr. Henderson's formate of soda toning bath, both for collodion and gelatine prints. The collodion prints took a very unpleasant tone, and they suffered considerably in the fixing bath from blistering, which seemed to point that the method was not suited to such paper. His formula was 20 grains of formate and 2 grains of gold to 30 ounces of water. The gelatine prints, although treated for a longer time, refused to tone altogether. He felt, however, that there was a promising future before the method, and that a great deal depended upon the nature of the gelatine used in the emulsions for the gelatine paper.

Mr. A. L. Henderson confirmed the statement as to the less pleasant colours produced upon collodion paper, and catechised Mr. Beckett with a view to discovering in what condition his toning bath was. He expected it was slightly acid, whereas, it would be remembered, he stipulated that it should be either neutral or on the side of alkalinity. As regards the resulting tones upon printing papers, he discussed at some length the part played by the colouring substance with which some papers are slightly tinted. It was extremely probable that some chemical action would result from the contact of the emulsion with the colouring matter, in which event disagreeable or less pleasing tones might be produced. Mr. Henderson proceeded to say that he had got some magnificent tones by employing as his toning bath 60 grains of soda formate in 5 ounces of a ten per cent. solution of plain hypo, the prints being toned straight from the frames. Observe that neither gold nor platinum plays any part in this mixture. It became a question what part was performed by the gold and platinum, at any rate in the combined bath, in which hypo was present, as this last experiment suggested that the action was independent of these metals.

Mr. W. D. Welford remarked that one claim was for the total absence of double tones by the formate method. The prints he now handed round were on glazed and matt P.O.P. toned in a simple bath of platinum, salt and water, acidified with citric acid. He claimed that none of these showed any evidence of double toning, notwithstanding that in one the sky was fully printed in ten seconds to the sun, while the foreground required three days under the same conditions.

It was discovered that the term "double toning" was being indiscriminately applied to two conditions of things, namely, the blue tint assumed by half-tones throughout the whole of the print, due to a faster action at these parts, and to another state of things in which the edges, shadow and half-tone alike, tone quicker than the centre of the print. It was not unanimously decided

which of the two was what was generally accepted under the term, or whether both came under one head.

Mr. W. D. WELFORD read a paper upon

STANDARDS AND UNCHARITABLENESS.

In the course of his paper the author protested against laying down limitations in the shape of standards or rules in pictorial photography, which, according to him, had sadly hindered its progress. He suggested that they were creating for themselves too many standards, and it was against the multiplication of them in general, and of the harmfulness of some in particular, of which he wished to speak. One of these he described as the "good photographer," who had been defined by some people as one who had proved his worth by making his business a commercial success. If commercial success be the standard, then we can easily reach the definition that a good photographer is one who cannot photograph. Another absurd attempt at the standard was that of the "perfect negative." The negative was not the goal, and, if the desired print could be obtained from a yellow-stained negative, there was no reason why an unstained one should be employed. Many attempts had been made to standardise "faking." Every main, he said, fakes, and he would define faking as commencing where the particular operator describing it had to leave off. "What we ourselves can do is legitimate; anything more than this is faking." A standard in this direction had been attempted by defining faking as work on the print, passing over as allowable anything done upon the negative. Another attempt was to define faking as obtrusive hand work. Dealing with uncharitableness, the reader of the paper condemned that form of it which is met with in society meetings, for which these standards were mainly responsible. If we could keep away from definitions and standards, the meetings would probably be pleasanter, and members would be more lenient towards the opinions of others. The standard, he said, was a good thing to climb to, perhaps, but a rotten support to which to cling.

In the discussion, which embraced a very wide field, Mr. Henderson maintained that more value was attaching to the experiences of a photographer of thirty years' standing than to those of five to ten. He believed in the black, unstained negative. Its qualities were constant, not like the yellow thing which was slowly changing. One must not judge the good photographer from the ordinary work he often unwillingly has to send out. Strongly as he might feel against this and that pose or view, he had to cater for his clients' tastes, and yet in himself be truly a good photographer.

Mr. BECKETT charged the author of the paper with setting up the standard that every man was to do that which was right in his own eyes, and go ahead independent of every one else's opinion. In knocking down some he had created yet another standard.

Mr. WELFORD replied at length to the points raised, restating his arguments, and introducing others in support of his contentions.

PHOTOGRAPHIC CLUB.

September 28,—Mr. Hans Müller in the chair.

Mr. F. A. BRIDGE, referring to some mention of defects in film negatives, said he had spoken to a man intimately connected with the manufacture of celluloid films about the same thing. Not once in a hundred cases, he was assured, were the defects due to the substance of the celluloid and its action upon the emulsion, but rather to the gelatine. The presence of a bad packet of gelatine in a batch of emulsion was sufficient to mar the whole of the plates or films coated therefrom.

Mr. W. D. WELFORD asked how was it, then, that the same trouble was not experienced with plates, or at any rate so often? It must be the celluloid or the camphor it contained which caused deteriorations and defects like these. Cut films were less offenders than the rollable film in regard to spots. Films, again, lost speed sooner than plates.

Mr. E. W. FOXLEE said that, without doubt, the solvent of amyl-acetate and fusil oil used in making some films, and not always thoroughly evaporated, was bad stuff to be in contact with the gelatine and silver salts. Cut films, as a rule, were made by kneading the nitro-cellulose with camphor, rolling and kneading alternately, and this is allowed to season in sheets perhaps for a year or more, and all this time the camphor is evaporating.

Mr. J. R. GOTZ championed cut films, which he had used to the exclusion of plates in the field for the last four years. He had found that even after four years they were quite good.

Mr. W. D. WELFORD read a paper entitled

UNCLE ABE'S STRAIGHT TALK.

The paper may be said to consist essentially of critical remarks intended, in the lessons they point, to give advice to exhibitors and would-be exhibitors, the novice or beginner, and our very good friend the dealer. To take the exhibitor, the reader of the paper proceeded to describe how, having two pictures accepted out of the five frames sent in, his first care is to locate the coveted medal labels, with the conclusions of the Judges indicated, by which, according as he is fortunate or not, he may agree or discover a different opinion. His disappointment condemns the system of election of Judges, selection and hanging committees, and he decides that alterations are sadly needed. Then, there was the society novice, a persevering fellow, but somewhat of a bore, who seeks at the weekly meetings of the society that most elementary knowledge which he might acquire from the sixpenny handbooks (for some were written by men who knew what they were talking about), and who resents the process of being jumped upon by more practised men, so often the fate of the raw beginner. The suggestion held out for the acceptance of the dealer was that obligingness was essential to good business, and made no bad stock.

Hackney Photographic Society.—September 27, the President, Mr. E. Puttock, in the chair.—The Hon. Secretary, in announcing particulars of the Exhibition arrangements, said that the Judges would be Messrs. J. B. B. Wellington, T. Bedding, and W. J. Byrne. Hanging Judge, Mr. A. Mackie. The feature of the evening was a lantern lecture on Norway, by Mr. F. A. Bridge.

Plymouth Photographic Society.—The Annual General Meeting of the members was held at the Athenæum, Plymouth, on Friday evening last, September 30. Mr. E. H. Micklewood, the President, occupied the chair, and there was a good attendance.—The HON. SECRETARY, in presenting the report of the Committee, said that the past year had been a very successful one for the Society, and one in which a great change had taken place, that of the establishing of the Society in admirable permanent quarters. For nearly the first six months of the year they had practically no home or habitation. Circumstances arose which compelled them to abandon the old meeting place, and then, through no fault of their own, they were beating about from pillar to post, until through the energies of Mr. T. Stanning, the Hon. Treasurer, and Mr. J. Davy Turney, they were able to negotiate with the Council of the Plymouth Institution with such success that they now had quarters of which they might justly feel proud. The number of members now stood at seventy-three, fifteen new members having been elected during the year, and though the meetings of the Society had been held at various places, under conditions anything but favourable, the attendance had always been large, a fact undoubtedly brought about to a great extent through each member receiving a reminder by post card a day or so previous to each meeting. The Hon. Treasurer reported that the year was started with a balance in hand of 5*l.* 4*s.* 11*d.*; there was now 3*l.* 9*s.* 8*d.* in hand, and nearly 4*l.* owing in outstanding subscriptions and other amounts, out of which a portion of the past year's rent had to be paid. Altogether he considered the financial position of the Society satisfactory. On the proposition of the President, seconded by Mr. H. S. Hill, the reports were adopted. According to the rules of the Society, the President was ineligible for another year of office, and, in thanking the officers and members for the courtesy and kind consideration extended to him during his three years of office, he said he should ever look back with pleasure on that period. The Committee for the last year had worked most harmoniously and with one aim, that of the advancement of the Society. His experiences of societies were many, but he was proud to say that never had he witnessed greater vitality in any than in theirs; there was no lack of enthusiasm, and he saw no reason why there should be, as photography was of all hobbies the least dry, and it had everything to recommend it. It brought them in closer touch with nature, and in Devon they had an abundance of all that was beautiful in nature. Concluding with an expression of the hope that the Society would still continue to prosper and achieve great things, and assuring them that he should still take a warm interest in the work, he again thanked them and nominated as his successor the senior Vice-President, Mr. H. S. Hill. Mr. H. J. Hissett seconded, and the new President was elected unanimously. The Hon. Secretary and Hon. Treasurer were re-elected. A ballot for the election of the Committee resulted in the return of all the old Committee. Mr. J. Davy Turney proposed, and Mr. T. Stanning seconded, that the subscription be raised from the present amount of 5*s.* to 7*s.* 6*d.*, with an entrance fee of 2*s.* 6*d.* for new members. After a long discussion it was carried, many thinking that increased funds were necessary for advancing the work of the Society. Eight gentlemen were nominated for membership, and, after other minor matters had been disposed of, the meeting terminated.

FORTHCOMING EXHIBITIONS.

1898.		
October 7–Nov. 5	...	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
,, 7–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
1899.		
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

COPYRIGHT FEES.

To the EDITORS.

GENTLEMEN,—In your issue of September 16, "Free Lance" remarks with regret that one leading photographer makes the minimum half-guinea his customary charge for all subjects of his reproduced by the illustrated journals.

My custom has been the same with a very few exceptions, the reason being that I have no means of knowing the market value of a good picture—good, that is, from the journalistic point of view. When a

higher fee is asked, the editor objects and gives one to understand that the prices usually paid are about ninety per cent. less, and the absence of knowledge makes it impossible to judge how much is mere bluff.

This is a matter of great importance to me, as I suppose I have granted from forty to fifty permits within the last two years, and I would suggest that in his next contribution "Free Lance" might give a few imaginary cases as guides—not, of course, what fees actually are obtained, but what it would be reasonable to demand, say, for a photograph of the boat-race to appear in the *Daily Graphic*, or of a big railway smash for the *Sketch*, a child study for *Black and White*, a portrait of Dr. B——, the recently appointed Bishop of the Cannibal Islands, for the *Church Times*, or a figure or animal study for the *Queen* or the outside cover of the *Sunday Companion* or *Home Chat*. If my suggestion cannot be adopted, perhaps "Free Lance's" interest in copyright matters is sufficient for him to allow me to place a few of my own cases before him privately.—I am, yours, &c., COPYRIGHT.

THE AMMONIA ACCIDENT.

To the EDITORS.

GENTLEMEN,—With reference to the report on the above in your issue of the 23rd ult., if it were better known that there is another refrigerating agent that is quite as efficient as ammonia in refrigerating effect, whilst possessing none of the dangerous properties of the latter, such an accident as the above would be rendered impossible. Ammonia, as is well known, is a blood poison, and even a small percentage in the air renders life insupportable.

This other refrigerating agent is carbonic acid gas, the chemical symbol of which is CO_2; it is the gas that is used for making all aerated waters, has no smell, and the respiration of air containing even a considerable quantity of it, leaves no deleterious effect upon the system.

If the machines on these respective systems are properly designed, their refrigerating power is equal, and, whereas one uses a noxious material, the other has been demonstrated to be, comparatively speaking, absolutely harmless; we venture therefore to think that the time has arrived for the universal adoption of this safer agent, carbonic acid gas, of which we shall be happy to supply any further information.

As regards reliability, the very large number of machines on the carbonic acid gas system that we have supplied is, we should think, ample evidence that they are in every way as reliable as any other system.—I am, yours, &c., BERNARD GODFREY,

J. & E. Hall, Limited, 23, *St. Swithin's-lane, London, E.C.*
September 29, 1898.

HACKNEY PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITORS.

GENTLEMEN,—As there may be some misapprehension with regard to the rule on our entry forms which prohibits the placing of an exhibitor's name on the front of his picture, will you allow me to explain, through the medium of your paper, that the rule applies only to exhibits in the members' classes, and does not affect those in the open classes?—I am, yours, &c., W. F. FENTON-JONES, *Hon. Secretary*.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

RECEIVED: A REGULAR READER; R. B. NEWTON; A. W. DOBBIE; J. H. SHARMAN; A COUNTRY PHOTOGRAPHER; and others. In our next.

J. WILLIAMS (Burton-on-Trent). The gelatine may be had through any photographic dealer.

A. BAKER (Burton-on-Trent). Yes; but the brand you name is a very suitable one for emulsion work.

E. G. PHILLIPSE (Ilfracombe).—We will publish the number of the missing lens in our News and Notes columns if you will send it. We do not answer questions through the post.

F. MCDONNELL.—You can only copyright prints from the negatives. Send our publishers three prints from each and one-and-sevenpence for each negative and they will effect registration for you.

PATENT.—HUNTS. You can certainly obtain a patent for your invention; but we may tell you at once that it would be of no value, as the thing is "as old as the hills," though we doubt not that it is original as far as you are concerned.

S. S.—You have omitted to enclose your name and address, hence your communication is not attended to.

APPRENTICESHIP.—S. H. W. The lad is quite right. You have no remedy, as the indentures are not stamped. He has been only a weekly servant, and can leave at the expiration of the week's notice.

GOLD FRAMES.—GOLD FRAMES asks: "Can you tell me the cheapest and best way to renovate old English gold frames? I do not mean by regilding, but otherwise?"—The only way we know of is by regilding. If the gold has worn off, it must be replaced.

WATER RATE.—SUBURBAN. Although the house is a dwelling-house, it seems it is used entirely for business purposes—printing for the London house, which requires a large quantity of water. The Water Company, under their Act, are perfectly justified in declining to supply, unless by meter.

EQUIVALENT FOCUS OF LENS.—NOVICE. There are several ways of finding the equivalent focus of a lens. The simplest for you will be to sharply focus an object, say a card, the same size as the original, on the focussing screen. Then remove the lens and measure the distance between the card and the ground glass. One-fourth of this is the equivalent focus of the lens. This is not strictly correct, but it is near enough for all practical purposes.

VALUE OF BUSINESS.—A.B. With so small a turnover, we should say the value of the goodwill is *nil*, and the plant and fixtures at valuation is about all you can expect. But, as the rent and the prices obtained are not mentioned, we can only offer a general opinion. So far as we are aware, photographic assistants are not paid better in Paris than they are in London. An Englishman not speaking French would certainly be at a disadvantage in Paris as a photographic assistant.

LANTERN SLIDES OF VARIOUS COLOURS.—LANTERNIST wants to know how to make lantern slides of different colours, such as bright blue, green, red, yellow, &c. The colours, he says, must be brilliant, and not such as are got by simply colouring the ordinary slides? The only way we can suggest is by making them by the carbon process, using tissues made with pigments of the colours desired. Tissues of some of the colours mentioned, if not all, would, we suspect, have to be specially made, as they are not stocked of the pure colour.

MEALY PRINTS.—J. A. COMPY writes: "We use albumen paper, own sensitising, and all through the summer we have been troubled with mealiness in our prints. We have tried different brands of paper, and different toning baths, but all behave much the same. Do you think this is the outcome of the paper ring?"—Doubtful, very. This has been an exceptionally hot and dry summer, and probably the paper has become abnormally dry when printed. A certain amount of moisture seems to be necessary while printing, and this is often absorbed by abnormally dry printing frames and their pads.

COPYRIGHT.—F. E. P. says: "Having come into possession of a copy of *The Seat of War in the East*, by William Simpson (first series), published by Paul & Dominic Colnaghi & Co., London, 1855, I want to know if I may copy the engravings for lantern work, it being published before the Copyright Act of 1862, or would I be liable if shown?"—We do not know the work in question; but, if it is an engraved one, it is very probable that there is a copyright in it. We should advise you to write to the publishers, because, if there is a copyright still in force, they may permit you to make lantern slides of the pictures.

HYDROQUINONE.—E. P. writes: 1. "I should be much obliged if you would tell me the difference between hydroquinone and hydrokinon? Whichever I send to dealers for, it is always hydrokinon I get, and a photographic friend assures me there is no difference, only some spell it one way and some another. Yet, if that is correct, how is it that hydrokinon will not develop plates when made up exactly as advised by the plate-makers? 2. Do you know which is the best work on photographic solutions, chemicals, their natures and uses? 3. What charge, if any, is there for being entered on the dealers' list in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC?"—1. They are one and the same thing. 2. There is no work specially devoted to the subject. But they are more or less alluded to in all elementary works on photographs. 3. None.

CLEANING LENSES.—T. S. M. W. writes: "I am most careful with my lenses, never leaving them uncapped when not in use; I find that this summer the surfaces have got a lot of spots on them resembling fly spots, most of them transparent but some black, these spots are hardly to be removed with wash-leather and alcohol. Would you kindly tell me if there is anything else I may use without damaging the glasses (both Jena and the old glasses), such as hydrochloric acid, &c., and may they be rubbed with the edge of a piece of wood such as peg-wood, as these spots are exceedingly hard?"—Probably, instead of using alcohol, a little water, or saliva, would remove the spots more easily. From the description of the spots it would rather appear that the lenses had been splashed with something. We should certainly say, Avoid the use of wood or any such hard substance.

FOGGED NEGATIVE.—J. W. says: "I herewith send you a 12×10 rough print from negative, showing what appears to be a flare spot, but I don't think it is so, as it only happens to some negatives, particularly when a long way from figure or when light faces the lens. It occurs in both lenses. I have one a Swift and the other Morrison's, and it has troubled me a great deal in all negatives taken, but never used to do so until lately. I cannot trace any hole in camera, so ask you for a little assistance to discover the fault; it is like a fog of some description always in the centre."—At first sight it looks like flare in the lens, but a closer examination shows that the fog is not confined to the centre of the plate. We should say that light gains access to it from some defect in the front of the camera, particularly as the defect has only occurred lately, and did not do so before with the same lenses.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
The British Journal Photographic Almanac for 1899	657
Ex Cathedrâ	657
On the Action of Light on the Salts of Cobalt.—V.	659
Leaderettes:— Photographic Studio Roofs—Cloud Negatives—Fugacity of Brown Dyes—Prevention of Rust—Acetylene Compared with Coal Gas—Forgery—A Slump in Art—Scientific Kite-flying—Undetectable Poisons—Vesuvius	661
Further Uses for Persulphate of Ammonia.—II. By W. B. Bolton	662
A Support for Panoramic Cameras	663
Photographing Birds' Nests and Flowers	664
Photographing Animals	664
The Lizars Exhibition: Full Prize-list	665
Mr. Warneuke's Exhibition at Glasgow	665
Notes from the West of Scotland	665
The Camera Club	666
A National Physical Laboratory	666
Our Editorial Table:— The Rectiflex Finder—The "N. & G." Camera in New Zealand—Skiagraphic Atlas, Showing the Development of the Bones of the Wrist and Hand—Specimens of Christmas Cards—*The Illustrated Annual of Microscopy*	666
News and Notes	667
Patent News	668
Meetings of Societies:— Royal Photographic Society London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—Hackney Photographic Society—Lewisham Camera Club—Bootle Photographic Society—Leeds Camera Club—Rotherham Photographic Society—Sheffield Photographic Society—Edinburgh Photographic Society	668
Forthcoming Exhibitions	670
Correspondence:— Packing Plates for Export—Second-hand Lenses—Washing Prints—A Plate Backing—Photographing a Spirit—Aintree Photographic Society	671
Answers to Correspondents	671

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that many of the advertisement pages of the Almanac are already booked, and that, to ensure insertion and good positions, orders and copy should reach them without delay.

EX CATHEDRÂ.

The first Traill Taylor Memorial Lecture will be delivered by Mr. Thomas R. Dallmeyer, F.R.A.S., on Tuesday evening, November 8, at eight o'clock, in the Exhibition Gallery of the Royal Photographic Society, No. 5A, Pall Mall, East, which has been kindly granted by the Council for the purpose. Mr. Dallmeyer's paper will, of course, be an optical one, and its title will shortly be published.

* * *

We have recently had two or three references to the process of colour photography with which the name of Dr. Gustave Sellé, of Berlin, is associated. Those references came from some of the daily papers, and their obscurity was so great that we last week took the opportunity of giving our readers an idea of what the process—or, to be more correct, the processes—really consisted of. It is not the first time that Dr. Sellé's work in colour photography has been referred to in our pages. On at least three occasions during the last two years we have felt compelled to criticise the vague and indecisive manner in which Dr. Sellé's alleged achievements in colour-photographic work have been put forward. It is perhaps the almost inevitable misfortune of most inventors and those associated with them that they fail to grasp the importance of being clear and explicit in the claims they make to novelty of discovery—what it is in fact about their inventions that sharply distinguishes them from other inventions that have the same end in view. Dr. Sellé has certainly "let himself in," as the phrase goes, for a considerable amount of sceptical comment by failing in precision of claim for his colour-photographic work, concerning which we ourselves might have been throughout far less severe in our criticisms had any inkling been obtainable of the direction in which Dr. Sellé was working.

WHAT, then, is the Sellé process, or processes, of colour photography? There is, and need be, no mystery about the matter. As we intimated last week, it is the three-colour process which forms the basis of Dr. Sellé's original work. We are frankly told that ninety per cent. of the Sellé processes is admittedly old; and that it is the remaining ten per cent. of experimental work which it is believed will render those three processes commercially practicable. It is, of course, the last feature which constitutes the final test of all colour-photographic processes. Unless they respond to the inexorable necessities of comparative cheapness of production and uniform good quality, such processes can only in the end be regarded as experimental curiosities. We are assured that the Sellé processes of colour photography have already entered the commercial stage.

* * *

THE well-known principles of three-colour photography have been availed of to produce (1) glass transparencies; (2) paper prints; and (3) chromo-collotypes. In the first and second of these processes the coloured images are obtained by the superposition of the three coloured films, and, as regards the second method, it is hoped that the adaptation of the process to paper will command considerable attention at the hands of photographers and others interested in the cheap reproduction of well-known views, &c. Certainly, among the large number of results that were placed before us last week, some were of very striking excellence. The same remark applies to the numerous examples of three-colour collotypes, in various stages of printing, that were also shown us on the same occasion. Originals and reproductions were placed side by side, and one could not desire to see better specimens of three-colour printing. There is no reason why these three processes—particularly the chromo-collotype, in which some well-known experimentalists have, from time to time, worked during the past few years—should not prove very great commercial successes.

* * *

THIS, then, will give the reader an idea of what is meant by the much-paragraphed Sellé process of colour photography. It is not our present purpose to discuss its claims to be regarded as "photography in natural colours"—no two men of science appear to be able to agree as to what the latter really is, and until some such agreement is come to it is idle to debate the question in connexion with the case under notice. We can only repeat, in conclusion, that, judging by the many admirable examples of colour photographs that were placed before us last week, there is no reason why this particular system should not command a very large measure of success. The results are good, and are comparatively inexpensive. We might say, finally, that some indications were given us of the improvements in detail that had been effected in working out the process, which more than anything else dispose us to regard its future with some confidence. These details relate to the method of taking the negatives and of printing the pictures in the collotype press; but we are unable to write at length about them.

* * *

"COLOUR" is in the air of our office this week. Mr. George Holland, of the Mid-Cheshire Society of Art, in sending the annexed cutting from *To-day*, asks, "Whatever is the enclosed? I take THE BRITISH JOURNAL OF PHOTOGRAPHY in, but don't remember seeing any mention of it":—"I am glad to put on record the fact that a Cornishman, in the person of Mr. Bennetto, of Newquay, has invented a process of colour photography which seems likely to eclipse the efforts of all those who have gone before. I had the pleasure of meeting this inventor only last week, and of carefully inspecting many of the results of his eight years of study. The simplicity of Mr. Bennetto's process is its chief recommendation. Unlike the typical inventor, he has worked out a system which will at once appeal to the amateur and the public. Colour photographs can be taken by one and all. Any ordinary camera can, at a small expense, be fitted with the necessary apparatus to enable the photographer to take coloured pictures or monochromes at will. Only one exposure is necessary, and the *developing, printing, and fixing* take no longer than is required for manipulating ordinary silver prints. Those coloured pictures taken by Mr. Bennetto which I have seen exceed in beauty anything I ever imagined could be reproduced. Mr. Bennetto's photographs are composed of pure colour, true to nature, and have none of the dual monochrome tones which mark the so-called coloured photographs. It seems to me that there is a fortune in this process. I hear, by the bye, that 50,000*l.* has already been paid by a Yankee millionaire for the rights for three American States."

* * *

WE are sorry to have to tell our correspondent that we do not yet know what the "Bennetto principle" is. We have found out all, or nearly all, about the Sellé principle; but that of Bennetto defies us. But our correspondent cannot have taken THE BRITISH JOURNAL OF PHOTOGRAPHY in for very long or he would have known that two years ago and onwards we had many references to Mr. Bennetto and his process, or rather to what Mr. Bennetto said about it. The Dansac-Chassagne and Sellé processes no longer mystify us; and, as some months ago we received Mr. Bennetto's personal promise to have a special demonstration of his process, we hope before long to be lifted out of the state of wonderment into which Mr. Bennetto has so long plunged us.

* * *

"ELECTROID" is the name of an alleged new illuminant which, according to a provincial contemporary, promises to become one of the lights of the future. "The non-smelling, deadly fumes which proved fatal to the water-gas boom of a few years ago, and the explosive properties of acetylene, are qualities which are entirely absent in the new illuminant, of which the inventors are Messrs. Marsh & Thorpe, of Manchester. In its elementary stages of manufacture, electroid is identical with acetylene. It is produced by the action of calcium carbide on water. But the acetylene afterwards undergoes a process by which it is so treated as to remove its dangerous qualities, and the result thus obtained is the new illuminant, electroid. It burns with a non-smoky flame of much brilliance and purity. Perhaps the most noticeable feature about it is the absence of "flash" or glare, so characteristic of the electric light. It is claimed for it that it is more like daylight than any illuminant that has yet appeared."

* * *

ACCORDING to a report of the American Ambassador at St. Petersburg nearly seventy per cent. of the patents granted in Russia are issued to aliens. This is important in view of the

ew market for manufactured goods in the Far East, a market hich will probably, for a long time to come, be under the ontrol of Russia. Patents are granted for inventions and improvements which represent an essential novelty in their otality, or in some part or parts, or in a combination of parts.)ne patent can cover several inventions or improvements; hen, combined, they form a distinct process and cannot be sed seperately. No patents are granted where there is no ssential novelty. It is a curious fact that the poor Russian ubjects, upon adequate proof to that effect, can be freed from he fee which the Government exacts upon filing the case. The expense of procuring Russian patents was considerably reluced when the new law went into operation.

* * *

THE Committee of the West Surrey Photographic Society nnounce a novel and interesting competition. A prize, value)ne guinea, is offered for the best photograph of fruits or vegeables, or the two combined. The prints may be by any process, and should be mounted. The display must be of not ess than three sorts of either fruit or vegetables. Leaves may be introduced and accessories, such as trays, flagons, mats, cloths, &c., may be used, but neither flowers nor figures. All such accessories to the general design should be suitable as to ise and harmonious as to position. The Judges will be asked to consider equally the art and the technique of the prints sent n. Prints must not be less than quarter-plate nor larger than whole-plate. The competition is limited to members of the Society, and the photographs must be the work throughout of the competitors.

* * *

NINE months have yet to pass before the Photographic Convention of the United Kingdom holds its 1899 meeting at Gloucester, but already some of the gentlemen who will be responsible for the local arrangements are interesting themselves in the matter. We have received from Dr. W. Hodges, of 38, Park-road, Gloucester, who, in all probability, will form one of the local committee, a copy of a book of seventy pages, entitled *Gloucester*. This is issued by the Gloucester Traders' Association, and it treats of the interesting features—industrial, natural, archæological, residential—of the city and district, and describes a number of picturesque walks, day excursions by carriage, cycle, rail, or water. The cathedral town and the best known surrounding districts are well described, and there are nearly fifty half-tone illustrations from excellent photographs printed in the book. It is quite obvious that in the matter of picturesque excursions the 1899 Convention will be extremely well favoured, and we also hear that the Gloucester municipal authorities are determined to make the visit a very successful one.

* * *

A CORRESPONDENT draws our attention to the following circular, emanating from "Success," 8, Whitefriars-street, E.C., that has been sent him: "We have had your name given to us by a member of 'Success' Club. As there are a good many members in your district, will you kindly let us know if you are prepared to take the portraits of 'Success' Club members upon the same terms as our London photographers, *i.e.*, 2*s.* per dozen for *cartes-de-visite*; 2*s.* for three cabinet size; 2*s.* for one cabinet and six *cartes-de-visite*. If you are, we shall be happy to publish your name in our paper, and it may lead to business." Our correspondent declined the proposal, and we do not blame him. On the other hand, we are bound to say that even at the low prices charged we have seen quite fair work produced; but to make a profit at those prices a very considerable volume of business would be required. However, the less inclined photographers show themselves to take photographs at these ridiculously low prices, the better it will ultimately be for themselves and the whole of the profession.

* * *

ONE of the features of the forthcoming Exhibition of the Aintree Photographic Society will be the following competition:—Open to Liverpool and district, ten miles' radius. Class G.—"Lecturette." Entrance fee, 1*s.* 6*d.* each lecture. Lectures may be upon any subject, and must be illustrated with about twenty-five lantern slides, and occupy not more than thirty minutes in delivery. For full particulars, post-card to Exhibition Secretary." Competitive lecturettes are certainly a novel item in connexion with a photographic exhibition, and we wish this experiment every success. At the same time we hardly anticipate either a large entry or an exciting competition. Half-hour lectures with twenty-five slides require considerable courage to undertake by all but the very few.

* * *

THE *Daily Telegraph* of Friday last told us that there was an agreeable surprise in store for those who were present at the Palace Theatre on the previous evening. "During the performance of the American Biograph a picture was thrown on the screen which drew forth the heartiest cheers from a delighted auditorium. In admirable presentment were seen the Guards home from the Soudan, marching on the way to Wellington Barracks. The view was taken as the regiment was wheeling round from York-road to Westminster Bridge-road. Neither Mr. Morton nor the manager of the American Biograph ever hit on a happier idea, or carried it out better and quicker before. The photograph was taken shortly after two p.m., and by 10.30 was being shown to prolonged applause." The feat, says our contemporary, from a photographic point of view, is remarkable. Frankly, we are getting somewhat tired of reading about "remarkable" photographic feats which are only remarkable in the eyes of ignorant persons. Eight hours in which to develop a kinematographic view, develop and dry a positive therefrom, and exhibit the result on a screen, is ample time for the work, the successful accomplishment of which may be praiseworthy, but certainly cannot be termed remarkable.

ON THE ACTION OF LIGHT ON THE SALTS OF COBALT.

V.—EXPERIMENTS WITH COBALTIC CYANIDE.

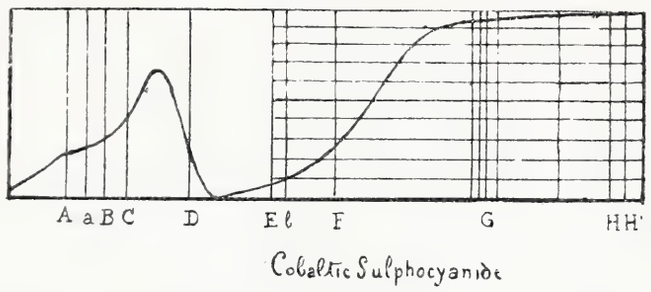
THIS salt was prepared by an indirect method, viz., by sensitising unsized paper with a solution of cobaltic citrate and, after drying in the dark, with an aqueous solution of potassium cyanide. Several sheets of this sensitised and dried paper were successively exposed under a negative in sunlight, the several given exposures being of about three hours' duration each. In no case was any perceptible image produced by the action of light. One of the exposed sheets was then immersed in an aqueous solution of disodic orthophosphate rendered alkaline by the addition of ammonia, This, however, failed to produce an image. A like result followed when a second sheet was treated with an aqueous solution of cupric chloride. A third sheet, immersed in an aqueous solution of gallic acid, took a violet tint, but no signs

of any process of development were visible. A fourth sheet, on being soaked in an aqueous solution of tannic acid, remained to all appearances unaltered. A fifth sheet was treated with a weak solution of potassium permanganate, but, owing to the corrosive action of this salt upon the organic matter of the paper, it was found impossible to decide whether or not an image was formed. Accordingly, the experiment was repeated with a fresh sheet of the exposed paper, a more dilute developing solution being now employed. This time it seemed as though the faint outlines of the picture could be discerned. The experiment was, notwithstanding, regarded as inconclusive, the irregular action of the permanganate on the paper being held sufficient to account for the phenomena in question.

Experiments with Cobaltic Sulphocyanide.

A sheet of paper was coated with a strong aqueous solution of sodium sulphocyanide and dried. It was then sensitised by coating with a solution of cobaltic citrate. When dry, it was exposed to the action of the spectrum for upwards of thirty-five hours. At first, little change was apparent; but, ultimately, a weak image of a brick-red hue was obtained. This

Fig. 6



is represented graphically in fig. 6 of the accompanying illustrations. Here it appears that the violet and the indigo rays exert an almost equal influence, the point of maximum intensity being, however, situated in the former. The blue rays are almost equally powerful, the orange rather less so, while the red exert a moderate action. The green rays are comparatively inactive, and the yellow wholly so. It should be added that the figure bears a certain resemblance to that of cobaltic citrate under the initial action of light.

A sheet of paper, coated as before with the sulphocyanide solution and dried, was then sensitised with a solution of cobaltic oxalate, prepared as will hereafter be described. On drying, blue patches made their appearance on the surface of the paper, and it was found to absorb atmospheric moisture very readily. Exposed under a negative in sunshine for seven minutes, a faint but distinct image was obtained, not, however, as before of a brick-red, but of a sky-blue colour. Continued exposure (lasting in all about twelve hours in sunshine and diffused light) did not appreciably increase the intensity of the picture, but, on laying the printing frame aside in a dark place for two or three weeks, a blue picture of considerable vigour was, when next the paper was examined, found to have taken the place of the imperfectly printed image, the molecular action once started having proceeded without access of light, as in the carbon process of printing. In the preceding experiment cobaltous sulphocyanide was probably formed. Here, on the other hand, the colour of the image seems to have been due to a basic compound of cobalt.

Experiments with Cobaltic Stannate.

On boiling cobaltic hydrate in water to which precipitated stannic acid had been added in slight excess, small crystals of cobaltic stannate were found to separate out on cooling. These were carefully collected and redissolved in warm water. Unsized paper was then coated with the concentrated hot solution and carefully dried in the dark. A portion of this sensitised paper was exposed for ten minutes in sunlight under a negative. A very faint image of a brownish hue was produced. On increasing the exposure, little or no gain in density resulted, and, at the expiry of an hour, the picture was practically as weak as when first examined. Removed from the printing frame and transferred to a bath containing an aqueous solution of potassium ferrocyanide, the image remained to all appearance unchanged.

In the next experiment a sheet of the sensitised paper was exposed for ten hours to light, the same negative being again employed. No image was visible after this exposure, and therefore, taking into account the results of the former experiments, it seemed probable that a process of bleaching had again manifested itself, destroying the faint picture impressed at an earlier stage of the operations. For purposes of development the exposed sheet was cut up into five strips. The first was immersed in an aqueous solution of calcium hypochlorite, the second in one of nitrate of lead, and the third in one of potassium ferricyanide. In no case, however, was there any appearance of an image by development. The fourth strip was soaked in an aqueous solution of mercurous nitrate. This reagent also failed to produce anything of the nature of an image, certain light brown markings which made their appearance being of too doubtful origin to be classed under this head. The fifth strip was then treated with a weak aqueous solution of potassium bichromate. This time a picture was indeed produced, but one so faint in its outlines as to be visible only on very close and careful scrutiny. The character of these results being somewhat unsatisfactory from a photographic point of view, a spectroscopic examination of the behaviour of the stannate was considered impracticable.

Experiments with Cobaltic Nitrite.

Unsized paper was first coated with a solution of cobaltic oxalate, and, after drying, resensitised with a solution of nitrite of lead, whereby the cobaltic salt was converted into nitrite, insoluble oxalate of lead being simultaneously formed. After drying in the dark, a sheet of this paper was exposed in diffused light under a negative for fifteen hours, but no image was impressed. A second sheet was then exposed to the action of the spectrum, the exposure extending to upwards of thirty-five hours. This, however, failed to produce an image. The paper was then divided lengthways into three parts. The first was developed with an aqueous solution of potassium ferricyanide, and the second with one of lead nitrite rendered slightly alkaline with ammonia. In neither case were any signs of development apparent. The third strip was immersed in an aqueous solution of mercurous nitrate, but this failed to produce any change in its appearance. When, however, it was transferred to a bath containing solution of potassium ferricyanide, a faint orange-hued image appeared in the course of a few seconds. So far as could be judged, the order of intensity of the active rays proceeded from the yellow (representing the maximum) through the green and the blue to the indigo (representing the minimum). This estimate must, however, be regarded as merely an approximation to the truth.

Photographic Studio Roofs.—Although electric installations are continually gaining ground, the presence of a photographic studio at the utmost altitude is still a prominent feature of the roof architecture of large towns. During the prevalence of wind storms and the nearest approach to tornadoes this country is capable of, we have known several instances when the owners of studios have been very nervous about the stability of their glass-houses, which, where there is no municipal building authority, are too often of the "jerry" character. There are, of course, certain well-known data as to the power of wind for certain slopes of roof, and, when the work is supervised by skilled architects, they are guided by these rules. At the same time the nervousness we refer to exists, and to allay it to some extent we may refer to a portion of the Presidential address at the recent British Association meeting. The architectural rules we refer to are based on Tredgold's observations, who reckoned on a wind pressure of 40″ per foot as having to be provided for. After the Tay Bridge disaster Government issued rules requiring fifty-six feet pressure to be provided against. Now, however, the latest discovery so called (though nearly a score of years ago the same facts were published at a business centre far away from the metropolis) is to the effect that all these rules are founded on false data, those provided by the indications of small anemometers, the truth being that the actual pressure on large areas is very considerably less per foot than these indications. It thus follows that studios are really safer than the architect had estimated when he left a safe margin against eventualities.

Cloud Negatives.—A hint in season is often of value, and such may be the case just now to some of our readers. Thousands of them have, during the past exceptionally fine (photographically) summer, been accumulating a good stock of negatives, which they intend to utilise during the winter months in different ways, enlarging from or for lantern slides. Have they all got a good stock of cloud negatives to use with them? If not, they should lose no time in obtaining them, as the photographic season is fast drawing to a close, or, at least, so far as securing cloud negatives suitable for summer subjects is concerned. During the autumn, when the sun is bright, usually the most charming cloud effects are seen, particularly those for printing into summer pictures, if judiciously used.

A GOOD stock of cloud negatives is a great acquisition to every photographer; yet how few possess them, if one may judge from the number of subjects often seen supplemented by the one same cloud negative. That, in some instances, is lighted from a directly opposite direction from that which the landscape is illuminated. This makes the whole picture, otherwise good, ludicrous, particularly if shown on the screen. If many of those who have put aside their cameras for a season were to use up their stock of plates left over for securing cloud negatives, they would, no doubt, find it advantageous. Stale plates, indeed, may often be utilised for the purpose, as it is not often that the extreme edges of the plate are wanted; indeed, the "softening off" is sometimes an advantage in masking in. Hand-camera clouds are easily taken, and, when once obtained, the negatives may be enlarged to suit other size negatives. Hence our hint to secure them while the opportunity lasts.

Fugacity of Brown Dyes.—If in the whole range of pigments or stains used in photography—for carbon printing, for spotting prints, and so on—there is one set of colours which would be looked upon as above suspicion, it would certainly be the browns. Yet, from the report upon the action of light upon dyes, presented by the Special Committee to the British Association, a large number of them are classed among the most fugitive of colours. Those who desire to have a full knowledge of the matter may read the report itself, which is being published in full in the pages of the *Chemical News*. Some of them, for example, faded to a large extent in one month's time, and at the end of about a year the original colours had vanished, and been replaced by one of a yellowish or greyish tint, quite unlike the original. There are few manufacturers of carbon tissue, and we do not doubt that they rigorously examine the pigments they use; but, at the same time, seeing the trenchant condemnation which the report delivers with regard to browns, it may be worth while to reconsider current formulæ.

Prevention of Rust.—In the shape of rolling presses, burnishers, cutting knives, and so on, there are large numbers of pieces of apparatus in use among photographers in which polished steel in one form or another finds a place. Sooner or later, unless the utmost care is taken, it will be found that a rust spot takes hold, and, once there, inevitably spreads, as red iron oxide absorbs oxygen most probably as ozone, and gives it up to the metal in its immediate neighbourhood. Many recipes have been published for the confection of a material which may be rubbed on to the steel and prevent oxidation, and among the latest we have noted one which seems to promise well. It is simply a mixture of black lead, camphor, and lard in the proportions of 2, 20, and 125 respectively. It is said to be an excellent preventive.

Acetylene Compared with Coal Gas.—At the Botanical Gardens at Edgbaston, a private view of an acetylene installation was held, during which Professor Hillhouse gave an account of some relative comparisons of the two gases he had made. First, as regards action on plant life, to which, as every one is aware, coal-gas combustion products are inimical. With acetylene the result was absolutely *nil*, so that on the ground of health it may be assumed that it may be safely used in dark rooms, &c., as superior to coal gas. His next comparison was as to the scale of the spectrum included. He found a whole range to be present, and that the faintest and most delicate shades of colour could be detected.

Forgery.—A case of alleged forgery of foreign bank notes has been before the Brentford Police Court for several weeks past. From what has appeared in the press, it would seem that photography and photo-mechanical processes have been utilised in the work, largely if not entirely. Of that we shall learn more as the case proceeds. At one time it was thought that, if bank notes and cheques were printed in various colours, forgery by photographic means would be defied; but orthochromic photography and multiple printing in different colours has set that idea aside; indeed, it seems that apparently, the more complicated the design, the easier it is to reproduce it without detection. Our Bank of England has for many years past relied solely upon the simplicity of its design and printing, as well as the paper and the water mark upon it. The latter may, however, be closely imitated by the late Mr. W. B. Woodbury's method of water-marking, namely, rolling the paper, with heavy pressure, between steel rollers, in contact with a photo-gelatine relief; but, if a paper so water-marked be immersed in or sponged over with water, the marking disappears, while a genuine water mark, *i.e.*, that conferred in the manufacture of the paper, will remain intact.

A Slump in Art.—An amusing case was heard in the Bloomsbury County Court one day last week when an artist appeared to a default summons. In reply to the plaintiff's advocate's question, "But you are an artist," the defendent replied, "Yes, to my sorrow. There is a slump in art. I have not sold a picture for eighteen months." He added: "The palmy days are past. The British manufacturers cannot spend the money now on pictures that they used to, and as to South African millionaires—bah! they are no good." It cannot be that the slump in paintings has been brought about by Salonistic photography, indeed, no suggestion was made in that direction. Notwithstanding the alleged slump, and the fact that this artist had given up painting for the more lucrative business of canvassing for advertisements, some artists leave good fortunes behind them: Burne-Jones, Millais, Leighton, and others, to wit.

Scientific Kite-flying.—The flying of kites, by which we mean veritable aërial visitants and not commercial transactions of lax morality, is quietly attaining important proportions, and quite recently the record has been broken by the flight of a "tandem of kites" from Mr. Rootch's observatory, the highest attaining an altitude of no less than 2124 feet, higher by 217 feet than any hitherto recorded flight. We have already pointed out the value of kites for observatorial work, a value in some respects greatly beyond that of a stationary balloon. Thus, with kites much smaller than this tandem contained, high ascents have been made and photographic recording instruments used, and actuated or controlled by electrical devices. We think it by no means unlikely that every military expedition will be armed with its batteries of kites for photographing distant objects situated in positions otherwise invisible. Some idea of what this kind of kite-flying means may be obtained from the published statistics. For example, five miles of wire were used for the kite string, and it weighed altogether some 75 lbs., while the kite itself with its recording instruments and secondary wire weighed 35 lbs.

Undetectable Poisons.—In his inaugural address at the Pharmaceutical Society, last week, if he is correctly reported, Sir J. Crichton Browne seemed almost to lament that murderers and suicides still adhere to the old-fashioned poisons. Here are extracts of his speech as reported in the *Standard*. "He referred at length to the use of poisons by murderers and suicides, and said that, notwithstanding the discovery of new poisons which when taken into the body could defy detection, even in a most minute *post-mortem* examination, homicides still clung to the old-fashioned and clumsy methods of human destruction." Further on he says, "Even medical men, who it would be thought, when they develop murderous instincts, would be able to ring the changes in a variety of ways, did not make use of the new and powerful organic poisons, but contented themselves with employing inorganic drugs which were easy of detection, and were scheduled in the pharmacopœia." After referring to nicotine, the Doctor added, "There were organic poisons well known to medical men which could be used with impunity without the slightest fear of detection, but they were rarely or never used illegitimately."

It is not at all surprising that coroners, whose province it is to find out the causes of deaths, look somewhat askance at such remarkable public utterances, and one has already expressed a very strong opinion on the matter. But are the poisons referred to really undetectable, and how long will they remain so? Chemical science, if pharmaceutical chemistry is not, is advancing. It is not so long ago that several of the alkaloids it was thought could not be detected in the system after death, but now that is an easy matter, and several culprits have suffered on the gallows for their misdeeds. We shall not be surprised if the lecturer's speech is fully utilised in three-volume novels, and perhaps in the "penny dreadfuls."

Vesuvius.—On more than one occasion lately we have alluded to the fact that those who dwell in observatories situated on mountains, such as Ben Nevis, Mont Blanc, Vesuvius, &c., do not always "live in clover." In a communication to the *Standard*, last week, an engineer, engaged in the proposed railway from Naples to Vesuvius, speaks of the volcano as a place for holiday-making, and describes the scene and its grandeur at night. He says that hundreds of people come nightly to see it and bring provisions with them to have a pic-nic in the open air and return to Naples in the morning, and adds that these nocturnal festivities are not conducive to the repose of a tired engineer—neither are they, we surmise, to the tired officials in the observatory, which is only a hundred yards from where he writes. All mountains are nice as pleasure resorts during the holiday season, but that is not the case all the year round; yet all the year round, even in the most inclement season, the observers have to do their work, even though they be isolated from the world for weeks together. There is a wide difference between a mountain as a pleasure resort during the summer season and a life in an observatory upon it during the winter months.

FURTHER USES FOR PERSULPHATE OF AMMONIA.

II.

From the total to an only partial destruction of an impressed image—from the restoration of a fogged plate to the mitigation of over-exposure—is not a far cry, and the agent that will effectually perform the one operation may be reasonably expected to compass the other. Indeed, from a practical point of view, if adequate means of restraint be available, the latter process will undoubtedly prove far the more valuable application of the persulphate.

My first experiment in this direction was made by subjecting a greatly over-exposed plate to the direct action of a one per cent. solution of persulphate of ammonia, but this had apparently no action whatever, or if it had it was of so general a character as to be practically valueless. The strength was increased until it reached the standard five per cent. solution recommended by Messrs. Lumière, but the only effect of this was to bring about a considerable weakening of the image without in the slightest degree altering the gradation or removing the inevitable flatness and want of contrast resulting from the excessive exposure.

From what has been said in my previous article no less than from the behaviour of the same solution on a developed image, this result is perhaps not surprising, since the most we can expect is a general reduction, or, if the reflex action described by MM. Lumière takes place, a reduction the reverse of what we require, since, as they point out, the persulphate attacks the heavier deposit, first leaving the shadows of a negative practically intact. For our purpose we want the very opposite action, in fact, if it were practicable, the hypo and ferricyanide reducer would be more correctly indicated.

But, working on the same lines as for the total removal of the image, a small quantity of soluble bromide was added to the persulphate, when an altogether different result ensued. It has already been pointed out in these columns that the addition of soluble bromide to the solution altogether alters its action, for, whereas a solution of persulphate of ammonia in distilled water *dissolves* the developed image without producing any deposit either in the solution or in the film, the mixture reconverts the image into bromide of silver in precisely the same manner as any of the ordinary bleaching agents, such as bromide of copper or the mixture of bichromate of potash and soluble bromide, but without the introduction of any chemical complications. Hydrobromic acid may be said to act in a similar manner without introducing any further complications, but even this is inferior to the persulphate and bromide, as I shall show by-and-by.

The mixture of persulphate and bromide of ammonium—five per cent. of the former and one per cent. of the latter being taken as the standard and used at various strengths—was applied direct to the over-exposed plate previous to development, and now the effect was very pronounced. Not only was the development very much retarded, but the alteration of gradation was especially noticeable, so much so indeed that what would otherwise have been a thin, flat, over-exposed image, transparent in the high lights and veiled in the shadows, became a strongly contrasted negative, capable only of giving the conventional "soot and whitewash" effect. The action was, in fact, so powerful in the least exposed portions of the image that they were completely eaten away, and no amount of forcing development would do more than pile on the density on those portions of the image that had escaped destruction.

This result was precisely the same whether the "standard" solution was used full strength or diluted to one-fifth, due allowance, of course, being made in the time of action according to the degree of concentration. However short a time the weaker solution was allowed to act, if it produced any effect at all, it acted disproportionately on the weaker portions of the image; and, so far as I could find, no variations in the relative proportions of the persulphate and bromide had much effect in modifying that action.

The outcome of these experiments was so discouraging that I was on the point of abandoning the quest altogether, when it struck me to try the persulphate in the developer itself. The probability of any useful action accruing was not at first sight a very strong one; however, I ventured to make the trial. Bichromate of potash has been used or recommended in the same manner, though I do not

think it has ever secured any serious adoption; but, then, the bichromate is only converted by the developer into neutral chromate, which still has a more than appreciable action on the developable image. Hydrobromic acid used in the same manner becomes simple alkaline bromide, and the persulphate of ammonia we may suppose to be converted into the normal sulphate, which, although somewhat of a restrainer, does not possess any specific action on the latent image. Still the trial had to be, and was, made.

There was one other circumstance that seemed likely to operate against the efficacy of the new combination, namely, the possible action of the powerful oxidiser upon the pyro, which, in my case, I keep in concentrated solution with metabisulphite of potash. However, on mixing them, I found no apparent effect, the solution remained as free from colour as if plain water had been added, although the pyro and persulphate were mixed before the alkali was added, and before, therefore, the oxidising action was destroyed Probably the first action is exerted, or even exhausted, upon the bisulphite, which, again, would be converted into sulphate.

I decided to commence with a maximum dose of the persulphate; so, for a collodion plate, took 2 drachms of five per cent. persulphate solution, to which were added, in the order named, 5 minims of ten per cent. pyro with metabisulphite, 3 minims of twenty-grain bromide, and 6 minims ammonia 1 : 8—in fact, my ordinary developer for such plates, only substituting the persulphate solution for plain water. This, as I fully anticipated, proved far too strong, and the image utterly refused to appear or the film to fog, although I tried hard for about ten minutes. The plate was well washed, and a new developer applied, made by adding an equal volume of normal developer to that already used, that is to say, ingredients in the same proportion, only using water instead of persulphate solution. With this, in about three minutes, the image began to appear, but progressed so slowly that I gave it up and started afresh.

I very soon found that, by adding the five per cent. solution in drops according to the degree of over-exposure, a perfectly manageable developer was obtainable for either collodion or gelatine plates, and that it may be mixed before starting development, or may be added as the need becomes apparent, whichever may be preferred. The effect is very marked at any stage of development, and leads in all cases to a decided increase in density and contrast, and may be pushed to the extent of altogether destroying the finer details of the shadows.

When the maximum effect is desired, or when the check action is required to act instantly, a corresponding addition of bromide is desirable, but the persulphate acts gently, but effectively, when no added bromide at all is present, as when using acetone. Here, no doubt, the bromine given off in development fills the duty, for I feel sure that free bromide is a necessity.

Whether the restraining action is due to the persulphate as such, or merely to the presence of a fairly large dose of normal sulphate, which in any case must be present, I am not now going to argue, but I may say that I have failed to produce anything like the same result by using either the normal or bisulphate of ammonia.

W. B. Bolton.

A SUPPORT FOR PANORAMIC CAMERAS.

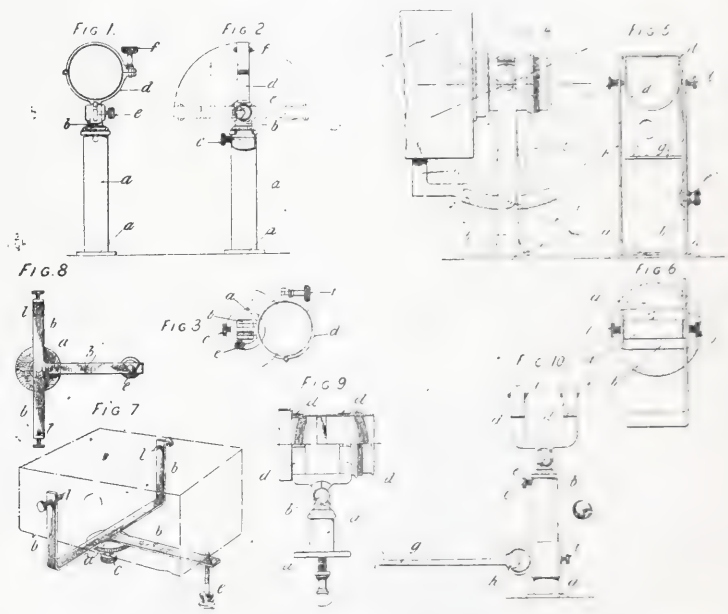
Colonel Bigsly-Chamberlin has devised an improved support for photographic cameras, the object being to enable an operator to take panoramic or extended views in sections by any ordinary camera, the said sectional view, when printed, being adapted for joining together to form one connected picture. The support is capable of movement upon two planes at right angles to each other, one plane being horizontal, or approximately so, according to the levelling of the stand or support, while the other plane, being at right angles thereto, is vertical, or approximately vertical. The two movements are separate, and are worked independently of each other. The form of the support requires variation to enable it to be attached to various shapes or arrangements of cameras, without, however, departing from the nature of the invention.

Fig. 1 is a vertical elevation of one form of the improved camera support, having a round clip at the top for the purpose of supporting the camera by gripping the lens tube only, as explained hereinafter; fig. 2 is a side elevation and partial section thereof; and fig. 3 is a plan of the same. The dotted lines indicate the direction in which movement can be made.

Fig. 4 is a side elevation, fig. 5 a front elevation, and fig. 6 a plan, of a similar support, but in which the box portion of the camera is secured by screws beneath, as indicated in figs. 4 and 5. Fig. 7 is a perspective view of a support for a hand camera, the latter being indicated by dotted lines, and fig. 8 is a plan of the support. Fig. 9 shows a partial section through the lens and its tube, mounted on a double-clip form of the improved support, to enable stops to be inserted or a diaphragm to be worked between the two clips. Fig. 10 is an elevation of a similar double support clip, but with an adjustable arm beneath to support the camera.

A base, *a*, is provided, which may in itself form the top plate of a tripod, but in figs. 1, 2, 3, 9, and 10 is formed as a pillar, which acts as a horizontal bearing for a joint piece, *b*, fitting thereon. The joint piece, *b*, is made capable of being turned round upon the base, *a*, on a horizontal plane, to all points of the compass, and a set screw, *c*, bearing upon a circular groove cut on *b*, is arranged in the base, *a*, to secure the joint piece, *b*, at any desired point.

By means of a mark or pointer on either *a* or *b*, and a scale upon the other representing a number of equal parts, the joint piece, *b*, can be turned to a predetermined degree on the scale for the purpose of taking a view, and moved from there to another predetermined point to take another view, and so on, if necessary, all round the horizon. For example, if the lens will take an angular view of, say, 75°, but it is considered desirable to take each of a horizontal series of pictures of 60°, then, by taking six successive views at intervals of 60° on the horizontal



scale, a complete picture of the horizon can be obtained by pasting together the positives (subsequently printed), each of which would, of course, be trimmed to suit the said angle of 60° before joining them together.

The upper part of the joint piece, *b*, is shown in figs. 1, 2, 3, 9, and 10 as having a knuckle joint for a hinged clip, *d*, adapted to swivel in a radial manner on the vertical plane formed by the knuckle joint, which joint works upon a pin having a screwed washer, in the well-known manner. By means of a scale marked upon the knuckle-joint part of *b*, and a pointer or mark upon the corresponding central part of the clip, *d*, in the centre of the joint, a vertical movement of the clip can be made to a predetermined range, and successive views taken on the vertical plane in a similar manner to that already described for the horizontal movement. A set screw, *e*, is provided to secure the parts, *b* and *d*, at any desired angular position while taking the several views.

The clip, *d*, is adapted to surround the tube, which carries the lens in the manner indicated by figs. 4 and 9, or it may be secured thereto permanently if desired. In the former case, and as shown in figs. 1, 2, 3, 4, 5, 9, and 10, the clip, *d*, is in two parts, the upper one being hinged to the lower part with means for connecting the parts, such as a milled-headed screw, *f*, engaging with a threaded flange, as in figs. 1, 2, 3, and 10; or a spring clip, as in fig, 5, in which case, however, the weight of the camera is sustained by an arm, *g*, adapted to be screwed to the under side of the camera box. A similar but pivoted arm, *g*, to assist in sustaining the weight of the camera or steadying it in a desired position, is shown in fig. 10, but in this case the arm, *g*, is adjustable to the angle made by the camera in its required position, and fixed there by a set screw, *h*, while the socket carrying the arm is adjustable in height upon the pillar, *a*, and secured in position by another set screw, *i*. The set screw, *e*, in figs. 1, 2, and 3, and the set screw, *h*, in fig. 10, are in each case placed excentrically with the pivot on which the parts shown turn, but any other clamping arrangement for the purpose indicated may be used.

In fig 4 the arrangement of the arm, *g*, is combined with a radial slot, *j*, and the screw, *e*, passing through *b*, is used for clamping the parts together to hold the camera at any required angular position on the vertical plane, the broken line through the optical centre of the lens tube, *k*, indicating the range. A scale on the base, *d*, shown in fig. 6, with a fixed index point on the tripod, serves to show the angular position of the horizontal plane. Similar scales are shown on the other figures.

It will be seen by the arrangement shown in figs. 4, 5, and 6, in which the lens tube is pivoted upon screws, *l*, that any movement upon the horizontal plane will cause the centre of the lens, or optical centre, to pivot upon the pivotal point on which the horizontal movement takes place, the two being on the same vertical line. Also, any movement on the vertical plane will take place on a horizontal line passing through the same optical centre, and through the two pivotal screws, *l*; and this assumes the proper levelling of the camera. Should, however, this not be exactly the case, the result will make very little difference in many cases, and may be disregarded in practice. The same is the case in figs. 1, 2, 3, 9, and 10, with the difference, however, that the pivotal point for the vertical plane is lower than in the former case, owing to the form of the joint piece and position of the knuckle joint. A movement around the horizon would be exactly the same as in the case of figs. 4, 5, and 6, except when the clip, *d*, is inclined from the truly vertical position, when the optical centre would describe circles varying in diameter according to the angle around the pivotal point of the horizontal plane, as is indicated by the plan (fig. 3). But this slight inaccuracy is of no consequence in extensive panoramic views, and may be disregarded in practice. In the arrangement indicated by fig. 7 a hand camera is suggested by the dotted lines, the box itself forming the joint piece, *b*. In this the camera support, *a*, is the pivot for the horizontal plane, while movement on the vertical plane takes place on the line between the two pivotal screws, *l*, controlled by the elevating screw, *e*.

PHOTOGRAPHING BIRDS' NESTS AND FLOWERS.

Before the Leeds Photographic Society, on Thursday, October 7, Mr. B. A. Burrell, F.I.C., presiding, Mr. Archibald C. Beilby delivered his lecture on the above subject, observing that his title might well have been a neglected branch of the art. Those who reside in the country have the best opportunity of doing this work. The exposure of a few plates bring back thoughts of your boyhood, making you feel young again, but better able to appreciate the wonderful works of nature. It takes up a lot of time; but, as a member of a photographic society, you can not only gain pleasure yourself, but entertain and instruct your friends too. "I hope to be able to make a complete set of British birds' nests. This season has been a poor one for variety; plenty of blackbirds, but other kinds were scarce in the vicinity of Roundhay. If you are a naturalist, by all means photograph the nests just as you find them *in situ*, with a stereoscopic camera. When you come across a nest with two eggs in, if you can add another of the same kind it will make a better picture, and if it is in a safe situation wait until the bird increases the number to three or four; on the other hand, if you do not make the best of the opportunity, you will probably lose it, for with cats, hawks, rats, weasels, small boys, and even the cuckoo, they have a perfect struggle for existence. We ought to value our feathered friends. The difficulties of photographing a nest in a tree of considerable height were overcome by a piece of apparatus, the joint production of Mr. James Taylor and myself. It consists of a board which will fasten to a ladder or branch of a tree in any position. One of my slides shows the support in position and in use, a hand camera, with focussing arrangement, is the best kind to use, one that will work with a long or short-focus lens, the latter being of most service. Besides the ordinary sliding-leg tripod, it is advisable to have one eight or nine feet long, for use on the outside branches of trees. Never tie a branch down without first taking out the eggs. On one occasion I did, with about 112 pounds' pressure, and then found it was a little too low; in unloosing the rope, it just slipped a quarter of an inch, shooting the eggs out with considerable force. Regarding exposure, always use an actinometer, or you will be certain to under-expose, and will find they generally require from ten to forty seconds with *f*-22 or *f*-32. In consequence of being so close to the object, small stops are required to bring everything into focus; it is also necessary to back your plates, or, better still, use a Sandell double-coated plate, which is a fairly rapid one.

"In the photographing of flowers there is an admirable field for the gentler sex. In the near future we shall see more work done in this direction. How desolate we should be if Providence had not created birds, flowers, and even insects. Flowers can be got so good and handy, there is no excuse for not starting at once. Quantity is not required; a good picture can be made with one or three, a few grasses adding addional charms. We are also furnished with flowers all the year round; in spring you can get a good variety, and summer gives us endless choice. Cut flowers are the easiest to manipulate. Your velvet focussing cloth stretched with dark-room pins will make a good background for lantern transparencies, a graduated one being better for prints, as you can get whatever tint you desire behind your subject. The choice of a receptacle is important; a vessel made of terra cotta is very good, also unglazed porcelain, as you can give them a coating of water colour any tint you wish.

"With a glazed vase, do not lose hope; coat it all over with gum or glue, and then dredge with tapioca or sand, and paint as above a colour to show the flowers to the best advantage.

"For white flowers, do not use an ordinary plate; the least over-exposure will produce halation even if plate is backed; use a thickly coated plate; the Sandell Double Coated are the best for all flowers, except those of a buttercup yellow. I must give the isochromatic plate with screen credit for doing the best work. Without a screen I have found Gloire de Dijon roses to halate through over-exposure, while the leaves were under-exposed. Helianthus or perennial sunflower, also some vases of different colours are a very severe test for the isochromatic plate. In one experiment with vases of buff, ultramarine, and terra cotta, I gave two hours' exposure with two number 4 gas burners, using an isochromatic plate without screen, and found it under-exposed, the ultramarine printing lighter than the other colours, which to the eye should look darker; the yellow flowers were very faint on the negative. Repeating above experiment by daylight with or without screen, the one taken with the screen excels. The same subject on a Sandell plate without screen, five minutes' exposure instead of twenty seconds (the correct time for ordinary work), with some white flowers in for experiment, came out without halation." The lecture was illustrated with sixty-two slides, consisting of nests of the blackbird, chaffinch, duck, hawk, hedge-sparrow, partridge, robin, swan, water-hen, willow-wren; and flowers, &c., were represented by baskets of roses, carnations, cycas revoluta (in bloom), gladeola (the bride), hyacinth, lilium auratum, moth orchids, magnolia conspicua, odontoglossums, wild flowers, alpine sea holly, also a hornet's nest (tenanted, tenantless, and in sections).

PHOTOGRAPHING ANIMALS.

The autumn session of the Kingston Photographic Society was inaugurated on Tuesday evening, October 4, with a public lantern lecture at St. James's Hall by Mr. Gambier Bolton.

After announcing that many of the slides to be exhibited had never been shown in public before, the lecturer remarked that it would be impossible to tell them all that was known about animals within the compass of a dozen evenings. Of the mammalia alone four thousand species had been already discovered, while there were thousands more of birds, fishes, and insects, all classed as animals. He would show them some slides prepared by himself and explain each subject briefly. The first few pictures represented lions, the chief of the flesh-eaters. They were noted for their human expression, and the photograph shown of Toby, now at Antwerp, brought out his good points, length of face and long white beard. He was very good-tempered, and allowed visitors to pat him. Hannibal II., now at Clifton, was noted for his very long mane, but it was a mistake to suppose, as artists depicted, that lions naturally had long manes. Lions were very ferocious, even towards themselves, and when shot it was not unusual for one to crush its own paws in its mouth. Lions were still plentiful in South Africa, where the settlers poison them with arsenic. No pictures, said the lecturer, could give a just idea of the size and brilliant appearance of the tiger in his native state. The colouring of his hide so nearly matched the jungle that the sportsman often came suddenly upon the dreaded man-eater. It was not generally known that tigers could swim, but some time ago one was found who regularly swam from the mainland to an island, and was ultimately captured by some fishermen in a net. The black leopard, of which a picture was shown, was among the most ferocious of the lion tribe, and there was no record of one ever being tamed. A very fine picture of a spotted leopard was next exhibited, and the following slides were the cheetah, described as an animal between the cat and dog tribe, and the Thibet lynx. The sea-lion, rugged as the rocks he frequented, was seen lying in the water just exposing the tip of his nose, till a sea bird came on the scene to investigate, and was promptly made a meal of. It often happened that large stones were found in dead sea-lions, and the lecturer said he had been told that the animal swallowed them by way of ballast.

Next came some fine portraits of "elephants a-piling teak," and the lecturer had much to say regarding the sagacity and docility of these huge animals. After dealing with the rhinoceros, the lecturer said, in illustration of the profits of animal-dealers, he would mention that a Malay tapir, of which he showed a photograph, had been bought for the Zoological Gardens for 180 guineas. Last year the same animal had been offered to him in Borneo for 7*l*., but unhappily he had not then the means of sending it home. Zebras closely resemble horses, and it had been thought that they might be broken to harness for use in South Africa, where the horse could hardly exist. It was soon found, however, that the zebra suffered as much as the horse, but in England Lord Rothschild had succeeded in taming a pair, and used them for his carriage. The next slides shown were highly popular, and depicted several famous shire and race-horses. Pictures were also shown illustrating how the ladies of Hawai rode without side-saddles, and with very long divided skirts reaching to the ground when they sat on the animal. The hippopotamus, one of the rarest of animals, had a very

ridiculous appearance, for he could not move his neck, and had to turn round whenever he wanted to see anything not directly in front of him.

In dealing with the camels and dromedaries, the lecturer said that the latter was rarely seen in England, and was the racehorse of his family. He had been able to secure photographs of some fine dromedaries, the exhibition of which was greeted with applause. Camels had twice the carrying powers of oxen, and were useful for making long journeys without food or water. The water buffalo was next described, and one of those photographed had originally provided milk for an Indian prince, but ultimately provided food for the lions and tigers at the London Zoo, for during one very hard winter animal food was scarce, and the buffalo was sacrificed. Bisons, often mistaken for buffaloes, were being exterminated. The zebus, of the same tribe, did not low, but grunted, and in some countries were supposed to contain the souls of the departed.

The lecturer had a deal to say about horned cattle generally, and dealt lucidly with antelopes, elands, and gnus. The gnus were very tame, and a photograph was thrown on the screen showing them gambolling around the settlers' waggons. The rinderpest was gradually exterminating these graceful animals, who formed the staple diet of the African lion, and consequently the lions were dying out as well. In Rhodesia, owing to the lack of food, lions had taken to attacking human beings. The giraffes afforded some excellent illustrations, and the lecturer referred to the pathetic story of Mr. Cecil Rhodes' giraffe, which was killed while passing through the only railway tunnel in South Africa, and in consequence of which a very curious travelling case had been devised. A strange fact about giraffes was that they only had the same number of bones in their necks as a human being, namely, seven. The Wapiti deer provided some very good pictures, and, going on to the marsupials, the audience manifested a deal of appreciation for some excellent pictures. The kangaroo is only found in Australasia. Other quaint Australian animals were the ornithorhynchus, a kind of combination between a duck and a mole, and the echidna, a kind of porcupine. Tortoises and turtles were next touched upon, and incidentally the lecturer said that he could not believe that M. de Rougemont had ridden on a turtle's back. If he had, it was more wonderful than anything else he had accomplished. The difference between alligators and crocodiles was next demonstrated, the chief point being that the latter do not show the fourth tooth when the mouth is closed. A very sensational photograph represented a man putting his fingers into a crocodile's eyes, and this, said the lecturer, was a sure way to prevent a crocodile attacking you, if you had the pluck to go up to him and do it. The lecturer dealt at great length, and in a very interesting fashion, with the quadrumana, which included the chimpanzee, the silver gibboon, and other apes. The slides devoted to birds were most interesting, and Mr. Bolton related an incident which demonstrated the wonderfully keen sight possessed by vultures. The penguins came in for much attention, and one of the pictures showed a vast number of these birds in their native haunts, sitting in rows like regiments of soldiers. It was often said that the penguins made no nests, but the lecturer had had the good fortune to see one on his travels; it consisted of two pieces of seaweed, two sticks, and a few feathers. The lecturer finished with the exhibition of a number of slides of the royal pets at Sandringham, and its conclusion was greeted with rounds of applause.

THE LIZARS EXHIBITION: FULL PRIZE-LIST.

We append the full prize-list of the above Exhibition:—

Class A (open competition for three photographs, any subject).—1. W. M. Warneuke, Glasgow; 2. J. Charters, London; 3. M. J. Clark, Glasgow; 4. N. Mellish, Langside; 5. G. Bird, Bath; 6. J. C. Oliver, Glasgow; 7. W. L. Primrose, Ibrox; 8. R. M'Gahey, Belfast; 9. J. B. Paterson, Edinburgh; 10. A. H. C. Corder, Brighton; 11. J. C. Alston, Glasgow; 12 E. G. Bagwood, London; 13. Mr. Evans, Seaford; 14. J. Newbigging, jun., West Kilbride; 15. W. Muir, Girvan; 16. N. M'Culloch, Whiteinch; 17. D. Miller, Lenzie; 18. Thomas Lupton, Stirling; 19. J. R. Robertson, Cathcart; 20. Dr. M'Harg, Glasgow.

Class B (open competition for Cyclists, for three photographs)—1. C. Chapman, Pollokshields; 2. J. S. Heward, Littlehampton; 3. R. M. Mann, Glasgow; 4. C. C. Mann, Gourock; 5 and 6 P. Ewing, F.L.S., Glasgow; 7 J. Charters, London; 8. J. Ritchie, Macduff; 9. R. T. Rendall, Edinburgh; 10. Mr. Anderson, Glasgow.

Class C (open competition for Ladies only, for three photographs, any subject).—1. Mrs. Aird, Mount Florida; 2 Miss Fleming, Greenock; 3. Miss Haslett, Belfast; 4. Mrs. M'Laren, Helensburgh; 5. Miss Grimstone, London; 6. Mrs. Norman Macdonald, Edinburgh; 7. Mrs. Bellowlees, Glasgow; 8. Miss Dangerfield, Mauchline; 9. Miss M. Scott, Edinburgh; 10. Mrs. Dixon, Ayr; 11. Miss Wilson, Glasgow.

Class D (open competition for Boys and Girls, any subject).—1. Agnes Stewart, Girvan; 2. L. H. Wilson, Paisley; 3. J. Macleod, Glasgow; 4. Master Macfarlane, Glasgow.

Class E (three photographs, for Beginners in 1898).—1. P. Monroe, Jamestown; 2. W. A. Gilmour, Glasgow; 3. J. Phillips, Glasgow; 4. J. H. Thacker, Wallsall; 6. Mrs. A. C. Symington, Glasgow.

Class F.—1. William M'Lean, Belfast; 2. Miss Haslett, Belfast; 3. J. Gibson, Edinburgh; 4. J. M'Cleary, Belfast; 5. J. L. Coulson, Glasgow.

Class G—1. W. L. Primrose, Glasgow; 2. W. M. Warneuke, Glasgow; 3. W. L. Primrose, Glasgow; 4. John Reid, Glasgow; 5. Mrs. Weir, Glasgow; 6. William Halley, Glasgow; 7. W. M'Kinnon, Glasgow; 8. J. L. Coulson, Glasgow; 9. C. B. Orr, Edinburgh; 10. C. C. Mann, Glasgow.

Special prizes awarded for single pictures of outstanding merit. Judges, Messrs. William Goodwin, A. Watson, and A. Lindsay Miller.

First prize, 1*l.* each.—71. W. J. Marwick, Lincoln: 126. W. McLean, Glasgow; 130. C. Chapman, Pollokshields; 139. R. B. Creak, Diss; 326. J. L. Coulson, Glasgow; 485. A. Cowie, Alloa; 489. J. Newbigging, jun., West Kilbride; 589. J. C. Oliver, Glasgow; 756. W. H. McGuire, Wexford; 913. Mrs. A. C. Symington, Glasgow.

Second prize, 10*s.* each.—49. J. D. Gibson, Kingston-on-Thames; 69. R. P. Rendall, Edinburgh; 116. J. D. Gibson, Kingston-on-Thames; 158. J. C. Alston, Glasgow; 162 J. Richmond, Cumnock, 226. R. W. Brown, West Calder; 514. J. D. Patterson, Edinburgh; 563. W. J. Croall, Edinburgh; 662. Major Phillips, Glasgow; 816. J. Ritchie, jun., Macduff.

MR. WARNEUKE'S EXHIBITION AT GLASGOW.

In connexion with Messrs. Lizars' Exhibition at Glasgow, Mr. W. M. Warneuke, Sauchiehall-street, Glasgow, is holding a most successful "one-man" show. The two extreme galleries have been allotted to him, and, with simple but appropriate draperies and fully sixty prints, he has made a really fine exhibition, and an exhibition, thanks to Messrs. Lizars' persistent advertising, that is being seen by thousands. As might be supposed, figure studies play a large part in the Exhibition, but they are not by any means "the usual thing" so depreciatingly spoken of by H. P. Robinson; each has a character and personality of its own. Some old favourites we at once recognise—there is the *Lady with a Veil*, which was a year or two ago a subject of much criticism at the London shows. Here, under the title of *A Reaper*, we reidentify a picture which, with a poetic title, won much praise from the critics when it paid its visit to London. It is good to thus recognise old favourites, and it must be gratifying to the creator of that favourite to find that it occupies a place in the memory, and is hailed with the satisfaction of an old friend. But, without giving a full list of the old friends, there are new faces that we will not in a hurry forget. There is *Mademoiselle*, a charming study of a modern girl in a modern dress on the seashore; this, we are informed, is an enlargement from a Kodak snap-shot—it has certainly been a happy one. *A Fairy Tale* is a delightful picture, simple but telling; a demure little damsel is engrossed in the "fairy tale," and entirely oblivious of all else. The modelling of the little face is worthy of all praise, and the whole picture hangs well together. *Expectation* is another charming child study; here a little chubby face is greedily devouring a biscuit while its friend the dog watches with pathetic eyes the disappearance of the dainty; the title is admirably carried out—let us hope the dog was not disappointed. *A Fisher Girl* is a powerful picture; the figure is well posed, and the wet sand by the seashore seems almost actuality itself. The girl has a dreamy, wistful look as she gazes seawards, where a mere strip of horizon indicates the limitless ocean beyond; we expect to hear more of this picture. Besides simple figure studies, however, Mr. Warneuke shows not a few "landscapes with figures" that recall the well-known pictures of H. P. Robinson, such as *The Ford*, *A Morning Chat*, *Kelp Gathering*, &c.; there is also a number of low-toned river scenes, restful and soothing. Space forbids us going over the Exhibition in detail, but we return to our text.

Can our photographers not see a lesson in all this? How often do we hear grumbling about slack trade? Well, instead of sitting twirling their thumbs, let them get moving and make some pictures, photographs to please themselves, not their customers, frame them suitably, send them to exhibitions (medals have a big influence with some people), and, when in your spare time you have got a sufficient number, run a "one-man" show in the city, town, or village, in which you are situated. It will force the inhabitants to take notice of you, the local press will review the show, and your name and business will be brought prominently before "all the people." Besides this, in working for this Exhibition you will have, in the earnest endeavour to provide good work, considerably improved your education and strengthened your abilities for better work in future. It will also have educated your customers into appreciating really good work.

NOTES FROM THE WEST OF SCOTLAND.

If any proofs were wanting of the increasing popularity of photography in Glasgow and the West of Scotland, they certainly have been supplied in the vast crowds that have flocked to the Fine Art Institute in Sauchiehall-street during the last fortnight to inspect the attractive display of work gathered together in the Lizars Exhibition.

In proof of the assertion that these crowds are not attracted by the cinematograph merely, it may be stated that the rooms have been

thronged by visitors during the daytime, there being no other attraction than the photographs upon the walls.

On the other hand, there is no doubt that, by taking a leaf out of the Glasgow and West of Scotland's programme in the past, the Brothers Ballantyne have done a good thing in having limelight lectures and lantern entertainments nightly during the run of their exhibition, for such has given an amount of interest, in this function, to many who otherwise would probably not have seen the fine photographic display.

The crowds who have nightly visited the Exhibition at the lecture hours may be said to be simply phenomenal, even although a ticket for admission is imperative.

Much interest has been taken in limelight lecturing in Glasgow for many years, chiefly through the exertions of the members of the Glasgow and West of Scotland Amateur Association and also Mr. Wm. Lang jun., who was among the first to discern the benefit arising to Glasgow's parent Photographic Association from lectures at regular intervals during the term of years he occupied the President's chair of the Glasgow Photographic Society.

On vacating his office, these popular nights with the old Society were less frequent, and it is noticeable that a corresponding decline in popularity ensued; but, inasmuch as the West of Scotland Amateur Association stepped in and filled up the gap, their success has been phenomenal.

During the week a very good programme has been worked out most satisfactorily by the Messrs. Lizars, on Saturday night the Institute being simply besieged by eager crowds to gain admission to Mr. T. N. Armstrong's lecture on "The Clyde from its Source to the Sea." Indeed, so popular has this lecture become in the West of Scotland, that Mr. Ballantyne stated from the platform the demand for tickets was so great he could have filled the hall six times over. To relieve the press, an extra cinematographic display was given prior to the lecture, but at least a thousand visitors had to leave without gaining admission to the lecture hall.

A fresh departure in photographic exhibitions has been inaugurated in Glasgow, and the Messrs. Lizars deserve great credit for the execution of what must be considered a bold and well-worked-out scheme.

In Glasgow, after many obstacles to its introduction into photographic studios, we have at last to record the successful introduction of acetylene gas for professional portraiture. No doubt, the action of our various insurance companies has tended to retard the introduction of this light for practical photography, for hitherto, whenever it has been displayed in Glasgow, such could only be said to be in an experimental form. This stage has, however, been passed, and in one studio at least most excellent results are being obtained daily, and in the near future there is no doubt the electric light will have to take a back seat in portraiture.

Mr. Stevenson, of Bothwell-street, has from the very first taken a great interest in this light, and has steadily worked to overcome prejudices and difficulties. In this he has succeeded, and now he is using the light in his studio with the most gratifying success. His arrangement is simplicity itself, and the negatives he is obtaining are well modelled. Some of the most exacting subjects, such as babies in arms, are easily dealt with, the time of exposure being reduced to very nearly that of daylight.

By a simple arrangement of folding wings, carrying a plentiful supply of burners, a beautifully soft light can be directed on any part of the studio. The lighting may be stated to be simply perfect, and, now that many of the absurd strictures imposed by the insurance companies have been removed, this light is sure to be largely adopted by others; it is eminently suitable for portraiture.

A feature of the cinematographic displays this winter would appear to be the introduction of coloured films. To many this at first sight might appear a matter of great difficulty. Yet it has been successfully accomplished, and Messrs. Lizars have, during the past week, been showing a series of charming subjects, in which the films, when thrown upon the screen, gave a most natural appearance of the original colours.

There is no doubt some subjects are more suitable to colouring than others, but it can be done with the most gratifying success in such subjects as skirt-dancing, where a change of tints is actually delightful to the eye from moment to moment.

THE CAMERA CLUB.

It is announced in the Camera Club *Journal* that among the gentlemen who have agreed to give lectures during the coming session are: Captain W. de W. Abney, C.B., F.R.S.; Professor H. E. Armstrong, F.R.S.; The Earl of Rosse, F.R.S.; Sir Norman Lockyer, F.R.S.; Professor Balfour, Professor W. W. Watts, Alfred East, R.I.; Linley Sambourne, G. A. Storey, A.R.A.; Car Thomas, Horace Brown, F.R.S.; A. Plumpton, Ph.D.; Professor E. Gardner, Major Holden, R.A., F.R.S.; James Cadett, George Davison, Andrew Pringle, and Colonel Waterhouse. On Wednesday, October 12, there was an Exhibition of lantern slides by members of the Amateur Photographic Field Club. On Thursday, October 13, Mr. T. C. Porter, of Eton College, gave a paper on "The Scenery of Niagara, Yellowstone, Yosemite (California), and the Pikes Peak District, Colorado." On Monday, October 17, Mr. E. Sanger Shepherd will give a lecture on "Reproductions of Paintings." On Thursday, October 20, the Rev. W. K. R. Bedford, M.A., will lecture on "The Knights Hospitallers: What they did and what they are doing." Mr. Bedford is Chaplain to the Order of St. John of Jerusalem in England, and has made a special study of that religious Order at Malta and elsewhere. The lecture will be illustrated by a series of lantern slides of Malta, Rhodes, old engravings of battles, &c. At 7.30 p.m., on Wednesday, October 26, the first House dinner of the session will be given, the guest of the evening being Captain W. de W. Abney. On Thursday, October 27, Captain E. H. Hills, R.E., will lecture on "The Recent Solar Eclipse." On Monday, October 31, Mr. Law Bros will give a paper on "Italy and its Architecture." The Committee has decided that members may introduce ladies to afternoon tea in the dining-room from 3 o'clock to 6 o'clock. About forty members have recently been elected to the Club.

A NATIONAL PHYSICAL LABORATORY.

In August of last year a Committee was appointed by the Treasury, with Lord Rayleigh as Chairman, to consider the desirability of establishing a national physical laboratory. Many eminent scientists were called as witnesses, and the Committee, in their report just issued, sums up its conclusions in the following recommendations:—

That a public institution should be founded for standardising and verifying instruments, for testing materials, and for the determination of physical constants.

That the institution should be established by extending the Kew Observatory in the Old Deer Park, Richmond, and that the scheme should include the improvement of the existing buildings, and the erection of new buildings at some distance from the present Observatory.

That the Royal Society should be invited to control the proposed institution, and to nominate a governing body, on which commercial interests should be represented, the choice of the members of such body not being confined to Fellows of the Society.

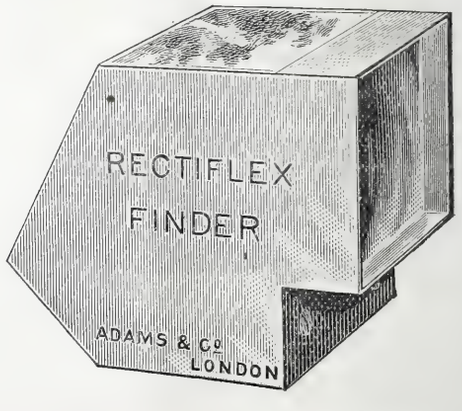
That the Permanent Secretary of the Board of Trade should be an ex-officio member of the governing body; and that such body should be consulted by the Standards Office and the Electrical Standardising Department of the Board of Trade upon difficult questions that may arise from time to time or as to proposed modifications or developments.

Our Editorial Table.

The Rectiflex Finder.

Adams & Co., 26, Charing Cross-road, W.C.

This is one of Messrs. Adams' exhibits at present on view at the Royal Photographic Exhibition. It possesses several distinctly novel or useful features which may be thus summarised: The view is shown the right way up and also correct from right to left. The picture is thus seen as it actually appears. The finder is composed of a solid piece of glass. The correct angle of view required is obtained. The reflecting mirrors



are silvered in optical contact upon the prism; thus there is no dust and no objectionable reflection from lens surfaces. The same Finder shows horizontal as well as vertical views. Having carefully examined one of the Rectiflex finders we are in a position to pronounce the foregoing claims to be well grounded. The Rectiflex is a beautiful production of its kind, and is not excelled in practical utility by any similar instrument that we know of. It is remarkably well made and finished.

The "N. & G." Camera in New Zealand.

By Robert B. Walford. Newman & Guardia, 93, Shaftesbury-avenue, W.C.

The initials "N. & G." applied to a hand camera have long since passed into proverb as symbolistic of the greatest constructive skill allied with practical efficiency in instruments of this character. The "N. & G." cameras are in fact by common consent allowed to be the standard of

excellence in such productions. It follows therefore that the high esteem in which Messrs. Newman & Guardia's hand cameras are held must not infrequently bring them an intimation of the fact, and an example of a very agreeable form of that appreciation is before us as we write. This is a daintily produced little book of sixteen pages by Mr. R. B. Walford, entitled *The N. & G. Camera in New Zealand*. In the book there are thirteen well-reproduced illustrations from Mr. Walford's photographs. The latter could scarcely be bettered, and they do Mr. Walford and his camera the greatest credit.

Skiagraphic Atlas, showing the Development of the Bones of the Wrist and Hand.

By John Poland, F.R.C.S. London: Smith, Elder & Co, 15, Waterloo-place, S.W.

This series of skiagrams showing the ossification of the hand and the wrist is taken from another work of Mr. Poland's on traumatic separation of the epiphyses. Prefatory to the illustrations the author gives a general description of the bones of the hand and the wrist. There are nineteen plates from skiagraphs (? or radiographs) taken by Mr. William Webster and Mr. Swinton, both experts in this branch of work, and the results have been left untouched. The ages of the children experimented upon range from twelve months to seventeen years, the frontispiece being an engraving of the bones of the hand and wrist at fifteen and a half years, all the bones being indicated and named. Mr. Poland puts forth his Atlas for the benefit of Röntgen-ray workers as well as students and anatomists, and expresses the hope that, in the near future, all the bones of the body may be thus portrayed. It would appear that the evolution of ossification, as indicated by radiography, is not in accordance with theories hitherto held. Mr. Poland's Skiagraphic Atlas is obviously of very great use to those engaged in X-ray work. Books of scientific interest, such as this, are rapidly displacing the somewhat shallow and sensational productions which Professor Röntgen's celebrated memoir gave rise to at the outset, and Mr. Poland's contributions to the practical applications of Röntgen's discovery are not the least valuable that have been made. This Skiagraphic Atlas will, doubtless, be highly appreciated.

Specimens of Christmas Cards.

Thomas Illingworth & Co., 5, Soho-street, W.C.

The specimens of cards Messrs. Illingworth place before us for our inspection range in size from pocket Kodak up to half-plate. The designs in all cases are extremely graceful, and the colouring adopted is in the highest degree artistic. Certainly nothing having more elegance and good taste than these specimens could be desired for Christmas cards.

The Illustrated Annual of Microscopy.

London: Published by Percy Lund, Humphries, & Co., Amen-corner, E.C.

There is no editor's name on the title-page of this capitally produced book—a very curious omission, the more so as the volume is obviously the work of an experienced hand. The *Annual* extends to 164 pages, and has many illustrations. The principal articles are "The Microscope in 1897," by Dr. Henri van Heurck, a valuable little guide in itself; "Multi-colour Illumination," by Julius Rheinberg; "Achromatics *versus* Apochromatics," by Edmund J. Spitta; and "The Elementary Theory of the Microscope," by Mr. Conrad Beck, occupying nearly fifty pages of the book, which appeals to microscopists and photo-micrographers alike. To those of our readers interested in either branch of the subject we can recommend this valuable book.

News and Notes.

Messrs. E. & A. Conway, of Monnow-street, Monmouth, inform us that they have a dark room for the use of tourists and amateur photographers.

The South London Photographic Society have fixed January 21, 1899, as the date of their Third Annual Dinner, at the Montpelier, Choumert-road, Peckham, S.E.

The Hackney Exhibition.—We are asked to announce that entry forms are due by or before October 22. The Exhibition will be opened by the Right Hon. Lady Berwick.

J. H. Dallmeyer, Limited.—The Secretary of the Company writes: "I have pleasure in notifying you that the above Company has paid an interim dividend of eight per cent. for the half-year ending June 30 last."

Royal Photographic Society.—Photo-mechanical Meeting, Tuesday, October 18, at 5A, Pall Mall East, at eight p.m. "On New Methods of Developing Daguerreotype Plates," by Colonel J. Waterhouse, I.S.C.

Photographic Club.—Wednesday evening, October 19, at eight o'clock. Beginners' Night. "Stereoscopic Photography," by Mr. J. Nesbit. All interested in this branch of photography are cordially invited. Visitors are admitted to the meetings of the Club on the personal introduction of a member, or by invitation cards which the Hon. Secretary (Mr. W. R. Stretton, 4, Queen-street-place, E.C.) will be pleased to forward on application.

Edinburgh Photographic Society.—At the last meeting of this Society the Chairman intimated that two medals would be given during this session by Mr. James Hay and Mr. G. Clelland, for papers dealing with the theoretical side of photography.

Fire!—Photo, Limited, of 72 and 74, Gray's Inn-road, London, W.C., inform us that, a fire having taken place on the adjoining premises and spread to their works, nearly the whole of their stock of mounts, specialities, &c., is seriously damaged by fire and water. They hope to be in a position to execute orders by the 20th inst.

The Yorkshire Exhibition.—We are asked to announce that particulars of exhibits should reach the Hon. Secretaries, at 13, Chesham-street, Bradford, not later than October 22, and all pictures should be delivered not later than November 1, addressed to the Hon. Secretaries, Yorkshire Photographic Exhibition, City Art Gallery, Bradford.

The death of Mr. William H. Sherman, of Milwaukee, is announced as having occurred on September 7, at his home in that city. Mr. Sherman was one of the veteran photographers of the West, and a man who was well known and highly esteemed by all who knew him. At one time his name was frequently appended to articles in this Journal and our Almanac.

There appeared in the *Optician and Photographic Trades Review*, of the 29th ult., a paper entitled "On the Construction of Photographic Lenses," by Mr. Conrad Beck. The impression has been created that this was a new contribution on the subject by the author, whereas it should have been stated that the excellent essay originally appeared so far back as 1889 in the proceedings of the Society of Arts, and therefore naturally contains statements which are not accurate in view of modern developments.

Since the collapse of the Wolverhampton Photographic Society last year, owing to the lack of interest shown by the general body of members, some of the leading workers in the late Society have been trying to unite for the common advantage until better times. The result is that a new Society has been formed for a limited number of photographers who have made sufficient advance in their work. The Society has been christened the Wolverhampton Camera Club, and the Hon. Secretary is Mr. H. Holcroft, Parkdale.

An Alleged Bogus Canvasser.—At the Liverpool County Police Court on the 7th inst., Roland Bailey, *alias* Cotton, *alias* Harrison, was charged with having, by means of false pretences, obtained on different dates, small sums of money, amounting in all, to 6*s*., from Sarah Ann Charnock. It appeared from the evidence that the prisoner presented himself at the house of prosecutrix, and stated that he had come from Mr. Joseph Addison, photographer, of London-road, Liverpool, and that he had been sent to take the place of a former canvasser, to collect instalments for a 6*s*. coupon for a photograph. The prosecutrix paid him sums amounting in all to 6*s*., and, upon presenting herself at Mr. Addison's studio, was informed that Bailey was not in his employ, having been discharged in September, and that he knew nothing whatever about the money referred to. The accused was remanded in order that further inquiries might be made.

Luminous Sugar.—There are phenomena attending the formation of crystals which, says the *Lancet*, are apparently quite distinct from chemical action. When, for example, a hot saturated solution of arsenious acid is allowed to cool, the act of crystallisation is accompanied by a flash of light. As each crystal forms there is a short, sharp glow, indicating the release of a certain amount of latent energy in the form of light radiation. A related phenomenon would seem to be the case when two pieces of cane sugar are quickly rubbed together. The flash is perfectly distinct and bluish-white in colour, the light extending into the substance itself far below the surface. Some interesting experiments on this manifestation have recently been made by Mr. J. Burke, the results of which were communicated to the recent meeting of the British Association of Science at Bristol. By mounting discs of loaf-sugar on a lathe and projecting a hammer on the rotating surface, an almost continuous luminosity was obtained. The wearing away of the sugar is compensated for by arranging a gradual approach of the piece to the hammer in exact accordance with the amount of sugar scraped away. In this way the spectrum has been observed and photographed. From these observations it would appear that the luminosity cannot be due to the particles of sugar becoming red-hot or white-hot by the impacts, the indication being that the light produced is due either to some change in the configuration of the crystals of sugar, or to some sort of chemical action set up between the sugar and the surrounding air at the freshly formed surface. The fact, however, that the surrounding medium does not seem to affect either the colour or intensity of luminosity suggests that the effect is not due to any influence of a chemical nature of the surrounding medium on the sugar, but favours the former hypothesis that the luminosity is due to some structural disturbance in the sugar itself. This ingenious and pretty study is being pursued further, and the results should lead to some interesting observations. Light is so often a manifestation of physical change that it is probable some day we shall derive it for illuminating purposes in a totally different, much simpler, and less clumsy way than obtains at present.

Transparencies for Enlarged Negatives.—When making transparencies for enlarged negatives the means employed must depend on the density of the original negative. When it is of good density, a carbon transparency is usually made; but the negative may perhaps be too dense or too thin to give a good carbon transparency, and, besides, many people do not care to buy sensitive tissue for enlarging one or two negatives. It is possible, of course, to sensitise the tissue so as to make it suitable for negatives of almost any density; but few photographers, except those who use large quantities, will go to the trouble of sensitising their own tissue, and prefer to fall back upon ordinary dry plates or perhaps lantern plates. As there is such a large choice as regards speed and power of giving density, this plan is a very good and convenient one, as it is possible to entirely alter the character of the large negative as compared with the original by a judicious choice of plate. This latitude is so great that it is possible by using a plate of such a speed as the Ilford Empress to produce a transparency by contact that will give a broad, soft

diffused effect in the large negative, from an original that was hard and chalky. And, on the other hand, it is possible to make a brilliant large negative from a small one, sharply focussed, but thin or misty from over-exposure or smoky atmosphere, by using an Ilford Process plate. I have recently had such a case, in which the original was so hazy from smoke, although of good density, that a brilliant print, either in silver or bromide, could not be made from it. There was no possibility of securing a better negative on a clearer day, as the photograph was a record of building operations on a certain date, and it was necessary to get a large brilliant print from it, such as the contractor loves. A transparency was first made on an ordinary plate, but the large negative was not as clear as was necessary. Another transparency was made on a Process plate, by exposing it by contact for fifteen seconds to a sixteen-candle incandescent electric lamp (about the same power as a good gas flame), and developing to considerable density. By reducing with weak ferricyanide and hypo a clear, bright transparency was obtained, in which the distant details were clear and distinct; the large negative was then made, giving a silver print which showed no signs of having been taken from an enlarged negative. It might have been from a direct negative. This was, no doubt, due to the absence of grain in the transparency, as the deposit of silver in the Process plate is extremely fine in grain. When working from a rather thin negative a Special-lantern plate may be used, from a negative of fair average density an Ordinary plate will give a good result, and for a very dense one a quick plate, like the Empress, is best.—HAROLD BAKER, in *Photographic Scraps*.

Patent News.

THE following applications for Patents were made between September 26 and October 1, 1898 :—

COLOUR Photography.—No. 20,417. "Improvements relating to the Production of Coloured Pictures by Photography." Communicated by the International Color-Photo Company. Complete specification. H. B. LAKE.

ANIMATED PHOTOGRAPHY.—No. 20,433. "Improvements in Connexion with the Reproduction of so-called Animated Photographs." M. LUHN.

PROJECTION APPARATUS.—No. 20,542. "Improvements in Automatic Optical Projection Apparatus or Lanterns." Communicated by L. Penkala. H. H. LEIGH.

DEVELOPING TROUGHS.—No. 20,593. "Improvements in Developing Troughs for Photographic Plates." L. GAUMONT.

CINEMATOGRAPH APPARATUS.—No. 20,603. "Improvements in or relating to Cinematograph Apparatus." Communicated by G. Bagrachow. W. P. THOMPSON.

CHANGING BOXES.—No. 20,615. "Improvements in Photographic Charging Boxes." T. MILLER.

LANTERN SLIDES.—No. 20,660. "Improvements in the Production of Slides for Optical Lanterns." L. ERRERA.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

October.	Name of Society.	Subject.
17	Barnet and District	*Fair Life.* Lewis Medland, F.Z.S.
17	Camera Club	*Reproductions of Paintings.* E. Sanger Shepherd.
17	North Middlesex	*Carbon Printing.* J. C. S. Mummery.
17	South London	*Some American Methods, Photographic and Photo-mechanical* H. Snowden Ward.
18	Birmingham Photo. Society	Demonstration upon the Use and Manipulation of the Limelight Optical Lantern. W. Bateman.
18	Bootle	Demonstration on Wellington & Ward's Bromide Papers.
18	Gospel Oak	Developing Competition.
18	Leeds Photo. Society	*The Caucasus.* G. Yeld, M.A.
18	Lewisham	*Exposure and Development.* C. Churchill.
18	Royal Photographic Society	*On New Methods of Developing Daguerreotype Plates.* Colonel J. Waterhouse, I.S.C.
19	Croydon Camera Club	Lantern Evening: Trial Night for Members' Slides likely to be acceptable for Display at the Public Hall in November or December.
19	Kingston-on-Thames	*Working up Negatives.* Albert Hill.
19	Leeds Camera Club	Annual Dinner.
19	Photographic Club	*Stereoscopic Photography.* J. Nesbit.
19	Woodford	Annual Meeting: Election of Officers, &c.
20	Ashton-under-Lyne	Meeting for Conversation, &c.
20	Camera Club	*The Knights Hospitallers: What they did and what they are now doing.* Rev. W. K. R Bedford, M.A.
20	Liverpool Amateur	*Mountaineering from a Woman's Point of View* Mrs. E. Main.
20	London and Provincial	Lantern Night.
22	South London	Excursion: Greenwich Park. Leader, F. Goddard.

ROYAL PHOTOGRAPHIC SOCIETY.

OCTOBER 11,—Ordinary Meeting,—The Right Hon. the Earl of Crawford, K.T., F.R.S. (President), in the Chair.

NEW MEMBERS, &C.

Eighteen candidates for membership were nominated, and four new members were elected. It was announced that the Kingston-on-Thames and District Photographic Society had been admitted to affiliation.

PRESENTATION OF MEDALS.

The PRESIDENT presented the medals awarded at the Exhibition to Mr. G. E. Thompson (for No. 360, *Threshing Wheat—Le Puy, France*), and to Mr. W. Edwin Brewerton (for No. 419, *Still Life*, a print in three colours). He asked the Hon. Secretary to forward the medals awarded to the following exhibitors, who were unable to be present: Mr. W. J. Warren (No. 21, *London in December*), Mr. W. A. Fraser (No. 67, *A Wet Night—Columbus Circle*), Mr. Charles S. Baynton (No. 255, *Norwich Cathedral*), and Miss Mathilde Weil (No. 329, *Polly*). The President congratulated the prize-winners upon their success, and expressed his great pleasure that medals had been awarded to two of our American cousins, Miss Weil and Mr. Fraser; he regarded this as a very satisfactory event, and was sure the Society would extend a hearty welcome to those exhibitors if they should at any time visit England.

THE PRESIDENT ON THE EXHIBITION.

The PRESIDENT proceeded: So far as I can gather from what has appeared in the press and from my friends, the general opinion seems to prevail that the Exhibition is quite as good as any that has been held under the auspices of the Royal Photographic Society, and with this view I cordially concur. There are, however, a few things to which, with your permission, I wish to draw attention. Our Society is, or should be, founded upon the widest possible basis, so that all who exercise the art and craft of photography may find in it a place. To their honour, very many of our members by the exercise of their profession bring food and raiment to their households; to this end they must look not only to the carefully thought-out work of art with which we are here so familiar, but also to the important factor the patron—the order from the British public, and to that production which will cause the British public to buy, and, having once bought, to come again. I would draw attention to two classes of work. I believe that fully half the plates that are exposed are exposed for portraiture, and yet you may look in vain upon the walls of this Exhibition for any examples which would lead one to suppose that there is more than one school of portraiture. What we see are, and should be, appreciated by the trained eye, but are not, I think, such as would be appreciated by the general public. Again, as a traveller about the world, I, with others, take great pleasure in looking over view scraps, which carry me back in thought to bygone days. Such photographs are, or should be, clean, clear, delineations of the places which they represent; call them, if you will, aids or short cuts to memory, still they serve their end, they are in much demand, and yet they are wanting on our walls. The commercial side of photography is undeniably of deep importance, and it should be the aim and honour of our Society to aid and foster it. From my observation, and from inquiries which I have made, I gather that the majority of the public look primarily to definition, and to what they call evidence of finish—that is, probably, a glazed surface; and I attribute the large falling away of the two classes to which I have alluded—portraits and view scraps—to the almost invariable use in the Exhibition of rough-surface papers, to the exclusion of gelatino-chloride, which, for power of giving exquisite definition is second only to the positive on glass. I think I hear you sum up my words in low, but I hope indulgent, tones as heresy; but, though I now address many of the leaders of the growing school, and I admire the splendid work that they contribute, I venture to remind the Society that this is an appeal on behalf of the large majority of those who make and buy photographs, that we are catholic in our aims, and that bread and butter are really of importance in the battle of life.

THE PRESIDENTIAL ADDRESS.

LORD CRAWFORD then delivered the President's annual address, in the course of which he said: I propose to address myself, with all the weight of responsibility that you have imposed upon me as your President, not to you alone, but beyond you to Her Majesty's Government and to the public at large. It is a matter of common knowledge that of late years the attention of the country has been very strongly applied to the spread of education, and that Parliament has not hesitated to impose somewhat heavy taxation for its advancement. Great encouragement has thus been given to local museums and free public libraries; and, admirable as these institutions are in their completeness, yet of necessity is it that vast numbers of the finest objects cannot be represented in them as originals. For some years past I have been endeavouring to get Her Majesty's Government to set up an establishment—primarily devoted to photography—for the service of the public museums, so that faithful reproductions of objects of beauty and rarity might be spread widely over the country, and in order that what is now inaccessible, save to a few, might be found in all parts of the land. As you may naturally believe, my connexion with the British Museum renders me familiar with this want. No week passes without some request being made to the authorities for permission to photograph some object or another; this entails considerable trouble to our limited staff, not to speak of expense, and this expenditure of time and money is not of necessity for the public or general advantage, for the negatives obtained are to a great extent only utilised for the private purposes of the persons who take them. The Trustees of the British Museum are fully alive to the advantages of photography, and all the publications they issue are now copiously illustrated by this means. I would urge that an establishment such as I have suggested should be attached to the Museum, and I am convinced that a year's experience of its working would lead Her Majesty's Government to extend its scope so that it should serve the wants of other and equally important collections, *e.g.*, the National Gallery, the Tate Gallery, the Museum of Science and Art, the Geological Museum, and similar institutions in London. The South Kensington Museum has already recognised the

importance of this matter, and has taken action to a limited extent. Personally, I have no doubt whatever that, were the Government to set up this establishment, it would, within a very short time, be self-supporting, and this is the point to which they give their chief attention. Admirable results have been attained in Berlin and Munich, where Government departments have been devoted to this work. This is neither the time nor the place for the discussion of details, but if we can manage to gain the ear of the public the action of the Government may be looked for in due course, and the cause of education will be advanced and we photographers will receive State recognition.

LORD CRAWFORD AND THE PRESIDENCY.

Mr. J. W. SWAN moved a cordial vote of thanks to the President for his address, and the motion having been, seconded by Mr. CHAPMAN JONES, was supported by

Mr. T. SEBASTIAN DAVIS, who urged Lord Crawford not to entertain for one moment the idea of resigning the Presidency of the Society at the next annual meeting. The address just delivered furnished a special reason why, upon public grounds and in the interests of photography, he should retain for a further period the office he had held with so much distinction.

Mr. SWAN added that the present exceedingly flourishing condition of the Society was largely due to the valuable assistance which had been rendered by Lord Crawford; and he added to the vote of thanks an expression of the hope that he would accept office for another year.

The PRESIDENT acknowledged the compliment, and explained that for many years past he had been compelled to reside abroad during the winter months; and, although, in consequence of his re-election as President, he stayed in England last year, it was absolutely necessary that he should leave here, and he had, in fact, booked his passage to Egypt. He was strongly of opinion also that the office should not be held for more than two years in succession by the same person. After a sufficient lapse of time he might be again at the service of the Society, if that were the wish of the members, but, for the reasons he had mentioned, he would be unable to stand for re-election at the close of the current year.

Mr. T. BOLAS hoped that Lord Crawford would upon further consideration feel that the appeal of the Society was irresistible, and that the success of the important scheme alluded to in his address would be materially furthered if he were able to approach the Government as the President of the Royal Photographic Society.

The PRESIDENT said that as the subject had been brought forward in so kind and forcible a manner, he would bow to the decision of the Society, although, in the event of his re-election, it would be necessary for him to ask for leave of absence during the winter months. His Lordship's decision was received with acclamation, and the proceedings then terminated.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 6,—Mr. J E. Hodd in the chair.

Mr. A. L. HENDERSON showed the two prints toned in his formate bath, without either gold, platinum, or lead, to which he had made reference on another occasion. The prints were decidedly toned, and by daylight were said to be pleasing in colour. A brief sketch was given of a projected experiment, with a view to discover what action silver chloride and formate of soda, in a hypo bath, would have upon a print. Mr. Henderson was anxious to learn the reason for the alteration in the colour of a toned print, when placed in the fixing bath, to a foxy tint, which later on gave place to the original colour of the unfixed print. His experiments, he hoped, would throw some light upon it.

Mr. E. H. Bayston showed the result of a three-and-a-half hours' exposure to the light of the full moon, at *f*-16, on an ordinary plate. Though obviously underdone, there was considerable detail in the picture.

PYRO-SODA DEVELOPMENT.

Mr. BEN EDWARDS read a paper upon this subject, as applied to negatives and lantern slides, his remarks being very forcibly illustrated by comparative slides shown upon the screen. It was not to be wondered at that this developer was becoming increasingly used year by year, as its great capabilities became more widely known, but it was only those who had made it a study who could fully appreciate its full value. As a proof of its latitude, exposures of one, thirty, and sixty seconds were shown, giving results of surprising similarity. For ordinary work the author preferred his developer to be without either bromide or sulphite. Of course, both were valuable aids, but had to be used with discretion. His formula had included metabisulphite of soda, but Mr. Edwards has now substituted the potassium salt, which is not contaminated with iron. He objected to sulphite on account of its grey image, which was inferior to a coloured image in printing value. His objection to bromide was that it cut out detail and built up density in the high lights, with the obvious result that the natural clouds of a picture could not be printed without shading the negative. In his own practice he secured detail first, and obtained density by continued development, as seen in the examples shown. Mr. Edwards next showed to what extent over-exposure was to be corrected by bromide. For this purpose he showed, in section, what would be the effect of a certain exposure and normal development, each step denoting a different density. Increased exposure brings about a shallowing of the steps as shown, the correction by bromide cutting them away again, but deeper and broader, with a consequent shortening of scale. Exposures were shown of one, thirty, and sixty seconds' duration, developed so as to match as nearly as possible. The longest exposure was developed with the soda in double normal strength and thirty minims of ten per cent. bromide per ounce. It was said that, when more than ten minims of bromide are necessary, the alkali has to be increased; more soda, more density; less soda, less density. In lantern-slide work a good deal of fashion manifests itself. Black, purple, and brown tones, in turn take to themselves first place, but, as there were all the suggestions that the present would be a brown season, this colour for slides had received the author's particular attention. With the exception of a little extra water and some bromide, the developers for negatives and slides have little difference. A reduction of soda and the omission of bromide gives warmer tints and a softer effect as a rule. A slide was shown with a rather heavy and obtrusive shadow, but by altering the colour it became less marked. Considerable scope is afforded in slide making for those with a notion of effect, a point which was enforced by the slides which followed. With hard negatives a weakened developer produces softer results. One of the slides was obviously from an under-exposed negative, but by leaving out the bromide the improvement was very marked, exposure and time of development remaining the same. The formulæ referred to throughout are those prescribed for Thomas's plates.

Mr. Edwards has promised to continue his paper on October 20, with a few hints on the production of warm from cold tones by a redevelopment process.

PHOTOGRAPHIC CLUB.

OCTOBER 5,—Mr. Birt Acres in the chair.

The CHAIRMAN, referring to a previous discussion upon celluloid film defects, said that until about a year ago he had been getting thoroughly seasoned and reliable film, but now, owing, doubtless, to the great demand caused by the increased use of animated photography, he found that he no longer got such well-seasoned material. It was very important that celluloid should be thoroughly matured before coating, and of the produce of the American Company he could say that, well seasoned, it was as reliable as glass. The Chairman then offered to give a demonstration of a new apparatus for animated photography which he had completed. His idea in constructing it had been to encourage those photographers who were not possessed of unlimited means and large premises to take up this branch of photography, for which class of a worker he thought he had devised a specially appropriate machine. It was in no sense a showman's machine, but more suited to drawing-room displays, required little room and offered no risk of fire. He would accompany his exhibition with a demonstration of the development and printing of the films.

Messrs. Thomas Illingworth & Co. had on view a couple of their Poco cameras. The special features of these cameras consist in their extreme compactness when folded up out of use, an adjustable double swing back, adaptability to roll-holders or double dark slides, rising and sliding front, and reversing view-finder and level combined. Provision is made for use upon tripod or cycle, in addition to the hand. The view-finder fulfils, as stated, the duties of a level, a small marble being introduced into the finder and allowed to run freely upon the upper surface of the ground glass, denoting that the camera is level when it rests exactly where two lines, ruled at right angles, cut each other.

The CHAIRMAN described a very efficient levelling device for use in conjunction with the finder, where no objection was raised to the latter being so large as two inches square. A small weighted piece of brass is suspended so that, when the camera is level, its image is seen quite sharply, while, if tilted downwards, it is thrown out of focus, and if backward it comes into touch with the glass.

There was a large selection of Busch lenses for examination, sent by the Rathenower Optische Industrie-Anstalt, and including the rapid, portrait and detective Aplanat series, the wide-angle Pantoscop, portrait lenses after Petzval's formula, and others.

Messrs. Negretti & Zambra showed the Verascope hand stereoscopic camera, with magazine and twelve plates, and the viewing stereoscope for the same. The picture taken is considerably smaller than the standard stereoscopic slide, but loses nothing on this account when seen in the stereoscope provided for the purpose.

Croydon Camera Club.—The regular Wednesday evening meetings were reinaugurated on the 5th inst., when the President of the Club (Mr. Hector Maclean, F.G.S.), as usual, marked the occasion by addressing a few words to the members assembled, who numbered between twenty and thirty. In the course of his observations he dwelt upon the conspicuous success which had marked the summer outings, and cited Tonbridge, Kingswood, Penshurst, Broomhill, and Earl Crawford's reception as notable for large gatherings and pleasant times. The good show made by the Club at the Photographic Exhibition arranged at the Town Hall in June by the Science Congress was next referred to, and the regrettable accident which has overtaken the Hon. Secretary, Mr. W. H. Rogers, spoken of with much sympathy. Mr. Rogers was, however, congratulated upon winning a first-prize medal for a gum print in an open competition, and for obtaining prominent positions for the same kind of print on the walls of the Royal Photographic Society and of the Salon. This notable success was attributed, in some measure, to Mr Packham's persistent advocacy of gum bichromate, and to the encouragement given by the Club to all efforts in the direction of æsthetic photography. Having adverted to the great photographic displays now open, to the arrangements of the coming season, and urged upon members to enter for a novel and an important photographic competition which the Club had instituted, the PRESIDENT proceeded to call upon Mr. J. T. SANDELL to address the gathering on the subject of

INTERIOR PHOTOGRAPHY.

Mr. Sandell began by pointing out differences which divide interior from exterior photography, of which the chief came under the headings of (1) illumination, (2) apparatus, (3) exposure, and (4) development. Illumination is apt to be feeble in general amount, and characterised by over-much contrast. The apparatus advised includes a square bellows camera, if possible one lined with black velvet, otherwise scattered light reflected from the bellows is likely to impair the brilliancy of the shadows of the negative. The longest-focus lens available should always be used. Respecting lenses, it should be remembered that a W.A., whilst having great depth, lacks flatness of field; it should, therefore, not be used on, say, a reredos. The R.R. lens, whilst enjoying good

definition over the whole of any desired plane, is less capable of sharply defining a series of planes. In using a W.A. it is best to focus upon the distance of an interior; with the R.R. the focus should be on the *middle* distance. The distinction between halation and atmospheric illumination was insisted upon, and illustrated by means of a number of 20 × 15 interiors, selected from some fifty or more of Mr. Sandell's taking, which he had brought to emphasise his arguments. These were much admired, being exceptionally fine examples of interior work. A number of questions having been asked, and comments made by Messrs. Isaac, Holland, Emms, Wratten, Dales, and Watson,

FOCUSSING BY SCALE.

The PRESIDENT advocated the frequent utility of focussing to scale when doing interior work, more especially when important architectural features were not the main portion of the view. Many had abandoned focussing by scale because, in the first place, the scale was incorrect, and, in the second place, most people were unable to judge short distances with sufficient accuracy. Few could with certainty decide as to whether an object were seven or nine feet away; a mistake of two feet at the above distances would be fatal to obtaining sharp definition at a good working aperture. The remedies were obvious. In the first place, one should test the accuracy of the focussing scale by trial on objects, the distances of which from the lens were known. Secondly, in using the focussing scale upon objects within fifteen feet, the actual distance should in every instance not be guessed, but be measured, preferably by means of a tape measure, failing which, by pacing the intervening distance. To illustrate the advantages of scale focussing, Mr. Maclean handed round a print thus obtained of a man at a machine at nine feet from the lens. The subject was so dark that it was impossible to see the image on the ground glass. Moreover, in order to take the subject in its entirety, it was necessary to stand the camera with its back touching a wall, a position in which the ground glass could not possibly be inspected. The print in question was generally considered an admirable example of accurate focussing.

Hackney Photographic Society.—October 4, Mr. C. F. Fleetwood presiding.—The principal item in the evening's programme was the lantern lecture on

ARCHITECTURAL PHOTOGRAPHY

by Mr. J. H. AVERY, and its value was enhanced by the fact that Mr. Avery was present at the meeting and read the lecture itself. Much valuable advice was given in the paper, and supplemented by Mr. Avery in the subsequent discussion. A useful rule for the estimation of exposure in interiors was as follows: Place the head under the focussing cloth for about a minute in order to get accustomed to the light, and then observe the image on the ground glass. On stopping down until the image be just barely visible, the required exposure would be ten minutes for that particular stop.

Lewisham Camera Club.—October 4.—About 400 members and friends were present to view Mr. A. L. Henderson's series of lantern slides, entitled

AJACCIO OR CORSICA TO DATE.

The characteristics of this place and its inhabitants were well depicted by the splendid photographs of street scenes, public buildings, churches, residences, and views of the surrounding country, which were shown on the screen. As the slides were passed through the lantern Mr. Henderson briefly described them, his historical particulars and remarks on the customs and manners of the people being much appreciated; and a hearty vote of thanks was tendered him at the close of a very interesting evening.

Bootle Photographic Society.—On Tuesday evening last, the 4th inst., Mr. W. T. Wright opened the winter session of the above Society with a demonstration on "Lantern Slides by Contact and Reduction." About twenty members were present, who evinced keen interest in the proceedings. Mr. Wright made two slides by contact and two by reduction, on Sandell's lantern plates, and developed with ten per cent. solutions of quinol, carbonate of soda, and bromide of potassium. He believes in full expoaure and quick development; if development be prolonged, yellow stains appear which cannot be got rid of. A vote of thanks, moved by the President (Mr. E. T. Cockerham), seconded by Mr. W. R. Brewster (Vice-President), and carried unanimously, concluded the meeting.

Leeds Camera Club.—October 5, the President (Mr. W. J. Warren) in the chair.—A large gathering (140) of the members assembled to hear Mr. Harold Baker, one of the Judges of the Royal Photographic Society, give his lecture on

PORTRAITURE,

a subject on which he is a high authority. The lecture was illustrated by a series of about forty lantern slides. Mr. Baker showed first the importance of the depth of colour of the background with regard to the sitter, and the different effects of a white, a grey, and a black background. The exposure of the sitter was the same with each, but the resulting portrait was strikingly different. The depth of the background must depend on the lighting of the sitter, and the lighting, again, must be suitable to the sitter, for what would be a pleasing effect to one would be totally unsuitable to another. In posing, the height of the camera made a great difference, and produced great variations. Mr. Baker condemned all artificial positions. Everything should appear to be natural, and all art in posing must be carefully concealed. The position of the hands was often a matter of difficulty, and should be arranged to give a side view rather than a full view of them, the latter tending to exaggerate their relative size. Avoid all elaborate surroundings or accessories; they were unnecessary, and often spoiled the effects. Good results were to be obtained in ordinary rooms, but it must be remembered that the light and shade as seen on the focussing screen are greatly exaggerated in the photograph, while the shadow side of the face is greatly improved by the use of the reflecting screen. Dealing with exposures, Mr. Baker said that, if a sitter could remain still, a truer and more lifelike expression was obtained by a longer exposure than a short one. The expression of the face might change without perceptible movement of the features, but such sitters were rare. Use the largest stop possible and bring the swing back into play, to bring parts into focus where necessary. Develop to produce a soft, thin negative, and use a quicker plate than would be used for outdoor work. Earnest workers, and all who wished to take portraits well, said Mr. Baker, should study the works of the best artists and photographers, such as Van der Weyde, F. Hollyer, W. Crooke, and Craig Annan. Go to all the best exhibitions within reach; never be content with what you have done, but examine the work for its faults and try to remedy them. In concluding, Mr. Baker showed a slide from one of his pet negatives, which might be used as a lesson. It cost him more than a year's work and experimenting before obtaining the desired result. Therefore they must have patience and try again and again. The last monthly excursion of the season, to Adel, took place on Wednesday afternoon, a large muster of members being present, accompanied by the President (Mr. Harold Baker), and Mr. W. E. Tindall, B.A. Mr. Tindall showed the members how best to obtain pictures as distinct from photographs. He afterwards entertained them to a substantial tea, for which he was tendered a very hearty vote of thanks.

Rotherham Photographic Society.—The Tenth Annual Meeting was held on Tuesday night, October 4, Mr. J. Leadbeater presiding. There was a good attendance. Mr. Hemmingway (Hon. Secretary) presented the report which recorded progress, both financially and in the quality of work done by members. The average number present at the seventeen ordinary and special meetings had been 14·58. The programme had proved both attractive and instructive, the chief event of the year having been the Annual (ninth) Exhibition which was much appreciated by the townspeople, and yielded a satisfactory addition to the funds of the Society.—Mr. A. S. Lyth (Hon. Treasurer) read the statement of accounts The balance in hand was 19*l.* 3*s.* 3*d.* Officers were chosen as under:—*President:* Dr. F. B. Judge Baldwin.—*Vice-Presidents:* Messrs. E. Isle Hubbard, J. Leadbeater and J. Turner.—*Hon. Treasurer:* Mr. A. S. Lyth.—*Hon. Secretary:* Mr. H. C. Hemmingway.—Other members of Council: Messrs. W. Firth, E. C. Parkin, F. Oldham, J. Caseldine, and J. C. Cox. Mr. C. E Parkin was appointed Assistant Hon. Secretary, and Mr. F. Oldham Hon. Librarian. Four new members were elected.

Sheffield Photographic Society.—The Annual Meeting of this Society took place at the Masonic Hall on Tuesday evening, October 4, the President (Mr. G. Tomlinson) in the chair. The balance-sheet showed the Society to be in a sound position, financially. The election of officers for the ensuing year resulted as follows:—*President:* Mr. G. Tomlinson.—*Vice-Presidents:* Sparham Camp, G. H. Day, J. H. Lygo.—*Council:* Messrs. D. C. Brookes, W. T. Furniss, W. H. Hill, C. H. Pearce, and J. W. Lister.—*Reporter:* J. W. Copley.—*Librarian:* Mr. T. G. Hibbert.—*Secretary:* G. W. Blackwell. *Assistant Secretary and Treasurer:* Mr. J. Smith.

Edinburgh Photographic Society.—October 5.—The President in his opening address congratulated the members on the progress made during the past session, when there had been a net increase of over fifty members and a revenue surplus of 30*l.* He hoped that by the end of the present session the membership would be over 500, and that before long they would be able to acquire larger and more commodious premises. In speaking of the lines on which the Society and the members individually might achieve progress, he strongly advocated the use of a small and compact camera for field work, employing the finest Jena glass lenses, which would enable enlargement to almost any desired size being successfully undertaken. The worker who was in earnest instead of aiming at the possession of a heterogeneous collection of prints which, having little inherent interest, had no abiding value, should study a specific subject and have his work dominated by some general idea. Edinburgh afforded abundant material for work on these lines, and he proposed that the Society should undertake, as a body, the streets of Edinburgh from the romantic, historic, and picturesque points of view. From the negatives so obtained an admirable collection of pictures could be formed illustrative of the Edinburgh of to-day, and these might form a section of an Exhibition in the city on a larger scale than had been held for some years. In conclusion, Mr. Eddington pointed out the lines on which artistic progression in photography was to be achieved, advocating the avoidance of undue detail and emphasising the importance to be attached to unity of effect and simplicity of style as essentials of any great and lasting work. The photographer could not aspire to reproduce nature on the lines of the landscape painter, but, while compelled to the use of monochrome, he could study the suitability of the colour he did employ to the subject he desired to reproduce, and this, with graduation of tone and skilful composition, will enable him to produce a picture that was not without claim to rank as a work of art.

FORTHCOMING EXHIBITIONS.

1898.		
October 14–Nov. 5 ...	Photographic Salon.	Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
,, 14–Nov. 12...	Royal Photographic Society.	Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
November 15–18	Hackney.	Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15	Yorkshire Exhibition.	Hon. Secretaries, 13, Chesham-street, Bradford.
,, 24	Ludlow.	Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
,, 23–26	Aintree Photographic Society.	Hon. Secretary, D. Travis, Fazakerley, Liverpool.
1899.		
March 4–11	South London.	Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PACKING PLATES FOR EXPORT.

To the EDITORS.

GENTLEMEN,—The amount of trouble, loss, and annoyance traceable to the bad packing of dry plates is, to those who attempt to practise photography in the tropics, very great, and does not appear to be recognised at home.

If they are bought in card boxes, they as often as not, even when sent out in a tin-lined case, arrive in a spotted condition, and in any case only last a few weeks. When ordered in tins, the position is only slightly better, for the tins are seldom air-tight, and no sort of care is taken to dry the packets before tinning them, so that the plates get ruined even in good tins. The tins are always clumsy, ill-made, and exceedingly dear. A hammer and cold chisel is required to open them, as they are so stupidly made that a common tin opener cannot be used without damage to the plates. For these unsuitable packages a charge of a shilling or so per packet of plates is made. The aggravating part of it is that one gets one's tobacoo, sardines, biscuits, butter, and other provisions, in carefully made air-tight tins, so contrived that they may be opened without any trouble by merely pulling off a strip of metal, turning the lid round, or some other simple means. The cost of some of these things is actually less than plate-makers charge for their tins alone.

To the professional, amateur and dealer in the East and Far East this is the most important subject there is connected with photography. Dealers are simply afraid to stock plates, as they have so many losses that they would be compelled to ask a prohibitive price for the plates they might be able to sell while in condition.

To give an example of the sort of thing which is continually happening, a few days ago I wanted to take a photograph, so opened a tin of plates and made two exposures; both were useless, so I opened a second tin, by another maker, and again exposed with the same results. I was thus out of pocket about twenty-five shillings, and did not get a picture. The plates cost nine shillings and sixpence per dozen, plus two shillings for the tins, besides the cost of freight, packing, &c.

Plates for export should be packed in carefully stoved papers and boxes, and tinned while still warm, in well-made and tested tins, preferably with a cover fitting on one end and sealed by a strip of metal soldered on to the junction of the cover and tin, with a key to open it by. On no condition should soldering fluid be used in the manufacture or sealing of the tins, as in a very short time it rusts holes right through them. If paper is used to separate the plates, it should be previously baked at a temperature sufficient to destroy the fungoid spores on it, before use. No gum or paste should be employed in doing up the packets, as it, of course, introduces moisture at once, and, in most cases, mould spores by the thousand as well.

For export it is useless to put up any plates which will not stand a temperature of 90° Fahr. without frilling or melting.—I am, yours, &c.,

F. Z. S.

SECOND-HAND LENSES.

To the EDITORS.

GENTLEMEN,—If not too late, I should like to be allowed to suggest that some one well versed in the knowledge should give amateurs of modern date an article in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC on the matter of second-hand lenses.

If possible to spare space, a list of the names of makers who have passed away, and whose goods may still be had second-hand, and a *résumé* of the quality of such lenses, would be a very acceptable piece of information.

Second-hand goods of this class are occasionally in the market, but, as amateurs generally have no knowledge of the status of the maker as an optician, I have no doubt many a useful bargain is missed.—I am, yours, &c.,

J. H. SHARMAN.

25, *Walkley-street, Walkley, Sheffield, October* 4, 1898.

[If our correspondent will procure the late Mr. Traill Taylor's book on *The Optics of Photography and Photographic Lenses*, published by Whittaker & Co., Paternoster-square, he will obtain much useful information on the subject he writes of.—EDS.]

WASHING PRINTS.

To the EDITORS.

GENTLEMEN,—*Re* the many discussions in THE BRITISH JOURNAL OF PHOTOGRAPHY as to the length of time required to thoroughly wash all traces of hypo out of gelatino-chloride and albumen paper.

We should like to know what you think of this method. After fixing for a quarter of an hour in hypo 4 ounces to every 20 ounces of water to each sheet of paper, several rapid changes in deep porcelain dishes with water running.

Next, prints placed on glass to drain while hands and dishes are well soaped previous to again washing quickly for three quarters of an hour before mounting.

Albumen prints after fixing have many changes for half an hour in warm water.

Prints on both papers finished over six years ago are still as good as when mounted.—I am, yours, &c.,

E. P.

[The method described should answer well in practice; but, if anything, it errs on the side of excessive washing.—ED.]

A PLATE BACKING.

To the EDITORS.

GENTLEMEN,—I have been trying a new plate backing. It is a mixture of kerosene oil and lamp black. For copying, process work, and all studio work it is A 1; even for outdoor work it will serve by simply laying on a sheet of paper to prevent it running or messing slides. Its appearance is—well, I fancy it must be the identical stuff used by the Evil One to decorate his drawing-room.—I am, yours, &c.,

Pachmarhi, September 22, 1898. H. HANDS.

PHOTOGRAPHING A SPIRIT.

To the EDITORS.

GENTLEMEN,—"F. R. A. S.," in his statement about a certain remarkable photograph mentioned in your issue of September 16, has not been correctly informed about certain details. I have a copy of this photograph in my possession, and know all the circumstances in connexion with its having been taken. The lady who took the photograph was in no way related to the supposed figure in the chair. She, with her sister, occupied the house only for a time, and during this time the photograph was taken. I should be glad to give any further information on this (to me) interesting subject.—I am, yours, &c.,

C. H. H.

October 5, 1898.

AINTREE PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—I would remind your readers that our Fifth Annual Exhibition opens on the 23rd prox., and that all entries must be in my hands by November 12.

From all appearances our Exhibition this year promises to be a great advance on our previous shows.

Shall be pleased to forward full particulars on recept of post card.

An Invitation Section is being arranged, for which I have received a number of acceptances.

A special feature will be the illuminations by the Fowler Acetylene Gas Company, who are undertaking the lighting for both pictures and slides.

Trusting you can find room for this letter in your valuable paper, I am, yours, &c.,

DARLEY TRAVIS.

St. John's-road, Fazakerley, October 7, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

A. L. Dawson, 17, High-street, Kirkcaldy.—*Photograph of Rev. Bruce Beveridge Begg, D.D.*

J. L. Tabb, 22, Keir-street, Barnsley.—*Two photographs of the Old Theatre Royal, Barnsley, Yorkshire.*

M. Leech, 28 and 30, Roe-street, Macclesfield.—*Three photographs of Wm. Bromley Davenport, Esq., M.P. for Macclesfield*

R. T. Watson, 461, Anlaby-road, Hull.—*Photographic group of Messrs. J. T. Brown and J. Tunnicliffe, with their record score.*

A. Lipshitz, 41, Cheetham Hill-road, Manchester.—*Photograph of lithographic print published by Rabinowitch, of St. Petersburg, Russia.*

J. Smith, 7, George-street, Stroud, Glos.—*Three photographs of laying foundation-stone of St. George's Church, Nailsworth, Glos., with masonic ceremony, by Right Hon. Sir M. E. Hicks-Beach.*

C. Bogg (Malton).—Of Messrs. Marion & Co., Soho-square, W.

W. S. A. Very good work indeed. We have returned the specimens.

W. A. (Partick)—The results seem very good. We shall be glad to inspect the machine.

W. T. Smith.—See under "Forthcoming Exhibitions" in the present number of the Journal.

A. Z.—If you address your query to the Prestwich Manufacturing Company, High-road, Tottenham, you will doubtless get satisfactory replies to your questions.

S.—A letter to the Eastman Company might bring the desired information, as we believe the photometer is used at their works. We are sorry we find it impossible to give the figures.

R. B. Newton.—As regards portraits, we know of no source. For home and foreign scenery, address Messrs. Levy, Rue Louis le Grand, Paris, and Messrs. Seaman & Sons, Chesterfield.

C. W. P. (Blackheath).—Many thanks. The matter was referred to in our Correspondence columns earlier in the year. We entirely agree with you; but such an absurd state of things requires dealing with by an authoritative body representing the profession.

Collodion.—*Abney's Photography with Emulsions*, published by Sampson Low & Co., Fetter-lane, will give you the desired information; but your better plan would be to spend an afternoon at the Patent Office, or the British Museum, and consult the indices of our back volumes.

Collotype and Process Work.—P. Stuart. Unless we knew the scale upon which you propose to work, it would be impossible to give the faintest idea of the cost of plant for working either process. Get Winstone & Sons, or Penrose's catalogues, and then you will be able to form your own estimate.

Glossy Prints.—R. P. We know of no form of rolling press or burnisher that will give the same degree of gloss as that obtained by squeegeeing the prints upon glass and mounting them while on the plate. Indeed, it is difficult to imagine that any such press or burnisher could be made.

Freckles.—Negro. Powdering the face of sitters to hide freckles is very seldom done now by professional photographers. In bad cases orthochromatic plates are sometimes employed, and they ameliorate the trouble to a great extent. As a rule, the freckles are overcome by the retoucher.

Boiling Water.—H. Watson. That is quite right, water does boil at 80°, but that is according to the Réaumur scale, which is equal to 212° of Fahrenheit scale, or 100° by the Centigrade scale. It is the Fahrenheit scale that is generally adopted in this country, though the Centigrade is frequently used now by English chemists.

Patent.—R. Robertson. The price of that is the same as all other specifications now are; that is, eightpence; and it matters not whether the specification is long or short, or how many drawings there may be in them. They are all of one uniform price. Provisional specifications, unless the patent is completed, are not published at all.

The Sight.—Retoucher. You certainly require some aid to your eyes, and, from what you describe, we should advise you to lose no time in obtaining it. Better consult an oculist, and, if your means will not permit of a private one, go to one or other of the eye hospitals—either that in Moorfields or the one at Charing Cross. We fancy you are suffering from astigmatism.

Position of Lens.—T. Wyman. In enlarging from a small negative by daylight, or indeed any other light, if the lens be a symmetrical one, that is, the front and back combinations alike as in the rapid rectilinears, it matters not which is next the negative; but with a portrait, or similar lens, the back combination should always be next the negative, as it was when the latter was taken.

Discoloured Lens.—H. Sawtell says: "I have an old portrait lens, bearing the name of a French house, one of the glasses of which has a yellowish iridescent appearance," and asks how it can be cleaned off?—It can only be removed by repolishing the surface, and that had best be done by the maker. However, if the lens be left as it is, it will make no *practical* difference in its working.

A Regular Reader says: "I think I might be able to add to my income by sending to papers instantaneous photographs of street scenes and so on; would these people merely want the negatives or prints, and what would be about the usual price?"—In reply: This would be entirely a matter of arrangement depending upon the value of the photographs. Prints only would be needed. The Copyright Union suggest a minimum fee of 10*s.* 6*d.* A visit to the editorial offices of the illustrated press, with a few of the photographs alluded to, will teach our correspondent more of the way in which this business is conducted than we could by devoting columns of our space to the subject.

Photographing Wine Cellar.—P. R. O. F. The best suggestion we can make is to use flashlights; using two—one with double the power of the other, and fired simultaneously They should be so placed that the larger charge will give the dominant light on the barrels, while the smaller one serves to soften the shadows. Of course, the lights should be so arranged that they do not directly reach the lens.

Distraint.—Anxious. We do not recollect anything about such advertisement. We do not, however, see how the creditors of another person can distrain on your goods; that is, if they are your *bona fide* property. But, if you have only rented them of the debtor, the case will be different. Much will depend on the terms upon which you took the premises, which are not stated. The best thing to do will, probably, be to consult a solicitor on the matter.

Increasing Angle of Lens.—P. Goodwell writes: "I have a rapid rectilinear lens, which is a very fine one and is exceedingly rapid; but it does not include so wide an angle as I often want. I am told by a friend that, if I have the tube shortened considerably, it will include a wider angle. Is that correct?"—Yes; by bringing the lenses closer together it will cover a larger plate, and consequently, on that, include a wider angle; but under those circumstances a small stop must be used, and the lens would no longer be a rapid one. We should advise you not to tamper with the lens you have, but to get a shorter-focus one that, with a smaller aperture, will cover the size plate you are now using.

Transferred Prints.—Country Photographer asks: "Will you please favour me with your opinion of whether there is value in a process by which carbon prints can be easily transferred to note-paper or similar surfaces? Or say if you know of any such process having been practised or published. The means used to effect the transfer of specimens enclosed I believe to be new, and particularly adaptable for small work?"—The prints are interesting but, as the method used for transferring is not given we, of course I cannot say if it is new or not. There are different methods of transferring, some of which yield better results than those enclosed. Probably this method could be made to yield better results with more experience in its working.

Silver in Paper.—Argentometer writes: "Can you inform me through the Correspondence column of your paper about the quantity of silver nitrate absorbed by an ordinary sheet of albumenised paper after floating for the usual three minutes on a bath of an average strength, and approximate value of same?"—It is impossible to answer such a question as this, as the quantity of silver required depends upon the proportion of chloride in the albumen, and its thickness. Again, "a bath of average strength" means nothing. If our correspondent wishes to ascertain the quantity of silver consumed with a given paper, and bath of a given strength, let him sensitise a quire of the paper on the bath, and note how much solution has been taken up. Then, knowing its strength, divide the quantity by twenty-four, and that will give the proportion of silver per sheet.

Copyright Views writes: "I should be obliged if you would answer the following questions. 1. A publishing firm bought ninety views (prints) for 5*l.* 5*s.*, had process blocks made from some of them (about sixty), and issued them in the form of an album with descriptive matter, and gave their word that photographer's name should appear underneath each one. Have they (the firm) the right to publish these views over and over again, or, in other words, have they the right to publish these views for an indefinite number of years, without any pecuniary fee to the photographer further than the 5*l.* 5*s.*? (No written agreement between publishing firm and photographer.) 2. Who holds the copyright of the said views? 3. If the views are published another year, has the photographer the right to ask for a further fee, and can he claim it? 4. Can the photographer compel a publishing firm to put his name under any or all photographs produced if no written agreement to this effect?—1. As there was no written agreement as to the name appearing or the number of editions issued, it seems that the publishers cannot be restrained. 2. The photographer—in the original pictures, but he has sold a right to publish them. 3. No. 4. No.

Toning Bath.—C. A. Waite writes: "I should be glad if you would tell me, through the medium of your Journal, the cause of the following. Having a large batch of prints to tone, I made up the toning solution as follows to tone fifteen sheets of paper used. Sulphocyanide, 12 drs. to every three sheets, taken from stock made thus (1 lb. cyanide dissolved in 40 ozs. water. From stock I took 10 ozs. and made up to 20 ozs. with water), 6 drs. gold (home-made from sovereign as recommended in Photographic Almanac). To three sheets I made solution up to one quart, taking particular care to add the gold last. Within a few minutes the gold had become deposited on the bottom of the dish. The dishes are always thoroughly cleansed before using. What could be the cause? I then made another bath, same proportions, making fresh cyanide, adding cyanide last, still a slight deposit, but the prints toned all right. I should say the previous batch was useless, owing to green stains, and frightfully bleached. I have never experienced this before, and always thought that the adding of gold last was strongly recommended. I have always found this method the best for another brand of paper, and if upon adding the gold the bath became a good rich blood red I took that as an excellent sign, but if it turned yellowy, bad."—As the second bath was made in the same proportions, and with the solutions as the first, it indicates that the first mixture was probably made in a dirty vessel, or that there was some impurity in the water used for diluting. The usual way *is* to add the gold last. The proportion of the sulphocyanide seems large. The usual proportions are 15 grains of the sulphocyanide to each grain of *chloride* of gold.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 2007. Vol. XLV.—OCTOBER 21, 1898.

Contents.

	PAGE
The British Journal Photographic Almanac for 1899	673
Ex Cathedrâ	673
Ancient Toning Methods.—I.	675
Leaderettes:— Action of Light on Brown Dyes—Dyes or Pigments—Life Photographs—Reappearance of the Great Sunspot—Art in the City—The City Guilds—Disappearing London—Kew Bridge	676
The Development of Doubtful Exposures	677
Foreign News and Notes:— A New Colour Process—A New Dark-room Medium—Pictorial Post Cards—Death of Herr Toth	678
Lines of Progress. By A. Eddington	678
Success in Professional Photography. By C. M. Hayes	680
Forty Years Ago	682
In the Key of Brown. By A Man in the Street	682
Stereoscopic Relief Without a Stereoscope	682
The Picture Post Card	683
Our Editorial Table:— Marion's New Print-quick Paper—Fallowfield's Christmas and New-year's Mounts for Photographs—The Presto Pocket Camera—The Vanguard Acid-proof Negative Varnish—Lederer's Sensitised Albumenised Paper—Liesegang's *Photographischer Almanack*, 1899—*Sunny Jersey*—Catalogue Received	683
News and Notes	684
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—Woolwich Photographic Society—Plymouth Photographic Society	685
Forthcoming Exhibitions	687
Patent News	687
Correspondence:— Mr. Barber's Stereoscopics—Rollable Film Patents—Spirit Photography	687
Answers to Correspondents	688

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC FOR 1899.

We have entered on the preparation of the thirty-eighth issue of The British Journal Photographic Almanac, which will be published on December 1 next. The volume will have a general resemblance to its two immediate predecessors; but we shall embody in it several novel features that will probably make the book, for purposes of reference, of greater usefulness than hitherto. During the past year we have received quite a large number of excellent suggestions for use in the compilation of the Almanac. We have adopted most of them, and we here take the opportunity of thanking those readers who were kind enough to write us on the subject.

Those of our friends who contemplate, as hitherto, contributing a brief article on a practical topic to the pages of the Almanac, will oblige us by sending us the copy and any accompanying sketches at the earliest possible moment.

Secretaries of Societies will also materially assist us if they will forward us lists of officers and other details for inclusion in the Directory of Photographic Societies. We shall also be glad to receive any additions that may be made to the list of telegraphic addresses of the trade, &c. As usual, a section of the Almanac will be devoted to notices of the latest introductions in photographic apparatus. Those firms who desire to take advantage of this feature should communicate with us as early as possible.

The Publishers wish us to remind Advertisers that the latest date for receiving advertisements is Tuesday next, October 25, and that, to ensure insertion and good positions, orders and copy should reach them by the date named.

EX CATHEDRÂ.

Two months ago we announced that, at the conclusion of his present year of office, Lord Crawford would not stand for re-election to the Presidency of the Royal Photographic Society. At last week's meeting of the Society (reported at p. 668 of the Journal for October 14) his Lordship himself made a statement to the same effect, but, in deference to the very strongly expressed wishes of the members present, allowed it to be understood that he would alter his intention, and would submit himself for re-election next February. Of course the election will result in the prolongation of Lord Crawford's Presidency for at least another year from that date. His Lordship's services to the Society while he has been at its head have been so great, and have been so highly appreciated by the photographic world at large, that his withdrawal from the Presidency would cause universal regret, and would amount to a distinct loss to photography. The beneficial influence which a man in the position of the Earl of Crawford can exert over the interests of photography, as a science and as an industry, make it, if we may be allowed to say so, almost a matter of duty on his part to continue at a post which he has so ably occupied during the past two years. We wish the noble Lord the best of health as the result of his projected Eastern voyage, and we look forward to seeing him personally at the head of the Society next year, carrying on the work of advancing the interests of photography, which owes him so much in the past and expects so much from him in the future.

* * *

The President's suggestion that the Government should institute a State photographic establishment attached to the British Museum, for the purpose of meeting its own photographic requirements and those of the other national museums and

galleries, is an excellent one, which, it is to be hoped, will be carried into effect. In such a matter Lord Crawford speaks, of course, with the highest authority and experience. Independently of the great utility such an establishment would be in the Government service, there is the equally large question of its value to private individuals anxious to obtain photographs of objects in the national collections, a matter now solely dependent on commercial enterprise, which has scarcely been developed to the utmost of its possibilities. We trust Lord Crawford will be successful in his endeavours to persuade the Government to take the subject in hand. A State recognition of photography would give it an impetus the fruitful results of which can scarcely be over-estimated. Lord Crawford's suggestion is one not to be lost sight of, and it deserves the active support of every photographer. We await with interest the precise method of moving that inert mass, the British Government, to extend its official cognisance to one of the most useful and far-reaching crafts of our time.

* * *

As to the subject-matter of the President's annual address, the majority of our readers, certainly professional photographers, will endorse every word said by Lord Crawford on the present Exhibition. His Lordship is fully alive to the commercial side of our art-science, a phase of it that seems to have been quite ignored by the Photographic Society—or rather the Selecting Committees it has appointed for the last two or three Exhibitions. Rightly the President says that fully half the plates exposed are for commercial photography, "and yet we may look in vain upon the walls of this Exhibition for any examples which would lead one to suppose that there is more than one school of portraiture. What we see are, and should be, appreciated by the trained eye, but are not, I think, such as would be appreciated by the general public." "The commercial side of photography is undeniably of deep importance, and it should be the aim and honour of our Society to aid and foster it." Again, Lord Crawford remarks that the majority of the public look primarily to definition, and to what they call evidence of finish, which is probably a glazed surface. In concluding his remarks in this portion of his address, his Lordship said he feared he might be charged with heresy. Not at all; his Lordship will be applauded by every professional photographer—whether portrait or landscape—for his outspoken words on behalf of the bread-and-butter side of the question and an ever-increasing industry.

* * *

For several years past we have given the statistics of the processes by which the Exhibition pictures were produced, and they have often been taken as a criterion of the prevailing taste. It is nothing of the kind; it is simply a reflex of the ideas, which, by the way, we have frequently heard characterised as "fads," "whims," "cranks," &c., of the Selecting Committee. It was rumoured that only one in about four or five of the pictures sent in to the present show was accepted, and we know by what processes the majority of them were produced; it would also be interesting to learn by what methods the majority of those rejected were made, and what were the subjects. When one looks at the names of the Selecting Committee, one can scarcely be surprised that commercial photography has been so completely disregarded in favour of such subjects as "Evenings," calm, stormy, or otherwise; "Marshes," under different aspects; autumns and winters, and mists on the mud, &c.—some little better than smudges on rough paper. Let us hope that the President's well-timed remarks will bear fruit in the next year's Exhibition of the Royal Photographic Society.

* * *

We give below a further contribution to the amusing specimens of journalism for which the subject of colour photography is responsible. Three weeks ago the news was cabled over from America that the late J. W. McDonough had solved the problem of photography in natural colours. What Mr. McDonough actually did was to introduce a system analogous to Joly's method of taking negatives, and viewing positives therefrom, through screens finely ruled with bands of colour—scarcely "photography in natural colours," however interesting and good the results may be. Under the heading of "Colour Photography solved in Chicago," one of our American photographic contemporaries, which should surely know better, prints a nonsensical effusion on Mr. McDonough's results, from which we make a few extracts.

* * *

"Colour photography has been made a final success by a Chicago man. The process of using an ordinary camera and in one-fifth of a second accurately photographing all of the brilliant hues of a flower garden, all the contrasts in green of a landscape, all the wonders of a summer sky, the jewel upon your finger, the ribbon at your throat, the stripe in your clothes, the decorations of your hat, the bouquet on your lapel, is now a reality. Not a canvas of the old masters but what may be reproduced, with every tint of the original; not a shade of colour in the banks of flowers of Washington Park but what may greet the eyes from a photograph; not a colour line in the features and dress of a friend but may be retained for ever upon the plain panel of a photographic card. And this is all done, not by retouching or tinting, not by laborious processes after the picture itself is taken, but done by the sunlight instantly, in the same second that the picture itself is taken. The discovery and its practical application is the work of the late James W. McDonough, of Chicago. He has been dead a year, but what he discovered has been in the hands of friends and business associates ever since, and is about to become public property."

* * *

"What he discovered," goes on this authority, "is due primarily to the dirty and nasty condition of the Chicago River. Crossing this river on the Madison-street bridge one day in 1870, Mr. McDonough noticed on the surface of the murky water the colours of the spectrum, caused by escaping oil from some close by warehouse. The thought came to him that the river would present a beautiful spectacle if covered with those colours. The second thought was as to why that river's surface could not be photographed. From this thought gradually developed and grew the process of colour photography that now will always be known as McDonough's. In the simplest language possible the process which he created is a colour photography that is purely mechanical. The ordinary camera is used and the negatives are produced and developed by the usual processes, but before exposing the negative in the camera a transparent screen ruled with the three primary colours, red, blue, and green, is interposed between the negative and the object to be photographed. After developing the negative a positive

late is produced from it, which, viewed by itself, does not iffer from the ordinary black-and-white plate, but, when it is aid upon a viewing screen ruled with the primary colours being a duplicate of the taking screen used in the camera), he colours in the object photographed appear," &c., &c.

* * *

After this follows a somewhat inaccurate description of Dr. oly's adaptation of the three-colour process with ruled screens. Ir. McDonough's rulings are said to have been 300 to 600 in he inch. Colour photography is also said to have engaged the ttention of photographers and chemists only since 1870. We ear that, notwithstanding the confident prophecy expressed in he second paragraph we have quoted, Mr. McDonough's process s not destined to have the career marked out for it—that is to ay, if it is to be put forward by his friends and associates as he solution of one of the greatest problems of the century. 'he ground is already covered by Ives with his kromskop ystem of glass pictures, and the three-colour half-tone block-rinting process, and, be they never so perfect, the McDonough uled screen pictures are hardly likely to displace these two ethods of making photographs in colour, to say nothing of ther obvious systems, which are either in experimental or ractical use.

* * *

The title of the Traill Taylor Memorial Lecture to be de-vered by Mr. Thomas R. Dallmeyer at the Exhibition Gallery of he Royal Photographic Society, 5A, Pall Mall East, on Tuesday vening, November 8, at eight o'clock, is, "On the Focometry f Positive or Negative Lens Systems and their Combination, nd a Focimeter for the purpose."

ANCIENT TONING METHODS.

I.

T the present time, when there seems to be a tendency to evert to old methods of toning, both with and without gold, latinum, or the precious metals, it may not be time wasted if e glance briefly at the different circumstances that prevail ow and in the days when such methods were more in vogue.

It may be pointed out, in the first place, that the modern ethods of toning, based upon the use of an alkaline gold ath, were the outcome of careful experiments, which went to ow that such methods were, not only so far as beauty and rtainty of results, but more especially permanence, far supe-or to the processes that had been hitherto in vogue; and, ough it is the fashion nowadays to speak lightly of the hotographer of a generation or two ago as a "rule of thumb" an, it may be seriously questioned if any more careful re-arches are to be found in our modern records than those of avanne and Girard, and of Fordos and Gelis in connexion ith gold toning nearly forty years ago. If the decisions of ose authorities pointed unanimously to the great superiority alkaline gold toning over other methods, it would certainly em that now those decisions should not be lightly set aside.

At the same time, as we remarked a few weeks back when riting on the subject of toning with the alkaline sulphides, ere is no reason why, under proper conditions and with e necessary amount of care, successful and permanent re-lts should not be obtained by some of the methods that are ually considered open to suspicion. It is not always the ning method itself that is the subject of doubt so much as the conditions that lead up to it; or, in other words, the process may be all right if only it be worked in the right way. Thus, in regard to the method of sulphide toning, it was pointed out that the condition necessary to success was the thorough and complete removal of every trace of hypo and of silver salt other than that forming the image, and that, when these conditions are fulfilled, not only are the results very beautiful, but they may be accepted as absolutely permanent as anything in the shape of a silver image can be.

It was pointed out, moreover, in the article referred to, that there is a wide difference between toning processes in which the effect produced is the result of a completed action and those in which the tone obtained is merely an arrested stage of an incomplete reaction. We are speaking now more particularly of so-called sulphur toning methods, for, if the remark be applied to alkaline gold toning, it may be objected that the varied tones obtained by that means are *all* arrested stages of an incomplete reaction. That, however, is not what we mean; the reaction is complete when gold is deposited on the silver image, and the variation in tone depends solely upon the quantity of gold so deposited. But in the sulphur methods it is too frequently the case that the tone obtained, however pleasing, is in the highest degree fugacious, for the simple reason that it is brought about by partial or arrested sulphuration, and the process thus left unfinished is liable, either spontaneously or from atmospheric influence, to complete its natural course, to the utter ruin of the picture.

Going back again to the researches of forty years ago, it was, if we mistake not, MM. Fordos and Gelis who examined most exhaustively into the behaviour of what is now called, though wrongly, the "mixed toning bath," consisting of a combination of gold and hypo, to which they gave the name of *sel-d'or*. But, if the *sel-d'or* toning process of Fordos and Gelis be compared with the modern mixed bath, we are forced to the conclusion that, while one is a thoroughly scientific and perfectly safe method, based upon correct principles, the other is the very reverse, and, as usually worked, consists of a solution in a constant state of change, and giving results in which finality is not attained until the picture has completely faded.

As a matter of fact, the *sel-d'or* process and others of that period, in which hypo was used in conjunction with gold, were purely toning processes, not a combination, as is now the case, of toning and fixing. The toning bath was, in fact, followed by a separate fixing bath in the usual way, the function of the hypo in the toning solution not being to fix the image; or, if it did, partially, it was never considered that it did so safely or completely. But the mixed solutions of that period—and it is only fair to say the same of some at the present day—were carefully and scientifically compounded with due regard to their proper chemical functions, in itself an element of safety; but what can we say of the modern formulæ, in which an infinitesimal quantity of gold is combined with the contents of a drysalting store, and left for a longer or shorter period until its earlier troubles have ceased or until it has to be used? Can it be at all wondered at if such mixtures have acquired a bad name?

There is, however, another class of toning solutions in which hypo figures, but from which gold is altogether absent, and which are usually classed under the general head of sulphur-toning methods, though it has been doubted whether the result is actually due to sulphuration. In the early days of silver printing, when hyposulphite of soda cost perhaps more per

ounce than its does now per hundredweight, it was a by no means surprising circumstance that strict economy was studied, and the fixing bath was often used over and over again. Before gold toning had been introduced, it was found that a fixing bath that had been used before gave a better colour to the prints than when it was fresh, and that, in proportion to the amount of previous use it had undergone, so was the improvement in colour increased. So it became the custom to keep the used hypo bath for toning purposes, and, later on, to add a definite quantity of silver, either in the form of chloride or nitrate, to a fresh solution of hypo for the same purpose. A toning bath we used with satisfaction for plain paper prints nearly forty years ago consisted of a plain solution of hypo to which a few drops of the sensitising bath were added until the precipitate ceased to redissolve.

But mark the difference between the "rule of thumb" man of that period and the up-to-date and *fin-de-siècle* one of P.O.P. Finding, or rather not waiting to find, by painful experience, but arguing from the nature of things that the fixing power of the toning solution must be lessened as it became loaded with silver, he did the sensible thing, and kept it as a toning solution, using a second and separate solution of fresh hypo to fix the prints. And so it happens that there are now in existence plain paper prints that were toned in this manner forty or more years ago that would compare more than favourably with many of the gelatine chloride prints of to-day or yesterday.

Action of Light on Brown Dyes.—Referring to our note of the British Association Committee on the action of light upon dyed colours, when we alluded to the possibility of the conclusions of this body of experts having an influence upon the makers of carbon tissue, it is worthy of note that it is rare in any combination of colours designed to give a definite tint to find simple mixtures have been used. Even in so slight a matter as the colour of a frame this rule holds good. We have been credibly informed by a frame-maker that a particular shade of green that took our fancy was compounded of five different stains in order to get the required effect. No doubt a similar diversity of colours is employed in tissue-making. For a long time past it has been understood that alizarine reds were used as one of the ingredients to get photographic browns, and we may say that in artificial colouring matters the oxyketone colours, comprising alizarine brown shades, are placed by the Committee referred to in the list of "*very fast colours*," and in the same list we find madder (the main tinctorial principle in which is alizarine), lac dye, and cochineal.

Dyes or Pigments.—It is to be remembered that the labours of the Committee referred to the colours used as dyes, but both the alizarines and cochineal when used as pigments are brought to the form of "lakes," and, under these conditions, the relative fugacity may not be identical. It is now, however, known that alizarine lakes, known to artists as alizarine red and purple, are permanent, but we find a different state of affairs when we come to consider cochineal lakes. These are known to artists as *crimson lake*, or, in a more carefully made form, *carmine*. Now, as every one familiar with the manner of setting a palette is aware, these two especial colours, above any in the colour box, should be avoided if permanency is to be desired. They are easy to use, and form, judiciously blended, excellent carnations, but they "go." Any one who has purchased, at the time when they were so popular, coloured photographs, copies of oil paintings, deplores the way in which all the flesh tints have vanished, all owing to the use of these fugitive colours. Hence it may here be mentioned that any one desiring to paint portraits in water colour on a photographic basis should scrupulously avoid crimson lake or carmine, for on the photograph they are, from some unknown cause, still more likely to fade than on plain paper. Madder lakes, though they have less body, are what should be chosen.

Life Photographs.—This is perhaps the only title that could be given to the developed gelatine plates by Dr. Percy Frankland, mentioned by us on a previous occasion. Just as uranium and its compounds give off an actinic radiation effective on gelatine plates, so Dr. Frankland found that certain bacterial forms of life also gave off a something which affected a plate so as to bring out varying opacities upon developing. It is well known that certain bacteria are luminous in the dark (*Photo-bacterium phosphorescens* for example), and the natural expectation that this luminosity should be capable of affecting a plate was realised. But that a non-luminous body should be capable of exerting a similar influence would hardly *à priori* be anticipated. Yet such influence was exerted, Dr. Frankland informs us. His exact words are: "Ordinary bacterial cultures on gelatine and agar-agar are capable of affecting the photographic film, even at a distance of half an inch, whilst, when placed in contact with the film, definite pictures of the bacterial growths can be obtained. As this action does not take place through glass, it is, in all probability, due to the evolution of volatile chemical substances," &c. In a footnote (dated October 9 1898) to the summary of his paper, given in the *Chemical News*, he states that the influence of phosphorescent bacteria on the photographic film is capable of readily traversing glass.

Reappearance of the Great Sunspot.—The great spot on the sun, lately described by us, has again made its appearance, though its apparent size is not nearly so great as when seen before the sun's rotation on its axis caused it to disappear; it has only about one-fifth of its area as then observed. But even now it is stated that its extreme length cannot be far from 40,000 miles, or a twentieth of the sun's diameter, *i.e.*, as large as some score or two of several globes the size of our own earth placed in the space.

Art in the City.—One day last week the Lord Mayor unveiled two more of the mural paintings that are to adorn the ambulatory of the Royal Exchange, and they are worthy of the places they occupy. The one is the gift of the Corporation, and has been painted by Mr. Seymour Lucas, R.A., and represents *William the Conqueror granting a Charter to the Citizens of London*. The other is presented by Mr. Carl Meyer, and represents *the Offer of the Crown to Richard the Third at Baynard's Castle*. The painter of this is Mr. Sigismund Goetze. The three that already adorned the walls are Lord Leighton's picture of *Phœnicians Trading with Ancient Britons*, presented by himself, Mr. Macbeth's *Opening of the Royal Exchange by Queen Victoria in* 1844, presented by Mr. Deputy Snowden, and Mr. S. J. Solomon's work depicting the progress of Charles the First to the Guildhall to demand the arrest of the Five Members, which was presented by Sir S. Montague, M.P. If the remaining works, when finished, are equal to these five, the Royal Exchange may feel proud of its possessions.

The City Guilds.—One by one the ancient City Guilds are taking a practical interest in the crafts they are supposed to, and once did, represent by offering prizes and granting certificates of proficiency. Many of these old City Companies are very wealthy, and, as a rule, they dispense much of their incomes on charitable purposes; but till lately they have done comparatively little in the way of encouraging their particular crafts. It is with pleasure that we see that the Ironmongers' Company have arranged to hold a competitive Exhibition of British Art Metal Work at their Hall on October 26 and 27, when money prizes will be awarded for the best designs for any kinds of metal work. It is especially interesting to note that there is to be a special series of competitions for apprentices. That is a step in the right direction, as it will tend to keep art designs abreast of those on the Continent.

Disappearing London.—Another once famous inn is being demolished—the old Coach and Horses, Clerkenwell. Apart from its associations with that notorious highwayman, Dick Turpin, the inn was interesting from the fact that it stood on the site that was, at one time, one of the leading and most patronised bear gardens in the neighbourhood of London. It was also the scene of many notorious prize-fights and suchlike "pastimes," when they were recognised by a certain section of the *élite* of society. It is somewhat a pity that such places of interest are not made more known to archæological photographers than they are before they pass into the hands of the "housebreaker" for demolition. Photographs of this once famous inn would be of great interest to archæologists a generation or two hence, and so would others of suchlike interest.

Kew Bridge.—During the past two or three years we have directed attention to the fact that Kew Bridge, on account of its unsafe condition, would have to be removed; and also, as it at present stands, it is an excellent background to some views of Strand-on-the-Green, so well known to artists, and the happy hunting ground of some photographers. For some time the Surrey and the Middlesex County Councils could not be brought to agreement on the subject. Eventually they were, and an Act of Parliament was obtained to enable the work to be done, and tenders for it were invited by the joint Committees. On Friday last the tenders were opened, and it was then found that the lowest of them was the trifle of 50,000*l.* above the estimate given by Sir James Wolfe Barry, and upon which the Act of Parliament was obtained. This means that the commencement of the work must be considerably delayed, if not, indeed, postponed for some time to come. The Bridge as it is, as we have said, forms a capital background for Strand-on-the-Green pictures, looking up the river. Such a background will not be forthcoming during its demolition and the construction of the one that is to take its place.

Kew Bridge connects Kew with the town of Brentford. This old town, which is one long narrow street, contains some old and picturesque houses, and other subjects that form good food for the camera. More than once we have met the late painter, Mr. Norman Macbeth, on his way with his camera to Brentford to secure bits to aid him on his canvases. Mr. Macbeth was one of the few painters who admitted that photography was an aid to artists, and he made no secret of the matter. Many of the old, quaint, and, photographically, the most interesting houses and shops in Brentford will shortly disappear, or will be modernised, as the High-street is about to be widened to make room for the tramways. Hence those photographers who desire to secure pictures of the old place must lose no time in doing so.

By the way, speaking of Brentford, we see by its local paper that an attempt is being made to form a photographic society there. We are always pleased to see the formation of new societies, as it indicates a spreading interest in photography. At the same time we have always deprecated forming societies in the immediate neighbourhood of well-established and flourishing ones, for the reason that one good one is better than half a dozen petty ones. If we mistake not, there are at the present time four or more societies within a radius of a couple of miles of Brentford, and all easily comeatable by tram, rail, &c.: the Richmond Camera Club, the Ealing Society, the West London, and the Chiswick one, which is somewhat of a split off from the previously named one. We commend this note to the promoters of the Brentford Society. Would not Brentford amateurs do better to join one or other of those already established instead of attempting to form a new one?

THE DEVELOPMENT OF DOUBTFUL EXPOSURES.

Arthur Freiherrn von Hübl has recently published, through Wilhelm Knapp, of Halle, a book on the above subject, the full title of which is *Die Entwickelung der photographischen Bromsilber-gelatinplatte bei zweifelhaft richtiger Exposition*, which contains a good deal of information on the subject in a convenient form, a *précis* of which may not be without interest.

After a summary of the existing theories of the action of light on silver bromide, he follows Eder's classification of the developers into two classes, viz., hydroquinone, pyrocatechine, glycin, and pyro, as slow developers, with which the high lights appear first and then the half-tones, and finally the shadows; and, as rapid developers are included, eikonogen, metol, para-amido phenol, amidol, and reducin (tri-amido-phenol).

In order to determine the effect of increase of alkali, an experiment was made with four plates, exposed for an equal time, and then developed with a one per cent. solution of glycin, to which varying quantities of potassium carbonate were added. The time of development with one per cent. of potassium carbonate was forty minutes; with four per cent., fifteen minutes; with eight per cent., ten minutes; with sixteen per cent., nine minutes. It will be seen from this, to increase beyond about four per cent. of the potash has but little effect, and, in order to avoid any action on the film, the best proportion is five per cent. of potash.

As regards restrainers, developers act very differently. None of the organic developers are so sensitive to bromide as ferrous oxalate; pyro soda will bear more bromide than pyro ammonia, chlorides are absolutely inactive with the organic developers, and potassium ferrocyanide is only a restrainer with the slow developers, and it is specially recommended with glycin, hydroquinone, and pyro. With glycin and hydroquinone it slows development, and in no case could any accelerating action of yellow prussiate be found, although it has frequently been recommended for this purpose.

Iodides reduce the time of appearance of the image, but prolong the total duration of development, and half per cent of iodide, added to the glycin developer, reduced the time of appearance to one-fourth, but increased the total time to three or four times that required without it. The oxidation products of the organic substances also prolong the time of development, and on this ground it is frequently suggested to mix once used developer with fresh.

The quantity of the reducing substance must be proportioned to the rapidity of development, assuming, of course, that a proper quantity of alkali is used. The quicker the development, the more reducer must be used, but this is only within certain limits, and, if these be exceeded, there is no increase in the speed of development. Experience has proved that 0·3 per cent. of pyro gives the greatest rapidity. Assuming that the reducing action is to be ascribed to the benzol-hydroxyl group, the necessary quantity of the oxidisable substance must increase with the increase of this group, and we therefore obtain the following table:—

Pyrogallol	0·3 per cent.
Hydroquinone	0·3 ,, ,,
Para-amidophenol	0·6 ,, ,,
Metol or amidol	0·7 ,, ,,
Glycin	1·0 ,, ,,

It has already been shown that five parts of potassium carbonate are required for every part of glycin, in order to attain the highest speed, and, as the amount of alkali must correspond to the number of the benzol-hydroxyl groups, and from the amount of the molecular weight, we obtain the following ratios of developer to potash:—

Metol or para-amidophenol	1 : 3.
Glycin	1 : 5.
Hydroquinone	1 : 7.
Pyrogallol	1 : 10.

The amount of sulphite is dependent on the tendency to the formation of brown decomposition products, and on the oxidisable powers of the developer; with pyro, amidol, and metol relatively large quantities are required, as much as ten times, whilst hydroquinone and glycin only require from three to five times the quantity. If caustic alkalies are used, more sulphite is required. If too much sulphite be used, green fog may be caused in long development, as silver bromide is soluble in sodium sulphite.

Alkaline developers are, as a rule, used in two separate solutions. This method has the advantage that it is possible to suit the developer to the exposure; but it is inconvenient, as several stock solutions have to be kept, and errors in measuring out the quantities may occur. The combining of all the ingredients in one stock solution is not possible in all cases, but it is quite possible with hydroquinone and glycin, for, if hydroquinone be dissolved in a concentrated solution in caustic potash, the solution will keep for a long time. Induced by this fact, Hübl was led to use a concentrated glycin developer in which the glycin is, for the most part, in a finely divided state, and not in solution.

As a normal developer is used—one per cent. of glycin and five per cent. of potassium carbonate—and at a normal temperature, the image appears in about thre quarters of a minute and is completed in about five minutes.

The stock developer is prepared by dissolving—

Sodium sulphite	25 grammes.
In hot distilled water	40 c. c.

And adding—

Glycin	10 grammes.
Potassium carbonate	50 ,,

For normal exposure one part of this is diluted with 15 parts of water.

For a very quick-acting developer for portraits and instantaneous work 1 part of the concentrated developer should be diluted with 30 parts of water, and to every 100 parts of the dilute developer from 2 to 4 parts of a ten per cent. solution of caustic soda should be added. This developer works as quickly as a metol developer, and may be used for several plates. If very dense negatives are required, only 20 parts of water should be used; if soft negatives are required, 50 parts of water should be used.

With plates the exposure of which is absolutely unknown, a developer of the following composition should be used:—

Concentrated developer	12 parts.
Potassium bromide solution (ten per cent.)	2 ,,
Water	1000 ,,

The temperature should not be above10° C. The plates should be placed in this and the dish covered, and the plates looked at occasionally; if the image appears in from fifteen to thirty minutes, the plate is correctly exposed, and in from three-quarters to one hour it will be perfect.

If the first sign of the image appears before ten minutes, an over-exposure of at least 500 times is to be feared, and the plate should be at once removed and placed in a developer of

Concentrated developer	4 parts.
Potassium bromide (ten per cent. solution)	4 ,,
Water	100 ,,

If the image does not appear in thirty minutes, the plate should be placed in

Concentrated developer	2 parts,
Caustic soda (ten per cent. solution)	2 ,,
Water	100 ,,

which should be heated to 25° C.

FOREIGN NEWS AND NOTES.

A New Colour Process.—Dr. Neuhauss has been examining a process of colour photography suggested by Herr Dittmar in 1897, and, although he has found this to be useless, he has discovered an actual process of colour photography. Dittmar's plates were prepared as follows: Methylated alcohol, 350 parts, fuchsine, 30 parts, and thymol, 8 parts, are thoroughly mixed together, then boiled for some time and filtered, whilst hot, three or four times, and then spread on warmed glass plates and allowed to spontaneously dry. They must then be treated till no longer sticky to the finger. According to Dittmar, the plates after exposure had to be washed in alkali, treated with chlorine water, and the colours were apparent. Neuhauss was unsuccessful with this process, but discovered that, if the fuchsine-thymol plate was exposed to direct sunlight for several days, till the surface showed a blackish-violet colour, and was then exposed under a coloured transparency for several days, a coloured image, showing actually reproduction of the colours, was obtained. This is hardly likely to be of much use, but is of theoretical interest as a confirmation of Wiener's theory of "Körperfarben."

A New Dark-room Medium.—Whilst carrying out the above-mentioned experiments Neuhauss confirms the statement which has been known for some years, that thymol-gelatine becomes absolutely insoluble by the action of light, like bichromated gelatine, but he also discovered that the thymol-fuchsine plates, instead of bleaching in light, as most aniline-stained preparations do, actually darken. The plates, first of all, transmit spectroscopically red and a little blue violet, but by continued exposure to the sun the colour changes and the blue violet is absorbed, and nothing but pure red is transmitted, without any yellow or any other colour. By exposure the films become insoluble in water, and adhere very well to the glass. Neuhauss states that by exposure of the thymol-fuchsine to direct sunlight for a few seconds a distinct image is obtained, on soaking in cold water; also that a mixture of fuchsine alone, with gelatine, becomes absolutely insoluble on exposure.

Pictorial Post Cards.—Herr Hanneke suggests the following methods of sensitising ordinary post cards: Coat the cards with equal parts of a nine per cent. solution of potassium metabisulphite and a twenty-five per cent solution of ammonio-citrate of iron. The cards should be, after sensitising, dried in the dark, and exposed in a printing frame until the deep shadows appear a grey blue, and then thoroughly washed with water till the whites are clear. Dr. Larus suggests the following modification of Herschel's argentotype process for the same purpose:—

A.

Green ammonio-citrate of iron	35 parts.
Tartaric acid	4 ,,
Distilled water	200 ,,

B.

Gelatine	6 parts.
Distilled water	100 ,,

C.

Silver nitrate	10 parts.
Distilled water	100 ,,

Dissolve the gelatine by the aid of heat, and add, at a temperature of 35° C., to solution A, and then add C. This should be applied warm to the card with a soft brush, and the marks evened out with a badger softener. After printing, the card is merely washed in water, and then immersed for a minute or two in a one in thirty solution of hypo, washed, and dried.

Death of Herr Toth.—Herr Victor Toth, whose name has been for so long associated with that of Eder on the study of intensifiers, particularly on that with lead, has just died. He was the author of a well-known book, *Die Künstlerische Photographie*, and had been for many years President of the local photographic society in Nagy-Somkut in Hungary.

LINES OF PROGRESS.

[President's Address to the Edinburgh Photographic Society.]

In choosing as the subject of the opening address of the session the title "Lines of Progress," I have had in view the absence of definite idea among the general body of amateurs who devote some portion of their leisure to photography. In most cases photography is looked at merely as a pastime, like golf, or football, or cricket, and, in what a cynic would term "these degenerate days," a tiny snap-shot camera would be taken as meeting all requirements. I recently met a young gentleman whose ideas of the camera and the cycle were represented by a twenty-two guinea bicycle and a five-shilling snap-shot camera. The young man actually produced what he thought was a very creditable performance, and as the case seemed to me hopeless, I did not venture to characterise his production. The spirit of which, let us hope, this young man forms the extreme embodiment has, I am afraid, a wide sway, with the result that, though photography captures many, a considerable proportion are only the votaries of weeks or months. I should not like to say anything that would appear as if I wished to limit the number of hobbies in which a man or woman might safely indulge. Hobbies are, I believe, the natural safety-valve of modern life. But for them the machinery would break down. I think every man should have as many hobbies as he finds necessary to keep his mind and body in perfect condition for the work of life. But photography demands a higher platform than that of mere amusement. Whether looked at from its scientific or artistic side, it is of immense advantage to the world at large. It now fills such an important place in the service of literature, of medicine, of different physical sciences, and of art itself, that it has become indispensable in almost all the directions in which it has become of use.

Hand *versus* Stand Cameras.

Notwithstanding all that has been written and spoken in the way of advice to the beginner, a start is almost invariably made with a hand camera or with the practice of snap-shot work, a fatal error which must be relinquished ere progress can be made. To the uninstructed beginner photography is a thing of button-pressing, and it is quite natural that he should desire what seems the easy path. It is only when he finds his way strewn with failures that he becomes a wiser man. At the risk of some criticism, I cannot help thinking that the hand or stand camera—mongrel type though it has been designated—meets in principle all the requirements of the outdoor worker. If properly constructed, it

has every advantage of the stand variety, and can be used for instantaneous hand-camera work almost as readily as the box form. The weak point lies in the adoption of bellows that are frequently too much tapered and too short, being thereby rendered useless for obtaining the full advantage of the two or three foci lenses. But the principle is right, and the modifications that I have suggested, and which are adopted in the more expensive forms of the hand-stand camera, if carried into general use, would make this type of instrument the best for general outdoor work. It almost necessarily follows that a small size is obligatory, certainly not exceeding half-plate. The trend of opinion in the present day is towards quarter-plate and 5×4, notably the latter. There is no need for a larger camera for field work. The whole plate, the 10×8, and larger sizes, are superfluous, and the working of them is a great drain on the resources of those with limited means. In the olden times they were necessary, for the simple reason that, when one wanted to do important work, the only way in which he could do it satisfactorily was by the employment of a camera that would take a plate the size of the desired picture. The professional will still prefer to employ this method when possible for obvious reasons. But the amateur, as a rule, is the man with one camera, which he wants to carry about with him in his perambulations, to do all manner of work. A small camera, with one of the finest Jena glass lenses, will enable him to make pictures that will enlarge beautifully up to 12×10 or 15×12, beyond which no mortal need go. Should he not be able to afford one of these lenses, then let him buy as good an ordinary lens as he can afford, preferably purchasing one a size larger than would be sold for the camera he is going to use. The advantage of this would be that that he would obtain a rather longer-focus lens than is customarily supplied, and his plate would be better covered. With the small camera, too, there is no doubt that composition is easier, and that many a photographer will be able to achieve success where a larger plate would land him in failure. The reason why I have given prominence to the 5×4 size is that the apparatus is but little larger than the quarter-plate, and therefore almost equally portable, while it allows more latitude for errors of composition; and last, but not least, it will be found that the pictures it produces are sufficiently important for mounting separately without enlargement, that process being reserved for specially good or interesting negatives. I have entered thus fully into the question of the choice of the camera because the camera is the mechanical appliance that more than anything else influences the work to be done. Progression is only possible where the mechanical appliances are suitable, and with the class of camera I have indicated the likelihood of progress is greater than with large, unwieldy instruments that are often carried under protest, and brought home with saddened hearts and weary feet.

Enlarging.

I may be expected to say a word about the enlarging necessitated by the adoption of a small camera. The virtues of enlarging have quite recently been well sung by Mr. Hume and others. Certainly we have a power of modification in tone, density, and composition of the original negative which is very welcome, and which is generally a good deal taken advantage of. As to the illuminant, daylight is the cheaper and more convenient form, and, when the difficulty of estimating its variation is mastered, it is by far the most satisfactory form of light so far. Oil and incandescent gas are too weak to do justice to the average negative or positive. For those who will take a little trouble acetylene gas forms an excellent light. It is more actinic than any artificial light we have, and probably an arrangement of burners will soon be devised that will meet present objections. Limelight has special advantages, but the future seems to me to lie with electric light, which we all look forward to as soon ousting gas for household use. When the mechanical difficulties have been overcome in the way of the construction of a steady lamp, enlargment, like snap-shotting, will simply be a case of "You press the button, we do the rest." This happy future I do not imagine to be far distant. It would be well if those members of the Society who are interested in electrical matters and are blessed with leisure and means—and I know there are such in our midst—would devote themselves to solving the problem of how to provide a cheap and effective lamp for the enlarging and projecting lantern. They would earn the undying gratitude of the photographic public and of this Society in particular. To ourselves as a Society it would be an immense gain in efficacy and convenience if we could have an electric enlarging lantern, and have our projection lantern also working with the electric light. I do not despair of seeing this accomplished in the very near future.

The Kind of Plate to Use.

With the great advance made in the rapidity of the lens it seems on the face of it retrogression to counsel the use of any but the fastest plate. Yet no one who has devoted attention to outdoor photography will assert that the fast plates can compare in efficiency and latitude of exposure with the slower brands. One great benefit that the open-aperture lens gives is the power of working with slower plates than can under similar circumstances be used when the lens is a rapid rectilinear. Therefore the general advice to employ the slowest plate that will be effective is doubly true when anastigmatic lenses are used. The expert worker is not limited like the average amateur, as he can expose and develop with almost mathematical precision. To him no advice is necessary; but it cannot be too strongly emphasised that the great proportion of the failures of young workers lies in over-exposure, coupled with the use of too strong developers. Working with a single lens and a slow plate the difference between two seconds' exposure and three is not great; but, to obtain the same result with a rapid lens and a rapid plate, the comparison would be, say, as between one-twentieth of a second and one-thirtieth. When we come to deal with fractions of a second, the mind is slow to realise the importance of time, and the hand as slow to act, with the result that the exposure is either hopelessly bad or such as to necessitate great care in development.

A couple of years ago Dr. Scott Lauder read an admirable paper to the members of the Society on the "Isochromatic Plate," which he illustrated with experimental exposures. The lessons of that paper have, I hope, remained with those who heard it or read it subsequently. The colour-sensitive plate places in our hands an additional power for the truthful rendering of nature, but the colour screen should be emp'oyed with care, as it is easy to over-correct and create harsh and violent contrasts. Some of the pictures that are sent out to advertise the colour screens are abortions from the artistic standpoint, more in the nature of warning beacons than guide lights. The backed plate is as essential as the isochromatic, its power of preventing halation being a godsend to work on all imperfect or violently lighted objects. Might I add a word of caution, while dealing with this part of the subject, regarding the use of film? The manufacture is yet in the experimental stage, notwithstanding the great use of the article. What we want is reliability. That we have not yet obtained. Even though films were uniform, we should still want greater controlling power in development than can be had with the thin and flexible film. These difficulties overcome, the glass plate will fade out of existence, but the time is not yet. Therefore the worker will have his advancement retarded if he does other than watch and wait so far as films are concerned. From plates we naturally advance to the stage of printing, and here I desire to say no more than that only the kind of paper should be used that will give permanent result, variety of tone, and power of control. There is room for experiment in printing, and the amateur should not feel restricted in trying what is novel. The reason for keeping to one kind of plate and one type of developer does not hold good so far as printing methods are concerned. The professional is tied to work on commercial lines, and must provide for the wants of the public. To the amateur there is no restriction, and his aim should be entirely different; indeed I may frankly say that I have no sympathy with the amateur who makes use of his hobby to the detriment of his professional brother. So much for what might be termed the mechanical and technical side of photograpny.

Specialism.

In the time of artistic and pictorial development the worker who is in earnest should direct his energies on certain lines. I do not wish to suggest restriction of area of work, but his work should be dominated for the time being at least by some general idea. Our ranks are thinned by one worker after another dropping out, not so much because of the oft-repeated excuse, want of time or even want of interest, as by the absence of some definite idea of work. Instead of taking a photograph here and another there, and becoming in time the possessor of a heterogeneous collection of photographs, which, because of want of association, have no abiding value, let him set about the study of a specific subject, and he will be surprised at the amount of interest that will be created. Some of you may say that is heresy, for is not the artistic photograph of specific and inherent interest, apart from any borrowed association? My reply is, that I admit that; but, in the first place, it is a very difficult thing to produce a photograph with an abiding inherent interest; and, in the second place, association will not destroy, but add to, inherent interest. By carrying out the scheme I have suggested the picture of intrinsic abiding merit is more likely to be produced than by undirected study or hap-hazard work. Let us say that scenic or pictorial photography is aimed at, how much interest and variety of interest might not be aroused by a study of that much-despised but most beautiful and diversified valley of the Water of Leith? From where the stream emerges from its lonely moorland to where it pours its waters into the sea at the salubrious port of Leith, there are many scenes of sylvan beauty and urban animation well worth permanent record. I have no hesitation in saying that on the short course of the river fifty good pictures could be secured, each with some point of interest, historic, romantic, or pictorial. Leith alone would furnish a respectable contingent. Or it is intended to record the impression of a holiday at the seaside? Instead of being content with one or two studies of waves, or cliffs, or cloud effects, why not, taking the sea as the central idea of work, make a series of pictures that would illustrate the life of the toilers of the sea? Here, again, is abundant material for a collection of pictures that would not only be of interest to the producer, but to the general body of the people, for we would not only touch inanimate nature, but deal with the daily life of the fisher folk, a most picturesque and interesting people. Again, life in the city would be an admirable field of work. What a variety of figure subject is to be found in the streets and lanes of a great town; and, though we are not so picturesque as our forefathers, the variety to be found in Edinburgh will provide

abundant material. Or the city may be studied from its picturesque and historic standpoint, and what better field of study could I suggest?

While it is good for the individual to concentrate attention for a while on some definite work, it is equally important for an association of individuals to occasionally leave the beaten track and devote themselves to a special object. The work which I submit for your consideration, now or some time in the early future, lies ready to your hand. Let the Society as a body, or a section of it, in name of the Society, take Edinburgh, romantic, picturesque, historic, present-day, prosaic Edinburgh, as a field of study. Let the Edinburgh Photographic Society achieve distinction for itself as the pictorial chronicler of the Edinburgh of to-day. From the negatives obtained an admirable collection could be formed, which would make, I am bound to say, the most interesting exhibition of lantern slides that has ever been got together by any society, or that has even been shown in Edinburgh, or probably elsewhere. Abundant though the material is, much of it is gradually passing away by the march of city improvement, hence such a set of pictures as I propose would not only be a pictorial delight, but take rank with Drummond's old Edinburgh and Kay's portraits as an attempt to epitomise the historic and picturesque features of the Scottish metropolis that would be of inestimable value.

An International Exhibition for Edinburgh.

I look forward to an early attempt being made to organize an international Exhibition of photography in the Royal Scottish Academy Galleries, Edinburgh. The three rooms now at disposal for exhibition purposes do not afford too much space, but a section of this Exhibition might be devoted to studies of picturesque Edinburgh; for, while in the scheme I have roughly outlined historic Edinburgh should take the leading place, in an exhibition, pictorial work would naturally demand a leading position. A cursory look at the subject might lead to the erroneous conclusion that there would be lack of variety in any attempt to reproduce Edinburgh pictorially. There would be no greater mistake. Princes-street and the Castle clothed with the snowfall of a quiet winter morning, and the same view under the glowing warmth of a declining sun or in the full blaze of noonday, are strikingly different. And yet again would they appear under new and beautiful aspects when the dawn creeps silently down the slopes of the wooded bank, or when fog wreaths half veil the battlements and throw a vaporous film over the recesses of the valley. The diversity of form to be found in the picturesque grouping of the houses in the Old Town, the stately character and varied architecture of much of the newer portions of the city, the history and romance attaching to many an otherwise uninteresting spot, all furnish reasons why a pictorial record of the Edinburgh of to-day would be a work well worthy the Society. A practical beginning will, I trust, be made this session in a hearty response to the offer by Mr. Blanc to provide prizes for lantern slides of Edinburgh architecture.

There are other ways in which a governing principle of work might be put in operation, but it is not necessary that I should pursue this idea much further. Before closing this part of my subject I will refer to only one more instance.

Titles.

Some photographic critics are against the use of elaborate poetic or sentimental titles to pictures, as detracting from their simplicity. The objection has force, though we sometimes see in academy galleries two or three stanzas of a poem as the title to an oil painting. But this need not deter the photographic artist from wedding his work to literature in other ways. He might, for instance, take a short descriptive poem and illustrate it. A good deal of our own ballad literature would lend itself to this method of treatment, and one reason why I would urge on the amateur the consideration of such work is that it would develop the imaginative faculty. A perfect association of literature and pictorial art is beyond our reach, but we can at least aspire to carry out and amplify the ideas of the painter in words, by associating suitable pictures with his letterpress. I feel sure that the influence of the work sought to be illustrated would be to raise the worker to a higher standard of work, that in fact it would tend to eradicate the mechanical, and to introduce and develop the artistic. And, after all that can be said has been uttered in favour of the matter of fact and the technical view of photography, we come to this, that pictorial photography is the be-all and end-all of the successful and progressive amateur photographer.

A Governing Idea.

The little I have to say in conclusion will be to throw out suggestions for your consideration as to the line on which artistic progress is to be made. Whether it be intended to photograph landscape or figure subject, the first and most important point is to have a clear perception of what really is to be the subject-matter of the proposed picture. Let us imagine it to be a landscape. It is not sufficient to simply focus the camera, and take what at the moment may strike the eye as the outstanding features of the scene. There must be a governing idea, or the proposed picture will be no picture at all. The true spirit of the scene must be felt, the artistic eye must see what is not self-evident, but is yet most truly real, and it is that which an attempt must be made to reproduce. It is folly for the photographic artist to attempt to rival the artist in colour in his own domain. The idea of people spending time in the production of coloured photographs, such as is suggested in a recent number of a photographic paper, is absurd. It is a pastime for children, and will never be anything else. The brush is a flexible tool in the hands of the painter; he is only limited, speaking generally, by his capacity to express. But the photographer is hedged in by mechanism, and the area of his individuality is small. Notwithstanding this, however, the earnest and intelligent worker will succeed, to some extent, in conveying his impressions of nature; and, although the resulting picture may be feeble indeed as compared with the great original, it will yet contain something that will redeem it from the ordinary and the commonplace, something that will stamp it as art. In the building up of the picture everything that interferes with the realisation of the main idea must be obliterated, or, if that be not, from mechanical reasons, possible, must be so subordinated as not to attract the eye. There must be no competing interest, and in particular there must be no discord. All should be harmonious. Every detail should lead up to the expression of the central idea, and thus we arrive at simplicity and unity, two essentials of any great and lasting work. How frequently do we see both painters and photographers destroying the harmony of an otherwise admirable landscape by the introduction of figure work out of keeping with the surroundings. A lovely evening pastoral, in which sheep appeared as a subsidiary interest—a scene that suggested only quiet and peaceful thoughts—was utterly spoiled by a well-known artist, through his introduction of a dog scampering along the road. The dog was not there to express an idea, but to fill a vacant spot in the composition. He filled it, but he did more. Amid everything that was restful he was the incarnation of unrest, and wherever the eye wandered it always came back with a shock to that disquieting dog.

Absence of Colour.

The absence of variety of colour is by many considered fatal to any passable rescript of nature by photography. It is not so. Sometimes the effect of monochrome in suggesting and realising is not less powerful than when form is aided by colour. There are many conditions under which nature almost divests herself of colour. The Newlyn School of Painters have taken advantage of that, and given us many charming studies in pearly grey which exactly express the conditions under which nature has been studied. The atmosphere of Newlyn may not suit the lens, but we are apt to go to the other extreme, and, by forcing detail, destroy atmosphere. Much of the finest figure work we have is but little dependent on colour, as may be ascertained by a study of reproduction and original, and in other cases the etched drawing is far more pleasing than the painting that inspired it, simply because the qualities that detracted from the value of the original have been eliminated, and the eye is not repelled by evident failure. Whistler at his best is almost a painter in monochrome; but what is absent in colour is compensated for by the infinite gradation of tone. To produce this must be the careful study of every photographer. Detail is a secondary matter; in the best and most inspiring pictures it will hardly exist; but crudity of tone, harsh and violent contrast, while they may appeal to the gallery of uninstructed and ignorant, will never find a place in the work of the refined and artistic spirit. To obtain this gradation of tone the utmost care in development will be required, particularly avoidance of the misuse of bromide.

Mounting and Framing.

A word as to mounting and framing. In no department of our work has more general advance been made than here; but, while the proportion of exhibited pictures badly framed has greatly decreased, I am afraid there is much room for improvement in private collections. The dealer can here help us a little more, I think, than he does. When one wishes to purchase other than the stereotyped mount, they are hardly to be procured, and the influence of the ordinary plate-sunk mount in forcing to conventionality is considerable. The idea of unity and simplicity which governs the production of the picture should be carried out in the mount and frame, and there must be general harmony, or success will not be realised. The hanging of the pictures at our Exhibition last year would afford some indication of what, in the view of those responsible, is desiderated, and I hope that in our forthcoming exhibitions due regard will be paid to this not unimportant question of mounting and framing. If a picture is worthy of the work expended on it, it is equally worthy of an appropriate setting. Colour photography is yet beyond our reach, so that we cannot, like the painter, surround our productions with a golden glory. We must therefore cultivate the unpretentious and the monochromatic, feeling thankful that, while we cannot aspire to the highest reaches of art, there yet remains to us an ever-widening field in which our knowledge can be applied and our sympathies and aspirations find adequate expression.

A. Eddington.

SUCCESS IN PROFESSIONAL PHOTOGRAPHY.

[An address delivered before the School of Photography at the American Convention.]

A school of photography is a school in which we should have practical and serviceable lessons, and to obtain this it is necessary to have an experienced and practical photographer, chemist, or artist, to give the lessons; and herein rises a formidable object in our pathway, as I presume that nine-tenths of the photographers from whom we can all learn something find it exceedingly difficult to tell what they know, and how they do their work, couched in language lucid and plain enough, so that one will not

lose the value of their ideas. I have listened to and read papers and articles calculated by the speaker or teacher to advance the photographer in knowledge and better him in his work or his business, and they were absolutely valueless, principally because the speaker was speaking or writing beyond what actually happens in his regular everyday business. Had he confined himself to what he actually knew to be true from experience, instead of indulging in vague theories or untried formulæ, his efforts, no matter how limited, could not but help and benefit his listeners or readers. It ought to be possible in these schools to obtain all that one could from a personal visit to the photographer in his studio, and we all know what that means; his mounts, prints, and manner of doing business, manner of displaying pictures, and all the little things that interest the photographer. Practically the results of what a man hears is what he wants to say and take hold of. The speaker may tell you that, in grouping, the pyramid form operates to lend beauty to the picture, that contour lines should always be observed, massing of light and shade, and numerous other qualifications are to be sought for, but you want to see him make his groups and illustrate his ideas in a practical way before your eyes if you are to get a real benefit from it. He may tell you that, in making a statesman's photograph, you should give him a statesmanlike, dignified pose, with a light that brings into prominence all the character and dignity which such a face must possess; you go away unsatisfied without you have an example of what he considers as such. You understand, of course, that what he has said is true, and that your picture of such a person should possess all these qualities; you want something more substantial, however; you want to know how a man weighing 250 pounds, bald-headed, with light, full, blue eye, all nose, ruddy complexion or face flushed, should be lighted, or how he should be posed in order to make a pleasant picture. All the words which it would be possible for you or me to write would not explain it as well as to show the subject posed and the negative made from him before your eyes under the skylight.

First of all, the successful photographer, if he makes a success of his business from a financial standpoint, must make a pleasing representation of the subject before him. I do not mean by this that the subject must be flattered to such an extent that the pictures are unnatural, but the photographer must secure a picture of the subject at its best. If the subject is stout, it should be taken in such a way that avoirdupois be not the principal feature of the picture. We all know that the sitting posture, with a bright light and a front view, tends to exaggerate the fleshiness of such a subject. On the contrary, these conditions with a thin subject would be all right. We know that the similarity of a certain class of subjects makes the same set of rules applicable. The value of speed in handling your subjects is obvious to any one who has ever noticed the subject who is nervous and tires easily. An exclamation calling the attention of the subject to any particular bad habit will intensify this tenfold. The only manner in which this can be avoided is to get the mind of the subject on something else in conversation with him; in posing the hands, keep your subject from realising, as far as possible, that they are being posed. In so far as you carry this out, the more successful you will be in getting the desired position. However graceful the subject may be, the very moment you call his or her attention to the fact that you desire a certain position of the hands, that moment it begins to feel unnatural, stiff and strained, and the muscles become rigid. Again, referring to the successful photographer as one who works with exceeding rapidity, and goes to his work with a definite object in view, and as one who had made up his mind as to the sort of a picture he is going to make of the subject before he commences, the subject will, with his suggestions, drop into position, and the picture is made before they have time to think where they are. A round-shouldered subject, with the head drooping forward, makes a side view practically impossible. I am inclined to think that the average posing chair has about as much to do with making the subject feel stiff and unnatural as the work of the photographer himself. I have used in eight years' operating an ordinary chair, with a long and flat cushion, that can be rolled up to any thickness desired, by which the subject's shoulders can be easily brought forward or laid back to any desired position, and I have used this when I had two patent posing chairs in my gallery all the time. I believe every photographer sees in his pictures certain things about his subjects' faces which appear exaggerated in the proof, especially if these points be bad; for instance, a subject with small eyes, under a skylight with a bright light, will appear to have smaller eyes in the proof than he has in reality, unless some artificial means are employed in making them up. The best thing I have ever used is crayon sauce applied with a crayon stump; this can be put on under the eyelid close to the eyelashes so softly and carefully with a crayon stump that it will be hard to detect it, even with the knowledge that it has been put on.

A more pleasing picture of a person with puffy heaviness under the eyes and around them can be made by the use of a little yellowish powder applied with a chamois skin, being careful not to get it on too heavy. This is also true of a person with a very prominent double chin. The pictures can be brought down to any degree desired by application of this powder. A white, shiny bald head and a reddish, brown face is a difficult thing to manipulate; this powder applied carefully makes a far more pleasing picture than it is possible to produce with a head screen. Who has not had a subject with a good head of coal-black hair with a tuft of white here and there, which looks as white as the collar because of its surroundings, but which, with a little of this powder applied, produces the appearance of naturalness.

All of us have a tacit understanding that the pictures we make of the ladies have to contain all the points of their beauty, and I do not believe there is a photographer living who is not happy in giving them all they want in this direction. We find a subject with drooping corners of the mouth, which at the moment of the sitting, in the unusual surroundings of the subject before a stranger, and going through what to the photographer is a mere matter of business, is apt to be at its worst expression. With a little touch of his crayon stump (just a trifle, understand) at the corners of the mouth upward, so as not to detract from the likeness, you will assist materially in securing the desired result. The crooked mouth occurs with obstacles in the way which are worse, if anything, than the crookedness itself. The crooked mouth sometimes occurs in people with unduly prominent noses and exceedingly high cheek bones and low, flat, receding forehead. This subject makes a very unsatisfactory picture. Again the application of the crayon stump, combined with touches of the pencil and scraper, will play an important part. Pardon me for indulging in these illustrations, which I presume many of you are familiar with, but they are things which are perhaps new to the newer class of photographers. At least I see by a good many photographs that they are forgotten or not deemed necessary.

Fully seven-tenths of our subjects are ladies and children. The photographer who has done business successfully realises how important it is to have his products present the subjects in their best light, and referring to these artificial means, cannot be condemned because the subject will not stand it, as I presume some of you are aware that artificial means of beauty are not always confined to the operating room for the picture. With children we have not the same latitude, and we do not need it. A mother or a photographer, who speaks of the picture to the child until after the negatives have been taken, in nine cases out of ten has made a mistake. Her toilet is made and she is rushed into the operating room, a strange sight for the child, and a stranger to greet her. The mother informs the little one it is "going to have its picture taken," and "that is the man who is going to take it." No matter how much of a winning smile or coaxing manner you assume, your subject is a "goner." The awful something which the child expects at once looms up before it in the camera. The strange surroundings and the unusual light of the room startle, and fully ten or fifteen minutes are lost, and sometimes longer time, in winning the child's confidence, and then sometimes you have to stand back of the camera and wait the chances of a shot. The man without tact or love of children should quit making children's pictures. If they are too small to take in a particular pose, without some definite idea which you have, put them up high enough so that the baby will not look like a bunch of dress with a pair of eyes sticking out of it. Get them up high enough so there is a connecting line between the head and the shoulders.

I have never let a child come out of the operating room yet without securing a negative. That they have not always been good I do not deny, neither do I consider myself a prodigy in making children's pictures; but I have learned at the cost of a good many plates that at the outset certain rules have to be observed, and in some cases it takes new ones, and a good many of them. I have ofttimes wished that the subjects had gone into a gallery further down the street, but, when they are in, do not give it up. It is your duty, not only to yourself and business, but it is your duty to the parents. No matter how exasperating the child may be, or how unsatisfactory your result may appear sometimes, stick to it, for we cannot realise too well what a priceless thing the photograph often is to the parents. Resitting, when you have obtained what you consider excellent work, is especially exasperating; do not make the resittings at all, or else go into the operating room as pleasantly as when you made the first sitting.

As to the question of appointments. Print upon every bit of stationery you have, and on your business cards, that it is necessary, in order to obtain a sitting with you, that appointments should be made. It will not cut out a single sitting, but in time will make it easier for you, as a hurried operator, annoyed by the frequent kicking of those who have to wait, especially if his sittings all come in a bunch, cannot work at his best. Talk it in the office when people come in to examine your work. If you do not have but two sittings a day and they both desire to sit at the same time, and you have got to accommodate or lose them, put them ten minutes apart, and you have carried out your rule. Do not complain or be irritated if a picture is brought in for you to make one exactly like it for your customer. It is a compliment to you if it is yours, and one of the best business chances in the world if your competitor made it. You can tell why he lives and how he does it. Never criticise a competitor or his work to a customer. It is bound to react on you. Avoid speaking of him at all if possible, but, if you must, *praise* him, and remember that the worst criticism you can make of him is faint praise. In my own experience I made one of my best customers, and one who had been a life long customer of another gallery, through an elegant dressing down that he gave me. It was a good lesson to me. It happened twelve years ago, and I have never forgotten it. In the light you hold your profession, the public will be apt to hold you in the same light. C. M. Hayes.

FORTY YEARS AGO.

At the last meeting of the London and Provincial Photographic Association, Mr. S. Herbert Fry gave an address upon photography and photographers, of a mixed sincere and frivolous nature, under the title of "Forty Years Ago." Although the connexion between subject and title was not strongly apparent, his remarks, as he imagined, were somewhat of a change from the usual thing, hanging more or less upon the technical side. He took his text from some words which appeared in one of the daily papers, by which it appeared that the nearest approach to respectability attained by a certain notoriety was the practice of professional photography. He proceeded to ask himself whether photography were respectable, and, indeed, whether respectability were desired. As a business, photography was not in high esteem by men of standing, nor did it require much capital, and as, of course, capital was very respectable, it followed that, lacking capital, it lacked in respectability. The speaker divided photographers into three grades—the professional, the dealer, and the amateur—very broad distinctions, and proceeded to note the little peculiarities of each. Without defining the professional, he might be said to be a man with a small capital, less business capacity, and no business training, inclined to talk a little on art, and to set up his trade as something beyond that of the butcher or baker, instead of laying himself out to supply, as far as possible, the wants of the public; and yet on the whole, with all his faults, away from his business he proved a very good fellow. The photographic dealer was essentially, or ought to be, a trader. His business was to buy and sell at a profit, added to which he generally knew everything that was to be known about photographic processes, old and new, reasons for failure and success, with a happy knack of reserving to himself loop-holes of escape. He was, in a word, an alarmingly well-informed man. To the foregoing, a large percentage, add a complete knowledge of art; they make pictures and take medals at exhibitions, and on gentle pressure disseminate amongst their customers wholesome lessons on everything pertaining to photography under the sun. Then again, in putting out work, they can tell exactly how it is to be done, which, of course, materially assisted the operation. But, like the professional, away from his trading he is a thorough good fellow. The amateur, he took it, was supposed to be one who took up his pursuit as a scientific or artistic hobby, for its own sake; but, like the foregoing, he is not always what he appears upon the surface. He is found sometimes doing a little "on his own," and is always seeking to get trade terms from manufacturers and wholesale dealers, buying with all the advantage of the professional and dealer, without incurring the onerous responsibilities of these classes. He was the most aggressive and assertive man of all; everything is at his fingers' ends; he has a special function of incorporating in his own personality all that is good in art, and what is not his is not good art. The lady amateurs deserved a separate classification. They learn photography at some school, and forthwith launch out. They build elaborate studios, and garnish them within by scattered teacups and saucers, and so on. Yet many ladies were following photography, and very well too, and it was possible that they might find a very open field for their energies in professional practice.

The speaker now came to a serious question, that of training schools for photographers. It was necessary to keep up the class, and so there must be young photographers. In his own mind it was a moot point as to how far the present system of polytechnic and such schools produced useful photographers. Apprenticeship was entirely out of vogue, and the only course open for securing assistants was to get one by advertisement, or to train a raw boy. The training of photographers, then, was a most important question, and one that would largely affect the prosperity of the trade. There was also the question of what sort of young fellow was suitable for this training. The only way appeared to be to catch lads young, and to keep them to one branch until they had got an inkling of it, and then extend the field. Processes were so many and so diverse, and at bottom it was so mechanical a trade, that one required men particularly trained in a particular branch before their results were anything like serviceable. He would train youths in practical work first, leaving reasons for a later period. If one thing was certain, it was that the theoretically trained lad, who knew the reasons for everything before he puts his hand to them, never made pictures, technical pictures he referred to. Therefore, he urged, catch them young if you can.

Now, as regarded the aspect of photography to-day compared with that of years ago. It seemed to him that photography was fast approaching the condition of a trade. In the earlier days, when still in process of discovery, it was the hobby of scientists and *dilettanti*. Then came the intermediate period, when occurred the rage for photography, and the professional was everything, amateur photographers only numbering a few enthusiastic spirits. But to-day photography tended towards becoming essentially a commercial pursuit, when it may be laid down that it was a business pure and simple, and no longer a profession or an art. There has been, and not wisely, a feeling amongst photographers that professional work was something other than a trade. But what was there about it to make a man engaged therein ashamed of the fact that he was engaged in it for trade purposes, for money-making? It was curious to observe that, notwithstanding the eagerness of its commercial pursuit, photography owed most of its progress and its very existence to the amateur. The discovery of the basic facts, of course, was the work of the amateur (as there was none other)—Daguerre, Niépce, Scott Archer, &c. Platinum printing, P.O.P., and other processes, were also brought about, and in many cases sustained, by the amateur element. Mr. Fry also referred to the distinction between amateur and professional. How could they be defined? Indeed, was it right or of advantage to draw the line? No doubt, there would always be a broad class dubbed amateurs, and the same with professionals. Generally, there might be a distinction, but specifically there should not. What an amateur was he did not know, but he felt some contempt at times when he saw the so-called amateur crossing the boundary line. In conclusion, whilst, no doubt, the amateur had done much harm to professional photography, on the other hand, he had so enormously widened the commercial field of photography that in the end he might prove a blessing in disguise.

An interesting discussion ensued, the three grades referred to by the speaker finding ready champions, and a vote of thanks was passed to him for his address.

IN THE KEY OF BROWN.

Brown—aggressively and unnecessarily brown; that is how the Royal Photographic Society's Exhibition strikes the writer, who can only claim to be an interested looker-on. Clever, undoubtedly, are the four hundred and odd photographs hung at the Pall Mall Gallery; artistic also they may, perhaps, be allowed to be; but the dolefulness of the *decadent* is in them all. Mists and twilight, rain and storm-clouds, desolate foreshore and marshy wastes, sluggish streamlets in flat lowlands devoid of life or motion—such are the subjects mostly favoured by the exhibiting photographers of to-day. On the roughest of rough papers, or on canvas whose texture is such that every thread of warp and weft shows separately, are these pictures printed in all the shades of dreary brown that carbon printing can compass. Gone are the bright warm silver prints of sunny glades where the light dances through the flickering leaves; of summer sweetness on river and roadside; of the loveliness of spring beauty and autumn glories. Gone too almost entirely (not quite, for which I am devoutly thankful) are those delicate little prints in platinum in which landscape and life, lakeside and seashore, castle and cottage, and homes of every degree between, shone forth brilliantly in the fulness of beautiful detail, so characteristic of the splendid steel engravings of the olden days, of which to me they were always reminiscent. Now there is no life, no sunlight, no detail, nothing more than the suggestion of form and material; only irregular masses seen through the dismal brownness of a London fog, not sufficiently dense to obliterate but thick enough to obscure. Even the very frames are doleful. Unrelieved broad black walnut seems to be the favourite fashion, or rough, unplaned deal stained to imitate its colour, or the still more depressing green or greeny-black, tints unknown in woods of nature's colouring; and the mounts, when there are any, are brown also.

One exception should justly be noticed, and that is the very fine group of architectural pictures, which, to my eyes, approach nearest to photographic perfection. Sunlight is there as well as shadow, and details in all clearness; though brick and stone be the subjects, yet is there human interest attaching to every one. Even here may be found brownness of colour; but, although one might feel inclined to regret it, still it is not as in the others, aggravating.

Is the Royal Photographic Society, in its Exhibition, seeking to imitate that of the Royal Academy, at Burlington House, by devoting a quarter of its wall space to professional or presentation life-size portraits? Comparison with the recollections of past exhibitions seems to suggest that such is the trend of policy or practice; and nowhere is the "brown" man seen to such perfection as in portraits where close scrutiny alone can discover a line of high light, of almost Euclidean attenuation, in an acre of burnt sienna. And who can doubt that man is a gregarious and imitative animal when he gazes upon the divers flocks of sheep scattered around the gallery?

A Man in the Street.

STEREOSCOPIC RELIEF WITHOUT A STEREOSCOPE.

At the Camera Club, on Thursday evening, the 13th inst., Mr. T. C. Porter (of Eton College), lectured upon "The Scenery of Niagara, California, and Colorado," and he prefaced his lecture by some remarks upon the subject of stereoscopy, particularly as to a means of viewing ordinary stereoscopic prints so as to obtain relief without the use of any instrument, and also of obtaining relief from stereoscopic transparencies projected upon the lantern screen. The idea, so far as prints upon paper were concerned, was not new, but he thought it would come as a welcome surprise to those by whom it was not yet known. So far as his own experience had gone, he said, the power of seeing stereoscopic views in relief without apparatus involved no more inconvenient strain to the eyes than was caused by looking at a distant mountain; and seeing them on the screen involved no more strain than that which one felt when looking at one's finger at a distance of a foot from the eye. Mr. Porter explained the method to which he referred as follows:—

"If you hold up one finger at a distance of about a foot in front of your eyes, look at a distant object, and then shut first one eye and then the other, you will be conscious that the position of the finger apparently shifts; then, looking still at a distant object, and fixing the attention

(not the eyes) on the finger, you will be conscious of seeing two fingers. You will perceive also that, if you move your finger further from your eyes, the two fingers approximate more closely, and that, if it is brought nearer, they diverge more widely. If you make a V with your fore and second fingers, and do the same as before, you will see that the V shifts, and if you open both eyes you will find that the two V's combine and form a W, and—what is most important for this purpose—the two middle strokes of the W overlap. Now, put a pair of stereoscopic views in the place of the two fingers, and by looking at a distant object, and yet keeping the attention fixed on the stereoscopic views, you will see four views, and the two middle ones will overlap; and, by moving the view to the right distance from the eyes, the middle of the three pictures—which consists really of two—will be seen in stereoscopic relief. When the views are on the screen, it is sometimes impossible, by looking at an imaginary distant object behind it, to create sufficient parallax to see the two views coinciding in relief; but by the inverse process of looking at an object near to the eye, while the views are on the screen, precisely the same kind of displacement takes place, and the middle view, seen when the finger is held at a certain distance from the eye, will be in stereoscopic relief. In this case, however, the pictures must be projected not as they are usually mounted, but the view originally seen by the right eye must be on the right side of the transparency, and that originally seen by the left eye must be on the left side."

As to the question how one could look at one's finger and at the same time see sharply the picture on the screen at a much greater distance, Mr. Porter could only say that his own eyes, and those of many people with whom he had tried the experiment, were capable of doing it, and, although there might at first be a little strain upon the eyes, it was soon overcome. He expressed the hope that the fact that stereoscopes could now be obtained so cheaply, and that one's eyes could be used at even less expense, in conjunction with the excellent methods available for the reproduction of photographs in books, might result in the complete revival of all the interest that had ever been felt in stereoscopic photography, and possibly a great deal more. The only published book which had been illustrated by means of stereoscopic views was, he thought, a work by Professor Piazzi Smythe on the Peak of Teneriffe; but he was himself about to publish the story of his wanderings in America with stereoscopic illustrations, and, as stereoscopes could be made for a shilling each, or even less, it would be possible to sell a flat stereoscope with the book, the middle partition between the lenses being unnecessary.

THE PICTURE POST CARD.

The following extracts from an article on this subject in a recent issue of the *Daily Telegraph* may suggest to many of our readers that the post card is an admirable vehicle for small photographs. Thus there is a possibility of the development of the cult of post-card photography.

"There is ample testimony just at present that the picture post-card craze, like the photographic craze, is very much on the increase, and the latest indication of this is afforded by the presence upon the platforms of the Underground—always up to date and attractive in these matters—of a 'penny-in-the-slot' machine, vermilion-hued, for the automatic production of the said cards.

"But, quite apart from the very latest addition to the growing list of Underground attractions, there are signs and tokens innumerable that, in the matter of these engaging picture cards, England is following the lead of Germany and the example of America. It is to be regretted, on the whole, perhaps, that we should take our post cards, as we do our pleasure, sadly, but the fact, nevertheless, remains that up to the present we have not emulated the fashion set by Brother Jonathan in respect of the 'funny' card. Obviously the possibilities of the 'funny' card are immense, and right glad was I to learn yesterday that the end of the year (what more appropriate season than Christmas?) will see the designer with a happy turn for humour and fancy pressed into the service of the manufacturer of the illustrated card. To Scotchmen, in particular, this should be brave news. But let it be hoped that, with the inevitable spread of the latest cult, the gentle art of making enemies will be studiously avoided by patrons of the coloured and 'correct' card. Up to a point, of course, symbolism is all very well, and quite felicitously might methods and principles of the type affected by Cynicus be employed in furtherance of the good cause. But it is one thing to send through the post a missive teeming with quiet fun, and quite another to forward an illustrated card bearing on the face of it the covert suggestion that the recipient of it is either a fit candidate for Bedlam, an entirely conscious kleptomaniac, a systematic wife-beater, a hopeless inebriate, or perhaps a congenital idiot. A coloured post card pictorially suggesting any of these things would be open to serious criticism on the score of good taste, and, for the sake of national tranquillity, one may hope that the future will bring forth nothing of the sort.

"In the mean time, I observe that the designer of the end-of-the-century picture card allows himself a pretty free hand in the reproduction of things familiar. A national monument, a city's landmark, a classic building—these are things that ought surely to be left alone and undefiled, even when bought for a halfpenny. Possibly, though, there are people who will be found to defend 'impressionism' even in post-card art, and I have no doubt the too-impulsive worker in half-tones, who put Mr. Richmond's mosaics outside of St. Paul's instead of inside, will be allowed to escape with his life. On the other hand, it is pleasant to find that the Fatherland is not having all its own way in the making of these cards. Mr. Beeching, in the Strand, showed me a great variety of specimens, in lithographic work, in photogravure, in three-colour tones, in collotype, and what not, that bear on the face of them incontrovertible evidence that English trade is now receiving a gratifying stimulus in this direction."

Our Editorial Table.

Marion's New Print-quick Paper.

Marion & Co., Soho-square, W.

A new "quick-print" paper for either day or artificial light, in two grades, glossy and rough, is being issued by Messrs. Marion. The following are the directions for its use: The paper can be opened and handled by ordinary gas light or weak daylight, the latter filtered through a yellow medium.

To use, place the paper in the printing frame, and expose for one to ten seconds to diffused daylight, or two or three minutes to an ordinary gas jet, the negative being held about four inches distant. Dense negatives will require longer and thin ones less.

Develop in either of the following baths:—

Metol.

Soda sulphite, pure cryst.	½ oz.
,, Carbonate ,, ,,	½ ,,
Metol	25 grains.
Potass. bromide (ten per cent. solution)	20 drops.
Water	10 ozs.

Amidol.

Soda sulphite, pure cryst.	200 grains.
Amidol	20 ,,
Potass. bromide (ten per cent. solution)	5 drops.
Water	4 ozs.

The developing operations may take place at a little distance from gaslight in an ordinary room; it is not essential that it should be non-actinic light. If properly exposed, the image will appear in a few seconds after commencement of development, and in about ten seconds it is completed. Now plunge into a water bath and then transfer to the fixing bath made as follows:—

Soda hyposulphite	8 ozs.
Water	32 ,,

Mix and add to the above:

Soda sulphite cryst.	½ oz.
Acetic acid 50°	3 ozs.
Alum pulv.	½ oz.
Water	5 ozs.

Fix for fifteen minutes, keeping prints moving for a short time after immersion.

Fallowfield's Christmas and New-year's Mounts for Photographs.

Jonathan Fallowfield, 146, Charing Cross-road, W.C.

As usual, Mr. Fallowfield is making a great feature of his mounts for Christmas and New-year's use. Samples of some of the principal designs have reached us. The designs are in all cases attractive



and refined, and the variety is so great that all tastes can be satisfied. In the special list devoted to the mounts something like thirty-two kinds are specified, of which the illustration depicts one. The sizes range from cabinet down. We can recommend these artistic mounts to the notice of photographers.

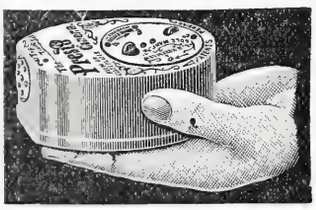
The Presto Pocket Camera.

Marion & Co., Soho-square, W.C.

This camera is made of metal and goes comfortably into the palm of the hand. It takes film for twenty-five exposures, and a plate-holder is included—at a cost of 10*s*. It is a clever little instrument, and the method of its use may be understood from a brief extract we make from the thirty-page pamphlet dealing with the manipulation, loading and unloading of the sensitive material employed in the camera :—

"*Snap-shots: Setting the Shutter.*—Hold the camera in left hand, smooth cover side facing palm, left forefinger covering lens opening; while in this position press push-button upwards with right forefinger; a click will then be heard, indicating that shutter has been set ready for making an exposure, and fingers should be removed from button and lens opening.

"*Snapping the Shutter.*—Hold camera in palm of left hand with top



or lettered side upwards; press down push button with forefinger of right hand until a click is heard, which means an exposure has been made. Try this position a number of times, being careful to hold the hand perfectly rigid, and press down the push button with the forefinger slowly and steadily until the click is heard. Care should be taken in making exposures not to move the hand and camera by a jerky pressure of the button."

Time exposures can also be given. The Presto Camera is just the thing to carry in the side pocket, for it is not much larger than a cigarette case.

The Vanguard Acid-proof Negative Varnish.

Vanguard Manufacturing Company, Maidenhead.

The claim made on behalf of this varnish is that it is an absolute preventive of silver staining. It is applied without heat, either by pouring or with a camel's-hair brush, and, it is said, dries quickly, and becomes thoroughly hard in an hour. Negatives treated with it may be left exposed to rain for hours without injury (whether in contact with photographic paper or not), any marks being readily rubbed away with a damp cloth without affecting the varnish in the slightest degree.

The Company say that a good way to test the efficacy of the varnish is to apply a few drops to a worthless negative, and, when hard, soak it in a powerful chemical that will attack the silver image, either a mixture of red prussiate of potash, hypo and water, or a mixture of potassium cyanide, iodine, and water. In either of these mixtures the unprotected parts will rapidly disappear, leaving the protected parts unchanged.

When we have a little relief from our Almanac work, we shall put the varnish to practical trial. In the mean while free samples are sent by the Vanguard Company in return for a penny postage stamp.

Lederer's Sensitised Albumenised Paper.

Manufactured by H. J. Lederer, 62 Colveston-crescent, Dalston.

We tried a sample of this paper, sent us by Mr. Lederer, and it yielded us admirable prints, having all the best characteristics of the albumen process: a process not likely to go altogether out of favour amongst photographers while print-out silver papers are used. Mr. Lederer claims for his paper that there is no smell attached to it; that it yields prints entirely free from mealiness; does not blister; can be handled freely; and that it will not crack or stick. These claims appear to be well founded

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Liesegang's Photographischer Almanack, 1899.

Ed. Liesegang, Düsseldorf.

This useful little volume appears under the editorship of Dr. R. Ed. Liesegang, and contains numerous interesting contributions by German authors of the first rank. Dr. H. W. Vogel, whose portrait forms the frontispiece, writes concerning the use of orthochromatic plates. Professor E. Valenta gives some notes upon new optical sensitisers for silver bromide. Ludwig Schrank contributes an article upon Portraiture; S. Jaffé upon the Advantages of the Carbon Process, and Dr. R. Ed. Liesegang, concerning some New Photo-chemical Theories. The book also contains a useful collection of photographic formulæ. We have much pleasure in recommending it to our readers.

"Sunny Jersey."

Published by W. Mate & Sons, Bournemouth. Price 1*s*.

This is an excellent guide to the charming island of Jersey. The historical and descriptive letterpress contributed by Mr. P. E. Amy is exceedingly well done, and there are about a hundred half-tone illustrations, chiefly from capital photographs by Mr. E. H. Toovey, of Jersey, which are of first-rate quality. Indeed, the book throughout, printed and produced as it is with taste and skill, forms a remarkably good guide which no visitor to Jersey should be without.

From the Autocopyist Company, 72, London-wall, we have received a number of excellent specimens of collotype printing produced by the photo-autocopyist, a simple and inexpensive apparatus for working the collotype process. The specimens are in a great variety of style and colour, and should commend the process to the attention of photographers.

Catalogue Received.

The Prestwich Manufacturing Company, 744, High-road, Tottenham, N.

Messrs. Prestwich's catalogue particularises a considerable variety of apparatus for taking and projecting animated photographs, together with printing outfits and materials incidental to this class of work. A list of films of attractive subjects is also published.

News and Notes.

The Austin-Edwards Monthly Film Negative Competition.—The prize camera for the current month has been awarded to Mr. F. W. Levett, 116, Loughborough-park, London, for his negative, *Shoeing the Wheel*.

South London Photographic Society.—The following gentlemen have consented to act as the Judges at the next Exhibition (March 4 to 11, 1899, inclusive) of this Society: Mr. Horsley Hinton, Mr. Andrew Pringle, F.R.P.S., and Mr. J. A. Hodges, F.R.P.S.

The names of the prize-winners in the Warwick Monthly Competition for October are: First prize (20*l*.), Mr. Harold Baker, 58, New-street, Birmingham; second prize (10*l*.), Mr. J. C. Richards, 134, St. Luke's-road, Edgbaston, Birmingham; third prize (5*l*.), Mr. C. H. Leat, 2, Richmond-street, Totterdown, Bristol.

Photographic Club.—Wednesday evening, October 26, at eight o'clock. Mr. Birt Acres will show a new machine for animated photography, and demonstrate the whole of the necessary processes, including development of film. Any one interested in this branch of photography will be cordially welcomed.

Brixton and Clapham Camera Club.—The Eighth Annual Exhibition of members' work will be held at Brixton Hall on Tuesday, November 18, the usual silver and bronze medals being offered for the best prints and lantern slides. A *conversazione* is also arranged for on the same occasion, for which a very attractive programme is being prepared.

Borough Polytechnic Photographic Society.—The Fourth Annual Exhibition of this Society is announced to take place at the Institute on December 27, 28, 29, 30, and 31. Besides an improved list of members' classes, there will be the usual Open Classes, with the addition of a Champion Class for previously medalled work. Full particulars and entry forms can be obtained from the Hon. Secretary, Mr. H. C. Philcox, 103, Borough-road, S.E.

Free Demonstrations in Glass-blowing.—Mr. Thomas Bolas, F.C.S., F.I.C., has kindly consented to give demonstrations of the adaptability of glass-working as an amateur hobby, in the *Photogram* Reading-room, on Thursdays, November 10, 17, and 24, from three to five, and seven to nine o'clock. Tickets of admission free on receipt of application and stamped addressed envelope from Dawbarn & Ward, Limited, 6, Farringdon-avenue, London, E.C.

The first session of the Photographic Class at the Aldenham Institute, Goldington-crescent, Pancras-road, N.W., in connexion with the City and Guilds of London Institute, commenced on Thursday, October 6, 1898. The class is held on Tuesday evenings, from 8 till 9.30, by Mr. Edmund A. Robins, Honours Certificate. Prizes are offered to students. None but those engaged in the trade are eligible to attend the classes.

The Goldsmiths' Institute, New Cross, S.E.—A course of twenty-four lectures and practical demonstrations on the theory and practice of photography is being given on Friday evenings at 8.30, by Messrs. William Jackson Pope and Alexander A. Donald. The course commenced on Friday, October 7, 1898. The fee for the course is 5*s*., and it is fully illustrated with the aid of experiments and the optical lantern. The syllabus may be obtained of Mr. J. S. Redmayne at the Institute.

The Austin Edwards Film Works, Warwick.—Mr. Austin Edwards writes us: "I beg to inform you that I have removed my film works to more convenient premises, as above, where kindly address all communications for the future. I have specially designed my new factory to enable me to still further improve the quality of the Austin-Edwards films, and, by building it in the heart of rural England, far from all smoke and dust, am now able to obtain even greater technical perfection than hitherto, to the mutual benefit of myself and users of my films."

SOLDER FOR GLASS.—A metallic compound which firmly adheres to glass, and can therefore be employed as a solder for glass, is obtained by melting together ninety-five per cent. (by weight) of tin and five parts of zinc. The melting point lies at about 200° (C. ?) By means of the soldering iron it can be spread upon the glass, previously heated to this temperature, and, after cooling, adheres firmly to it. An alloy of nine parts tin and one part aluminium may be used for the same purpose, but has the drawback that its fusing point lies considerably higher, viz., around 390°.—*Gold und Silberwaren Industrie.*

ROYAL PHOTOGRAPHIC SOCIETY.—Technical Meeting, Tuesday, October 25, at eight p.m., at 5A, Pall Mall East, "On the Alleged Discovery of Photography in 1727," by R. B. Litchfield; "On the Grain of Photographic Negatives," by E. Duncan Stoney, M.I.C.E., communicated by Mr. Harry de Beer. On Monday, October 31, slides will be shown by members of affiliated societies at the Exhibition of the Royal Photographic Society, 5A, Pall Mall East. Affiliation of Photographic Societies.—There will be a meeting of the Committee of Delegates on Friday, October 28, at 7.30 p.m., at 5A Pall Mall East.

HOVE CAMERA CLUB.—The Annual Exhibition of this Club will be held at the Hove Town Hall on Thursday, Friday, and Saturday, November 17, 18, and 19, 1898. Admission: Thursday evening, 1*s.*; Friday afternoon, 1*s.*; other times, 6*d.* The Judges are Messrs. A. Horsley Hinton and A. J. Bedford. The following are the Open Classes:—1. Open: (*a*) For pictures (any subjects) which have previously gained an award; (*b*) For pictures (any subject) which have not gained an award; (*c*) Lantern slides (any subject), in sets of 4. The Exhibition Hon. Secretary is Mr. C. Berrington Stoner, 24, Holland-road, Hove, Brighton.

A CORRESPONDENT writes: "I was being shown round the studio of a well-known photographer. In the printing room I saw, nailed to the wall, a silver-stained negative and an elaborate memorial card. I asked the meaning of their juxtaposition, and was told they were related to one another. Said the boss, 'I engaged a printer, and the first frame he filled had that negative in it. When he came to examine it, it was in the condition you see it. I told him to take a weak solution of cyanide of potassium to remove the stains. He did take it, and so I had that card printed as a warning to others.' The card ran as follows: 'Sacred to the memory of James Thomas, aged eighteen. He died of cyanide.'"

THE Edinburgh Photographic Society's Annual Exhibition of Photographs will be held from Saturday, February 4. to Saturday, February 25, 1899. The entries close on Wednesday, January 25, 1899, and the reception of pictures closes on Saturday, January 28, 1899. at ten p.m. A special gold medal has been offered by the President of the Society for the best picture in the Exhibition the work of an amateur member. The following classes are open to all: Class I., landscape, seascape, and architecture; Class II., portraiture, figure. and animal studies. Gold, silver, and bronze medals in each class. The Judges are Messrs. John Smart, R.S.A., Edinburgh; J. Craig Annan, Glasgow; and W. M. Warneuke, Glasgow. All communications should be addressed to the Secretary, Mr. J. S M'Culloch, W.S., at 2, George-street, Edinburgh.

IT is proposed to place in Corsock parish church, by half-guinea subscriptions, a suitable memorial to the memory of Professor James Clerk Maxwell. There is already in the church a memorial to the memory of his father, John Clerk Maxwell, by whose influence and exertions the church was originally built. "This church," we read, "is chosen for the memorial, as the Professor's connexion with it through life was very close. He was led to it as a child by his father; taught in its Sabbath school; was ordained an elder within its walls, and acted as such up to the time of his death; gave liberally towards its endowment, and the first and largest subscription towards the manse; was a trustee of the church and properties, and otherwise interested himself in its behalf." Subscriptions for the memorial may be sent to the Rev. George Sturrock. The Manse, Corsock, by Dalbeattie, N.B.

A CANVASSER SENT TO GAOL.—At the Liverpool County Magistrates' Court, on the 14th inst., Rowland Bailey, described as a photographic canvasser, was charged with obtaining money by means of false pretences. It appeared that the prisoner was formerly a canvasser for a photographer having establishments in Bold-street and London-road, Liverpool. The prisoner, under the pretence that people would be allowed to have a sitting for their photographs, collected several small sums of money from a Mrs. Charnock and Mrs. Clusky, who resided in Seaforth; but he failed to account for the money to his employers, and consequently, when the ladies went in their best clothes to have their photographs taken, they were told that they had been victimised. The prisoner admitted that he had retained the money, but said he was entitled to it as commission on orders received. The prisoner, in reply to the Bench, declined to give any account of himself beyond his present employment, and he was sent to gaol for one month with hard labour.

A DISPUTED ORDER.—At the Lord Mayor's Court, before the Common Serjeant and a common jury, on the 13th inst., Messrs. Kotch & Friedlander, wholesale dealers in photographic materials, sued the defendant, Mr. J. Hubert, photographer, to recover the sum of 15*l.* 15*s.* 10*d.* in respect of goods supplied. Mr. Herbert, barrister, who appeared for the plaintiffs, said the real point at issue was as to the order and delivery of 5000 cabinet mounts. Mr. Francis Kotch said the defendant had ordered the mounts, and the order had been acknowledged. At the same time they asked for the money to be sent at once for a previous order. The mounts had to be ordered from Berlin, and defendant was given notice that they were at his disposal. The plaintiffs could not make delivery because the defendant had changed his address. The defendant said he had cancelled the order for 5000 mounts, and therefore he did not see why he should now be called upon to pay for them. He also said the plaintiffs were suing him for goods sold and delivered, when, in fact, the goods had never been delivered. Eventually the jury returned a verdict for the plaintiffs for 15*l.* 15*s.* 10*d.*, and judgment was given for plaintiffs accordingly with costs.

A SIMPLE METHOD OF MAKING LIGHT MIRRORS.—Mr. Charles B. Thwing writes to *Nature*: "The following description of a simple and inexpensive method of making optically perfect mirrors for galvanometers and similar instruments will, I think, be of interest to many of your readers: Strips of French plate glass, about 5 mm. thick and 20 mm. long, are well silvered and carefully polished with rouge. The silver strip is placed upon edge on a flat stone or other firm support, and a light blow is struck with the edge of a hammer a little distance back from the silvered face. If the blow is well directed, a chip of grass of circular or elliptical form will be broken out. The nearer the edge the blow is struck, the thinner the mirror will be. Of course, not every blow will produce a good mirror; but, with a little practice, a strip of ten centimetres long should yield a dozen good mirrors, of assorted weights and sizes, which may be cemented to a card and put away in a box for use as occasion requires. Since the silver surface is exposed, it will tarnish in time; but, as the expense and trouble involved in making the mirrors is so slight, and the definition given by them when new is so perfect, one can afford to renew them once a year if necessary. The method of silvering mirrors given in the *Encyclopædia Britannica* gives a surface well adapted to this purpose."

AT St. James's Hall, Piccadilly and Regent-street, on November 7, 9, and 11, at eight p.m., there will be an exhibition of animated photographs of the cruise of H.M.S. *Crescent*, commanded by Captain H.R.H. the Duke of York, as shown before Her Majesty the Queen at Osborne, on August 27, by Messrs. G. West & Son, Southsea. The following are a few of the animated pictures: *The Captain of the "Crescent" inspecting a March round the Quarter Deck; Physical Drill by Midshipmen, H.M.S. "Crescent;" Sailors Dancing on the Forecastle, H.M.S. "Crescent;" Dancing the Hornpipe, H.M.S. "Crescent;" "Away, Boats' Crews;" A Race round the Fleet; Field Gun Drill; Torpedo Explosion on Board H.M.S. "Majestic;" "All Hands on the Forecastle;" Commander giving Instructions: "Dismiss;" "Beat to Quarters;" Barbette Guns in Action; Naval Brigade Firing Royal Salute; Attack and Defence; Portsmouth Dockyard Gates twelve o'clock, Saturday,* &c.; "*Turbinia," the Fastest Vessel in the World, going thirty-five knots,* showing the extraordinary effects of foam, &c.; also several yachts racing, rough-weather scenes. One design, *Yachts gybing round Outer Spit Buoy; Weather View of Yachts Racing in a Rough Sea; Lee-bow View of the crack Yachts Racing* (in securing this picture Messrs. West & Son had a narrow escape of being run down), and various others of special and exciting interest.

THE ROYAL PALACES.—Mr. Horatio Nelson King gave an illustrated lecture on Wednesday evening, October 12, at the Royal Photographic Society, on "The Royal Palaces of England," before a large assembly in the Society's Exhibition Room, Pall Mall East. Mr. King, who has enjoyed special facilities for taking views of these palatial residences, internally as well as externally, showed, in the course of an hour, upwards of 150 lantern slides, thrown upon a large screen by a powerful lantern, depicting with remarkable definition and brilliancy the exteriors and interiors of St. James's Palace, Buckingham Palace, Clarence House, Kensington Palace, Hampton Court Palace, Claremont, Osborne, Windsor, and Balmoral. He accompanied the views with historical reminiscences connected with the reigns of the present and former sovereigns. The pictures of the interiors embraced all the principal State and private rooms of the various buildings, and, in several instances, furnished vivid and charming reproductions of statues and other artistic objects with which the rooms are adorned. To all these the lecturer added a number of interesting specimens of his work as a photographer in the old collodion days, including some that were done forty-five years ago, and one, portraying Burnham Beeches, photographed in 1854, in company with Mr. Scott Archer, the inventor of the collodion process. The magnificent display contained several exceedingly effective Jubilee pictures appropriate to the main subject of the Palaces, and concluded, amid warm applause, with a splendid bust portrait of the Queen.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

October.	Name of Society.	Subject.
24.....	Camera Club	Sale of Members' Photographic and Cycling Apparatus.
24.....	North Middlesex	*Bromide Enlarging.* John H. Gear.
24.....	Oxford Camera Club	*Intensification and Reduction.* J. McIntosh.
25.....	Birmingham Photo. Society ...	*A Fortnight in Norway.* E. W. Taylor.
25.....	Royal Photographic Society ..	*On the Alleged Discovery of Photography in 1727.* R. B. Litchfield.—*On the Grain of Photographic Negatives* E. Duncan Stoney, M.I.C.E.
26.....	Camera Club	House Dinner.
26.....	Croydon Camera Club	Slide-toning Demonstrations. Messrs. Maclean, Wratten, and Isaac.
26.....	Kingston-on-Thames	Exhibition of Prize Slides.
26.....	Leeds Camera Club.....	Carbon Printing Demonstration.
26.....	Photographic Club	A New Machine for Animated Photography. Birt Acres.
27.....	Ashton-under-Lyne.....	Conversation and Sale of Papers.
27.....	Camera Club	*The Recent Solar Eclipse.* Captain E. H. Hills, R.E.
27.....	Liverpool Amateur	Demonstration: *Bromide Paper.* Fred. Anyon
27	London and Provincial	Open Night.
27.....	Woolwich Photo. Society	Affiliation Slides by Selected Workers.
28	Croydon Microscopical	Exhibition of Slides by the Brechin Photographic Association on *Linen and its Production.*
28.....	Plymouth	*Elementary Optics.* R. Child Bayley.
28.....	Royal Photographic Society ...	Committee of Delegates of the Affiliation of Photographic Societies.

ROYAL PHOTOGRAPHIC SOCIETY.

October 18.—Photo-mechanical Meeting,—The Right Hon. the Earl of Crawford, K.T., President, in the chair.

Some New Methods of Developing Daguerreotype Plates.

Colonel J. Waterhouse, I.S.C. (Hon. Secretary), read a paper, in which he recounted a series of experiments in developing sensitive Daguerreotype plates with ordinary collodion wet-plate acid developers, iron and pyrogallol, with dry-plate alkaline and other developers, pyroacetone, pyrocatechin, ferrous oxalate, &c. For photo-mechanical purposes, he said, the Daguerreotype process had the advantage that a negative or reversed image was produced directly on a metallic surface, and therefore, if some means could be found of strengthening that image to enable it to be etched directly, and sufficiently deeply, use might be found for the process in photographic engraving, either in relief or intaglio. In the course of an investigation for the purpose of ascertaining whether the method might be improved by the light of modern knowledge, he had succeeded in developing passable images on the silvered plates with ordinary developers, a result of some interest because it showed that the bromo-iodide formed by exposing the silver surface to the fumes of iodine and bromine had much the same properties as the bromo-iodides produced by double decomposition. By treating the silvered plates with an acid iron or pyrogallic acid developer, an image was obtained in deposited silver very slightly different in appearance from the ordinary Daguerreotype image developed with mercury. With an alkaline dry-plate developer the character of the image was quite changed, and it was apparently superficial and not a deposit, though it could, no doubt, be intensified. In the course of a few remarks on the manipulations of the Daguerreotype process, the author of the paper said he had been struck by the failure to obtain the very great sensitiveness secured by the early Daguerreotypists; in his experience, the process at its best was much less sensitive than wet collodion, his shortest exposure for a good plate in Messrs. Negretti & Zambra's studio at the Crystal Palace having been forty-five seconds, with full aperture of a 2B Dallmeyer portrait lens; while for outdoor subjects, with a modern landscape lens working at about *f*·9, the exposures varied from one to five minutes, or longer. In carrying out his experiments, he had had in view two main objects: first, to ascertain if colour effects could be obtained on Lippmann's principle of a reflecting surface at the back of a grainless sensitive film; and, second, to investigate the applicability of the process to photo-mechanical requirements. As regards the first, there were very few traces of colour in his plates; but in one plate, which had been exposed under a colour scale and developed with acid pyro, there was a distinct pinkish tint under the pure green, and a yellowish tint under the bluish glasses. He found that a Daguerreotype plate, washed with an orthochromatic tincture containing erythrosine silver, ammonia, and picric acid, showed a distinct prolongation of the spectrum towards the yellow, with a minimum in the green; and he had clearly established the fact that the plates could be rendered sensitive to the less refrangible rays. After detailing the results obtained with a variety of developers, the paper proceeded with a description of similar experiments with plain copper plates, and Colonel Waterhouse concluded by expressing the opinion that it was quite possible to obtain an image direct on the copper plate capable of being etched by perchloride of iron or some other etching fluid.

Mr. T. Bolas considered that Colonel Waterhouse had brought forward a most promising field for work, with the prospect of some day being able to get three copper plates sensitive as required for the three-colour process; if it were possible to expose three copper plates simultaneously for three-colour heliochromy, and in a few hours produce the printing plates, photography would be almost revolutionised. The paper furnished a link between Niépce's experiments and the very latest practical development of photography.

Mr. W. Gamble also thought that the substance of the paper had a very promising photo-mechanical application, and he expressed the belief that the tendency of photo-mechanical processes in the future would be towards surface or intaglio printing, and that machines would be devised which would bring many old processes into use again. If the image could be obtained in the camera, and if by some method of electro-gilding that image could be made to form the resist for galvanic etching, one would have exactly what was wanted, and the process would not be so beset with arbitrary conditions as were the present processes; all the conditions were purely chemical and physical, and they were likely to be conducive to perfect work.

After conversational remarks by Mr. Sanger Shepherd, Mr. J. Sterry, Mr. L. Warnerke, and others,

Mr. Bolas said the principal points which had been raised for the practical application of the process for making blocks direct in the camera might be summarised thus: Expose a bromised copper plate under a screen in the camera; develop and fix; gild with a compact film, and then etch.

The President, in expressing the thanks of the Society to Colonel Waterhouse, remarked that he had shown great generosity in giving to the photographic public the results of researches which might lead to a large commercial business, instead of keeping them in a recess of his brain until such time as he chose to walk down Chancery-lane and take out a patent.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 13.—Mr. A. L. Henderson in the chair.

Mr. S. Herbert Fay said he had tried the method of altering the colour of lantern slides described by Mr. Edwards at the last meeting, namely by converting the image with ferricyanide and redeveloping. The slide he now showed had been converted in this way, as regards one half, the other being left for purposes of comparison. It was redeveloped in three sections, for a limited, and a more protracted time, and to its utmost extent respectively. For the redevelopment he used a normal amidol developer, diluted with twenty-five times its bulk of water. The experiment exemplified the possibilities of the method in altering cold to warmer tones, and in addition raised some discussion on the chemical aspects of the case. Mr. Fry stated that no bromide was present either in the ferricyanide solution or in the redeveloper used. Personally he should not elect to secure the colour in this way, and thought it might be better done by other methods. Replying to a statement which inferred that the presence of bromide was necessary to the action he had obtained, he asked the reason for this, and an explanation of the fact that, having omitted it, he had still obtained the expected result.

Mr. Haddon explained that the use of the bromide was to convert the silver from the metallic state to the bromide of silver, which, as was known, yielded to developing solutions. Accepting Mr. Fry's statement as a fact that bromide played no part, it would appear that a new developable salt of silver, induced by the action of the ferricyanide, was open to experiment, as he did not know that it had been usually acknowledged as a developable salt.

In the discussion which attended this announcement, the immediate cause of the alteration in the colour of the slide was touched upon, the general opinion that the silver underwent a molecular rearrangement not being received in every quarter.

Considerable interest for the Association attached to the statement by Mr. Welford *apropos* Mr. Henderson's formate of soda toning method. He had received from Messrs. Burroughs, Wellcome, & Co., measured quantities in their "tabloid" form of the salts for this bath, put up in glass tubes. He was informed that they liked the bath very much, and were shortly intending to put it, in their distinctive form, upon the market. They advise the following proportions:—

Sodium formate	7·5 grains (one tabloid).
Distilled water	5 ounces.

to which is added one tabloid of gold chloride, containing half a grain. The temperature should not be lower than 65° Fahr. In view of the statement that a dozen quarter-plate P.O.P. prints require a grain of gold, it is advised that at first only six prints be placed in a bath of the above quantity. Samples of the tabloids were distributed for experiment.

PHOTOGRAPHIC CLUB.

October 12,—Mr. E. A. Newell in the chair.

Mr. W. R. Stretton showed a specimen photograph illustrating the capabilities of the half-plate Busch Rapid Aplanat, No. 2 lens, of eight inches focus, used upon a 9×7 plate. Taking into consideration the low figure at which the lens is priced, the performance was meritorious, the picture being sharp to the edges; but, on the other hand, the diaphragm aperture was not stated.

Mr. W. D. Welford gave a display of slides illustrating the characteristic scenery of the Cumberland Fells. The market town of Alston, situated in what was once a busy lead-mining district, until it became cheaper to import from Spain, was made headquarters, the district supplying material for many interesting pictures. The difficulty of rendering the hilly nature of the country was perseveringly encountered, some very good representations of steep roads being shown, the rest of the series comprising several panoramic pictures, views in the town, the neighbouring Roman camp, and of the local architecture, in which stone almost exclusively figures. Mention must be made of one very fine panorama measuring twenty-eight inches in length, from which an excellent idea of the country was obtainable. The series concluded with a number of cloud studies of a very strong and massive type for which the district is famous, although for pictorial work they are not much suited.

Croydon Camera Club.—The meeting on Wednesday, October 12, was mainly occupied by demonstrations carried out by Mr. J. Chadwick Taylor, and Mr. S. H. Wratten, on

Simple Means of Making Lantern Slides by Reduction.

Mr. Taylor showed and explained in full and clear fashion the use of the devices and instruments he employed, and subsequently exposed and developed some slides made by means of the apparatus. A very satisfactory transparency was produced, using amidol as the developer. Mr. S. H. Wratten explained how, at practically no cost at all, it is possible to fit up an arrangement by which slides can be obtained from negatives over 3¼ in. in size, using daylight to illuminate, and the camera to expose the lantern plate in. A number of examples taken by such an extemporised device were shown, from which it would appear that, given care and thought, excellent results are attainable by those who have experience in slide-making. Amongst the successful slides was one developed with pyro-acetone, and another treated with persulphate of ammonia. In proposing the Club's thanks to the above gentlemen, the President congratulated the members upon the fact that they had, so far, this season had no need to look outside the Club for borrowed knowledge as regards the ordinary technicalities of photography. Every year they were getting not merely more numerous, but more fully equipped with technical information. In responding, Mr. Taylor, whilst disclaiming to be a specially skilled slide-maker, acknowledged to have already made between 500 and 600 lantern slides. Amongst the prints handed round during the evening were two large mounts, containing sets of prints taken in and about Ireland by Mr. H. K. Tayler, which included some scenes full of poetical suggestion. Mr. L. W. Hurmen was elected a member. It was announced that, besides other attractive items, Mrs. E. Main, whose snow and ice scenes have several times obtained the medal of the Royal Photographic Society, had kindly consented to show and describe a set of her remarkable series of St. Moritz and other Alpine slides at the first public lantern show of the season, which will be held on the 16th proximo.

Woolwich Photographic Society.—October 13, the Secretary and Treasurer presented the balance-sheet for the year, which was voted to be eminently satisfactory, the deficit of the previous year having been wiped off and a satisfactory balance remaining in hand. The report which followed was of the same tone as the balance-sheet, the success of the Annual Exhibition from a photographic and pictorial point of view, combined with its success financially, was a source of gratification. The election of officers then took place with the following result:—*President:* Mr. W. H. Dawson.—*Vice-Presidents:* Colonel C. D. Davies and Mr. C. Churchill.—*Council:* Messrs. A. J. Allen, J. Desforges, S. Hughesden, H. Colebrook, Jas. Hope, G. Tapp.—*Librarian:* Mr. J. Cregan.—*Hon. Secretary and Treasurer:* Mr. Frederick W. Machen, 161, Griffin-road, Plumstead.—*Hon. Assistant Secretary:* Mr. Charles H. Imrie, 60, Heavitree-road, Plumstead.

Plymouth Photographic Society.—October 14, the President in the Chair.—There was an attendance of twenty-six members. Mr. H. S. Hill, in his presidential address, said, when the history of the Victorian era came to be written, photography must hold a foremost place for the rapidity of its growth and the rich and varied character of its harvest. It had meant much for the industry of the country, for it employed an army of chemists, scientists, and workers in metals and woods; and the capital invested in more than one manufacturing firm equalled the loan issues of some Continental countries; and any attempt to realise what photography had done in adding to the sum of human knowledge, in stimulating the intellect of the country, in elevating its taste, in increasing the chances of life, in multiplying the sources of enjoyment, and in securing completeness and permanence of records, must involve a survey of nearly the whole range of human activity, mental and material. In the field photographers were brought face to face with Nature in its changing moods; in the laboratory, the study, and the observatory they compelled her to yield up her inmost secrets. Photography, too, as an elevating, chastening, and disciplinary force, had much to commend it. In hand-camera work especially there was much to make for decision of character and alertness of mind. The successes were fascinating and exhilarating, and, if the failures were not accepted as blessings in disguise, and utilised for the improvement of moral health, then photographers failed to avail themselves of all the advantages a beneficent Providence had provided. Wonderful as was the growth of photography since it was discovered about sixty years ago, finality was not at all in view. Even if members did not do great work or solve problems that were occupying the cleverest workers, yet if they strove to do good work they would with all the more satisfaction enter into the labours of the most successful, and be the better able to appreciate and enjoy any startling developments there may be in store. Mr. W. E. Drinkwater, a professional member of the Society, read a paper on

Developers and Development,

and followed it up with a demonstration using pyro, pyro-metol, metol, and ortol, with carbonate of potash as the accelerator and a ten per cent. solution of citric acid for the restrainer. He very much preferred it to bromide of potassium for the purpose. Several suggestive hints were given and a variety of questions answered.

FORTHCOMING EXHIBITIONS.

1898.		
October 21–Nov. 5	...	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
„ 21–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
November 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
„ 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
„ 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
„ 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
1899.		
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Patent News.

The following applications for Patents were made between October 3 and October 8, 1898:—

Stereoscopes.—No. 20,884. "An Improvement in Stereoscopes and the like." A. L. Guiterman.

Shutters.—No. 20,928. "Improvements in or connected with Photographic Shutters." A. C. Smith.

Colour Photography.—No. 20,958. "Improvements in Apparatus for Taking and Exhibiting Photographs in Colour." T. W. Barber.

Oxygen.—No. 21,067. "Improvements in or relating to Apparatus for use in the Production of Oxygen Gas." F. Brown.

Chrono-photographic Apparatus.—No. 21,191. "Improvements in Chrono-photographic Apparatus." A. Rateau.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

MR. BARBER'S STEREOSCOPICS.

To the Editors.

Gentlemen,—I have to thank you for the "comic relief" introduced into your pages during the past few weeks, by the letters of Mr. Barber on Mono-visual Stereoscopy and the very elaborate humour of Mr. Hill's little invention, which enables one to see one photograph with two eyes. Mr. Barber has evidently the courage born of strong convictions, seeing his theory confirmed in the whole realm of animated nature, and launching out on a sea of sines, and angles, and minute fractions, where I dare not follow. Neither can I show him how birds see stereoscopically, if indeed they do, for I should not care to assert such to be the case. But it seems to me that, in speaking of the stereoscopic effect of some lantern slides, Mr. Barber is confusing what the eye actually sees with what the mind *thinks* the eye sees. The conjurer's success depends upon his ability to make us believe we have seen something our eyes have certainly not seen, and a good lantern slide with a powerful foreground, no doubt, produces a certain "stereoscopic" (?) effect in this way, *i.e.*, on the mind. But we don't see the view stereoscopically any more than we see the conjurer's shilling placed in the handkerchief. However, apart from all this, Mr. Barber says that, when on looking at a view in the stereoscope one eye is closed, the only effect is to reduce the illumination by one-half. This gives his case away altogether and makes it pretty certain that he has never seen a stereoscopic slide properly. (Has he been experimenting with Continental slides, in many of which the two halves are from the same negative?) Mr. Barber is evidently a very careful worker, for, if he had ever made the mistake of mounting the two halves of a stereoscopic view on their wrong sides, his views as to the non-importance of the slight difference of the visual angle would have died a sudden death—collapse consequent on shock to the system.—I am, yours, &c.

R. W. Blakeley.

4, *Seedley-crescent, near Manchester, October* 15, 1898.

ROLLABLE FILM PATENTS.

To the Editors.

Gentlemen,—Our attention has been called to an extraordinarily erroneous paragraph which has appeared in some London daily papers and other journals. It relates to alleged litigation between Mr. Goodwin, of Newark (U.S.A.) and the Eastman Kodak Company, of the United States, to settle a claim to the right to the patent in manufacturing a form of photographic film. The statement that this claim was settled in favour of Mr. Goodwin is absolutely untrue.

The comments on this subject that have appeared recently had their origin in an article published four or five weeks ago in a sensational Sunday paper published in Newark, where Mr. Goodwin lives. The statement that there has been any litigation whatever, in recent years, between Mr. Goodwin and the Kodak Company, is also untrue. The only controversy that the Kodak Company ever had with Mr. Goodwin was in the United States Patent Office, and not in the Courts, and was decided some years ago, in the first instance in favour of Mr. Goodwin. This decision was, however, soon reversed in favour of the Eastman Kodak Company. The Kodak Company has the prior patent, and Mr. Goodwin's patent, which was issued very recently, cannot by any possibility be held to include the subject-matter of the Kodak Company's patent. The Goodwin patent, if it covers anything, covers a chemical process not in use by the Eastman Kodak Company. The supposition that Mr. Goodwin might have a claim for past profits in the film business is nonsense, because a United States patent does not come into force until it is issued. As for Mr. Goodwin's ability to interfere in any way with the film business of the Eastman Kodak Company, we may explain that, if Mr. Goodwin could make any film under his patent, which is extremely doubtful, it would be impossible for him to make it in such form as would be usable in the present style of Kodaks without infringing the Daylight Cartridge patent, of May 5, 1895, owned by the Kodak Company.

It will thus be seen that the issue of Mr. Goodwin's patent has not the smallest significance as regards either the American or English Eastman Kodak Companies.

We trust you will please give this explanation publicity in your valuable journal.—We are, yours, &c., The Eastman Kodak Company.

43, *Clerkenwell-road, London, E.C., October* 17, 1898.

[In order to make the subject of the foregoing letter quite clear to readers at a distance, we append a version of the erroneous para-

graph in question, taken from the London *Daily Chronicle*, and the absurdity of which is manifest on the face of it.—EDS.]

"The litigation which has been going on in the United States for the past twelve years, over the question of the patent rights of the film used in Kodak and other cameras, has recently been settled in favour of the Rev. Dr. Hannibal Goodwin, who produced a film in 1887 and applied for a patent. While the authorities were looking up the subject a company filed an application for a similar article. Dr. Goodwin has been allowed the patent exclusively, which means, according to his own statement, that for seventeen years he will have the 'entire control of the film business.' That vast interests are involved cannot be questioned, seeing that it has been estimated that 1,500,000 Kodak cameras and imitations are on the market, and one company alone, in the United States, is making 60,000 spools a week. The royalty accruing on the invention since May 1887 would be a great sum, but how is it to be recovered?"

SPIRIT PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—Several of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY have written to ask me for a specimen of my collection of genuine photographs of "spirits," and I had much pleasure in complying with their request. A further letter of mine in the *English Mechanic*, viz., in the current number, throws more light on them, and I shall be glad to send a specimen free to any of your readers who would honour me with an application for one. They are cabinet-size photographs of an *amateur* medium and a spirit posing by his side, and the best of them made beautiful pictures.—I am, yours, &c., J. C. STARLING.

Iverson-road, West Hampstead, N.W.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

A. M M. Swiney, Montpellier House, Herne Bay.—*Painting of "St. Dominic," three-quarter length.*

R. T. Watson, 461, Anlaby-road, Hull.—*Photograph of John Thomas Brown. Photograph of John Tunnicliffe.*

Messrs. W. T. Watson & W. H. Duncan, 20, Ocean-place, Hull.—*Two photographs of the Clowes Memorial Obelisk, with group of ministers.*

F. W. McDonnell, 25, Mortlake-road, Kew Gardens, Surrey.—*Painting of "A Pass in Glencoe—Scotland." Painting of "Highland Cattle."*

RECEIVED.—S. F.; I. H.; OPALESCENT. In our next.

R. T. WATSON.—No particulars are yet available. We believe the process is to be commercially worked by a company in course of formation.

EXPOSURE.—There are several theoretical ways of destroying the latent image; but in practice we do not recommend their adoption for the purpose you name.

CHROMO.—The colours, we were informed, are not fugitive; and their composition is stated to be a secret. The process is described at p. 832 of our ALMANAC for 1897.

STAINED PRINTS.—E. W. P. says: "Will you kindly answer me what these stains are caused by?"—Prints imperfectly fixed, through not being kept moving while in the fixing bath.

G. & W. MORGAN—A capital photograph, cleverly executed. Unless you had drawn our attention to the method in which the portraits were obtained, we should not have supposed that the picture was taken otherwise than direct.

INTENSIFYING.—AJAX asks: "Is it desirable to let a negative dry, after washing the hypo out, before intensifying with mercury?"—It does not matter, though it is usual to dry it first, the better to judge if it requires any intensification.

JNO. S. W. STANWELL (Newbury).—The plate arrived smashed to atoms; a result you must have anticipated through dispatching it by ordinary letter post. Send us another example properly packed, and repeat the question, and we will endeavour to answer you.

ROBERT DAVIDSON (Dumfries).—At a guess, a guinea each for the right of reproduction of each photograph should suffice; but you do not supply us with sufficient data upon which properly to advise you. Of course, there is no "proper charge;" this all depends upon the circumstances of the case.

SENSITISING CARBON TISSUE.—W. J. FARMER writes: "Has the experiment ever been tried of sensitising carbon tissue with silver as well as bichromate of potash? This plan might probably enable one to see the picture printing, and the silver image would wash out before developing the usual way."—We cannot say if the thing has ever been tried. We should certainly say not, at least, by any one who knew anything of the subject—either carbon or silver printing.

H. G. P.—That method of colouring has been described in back volumes over and over again *ad nauseam*, so that we cannot spare space for the subject again. It is simply to make the print transparent, and then colour it from the back with oil colour. Castor oil, paraffin wax, &c., may be used to render the print transparent.

BRITISH MUSEUM.—PROVINCIAL. Yes; there are restrictions as to photographing objects in the British Museum, and permission will have to be obtained. You will have to write to the Trustees and specify what particular objects you wish to photograph. We do not at all think permission will be given to use a camera indiscriminately on any object fancy may dictate on your visit.

CLEANING PRINTS.—T. WADE inquires how he can clean a valuable engraving he has which has become mildewed?—There are different ways of cleaning engravings, but they are all based upon the bleaching action of chlorine. As the print is a valuable one, it had better be put into the hands of an expert at the work, as it would probably be ruined by a novice's first essay, for plate paper is very little stronger than blotting-paper when wet, especially after the action of the chlorine. Moreover, space will not, in this column, allow of giving full working details of any one of the methods.

DIRECTORY OF BOOKSELLERS.—DIRECT says: "We have some photographs which we wish to put on the market throughout the United Kingdom, and shall be glad if you could tell us whether it would be possible to get a book containing the names of the booksellers in each of the principal towns. Failing this, what would you advise us to do?"—In reply: Messrs. Kelly & Co., who issue the *Post Office London Directory* doubtless publish a directory in which booksellers are listed. Better inquire of the firm; failing them, write to one of the bookselling or stationery trades journals.

SOLAR CAMERA.—S. J. M. writes as follows: "I am offered a Solar camera, all complete, for a very moderate sum; but, before purchasing it, I should like your opinion as to whether you consider that as good enlargements can be made on albumen paper direct as by making an enlarged negative in the ordinary way and printing from that, because the saving of trouble would be great?"—Yes, quite as good results may be obtained, if not better. But it must be borne in mind that the Solar camera can only be used when the sun is shining. It is for that reason that the Solar camera has been so little used in this country.

VARIOUS.—A. M. Z. writes: "1. I wish to use another developer for plates instead of pyro which I like, except its staining properties; would you kindly tell me the developer which most nearly approaches it for landscape purposes, and the formula. 2. What is the life of a well-made print, (*a*) sepia platinotype, (*b*) bromide? 3. Which is the best and most satisfactory hand camera? Are they both equally well and accurately made? If you will kindly answer these questions, you will much oblige."—1. There are so many other developers, all of which are good, and formulæ for them are given in the ALMANAC for the current year. Our correspondent should try a few of them and adopt that which is most to his taste. Possibly ortol more resembles pyro than others. 2. A well-manipulated platinum is generally accepted as being *permanent*. So are bromides, if carefully made, by many; though, if not so made they may change sooner or later, according to the care bestowed upon them. 3. It is against our rule to pass an opinion on any particular maker's goods. We may, however, say that both those named are excellent.

MOUNTING DIFFICULTIES, &C.—WINDSOR says: "Kindly answer my queries. 1. I have mounted some photographs with ———'s paste, and they have peeled on the edges. I mounted them in the afternoon and burnished them next morning. I also tried starch paste, and that acted the same. Should the prints be burnished as soon as dry, or should they be left a short time? 2. Some spots of gold have got on my Knox burnisher roll; I expect off the prints on the mounts. How can I get them off? 3. In burnishing some photos it altered the tone of them to a rich red. Was the burnisher too hot? 4. Give me a formulæ for a good lubricant; also for a good mountant. 5. Give me good formula for toning P.O.P. for portraits."—1. We do not know the paste named, and probably the starch paste was made too thin, or not applied thickly enough at the edges. When dry. 2. We should suspect that the spots on the burnisher are rust, in which case it must be *polished* off. Gold from the mounts could be rubbed off. 3. Yes. 4. Castile soap in alcohol, thirty grains to the pint. 5. Better use the formula supplied with the paper. Some papers work better with one formula than another.

CONDENSER.—LUCIPHAT writes: "1. I feel my best thanks due to you for the most useful article, 'Limelight Experiences,' published on page 75, SUPPLEMENT, October 7, of THE BRITISH JOURNAL OF PHOTOGRAPHY, and many others, I feel sure, have like cause to be grateful for practical information of this kind. In reference to this article I should be much beholden for a definite recommendation as to the most suitable condensers to employ with 'Darlot's' three-inch (80 mm.) diameter objectives 27·5 focus (about 10·826 inch). Although not absolutely necessary, I should have less difficulty if the diameter of condenser did not exceed four inches diameter. 2. I may mention that I sometimes modify the focal distance of projection objectives of the ordinary double combination type by altering the distance between the combinations. What are the disadvantages of this course? The above query has reference to working at about sixty-four feet from screen, economy, *i.e.*, brilliance of illumination, being the primary consideration, and magnitude of disc wholly secondary."—We should think that the condenser you have, if of the ordinary type, will answer very well with the objective named, if the light be adjusted at the most suitable point. Theoretically, a condenser of twenty-five per cent. longer focus would be better, but there will not be much difference in practice. The focus is lengthened or shortened, but the performance of the instrument is best when the components are in their normal position.

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Contents.

	PAGE
Ex Cathedrâ	689
Assimilating Lenses of Different Foci for Stereoscopic Purposes	691
Continuous Films and their Development	692
Jottings. By Cosmos	692
Actinometric Papers	693
Foreign News and Notes:— The Paper Ring—Collodio chloride Paper — Patent Rights — Electricity and Light—The Ammonium Persulphate Reducer — The Latent Image	694
Photographic Possibilities in Illustrating By J. Rees	695
Notes from the West of Scotland	695
Working up Negatives	696
Stereoscopic Photography	696
An Editorial Impression	697
Fixing and Finishing Prints. By J. Pike	697
Producing Relief Pictures with the Aid of Photography	698
The Eastern Graian Alps	698
London County Council and Cinematograph Entertainments	699
Triplet Lightning Flash	699
Schaub's Plate-holder or Dark Slide	699
News and Notes	700
Patent News	700
Meetings of Societies:— Royal Photographic Society London and Provincial Photographic Association — Camera Club — Croydon Camera Club — Richmond Camera Club — West London Photographic Society — West Surrey Photographic Society — Bootle Photographic Society — Leeds Camera Club — Blairgowrie and District Photographic Association	700
Forthcoming Exhibitions	703
Correspondence:— Photography in British Guiana	703
Answers to Correspondents	703

EX CATHEDRÂ.

It is with sincere satisfaction we observe that the true character of the notorious "free-portrait" dodge has at last been brought to the notice of the public through the agency of some of the principal London daily newspapers. During the last eight or nine years we have exposed the scheme over and over again; but, for all that, it has continued to thrive both at home and abroad, and we almost despaired of seeing the time when the world outside the class to which the photographic press particularly appeals would be warned against the traps which the "free-portrait" knaves know so well how to set. The initiative in drawing public attention to the matter has been taken, it is interesting to note, by Dr. R. Anderson, of the Criminal Investigation Department, who last week addressed the following letter to the Press:—

* * *

"To-day's post" (October 17) "has brought me a circular letter from A. Tanquerey, 9, Rue de St. Pétersbourg, Paris, offering me 'a life-size crayon portrait of a value of 4*l*, made after any photograph, absolutely free of charge,' the only return asked for being that I will recommend Tanquerey's portraits to my friends. As this circular, which came in an open cover, with a five-centime postage stamp, is being distributed broadcast—my own name and address were evidently obtained from an old directory—perhaps you will allow me to say that, in my official capacity, I have received a very large number of complaints about this very scheme. If the British public were less gullible, our police forces would be saved a large amount of useless clerical labour. Common sense might teach people that in trade no one will give away his wares, whether they be silver watches or portraits. I myself have never known an offer of the kind that was not fraudulent in some way."

* * *

Dr. Anderson's letter appeared in several of the newspapers, and we hope it may go the round of the entire London and country press, so that the warning may come under the notice of as many people as possible. Many other letters on the subject have been published, notably one from Earl Russell, who said: "I also have received this circular, but I adopted the course recommended by Mr. Labouchere, and forwarded it to the Postmaster-General, with an expression of regret that the Post Office should make itself the agent for distributing broadcast, in open envelopes, the advertisements of a notorious swindle." If photographers throughout the country would write to the local press, exposing the nature of the free-portrait scheme, we feel sure they would earn the thanks of the public, and would confer no inconsiderable benefit on their own profession, by showing that it is not in sympathy with these discreditable "something-for-nothing" systems of doing business.

* * *

In a brief article, headed "Science in Relation to Trade," *Nature* draws attention to the fact that during the last few years numerous references have appeared in various reports made to the Foreign Office by Her Majesty's diplomatic and consular officers on the methods adopted by the principal trade rivals of the United Kingdom in their competition in foreign trade abroad, and on the apparent supineness of British traders in meeting this competition. Besides calling attention to this, the consuls suggest the adoption of certain measures which they consider would be advisable for British traders to take with a view of retaining the pre-eminence of this country in foreign markets A selection has been made of the views expressed in some of these reports issued during the period

comprised between January 1896 and the present time, and hast just been published in a Blue Book.

* * *

After enumerating the principal causes which operate adversely to the progress of British trade in the foreign markets, our contemporary goes on to point out the serious manner in which British exporters handicap themselves by their neglect of the metrical system of weights and measures. The Consuls all lay stress upon the uselessness and expense of British exporters forwarding trade circulars and catalogues more or less well prepared in English, and with English weights and measures calculated in our own currency. British weights and measures are not liked abroad, and are in many cases either not understood at all, or very imperfectly so, and the preference is given to those who accommodate themselves to the metric and decimal systems. On this point the Consul at Naples expresses himself as follows: "It seems absurd that the first commercial nation in the world should measure their horses by hands and their dogs by inches, their cloth by ells and their calico by yards; that such impossible numbers should come into their square measure as 30¼ and 4840, and in their measure of solidity as 1728. And the weights are worse still. It can never be too much impressed upon British traders that all goods for sale on the Continent should be marked in metres and kilogrammes, and all catalogues sent to the Continent should be in a language which is understood by the people of the country."

* * *

We commend this matter to the attention of photographic-material manufacturers, few of whom, it is to be hoped, will neglect the useful hints above given. As compared with other industries, the photographic trade is by no means so backward as some in the use of Continental languages and the metrical system of weights and measures; but there are several firms, we know, who are behindhand in the matter, and this reminder may therefore be of some little service to them.

* * *

We are sorry to learn of the death of Mr. Gleeson White, the well-known writer on art topics, in the forty-seventh year of his age. The deceased gentleman succumbed to an attack of typhoid fever last week. In recent years photography attracted his attention, and his critical writings upon its pictorial aspects commanded considerable respect. According to a contemporary, Mr. White had led a busy life. He was associate editor for a time of that admirable publication, the *Art Amateur* of New York. Possibly this magazine suggested the lines on which he edited the *Studio*, one of the most successful of our art magazines. Mr. White had an extraordinary knowledge of poetry, and his charming collection of *Ballades and Rondeaux*, in the Canterbury Poets, showed all the quality of wise discrimination. Other volumes which bear his name are *Practical Designing*, *Salisbury Cathedral*, *English Illustration*, and a series of *Master Painters of Great Britain*. He was editor of the *Ex-Libris* series, of the *Connoisseur* series, and of the *Pageant*. In all refined pleasures he took a deep interest, and few were the subjects on which he could not discourse with knowledge and charm. Rare prints, valuable blue china, musical masterpieces, all extorted his warm admiration. Few men in London deserved better the hackneyed title of "connoisseur."

With reference to the Traill Taylor Memorial lecture, to be delivered by Mr. Thomas R. Dallmeyer, F.R.A.S., at 5A, Pall Mall East (the R. P. S. Exhibition), Mr. Everitt, Hon. Secretary of the Memorial Fund, writes: "You announced the Traill Taylor lecture for 8 o'clock on November 8; we cannot begin before 8.30. Will you please make the correction and add that Sir Henry Trueman Wood will take the chair." Admission will be free, and we trust a large attendance will result.

* * *

Mr. James Brown, who for many years was Hon. Secretary of the Newcastle-on-Tyne and Northern Counties Photographic Association, lately removed to London, and we are pleased to learn that he has not been allowed altogether to drop out of a department of photographic work for which his abilities peculiarly fit him. He has been elected Hon. Secretary of the West London Photographic Society, which includes among its members some clever and spirited photographers. We hazard the prophecy that, under Mr. Brown's guidance, the West London will immediately enter upon a career of vigour and prosperity, and that, as in the past, the Society will take rank as a leading London photographic institution. Six or seven years ago the Society's meetings and Exhibitions were full of promise and interest.

* * *

From *Photograms of* '98, which has just been issued by Messrs. Dawbarn & Ward, of 6, Farringdon-avenue, E.C., we miss the critical comments from the cultivated pen of the late Mr. Gleeson White, which we had grown accustomed to look upon as one of the most valuable features of the volume. The book, however, in other respects closely follows the lines of its predecessors. *Photograms of the Year* is now an established institution, and it is quite the "usual thing" of the autumn Exhibition season, so that its appearance is taken as a matter of course and waited for. This year, if we mistake not, the volume is issued earlier than the 1897 production, and as both the "great" Exhibitions, as they are grandiloquently styled, are still open, the book will, doubtless, be welcomed as a kind of pictorial and critical guide to the principal features of those Exhibitions. *Photograms of the Year* surveys pictorial photography, so to speak, from China to Peru, and the many admirable reproductions given of photographs produced by the world's foremost workers tell the student at a glance how far photography has progressed as a picture-making art. The examples reproduced are perhaps not quite so representative as hitherto, and, as we have remarked of previous volumes, some of the critical writing is only of ephemeral value; but the book, as a whole, is not behind its predecessors in interest and excellence. *Photograms of the Year* has created a place in the illustrated literature of photography which no publication but itself can satisfactorily fill.

* * *

There is quite an epidemic of three-colour photographicalities, so to speak, attacking the general press just now. The latest example of how not to explain the three-colour process appeared in a scientific contemporary last week. Thus: "Most persons are by this time familiar with the very beautiful invention of photographing nature by a threefold process. First, a plate sensitive only to the yellow rays of light is exposed, and all that is yellow in a landscape, or a portrait, or a basket of fruit, or any other object, is secured in the negative. Another plate is exposed, susceptible only to the

blue, and a third that will photograph nothing but the red. *When these negatives are placed one upon another, and while light is passed through them, they complement and combine with each other just as yellow, red, and blue do in nature, and the result is all the colours of the natural object.* It is the actual mingling of coloured lights, and tints are produced in all the delicacy and gradations of nature's own loveliness." It is a pity that a small primer on the subject is not available for the use of uninitiated pressmen.

* * *

WITHIN the last few weeks there have been some small fires at places of public entertainment originating at, or near, the cinematographic installations that have been set up in the respective halls, and most of the newspapers that reported the occurrences conveyed the impression that either the projection apparatus employed or the celluloid film was the cause of the outbreaks. We have carefully read the reports in question, but have failed to discover that such was the case. Since the Paris disaster there has obviously been a decided inclination in the reportorial mind to rush to erroneous conclusions whenever there is a fire on premises where the cinematograph happens to be in use, and naturally the effect of this gratuitous sensationalism upon the minds of the public is to create some distrust of the "safety" of cinematographic entertainments. It is to be hoped that those who have the opportunity will take every legitimate means of preventing the spread of this unreasonable alarm. We observe that the County Council are reported to be redoubling their vigilance as to the conditions under which cinematographic exhibitions are given, and we trust that this action, combined with a general discountenancing of "panic-mongering," will tend to heighten confidence in the harmlessness of this form of entertainment when it is conducted with due precautions for the public safety.

ASSIMILATING LENSES OF DIFFERENT FOCI FOR STEREOSCOPIC PURPOSES.

THE resuscitation of the stereoscope is making some headway in England, but more slowly than is the case on the Continent and in the United States. Still it is making steady, though slow, progress, as witness recent society reports on stereoscopic photography. At the meeting of the Photographic Club last week, Mr. John Nesbit, a veteran amateur and an enthusiast in stereoscopic photography, gave a "beginners' night," and, according to the report, dealt ably with the subject, with which he is so practically at home. It is certainly surprising that modern amateurs in this country take so little interest in this phase of the art, and various reasons have from time to time been given for the fact, yet that fact remains. One reason may possibly be that stereoscopic cameras and stereoscopes are not made such a feature of by the dealers in England as they are elsewhere.

Any one, however, who has an ordinary half-plate camera has in it a stereoscopic camera, and if it is of modern construction it is already provided with the central partition, or, if not, one is easily fitted. All, therefore, that is necessary in addition is a pair of stereoscopic lenses. Many are, no doubt, deterred from the possession of them on account of the supposed cost of them. If we take the catalogues of the principal opticians, we find that the prices quoted for them are somewhat high, and to some prohibitive. If, on the other hand, we take the lists of those who supply the cheaper forms of lenses, we find that pairs of stereoscopic lenses are seldom mentioned, except sometimes by a footnote that certain ones may be matched for stereoscopic work at such-and-such additional cost. None seem to quote stereoscopic lenses at so much per pair.

For stereoscopic photography no special lenses are required provided they are not of too long focus. Any lens, however low in price, whether single or compound, that is good enough for a hand camera, is equally good, with a similar one, for stereoscopic purposes. The two must, however, be of identical foci, or practically so. This brings us to the point, How is the dissimilarity in the foci in two lenses to be assimilated? In the case of single lenses this cannot be done without regrinding one or other of them, though, when several single lenses of the same make, and supposed to be of the same focus, can be selected from, two can generally be found that will make a pair.

In the case of compound lenses the adjustment is really a very simple affair, and well within the compass of a novice. Suppose, for example, we have a rapid rectilinear lens on our own hand camera, say, of the usual five-and-a-half inches focus, a fellow one to it will make an excellent pair for stereoscopic pictures, and the only difficulty is in purchasing it of identically the same focus. If, however, there is not much difference between them—and there rarely is with instruments of the same type by the same makers, and purporting to be of the same focus—it is easily remedied. We recently had the opportunity of examining a dozen or more hand-camera lenses of the kind referred to, and there was not more than a quarter of an inch difference in the focus between any two of them, and so slight a difference as that could easily be assimilated by the owner himself without any optical knowledge or special appliances. Therefore, if we procure from the maker of the first lens a second one, the probability is that it will be of, approximately, the same focus, whatever that may be.

If we take, say, a rapid-rectilinear lens and shorten the distance between its components, we shorten its focus; and, conversely, if we lengthen it, we lengthen its focus. Thus we have a simple means of assimilating different foci. The threads in the tubes and on the cells are generally sufficiently long to materially aid the novice in the initial part of his work. In a hand-camera lens we have, the threads at either end will allow of the cells being unscrewed without their falling out to a sufficient extent to lengthen its focus nearly a quarter of an inch. If that be only the difference in the focus of the two instruments, the thing is done at once, though it is not advisable to make the adjustment entirely by one instrument. It is better to "split the difference" by lengthening one tube and shortening the other to a similar extent. If, for example, the difference of a quarter of an inch is necessary, one tube should be shortened an eighth of an inch, while the other is lengthened to the same extent. In this way the correctness of the instrument will not be materially interfered with, which might be the case if the adjustment were done with one only. As a rule, the stated focus of lenses of the better sort of short foci by the same makers rarely varies more than a quarter of an inch, and that is well within the amateur's means of remedy.

The shortening of a tube is best done in a lathe if one is at command; but it may be done, practically, as well with a file by any one who can use one. The lengthening of a tube is done by getting pieces of tube of the necessary length, tapped

to screw into the mount, and into which the cells with the glasses can be screwed. But for all practical purposes, when the cells can be sufficiently unscrewed to give the desired length, a ring of brass wire of the right size may be sprung on the cells; then, when they are screwed home tight, the right position will always be retained. It should be mentioned that, with a lens of the symmetrical or rectilinear type, whatever alteration is necessary should be made at both ends of the mount. If it has to be shortened the eighth of an inch, a sixteenth should be taken off each end; and, in the lengthening, a sixteenth at either end. As a rule, the thread of the screws will admit of that being done without further trouble.

In the present article we have not gone into the theoretical part of the matter, or the question of equivalent and back foci, for that is practically unnecessary when dealing with such short-focus lenses of the same make and of approximately the same foci; for, if two can be made to give simultaneously sharp images on the ground glass, that is all that is really required. The object now is simply to point out how any one possessed of a hand-camera lens can, by obtaining another of a similar sort, inexpensively become possessed of a pair for stereoscopic purposes.

CONTINUOUS FILMS AND THEIR DEVELOPMENT.

THE battle of spools *v.* single films or plates has, during the past season, been carried on with greater vigour than ever, the daylight changing arrangement having given an almost irresistible impulse to continuous film work. But the magazine camera builders have not been idle, and there are now on the market many patterns of first-rate importance and easy working capabilities. This move again has been met by the introduction of single film conveniences, adapted to spool-using cameras, and no doubt the battle will continue to be waged, as the continually produced improvements give the advantage first to one and then to the other side. The spool system is of undoubted advantage to the traveller who does not intend to develop his exposures till he is back at his own dark room—it would scarcely be correct to speak of his own fireside. The inconvenience of the system makes itself felt when it is desired to make one or two exposures only—there is too much house building to be done, as we once heard it described, to cut out a couple of pieces from a dozen and set the camera afresh. With a suitably constructed magazine camera the change is a matter of a few seconds, and still less with dark-slide-using hand cameras. The realisation of this especial difficulty is, no doubt, the cause of the greater attention given of late to fitting cameras, originally devised for continuous films only, with dark-slide adjustments, and the nearer the power of change from spool to slip is made to approach the facility and rapidity of changing dark slides only, the less will be the advantage the magazine can claim over the spool camera.

Then, there is another important point to be considered. For those whose only experience of photography is with spools, the facility of single film or plate work is not of such striking importance. But it is a very potent factor in the mind of the accustomed worker with single plates, who often abhors spools, as did the old wet-plate worker when gelatino-bromide first began to be talked about.

Another great objection to the spools, raised by many, is the difficulty attendant upon developing them, each worker having usually a method of his own, to which he attaches great value as being far superior to every or any one else's. Obviously we are alluding to the photographer whose exposures are comparatively limited in number, and who cannot avail himself, through considerations of expense, of such conveniences as the professional surrounds himself with. We are not ignorant of the fact that there are many conveniences already in the market for facilitating the development of long lengths of film. Among these may be mentioned the glass-bottomed dish, the width of a spool, and in length equal to a dozen exposures of the smaller or half that number of the larger spools.

Hence extemporised arrangements, as might be anticipated, are in great request, some few of which may be referred to. For the smaller films such as the well-known pocket Kodak we have seen used with great success a very simple arrangement: A glass jar, with upright sides and without flange at the mouth is used to hold the developing solution. Then a glass bottle, chosen of such a width as just to drop into the jar and leave a slight annular space of about an eighth of an inch in width between bottle and jar. The height of this bottle, provided it is at least equal to that of the jar, is immaterial. When a roll of film is to be developed, it is wound round the bottle spiral-wise, and kept in position by two elastic bands, one just clipping the lower corner of the end of the film, and the other the corresponding top corner. A very small quantity of developer is placed in the jar, and the film-enwrapped bottle gently inserted, care being taken to avoid scraping it against the jar edge. The fluid naturally rises till the film is all covered, and here it simply remains with occasional gentle agitation till the development is complete. We should point out that the bottle round which the film is wrapped needs to be partly filled with water, and corked, as otherwise it would not sink.

In a recent issue of our ALMANAC a contributor recommends the use of the indiarubber adhesive plaster (purchasable in spools) for attaching the film to plates of glass. Small pieces are cut off, and, the spools being cut down, the pieces are attached to the plate by using the small pieces of plaster as adhesive clips. We have seen this plaster used in another and very ingenious way. A glass plate was taken, and a band of the plaster (adhesive side outwards) was tightly clipped at each end of one surface of the plate. The film cut into lengths was simply laid upon the glass and pressed to the sticky surface of the plaster, and thus the whole plate was covered with film, and could then be placed in a dish of developer and treated as an ordinary simple dry plate. We may say that the mode of attaching the strips of plaster was by means of small pieces of the same cut off and used as clips. Half an inch overlapped the back of the plate; another half-inch sufficed to attach the long strip firmly to its place at one side, and then similarly at the opposite end. In conclusion, however, it may be asked whether any contrivance at all is necessary. If a strip of exposures be soaked long enough in water, it will lie perfectly flat; and that is all that is desired.

JOTTINGS.

As might have been expected, the suggestion that in future the Exhibitions of the Royal Photographic Society and the Salon should be held under one roof, that, in fact, to quote the charming Mrs. Paula Tanqueray, they should "keep house" together, has fallen flat. Neither party desires to contract such an immoral union. The position is very simple. The Photographic Society doesn't want,

and most decidedly does not need, the Salon; on the other hand, if the moving spirits of the latter concern are anxious for some kind of "fusion," I imagine that the matter could be arranged—but only upon the Photographic Society's terms. And as I take it that these would simply be that the Salon people should submit their photographs for acceptance or rejection at the annual Pall Mall Exhibition, just like anybody else, the chances of a combination are somewhat remote. The Salon would be very stupid to merge itself into the R. P. S.; while, if anybody thinks that the Society is likely to make the smallest advances towards its dissentient offshoot, he is wofully mistaken. Things are best as they are—for all concerned.

While I have the pen in hand, my eye falls upon the last number of the *Journal of the Photographic Society of India*, wherein its London correspondent, a Mr. C. F. Townsend, gossips about the suggested fusion, which, he says, "has raised jeers from the militant supporters of the old Society. One evil-minded person, who writes under the pseudonym of 'Cosmos,' looks forward to the time when he may retire from photographic journalism and go into the tombstone business." I suppose an accusation of "evil-mindedness" is a specimen of Mr. Townsend's fun? So be it; but, if humour is his strong point, accuracy clearly is not, for I have never written anything which could be construed into the expression of an intention to go into the tombstone business, and retire from photographic journalism. A fertile imagination is one of the strongest qualifications for the position of "London correspondent," and in this sphere of journalism Mr. Townsend strikes me as having a grand future before him, if he goes on as he has commenced.

Walking round the Photographic Society's Exhibition at Pall Mall the other day, some of the photographs, notably one or two of the portraits, which it is now the custom to call the "usual thing," struck me as having all the charm and freshness of novelty, after I had passed by the doleful wall of dark frames and low-toned prints which the visitor finds to his left as he enters the room. We read a great deal about the beneficial effect which the Salon is said to have had on the work shown at Pall Mall; but, if the present Exhibition of the Society is supposed to illustrate that influence, who will deny that a very bad example has been set and profited by? Dozens of the exhibits simply out-Salon the Salon as the latter was in its worst days, so that parts of the gallery are about as cheerful to stand in as one might imagine a parish mortuary to be on a wet Sunday afternoon. The present Salon is infinitely brighter and more exhilarating than the Pall Mall show, which is quite calculated to give your old-fashioned photographer what is bluntly called the hump.

But I think the pendulum is on the swing. Everybody is tiring of the reign of ugliness inaugurated by the so-called new movement of a few years ago. The misty-merey-marshy-muddy school has had its day, and only awaits extinction forthwith. As I have said many a time before, the sun sometimes shines even in England, and we might occasionally recognise the fact in our photographs. Then the black or brown-toned print, framed close up in a black or brown-coloured frame, when hung by the dozen on a gallery wall, may have some use in inducing a mental condition such as a devout observer of Lent might wish to cultivate for penitential reasons, but I take it this is not the function of photographic exhibitions. Let us hope that by next year the pendulum will have made a perceptible movement, and that we shall see fewer of the dreary, dismal style of photograph hung on the walls at Pall Mall. Try back, ladies and gentlemen.

Spirit photography has recently occupied a great deal of space in the correspondence columns of that always interesting paper, *The English Mechanic*, and some extracts from it have appeared in these pages. "F. R. A. S." asked for an explanation of the appearance on a photograph of a "supplementary" figure, one not visible or present when the photograph was taken. The many letters that have been published contain, with one exception, little or nothing that can be termed explanatory. The exception bears the well-known signature of the Rev. T. E. Espin, who suggests, from an examination and measurements of a print from the negative in question, that the "spirit" photograph was due to a reflection from a metallic surface in the room, of which the lens took cognisance when the exposure was made. From the purely photographic point of view, an explanation equally simple might, doubtless, be given of the presence of the supplementary figures in all the so-called spirit or psychic photographs that find currency.

As to the implied theory of many of those interested in spirit photography that the appearance of these supplementary or psychic figures on the sensitive plates is to be accounted for on supernatural grounds, I have only to say that it appears to me inconsistent with the exercise of the faculties of reason. The very term "spirit" photography is in itself contradictory. Besides, has anybody ever seen a spirit? If so, where is the testimony? if not, on what grounds are these inferior photographs of ordinarily dressed men, women, and children termed "spirit" photographs? And so on. One might keep on in the same vein over whole pages of this JOURNAL, and at the end who would be wiser? All that has recently been published on the subject does not take us a single step nearer the confirmation of the theory that supernatural agency specially favours "spirit" photographers. Nobody is entitled to claim that the explanation of the phenomena should be sought on any other than photographic grounds.

The name of the late Mr. J. Traill Taylor has been imported into the controversy, and he is credited with the statement, regarding some of these so-called "spirit" photographs, that "no photographer, even if he had confederates and a day to do each picture, could have produced them." I recollect preventing Mr. Taylor being very nearly imposed upon in a matter of this kind some few years ago. A photograph of an alleged "spirit," or aerial, city—a city existing in the atmosphere, so to speak—was handed to him, and he was asked to believe that it was *bonâ fide*, that the camera and the dry plate had photographed a city which had no objective existence. It was simply a view of Bristol, taken from the heights of Clifton, printed so as to have a misty effect, and it came from such a reputable source that, had I not intervened, no doubt would have been cast upon the authenticity of the picture. The late Editor of this JOURNAL was certainly a tower of strength to the believers in "spirit" photography, but I am throwing no disrespect on his memory in saying that, when it came to a test case, in which it was of vital importance that the quickness of the hand should *not* deceive the eye, Taylor was scarcely an ideal detective. In matters of this kind, as all who knew him will admit, the genial and good-natured "J. T. T." was hardly so sharp as a Sherlock Holmes.

Little or nothing concerning this year's Salon calls for comment from me. I will only say that Mr. Craigie, the new Honorary Secretary, missed a fine opportunity for utilising the common sense of which he is known to be the possessor, by not insisting upon the suppression of the Catalogue "Forewords," or at least their thorough revision by a competent hand. I need not quote this painfully stupid production—it is printed in full on pp. 645–6. The affectation of 'orty contempt for photographic science which the "Forewords" breathe, and the implied suggestion that no pictorial photographs are produced save the few that are hung in a charming little room behind Mr. John Roberts's billiard-saloon would be a gross impertinence if the "Forewords" were meant to be taken seriously. On the other hand, viewed as a joke, they have neither humour nor sense; and, as they are unsigned, it looks as if their author was ashamed of them. No wonder. COSMOS.

ACTINOMETRIC PAPERS.

BEFORE the recently held third International Congress for Applied Chemistry, Dr. Andresen read a valuable paper on the actinometry of sunlight, in which he pointed out that Bunsen & Roscoe's method has, till quite recently, been accepted as the best, and is that which has been most generally used; but we know from the present state of science that this method really only measures the actinic properties of the violet and

ultra violet rays. Andresen determined to prepare a paper which should keep well, should print out, and yet have the maximum sensitiveness for any particular region of the spectrum, and the following is a *précis* of his paper on the subject:

The normal silver chloride paper prepared by Bunsen & Roscoe has, in consequence of the ever-present excess of silver nitrate, very poor keeping qualities, and therefore Abney's normal paper, in which the excess of silver is removed by washing and the blackening induced by the presence of sodium nitrite, was used.

Andresen tried various chemical sensitisers, and found that, as regards the intensity of the blackening, they might be arranged in the following order:—

Hydroquinone.
Sodium nitrite.
Pyrogallol.
Potassium metabisulphite, } Approximately equal.
,, oxalate, }
Ferrous sulphate, }
Sodium sulphate.

Sodium nitrite was chosen, however, because it is much more stable than hydroquinone, which gives the greatest blackening, and because it could be distributed in the paper better.

The normal silver chloride paper of Bunsen & Roscoe is, as has already been pointed out, very sensitive to the violet and ultra-violet, but almost insensitive to the less refrangible rays. Silver bromide paper, prepared in the same way, shows, however, a totally different spectral sensitiveness, the maximum being between F and G, and it is therefore more suitable for the preparation of a paper which could be sensitised for the less refrangible rays.

Andresen employed the principle of orthochromatising, first suggested for negative plates by H. W. Vogel in 1873, on which is based at the present time the preparation of all colour-sensitive plates, and from a number of experiments he has found that the following dyes sensitise for the particular colours:—

Chlorophyl	for	red.
Rhodamine	,,	yellow.
Rose Bengal	,,	,,
Erythrosine and eosine	,,	green.
Auramine	,,	bright blue.

The normal paper is prepared as follows: Raw paper is bathed for five minutes in a solution of 61 grammes of potassium bromide in 1000 c. c. of water, and dried, and then, in ruby light, floated for two minutes on a twelve per cent. solution of silver nitrate. This paper has a maximum of sensitiveness in the spectrum between F and G. The paper is now washed, without drying, in order to remove all soluble salts, and is then bathed for five minutes in a solution of—

Water	200 c. c.
Sodium nitrite	6 grammes.
Sol. rhodamine B (1 : 200 alcohol)	8 c. c.

and it is then dried in the dark. This paper has a distinct maximum for spectral yellow near the yellow D line.

The other dyes named above are used in the same manner with the exception of chlorophyl, which is insoluble in water, and in this case the paper is bathed in an alcoholic solution of chlorophyl for five minutes, and then treated to the sodium nitrite.

To prepare the chlorophyl solution, old leaves of the rhododendron were cut up into strips from 2 to 3 mm. broad, and covered with ninety-six per cent. alcohol, and allowed to stand for two days with constant shaking.

With the exception of the chlorophyl paper, these dyed papers show in a most striking manner an enormously increased sensitiveness in that region of the spectrum to which they are sensitised, and they are more readily affected by the less refrangible rays than the blue and violet.

All the papers keep well, and Andresen has used one-year-old paper without noting any loss of sensitiveness or deterioration.

FOREIGN NEWS AND NOTES.

The Paper Ring.—The *Photographische Chronik* publishes an article by F. Stoltze, discussing the present situation. Our readers will remember that we drew attention to the competition the Ring might expect from the combined action of Scherings and F. Schoeller junior, who had taken up the manufacture of photographic paper, and produced a suitable material, which they offered at lower prices. F. Stoltze, after expressing his fears that the new manufacturers may think it to their interest to join the ring, or enter into other arrangements with them, takes exception to the fact that the new firm should be associated with Scherings, who are manufacturers of celloidine paper. Other makers must consequently buy their paper from a firm in which an important competitor is interested. He also inquires by whom the new paper is coated with baryta? The three firms who have hitherto done this work are tied to the ring, and, without some information upon the point, what guarantee is there of the suitability of the baryta substratum? Stoltze strongly advocates the desirability of an independent paper supply, where photographic manufacturers may obtain their material at first hand. The business is important and lucrative, and it is a pity that some of the large paper-makers in England do not face the difficulties connected with the manufacture of photographic paper and win the business for this country.

Collodio-chloride Paper.—Frequent complaints are seen in the German photographic press concerning the instability of collodio-chloride prints, and P. Hanneke draws attention in the *Photographische Mitteilungen* to many possible causes. Although a collodio-chloride print will resist the action of sulphuretted hydrogen for a considerably longer time than albumen, it is none the less the fact that finished collodio-chloride prints of apparently high quality will sometimes turn yellow in a few days, especially if exposed to light. Hanneke is of opinion that chemical analysis of the prints is of little use for discovery of the cause, and that it is preferable to study the manufacture of the sensitised paper. If the emulsion is prepared with much alcohol and little water, a very bright surface is obtained, but at the expense of sensitiveness and toning quality; consequently the paper has less keeping quality. The same faults are observable if too much castor oil or glycerine is added to the emulsion. If the paper is too thinly coated with emulsion, the surface is less brilliant and the prints show scarcely any tendency to curl in the toning bath; but, unless used quite fresh, the paper prints bright red or pale brown and refuses to tone. The same characteristics are apparent if the paper is not properly dried after coating. If the proportion of silver chloride in the emulsion is large and the excess of silver nitrate small, the prints will lack vigour. On the other hand, a small proportion of silver chloride and a large excess of silver nitrate will give hard prints difficult to tone and with bronzing of the shadows. But a peculiarity of the process is that the emulsion defects are not very perceptible if the paper is used fresh, yet sooner or later it will be seen that the prints are not what they should be, and notwithstanding the most careful toning and fixing they will turn yellow. Such faults in the emulsion affect the permanence of the print and the keeping quality of the paper. There are also other possibilities of fading connected with the *baryta substratum* and the quality of the paper. It is, therefore, necessary that the manufacturers and users of collodio-chloride paper should exercise the greatest care.

Patent Rights.—Dr. H. W. Vogel draws attention, in the same publication, to a recent decision in the German Courts concerning the German patent rights of the Auer Incandescent Gaslight Company. Some thousands of pounds have been spent in litigation, but the Company has been defeated by its competitors on technical grounds. It appears that the mantles have been much improved by Auer by the addition of one to three per cent. of cerium oxide to the thorium oxide, which has raised the lighting power from 15 to 50 or 70 candles. The Court acknowledges that Auer made the discovery; but, as the German Patent Office would not recognise its importance, it has been decided that this improvement is not protected in Germany. We often hear complaints concerning the ease with which patents may be obtained in this country, but it is open to question if the inventor is given more encouragement under the German law.

Electricity and Light.—The *Deutsche Photographen Zeitung* refers to Professor Karl Zickler's improvement in telegraphy without wires. One of the drawbacks to Marconi's system lies in the fact that the messages may be read by any one possessing a receiver. Professor Zickler utilises a remarkable property of the ultra-violet rays. Hertz observed that these rays possessed the power of establishing a current between two electrodes which were otherwise too far apart. Zickler furnishes the transmitting station with a powerful light, rich in ultra-violet rays, preferably an arc light. The light is collected by means of a quartz lens and directed upon the receiving apparatus by a second quartz lens. The receiver consists of a disc-shaped cathode, inclined at an angle of 45° to the rays, and

reflects them upon the anode. Consequently cathode, anode, and path of discharge are illuminated; and, if the electrodes are connected by means of a Ruhmkorff coil, they are discharged when ultra-violet light is transmitted. The discharge may be interrupted by interposing a glass plate at any point in the path of the light, as it absorbs the ultra-violet rays. As it is impossible to see these interruptions, only the person at the receiving apparatus can read the messages.

The Ammonium Persulphate Reducer. — Dr. E. Valenta communicates to the *Photographische Mitteilungen* the result of his experiments with this salt, and strongly recommends it for hard negatives where the high lights are too intense. Messrs. Lumière recommend a five per cent. solution, but Dr. Valenta thinks a two per cent. solution preferable. The action of the reducer may be arrested immediately by immersing the plate in a solution of sulphite or hyposulphite of soda. The stronger solutions of persulphate have a tendency to attack the gelatine film and produce frilling. As an illustration of his remarks, Dr. Valenta publishes two photographs. The negative was taken in bright sunlight, and the prints made before and after reduction with persulphate. The detail in the high lights is preserved, whilst the shadows are much more transparent and show detail, which was lost in the over-printing necessary to obtain detail in the high lights.

The Latent Image.—A very interesting article upon this subject appears in Dr. Liesegang's Photographic Almanac. The author, Dr. Richard Abegg, after referring to the researches of A. and L. Lumière and Dr. Anderson concerning developers, pertinently inquires why certain groups of substances have the power of development, whilst others resembling them in a high degree are quite useless for the purpose. Bredig has recently shown that the action of retainers depends upon their power to reduce the solubility of bromide of silver. Dr. Abegg thinks that the solubility of silver bromide, although but slight, plays an important part in the nature of the latent image. It is also apparent that the ripening process is closely connected with the question. Ripening seems to indicate a process in which the silver bromide passes from an amorphous (or perhaps partly colloid) to a crystalline modification, differing in solubility and capacity of reduction. The growth in coarseness of grain also harmonises with the crystalline structure of the ripened bromide, and the acceleration of the process, brought about by ammonia and the alkalies, is certainly remarkable. The theory of the formation of a sub-bromide is purely hypothetical and has never been strictly proved. Whilst leaving it an open question, the author thinks chemical practice points to its improbability, because chlorides, bromides, &c., are more easily reduced than their corresponding subsalts. It may be assumed with equal probability that exposure brings about reduction of silver. It is only possible to make surmises at present concerning the process of development; but it suggests to the mind a species of action of three substances in contact—the original silver compound, the developer, and metallic silver—resembling a galvanic element, on the lines of Lermontoff and Eder's experiments. It would almost appear probable that development is dependent upon the presence of free silver, as recently stated by Guébhardt, who ascribes the sensitiveness of rapid plates to the presence of slight fog caused by ripening, independent of the action of light.

PHOTOGRAPHIC POSSIBILITIES IN ILLUSTRATING.

Without the aid of photography, the markedly high success of the modern cheap, and—to prove the usual exception to the rule—good magazine and illustrated newspaper could not have been achieved. The question as to whether the older or newer methods of illustration be the more artistic need not here be entered into, both have their peculiar good points and both their drawbacks; suffice it that, amongst the former belonging to photography, eminently suitable in this particular sphere, are cheap and rapid production, features of the first value in meeting the demands of the reader of to-day for illustrations to supplement in the quick grasping of descriptions and news. If photography, however, is to hold a leading position in this field, it will have to keep pace with advance in other allied branches. The recent real war marches in the Soudan, for instance, were followed almost as readily and closely from day to day as the sham ones upon Salisbury Plain at the same time, and their culmination at Omdurman, reported in a phenomenally short time after the battle had been fought and won. Sketches and photographs had to take a time-consuming mode of reaching us, and, although studied with very keen interest, how much keener would it not have been had it been possible to have published them with the first descriptions! The not distant future will find this problem solved, and an illustrated first account of a distant event made practicable. The transmission of simple sketches is already possible; that of the ordinary photographic negative, with its detailed and truthful representation, must, in the natural course of things, duly follow. Regarding the negative as a surface giving a picture, due to a varying and graduated thickness of chemical film, could this be delicately charged with electricity proportionately to the gradation in it, we would have the germ of a possible way of transmitting the picture. The future correspondent way thus very conceivably, by placing his negative in contact with a prepared plate at a transmitting instrument, be able to ensure its faithful reproduction at the receiving end upon a sensitised surface in contact with a duplicated plate of that of the transmitter. Indeed, we may logically, and with the eye of scientific faith, look beyond, and anticipate such a transmission of even the undeveloped negative; or, further still, when a camera and its electric attachment, fixed at one end of a charged wire, will be sufficient without a plate at all, for the telgraphing, or tele-photographing, of scenes and incidents to any distance; and, as wireless telegraphy has been proved practicable, who knows whether, in the case we are suggesting, the wire may not be dispensed with also, and a——; but this is rising a little unduly, possibly, to the probabilities of a too distant future; let us return instead to the soberer ones of the more immediate future. With respect, for instance, to the transmitting of the undeveloped image, do we not know this latent image to be impressed upon an exposed plate in all perfection, and also that our methods of making it visible are very crude and rough? Is it not fair to argue that, with very much finer tools, we could treat that image as readily, short of the stage of visibility, as afterwards? One such tool will certainly be found upon the electrical side; it has proved so in all other scientific directions, why should the photographic side prove an exception? Indeed it is rather strange, when one comes to think of it, that no connexion has yet been made at all between the domain of the photographer and the electrician.

Such an application of transmitting pictures offers very pleasing ground for the imagination in a cinematographic direction. Speed and comfort, I think it will be admitted, are two main essentials figuring throughout the strained and nervous life of to-day, whether at home, travelling to business, in the conduct of that business, or in the pursuit of amusement and pleasure. It applies as markedly in our reading, whether of newspaper ready cut, with recent events and items from distant corners of the world served at their hottest; in the magazines with their short meaty articles; in the crisper, snappier, spicier tone of literature in general. It may be bad for the literary stomach, that is not so much the question, as that the demand for this type of food is an increasing one, and will be met yet more fully by brainy enterprise. The future newspaper will as a result be probably laid on like the water and the gas; and the subscriber connected, by wire or otherwise, with headquarters. By means of a combined telephonic and phonographic instrument he will then be able, by turning a switch, to have recited to him in bed, or at breakfast, the news of the day; have the leading articles or what will then correspond with them, in the actual voice of their writer or talker, for instead of writing them he will have enunciated his opinions against a phonographic cylinder, subsequently set revolving noiselessly in the engines in the basement of the news-distributing offices. Now, illustrated newspapers and enterprise will surely not be behindhand, but by advance along similar lines be prepared to give, by means of a portable tele-photoscope in front of a screen, or prepared side wall of a room, living pictures of the events of the day. The assembled family will thus have at home, the representation of the laying of a foundation stone by royalty, a wedding at a fashionable church, or burial at a fashionable cemetery, the sitting of Parliament over night, the Derby, the boat race, or what not—even to the pictured destruction of a fleet, or the details of a battle fought upon the desert confines of the Empire, to the accompanying descriptions of correspondents on the spot.

Thrice happy photographic science and art, that must prove one of the most important factors in such a glorious accomplishment. J. Reed.

NOTES FROM THE WEST OF SCOTLAND.

The Lizars Exhibition came to a close on Saturday week. From first to last this function has been a brilliant success. Finer weather could not have been desired during the fortnight the Exhibition lasted; in fact, there was not a rainy day or night during its continuance, and this, no doubt, helped to augment the large crowds who eagerly clamoured for admission nightly to the lecture hall. It is computed that something like 20,000 persons visited the Fine Art Institute during the twelve days the Exhibition was open to the public. Towards the close, indeed, the crowds were almost unmanageable, and, on the two concluding nights, special provision had to be made to cope with the enormous rush for admission.

There is no doubt that amateur photography in the West of Scotland will have derived considerable benefit from this display of work, gathered

together as it was from all parts of the United Kingdom. The money prizes were of considerable value, and the decisions of the Judges, with perhaps two or three exceptions, gave general satisfaction.

A very strong feeling is expressed in Glasgow that something should be done in the matter of forming a Photographic Institute, on lines similar to those of the Fine Art Institute, and which could arrange for an annual photographic display of apparatus and work during the months of October or November, or prior to the painting exhibitions generally held at Christmas.

The number of amateur workers in Glasgow and the West of Scotland is now very great, and, were a strong body of gentlemen formed, an annual exhibition of photographs, accompanied with limelight lectures, would be a financial success, without doubt, for this form of entertainment has clearly caught on in Glasgow, and only waits for the proper people to move in the matter.

What must be termed a clever bit of work in photography was performed in Glasgow last week on the occasion of the visit of the Patti Concert party to Glasgow. Two local experts were asked to photograph the entire audience during the time that Madame Patti was singing the second verse of "Home, Sweet Home," the one working from the back of the area in St. Andrew's Hall, the other working upstairs from the back of the balconies. A vast concourse of people was present, as usual on a Patti night, and it is most gratifying to the operators that they both succeeded in their attempt. Their results will shortly be shown in the shape of process-block reproductions in several of our illustrated periodicals. At an early date we hope to give our readers an outline of the *modus operandi* of this little bit of work. We believe it is the only occasion, in Glasgow at least, upon which such an undertaking was executed without a special installation of artificial light.

A local professional photographer has just invented and patented a machine for printing in vignette form, by means of bromide paper and artificial light, and shows some excellent results obtained with the machine. Hitherto the obtaining of nice soft gradations in the vignetting of ordinary negatives, when printing on any of the bromide papers by means of ordinary artificial light, has not been an easy matter, even although special printing frames, provided with diffusing screens, have been used; and the inventor, Mr. Willie Anderson, of Partick, claims that thousands of prints, in every way identical in appearance, are easily obtained with this machine. We understand Mr. Anderson intends, at an early date, to show the working of the machine before our various photographic societies.

Glasgow's leading amateur society held their first meeting this week, and they are having an enormous addition again this year to their roll of membership. No doubt the fillip given to amateur photography in the West of Scotland by the Lizars' late Exhibition has something to do with this large increase in the number of applicants for admission, for we understand all the other societies in Glasgow have likewise received a similar demand for admission as members.

The new President of the West of Scotland for the coming season is Mr. Cameron Todd, a gentleman who has taken a great interest in photography for many years, and who is perhaps one of the best workers in fruit and flower studies we have at the present day. Mr. Todd was a prominent figure at the recent Convention meetings, and his elevation to the coveted position as President of the West of Scotland Association is being very popularly received.

Much regret will be felt among a large number of photographers, as well as those taking an interest in lantern work, at the serious indisposition of Mr. James More. For many years Mr. More held what may be termed a unique position in the West of Scotland in connexion with limelight projection, and his services in this respect were always eagerly sought where any important function was concerned. The able manner in which he carried through the limelight arrangements for the two International Photographic Exhibitions, held in Glasgow under the auspices of the Glasgow and West of Scotland Amateur Association, will long be remembered by those who had an opportunity of judging of his ability. During these two functions alone something like sixty limelight lectures were delivered by entirely different lecturers, but not a single hitch from first to last occurred under Mr. More's expert manipulation. Some time ago, when travelling in England, Mr. More caught a severe chill, from which, we regret to say, he never recovered, and his business in Renfield-street has been recently acquired by Messrs. Rae Brothers, of Glasgow.

There was a very large addition to the roll of membership of the Glasgow and West of Scotland Amateur Association at their recent meeting. The position of this Society is now a very strong one, both financially and as regards its membership, and before long some steps will require to be taken for increased accommodation.

The *Evening Times* Camera Club have been trying what may be termed a fresh departure in the shape of a sale of work, the object being to aid the Society's funds. There was a large attendance in the Masonic Hall on Friday, the 21st inst., when Baillie Sinclair opened the proceedings, and good business followed.

The cinematograph craze is quite as popular as ever in Glasgow again this winter, and all opticians who cater ror this form of entertainment are having a busy time of it. The battle of Omdurman is promised at one of our bazaars at an early date.

WORKING UP NEGATIVES.

Before the Kingston-on-Thames and District Photographic Society, on October 19, a lecture was given by Mr. Albert Hill, one of the founders of the Society, on the "Working up of Negatives." After dealing with the better-known methods of correcting faults in the balance of light and shade in a negative by means of local intensification and reduction, the lecturer described his own methods of working, which contained many novel and effective ways of obtaining the modifications desired. Any means of "faking" which the ingenuity or skill of the operator could devise were, in his opinion, perfectly legitimate, provided the eleventh commandment were broken, namely, that "Thou shalt not be found out;" or, in other words, that the faker's labours remain undetected in the print. As a means of reducing the contrasts of an under-exposed negative, he was of opinion that rubbing with methylated spirit was far preferable to the use of chemical reducing agents, and, to bear out this statement, a negative was handed round in which a perfectly opaque sky had been transformed into a very natural and pleasing cloud effect by a little judicious rubbing with a piece of "Selvyt" or white cotton velvet dipped in spirit. The lecturer pointed out that rubbing had no effect whatever until the spirit had three parts evaporated, but at this point the friction set up wore away the gelatine, thereby reducing the thickness of the silver deposit. A simple means of filling up a pinhole was next described. The spot to be filled in was first pricked or stabbed with a sharp needle, and a pointed crayon drawn across the incision in every direction. After the plate was dusted, the pinhole was found to be completely obliterated by the powdered crayon which remained in the hole pierced in the gelatine.

Several new members were elected, and the Secretary announced that the Society now had a membership roll of over one hundred.

STEREOSCOPIC PHOTOGRAPHY.

Before the Photographic Club, on October 19, Mr. John Nesbit delivered the first of the "beginners' night" lectures on "Stereoscopic Photography." Recent developments of photographic science and its appliances are now so engaging the interest of the public, that to a large extent the enthusiasm once accorded to stereoscopic photography has been superseded by neglect. At one time such was the popularity of this branch of photography that nearly everything was taken in binocular form, until quite a repletion of this class of production was the result. Then came an important rival in the *carte-de-visite* craze, which latter in turn has suffered in presence of stronger claimants to our favour. "The purpose of this lecture, however, is to impress upon you that there is still a vast amount of pleasure to be obtained by varying our usual methods, and to point out some of those niceties which attend the production of good stereo work. The camera shown is adapted to all sizes up to whole-plate, but this equipment is certainly too elaborate for a beginner. It is recommended therefore that a camera of half-plate size, with movable division, be adopted. This, with three double dark slides, will give, say, two half-plates, four large quarters, and two stereos, or any variation desired. The reason for selecting a plate of $6\frac{1}{2} \times 4\frac{3}{4}$ dimensions is, that such a camera is readily obtainable and allows of ample margin in after trimming. The camera front must allow the lenses to be $2\frac{3}{4}$ inches apart, and it is an advantage to be able to separate them a further quarter of an inch for general views; but for portraits the closer measurement is found best, while for very near objects the lenses should be approximated still more. An additional front will be required to carry the lens for the full-plate work, unless a provision be made to slide one of the lenses to the centre of the front. A focus of six inches for the lenses will be very serviceable, and if accurately paired and fitted with iris diaphragms, working precisely to the marking on the mounts, as do the Ross portable symmetrical lenses on the camera shown, much trouble will be avoided. Two double shutters—one by Newman & Guardia, and the other home-made—are shown. The latter is adjustable for varying separations of lenses, and no shutter should be rigid in this respect, for the before-named reasons.

"As regards the printing of the negatives, if proofs be made from the negatives as they are, the results will be pseudoscopic when viewed in the stereoscope. Here is an example of incorrect mounting, expressly done to show the effect. In order to get the true effect of solidity, the prints must be reversed on the mount, carefully noting which is to be right and left by an indication on the back of each print. Here is a picture, the two halves of which are not trimmed to the same base line. Such a print cannot be brought to coalesce properly, so that the question of exactness of level is important. Vertical edges may differ slightly, and indeed be so cut that a little more is visible on the left side of the right-hand picture than the other. This is seen in the picture shown, and the effect is to throw the view behind the mounting card, with an improved result. The idea entertained by some people that two identical pictures mounted side by side will give the sense of relief is very erroneous, and may be seen at once by examining the print so made. Regarding the dimensions of the cards, the smaller is most usual, but with a suitable instrument a picture of four inches in height does not unduly strain the sight. The width, however, should not be increased. Here are some

transparencies made from whole-plates reduced in a binocular copying camera. This system renders needless the reversal of the two portions as in paper printing. The reasons for this fact have been explained in optical treatises, notably by the late Mr. Traill Taylor. Subjects specially suitable for representation stereoscopically exist in plenty, and no one can fail to appreciate the beautiful effects which can be obtained by this delightful branch of photography."

At the conclusion of his paper Mr. Nesbit passed round many of his pictures, which, with the aid of several stereoscopes, were seen and appreciated by the meeting. He found that, of four prints handed to him for criticism as commercial articles, two were bad, in one case the pictures being of unequal size, and in the other the lens cutting off the sky. He gave it as a general rule that, the more distant the view, the greater the separation of the lenses. Occasionally, as in the case of pots of flowers, not more than an inch need separate the two points from which they are taken. His attention was drawn to the enormous relief shown by one of the Daguerreotype slides, which was not so marked in the paper prints and transparencies. This was caused by excessive separation of the lenses of the camera.

Mr. E. W. Foxlee showed a Daguerreotype illustrating the effect of too great separation of the lenses in a marked manner. He also had an albumen transparency of a view of Paris. He believed he was right in saying that one of the pair of pictures was taken from one tower of Notre Dame, and the second from the other tower. The result was to present Paris as a cardboard model, so great was the separation of the points from which the stereo was taken.

In proposing a vote of thanks to Mr. Nesbit, the hope was expressed by Mr. Bridge that his remarks would lead to the better appreciation of the beauties of stereoscopic photography, and its wider practice.

AN EDITORIAL IMPRESSION.

By a Worldly Photographer.

Scene.—Editor's *sanctimonium* (shortly after midday). Editor discovered writing.

Editor (soliloquises).—So that cab has gone at last. Phew! (Opens the window.) How it ever got there beats me altogether. And a parson, too! Thought parsons never indulged in the vanity of cabs; must have been mistaken. Let me see, where is my pet inkpot? That boy must have moved it, and I have yet much to do. (Rings.)

Boy.—Did you ring, sir?

Editor.—Bring me my inkpot, the one that holds a gallon and a half. I have much to splash—I mean write—and, stay, if Mr. B. calls, say I am reading it over, and will give him my opinion next year, and I will see him at his Grace of York's to-night at nine.

Boy.—Yes, sir. (Brings in an A[1]-sized double-barrelled German inkpot, and puts it down very seriously.) Anything else, sir?

Editor.—Not at present. (Thinks.) Smart boy that; should swell the noble army of bad photographers some day. Now for those pars. (Writes.) "The present status of the modern school of photography is in a position deeply to be deplored, not only on account of the want of knowledge of technique shown by its exponents, but more especially owing to the utter falsity manifested in the delineation of its ideals. This is exemplified by"—— (Stops: soliloquises.) Dear me, how extraordinary! Nearly one o'clock. I must leave off and look through those proofs of the Salon for the printer before lunch. (Rings. Enter *Boy*). Anything from the printer, boy?

Boy.—Your proofs, sir.

Editor (looking at proofs).—Eh? What is this? (Reads.) "The greatest art is the art of concealing art." "No respect for the media in which they work." Bless my life, that is rather strong (takes up blue pencil), but true, quite true. (Lays down pencil again.) Just my own opinion, only differently expressed. I'll let it go.

After reading for some time, calls for *Boy*. (Enter *Boy*.)

Editor.—Bring me the catalogue of the Salon and those Press slips again.

Boy.—Yes, sir. (Brings them.)

Editor.—Reaches last catalogue of Salon, refers, finds a number wrongly quoted, corrects it, and proceeds as before, then finishes proofs, and at the end pauses and thinks. "No reference to those slips for the use of the Press—slips of the tongue, many of them—nor that tea-chest, nor the biscuits—that takes the cake! Now, if this scribbling idiot had talked about the Mazawattee (pause)——It wasn't badly served either, and those girls in their caps reminded me of something in Ingoldsby—let me see, what was it (goes to the bookcase, takes down a dilapidated old Ingoldsby, and reads from the *Jackdaw of Rheims*). Yes, the cap fits beautifully; I'll just transpose a little of that for amusement till the next proofs arrive. How's this?"

(Parody.)

"And six little waiting maids, dear little souls,
With nice fresh faces (quite free from moles),
Came in order due, two and two,
Marching that picture gallery through.
A nice little maid held a silver ewer,
Embossed and filled up with milk as pure
As any that's sent out from Switzerland, sure."

A knock at the door (Editor starts and crumples up paper).—Well?

Enter *Boy*.—Please, sir, the Editor of the *Photo-chemical Tell it 'em-in-once Gazette* sends his compliments, and wants to know if you will kindly give him the answers to these questions. (Hands in five sheets of foolscap containing questions.) The messenger is waiting for an answer, sir.

Editor (reads).—Frowns and ejaculates: Confound his impertinence; he wants the benefit of my experiments and experience for the last twenty-five years boiled down for him in twenty-five seconds, and all for nothing. *To Boy.*—Wait, I'll write (writes): "The Editor of the *Mud-cum-splosh Weekly Guide* presents his compliments to Mr. Pumpington, and regrets his inability to answer his questions at the moment; but if Mr. Pumpington will refer to the articles on the subject in the pages of this journal for the past twenty-five years, he will, doubtless, obtain all the information he desires." (Gives letter to *Boy*.)

Editor (thinks).—There, I wish him joy of his search. Only imagine it! wanting to suck my brains for the benefit of his readers, indeed. (Sighs.) Ah, well! he's not the only one by many, worse luck; we poor editors are expected to answer everything provided it comes from a pal or through the inquiry column. Now I'll go and have my steak and oysters at the Cheshire Cheese.

Enter *Boy*.—The printer has sent to say, sir, he wants 50,000 more words by four o'clock, sir.

Editor (staggered).—What? Oh, he's mad! (Goes and interviews the printer's d——l, and learns that he wants 500 more words by next morning.)

Editor walking away happily to lunch when *Boy* stops him again.

Boy.—You are are wanted at the telephone, sir.

Editor (goes to the instrument. Hullabaloo.).—Who are you? (Listens.)

"Sir—face."

Editor.—What does he mean? (Shouts.) Who? Oh, I see, Surface. How are you, old man? Thought you had gone back; enjoyed the shows? So glad; nice little thing that snow scene of yours. What? Can't hear. *Suicide! Cut it down!* What does the man mean? Oh, yes! Suicide to cut the print down; yes, quite so. I thought you said your printer had committed suicide and you had cut him down. Call in before you go. What's that? Oh! (Smiles.) Those press slips—you think so, do you? Well, it *was* a bit stiff; I own it. (Rings off and thinks.) Dear me, *Editorial Federation;* I wonder how it would work? Good thing to discuss with B. to-night. (Goes to lunch.)

FIXING AND FINISHING PRINTS.

I suppose many of us stick to P.O.P. and albumen prints simply by mere force of habit, for it is impossible to regard either of them as ideal printing processes or as likely to last the ages. However, pending the arrival of that perfect process the nimbus or aureola of which is barely discernible above the photographic horizon, we must do the best we can with that nearest to our hand.

The problem of toning the silver print without the errors incidental to the sulphocyanide bath has been pretty well solved. The gold, plus sulphocyanide, plus sulphite, will now lay the ghost of double toning very effectually.

The popularity of single-solution toning and fixing baths is astonishing, and I think deplorable. From the seller's point of view it is all right, and the users are not, in the bulk, to be taken seriously, but any amateur who aims at something beyond a little evanescent work with the camera should avoid combined baths. This leaves us still face to face with the discomforts attending the washing of the prints and the elimination of the fixing salt.

Photographers in the old days of albumen were wont to use the washing tub or an old cask for this business; that is to say, having a batch of a hundred or two prints just out of the fixing bath, you would put them in the tub, turn on the water—a simple siphon arrangement, which often failed to work, would give the thing a semblance of the laboratory—and here they would remain from night to morning; if disturbed at all, it would be by taking them out in the gross, squeezing them in a cloth, and returning to the tub to disintegrate at leisure. Some of the prints would be reduced literally to rags, but many survived, and are still on view, such as they are, in our family albums.

I have always taken an interest in those clever articles which tell us exactly (though it is not a difficult thing to calculate for oneself) how much silver there is or should be in a cabinet print and how much hypo is required to fix the same, also how much water is necessary to remove the hypo. It is nice to know all this, though the information is more for the laboratory than the average photographer, who, with that excellent manual of Jabez Hughes on his bench cannot go far wrong; it is easy to forget chemical figures and formulæ, but such sentences as "fixing bath, 4 oz. hypo to the pint, prints to be kept therein not less than five, and not more than ten, minutes," do not readily fade from one's memory. One of the first things I noticed in the washing of albumen prints was, that if they were washed individually and collectively in several changes of water, then allowed to remain for a time in a large dish of water, they gradually rose to the surface, presumptive evidence that the washing had been complete. Nothing then remained to be

done beyond the separation and rinsing of the prints prior to drying. P.O.P. prints do not always behave in this way, the paper is usually so loaded as to prevent it remaining anywhere but low down in the dish; but the incident is worth noticing, and shows that the first consideration in selecting a washing dish is to have one of more than average depth and with a false and perforated bottom; as a matter of fact, the old-fashioned circular siphon washing dish has more common-sense points about it than will be found in some of the newer products of the last few years.

A very important point in the treatment of prints is the use of a clearing bath. I am strongly of opinion that the use of such a bath is very essential if we wish for prints of any permanence. As a clearing bath pure and simple there is really nothing better than the modification of Howard Farmer's reducer, so generally in use for over-printed proofs. Does the use of such a bath as this affect them injuriously with reference to their permanence? I do not see why it should be so; but, if there is a doubt about the matter by reason of this complex chemical equation involved, why not use alum? a simple solution of alum one ounce to the pint was recommended, if I am not mistaken, by Captain Abney years ago as an eliminator of hypo, and there is no doubt that by its use not only may the time taken up in washing (as usually prescribed) be considerably reduced, but the prints themselves are the better in every way and more likely to last. A suitable and modified bath as referred to above can be made (I insert this for the benefit of the newer readers) of—

Hypo solution (1·5)	2 ounces.
Water	20 ,,
Ferridcyanide potassium saturated solution...about	5 drops.

Now, supposing that a batch of fifty half-plate prints have been properly fixed for the requisite time, *i.e.*, not less than *five* and not more than *ten* minutes, they are dropped one by one into fresh water, and from this, *if used*, into the modified reducer; in this bath their stay should be brief, say, from one to two minutes at most in the ordinary way; thence to fresh water, and, in fact, to as many changes of water as can be accomplished in half an hour. At this stage two washings and soakings, each of half an hour's duration, in fresh water and in a dish with a false bottom, is enough to complete the due washing of the batch.

With alum, I divide the time, which is also somewhat reduced, nearly as follows:—

1st washing	10	minutes,
2nd ,, ...	5	,,
3rd ,, ...	5	,,
4th ,, ...	5	,,
5th ,, ...	5	,,
Alum bath	10	,,
6th washing	20	,,
7th ,, ...	10	,,

while the eighth wash or bath is devoted to the finishing of the process, which means that each print is carefully gone over with a tuft of wet wool and once more rinsed before removal to the drying board. In brief, my experience is, and I have used ordinary chemical tests, that this treatment represents a practically efficient washing, and that anything beyond is mere superfluity. J. Pike.

PRODUCING RELIEF PICTURES WITH THE AID OF PHOTOGRAPHY.

The process due to Herr Pietzner of Vienna is one for the production of relief photographs on ceramic articles of all kinds; also on glass, paper, silk, and the like, in all colours; and particularly of portraits and landscapes; further, of pictorial representations on porcelain, terra cotta, pottery, "cydesolith;" and also on extensible and flexible materials of all kinds.

The process is characterised essentially by the fact that the ceramic mass which is to constitute the relief is applied on a suitable backing or foundation which is shaped according to the outlines of the picture; then with the aid of a "pigment print" it is modelled, and it is then covered with the picture which is to be represented. This covering with the picture is effected according to this process either by means of pigments or other pictorial representation, or, if the picture is to be burnt in, it is effected by means of a picture in enamel colours.

In carrying out this process the procedure is as follows:—

The photograph or the picture is cut out to the outlines which are necessary to be shown in relief, upon a suitable backing or foundation.

The method of doing this which is preferred is to place or paste the picture upon a thin plate or sheet of metal or clay (or, of course, the picture may also be drawn upon said plate or sheet), and then to cut it out in ou line. If desired, cardboard or fret-sawyer's wood may also be employed as a backing.

The outline picture thus produced is then coated with a ceramic mass (modelling clay) to the thickness of the desired relief, in such a manner that said coat shall be bevelled off towards the edges and terminate with the outline. Then preferably a pigment print is placed upon the same, outline to outline, and from this the lines and shadows are worked with the modelling tool. The pigment print serves, of course, only for the purpose of facilitating the modelling operation and of enabling the exact forms and lines to be imparted to the model, so that it does not matter if the said print gets damaged; in fact, the print must be washed off again when the picture has been completely modelled, but preferably only after the model has become dry.

In the case of ordinary relief photographs on silk, paper, or other materials, the photograph or design is transferred to, or imprinted upon, the material by any of the well-known processes. This print is simply cut out so as to leave a border of ½ to 1 centimetre projecting beyond the outline. Then the print is coated on its rear side with paste, gelatine, or other adhesive agent, and it is laid upon the model referred to above, outline to outline, and it is then pressed down carefully by means of a moist pad. Preferably the picture should not be moistened too much before applying the adhesive agent to it, because otherwise the material will stretch or expand at first, and thus it may possibly happen that the corresponding parts will not coincide, so that it is preferable that the moistening shall only be done when the picture is being pressed down with the moist pad. It is also desirable to employ the thinnest possible materials for the picture, because this has the result of causing the relief to appear more plastic and with more effect when dry. The projecting border is then turned over tightly and pasted over the back of the foundation. Any incorrect shape in the outline can be very easily corrected, when dry, by pressure or by filing. The modelling mass may be mixed with a little gelatine or albumen ("white of egg") and the like, for the purpose of ensuring a homogeneous union between the model and the picture.

If the reliefs are to be employed for ceramic purposes, the procedure of their production is exactly the same as that above described, but the finished relief model is not only dried, but it must, above all, be cleaned from the pigment print; this is best done by washing, after which, of course, the model must be dried again and be burned once. Then a so-called photo-ceramic enamel-colour picture is produced by means of the well-known iron-dust process, or transferring process for burned-in pictures, and said picture is transferred on to the model in the same manner as above described. But in this case no paste is used, but an adhesive medium is used which is capable of being burned in. Further, the pad for pressing down the picture must in this case not be made too wet, and any damage done can be very easily retouched with the same material and with the same colour. The picture is now ready for burning in, and, if it is to be painted in enamel colours, it can then be treated in the usual manner.

It is obvious that only certain parts, such as, for instance, the head alone, may be produced by a photographic transferring process, the body, and also, if desired, the background, being left to the artistic sense of the modeller. The modeller is not then compelled to keep always strictly to the photographic forms and lines, and he will simply paint the freely modelled portion of the relief or of the figure in the same shade of colour as has been selected for the photographic portion which has been transferred.

Ceramic pictures which are not to be burned in are advantageously protected by means of a coat of good white copal varnish; any other transparent varnish may, however, be used.

In producing numerous repeat articles, the original model is simply copied by moulding in the usual manner, and the succeeding copies are stamped or formed from this mould, when the further procedure is then the same as above described.

Also pictures of this kind can be made or procured in large quantities in enamel colours by means of the known printing process, and the said pictures can then be employed in the same way.

It is to be understood that the clay or ceramic mass, after modelling upon the outline piece in the manner hereinbefore described, and receiving the picture contour to contour, remains in place in the silk or like material, and, when applied to ceramic wares with enamel-colour pictures and the like, is burned in.

The relief pictures thus produced may be applied on a gold or other coloured ground, composed of ceramic mass or other substances.

THE EASTERN GRAIAN ALPS.

At the meeting of the Leeds Photographic Society, on the 18th inst., Mr. B. A. Burrell, F.I.C., presiding, introduced Mr. G. Yeld, M.A., editor of the *Alpine Journal*, who gave a lecture, both from an Alpine climber's and photographer's point of view. He observed, This group of the Alps, the superb ice scenery of which is famous, lies about thirty miles due south of the well-known pass of the Great St. Bernard. Its two highest peaks, both conspicuous from the Zermatt Mountains and from the Mont Blanc range, are the Grand Paradis, 13,300 feet, and Grivola 13,019, the latter's beautiful snow scene being one of the great sights of the Val d'Aosta. The lecturer, who has spent many summer holidays in this group, and has ascended most of the higher peaks, first gave a short account of the geography of the district. He then took his hearers to Cogne, the centre of these mountains. This village has an altitude of 5000 feet and boasts a royal residence, which is occupied by the King of Italy when he comes to

unt the numerous chamois and bouquetin which are strictly preserved ver a large extent of country over which the king has acquired the ooting rights.

Besides describing the mountains, torrents, and pastures, the lecturer owed slides of the peculiar costumes worn by the women. The scene as then transferred to Val Savaranche, the valley parallel to the Val- ntey (at the mouth of which Cogne is situated). The mountains and laciers at the head of this valley were then described and a visit paid the Noaschetta Glacier, the scenery of which is hardly known to urists. The lecturer touched on the flora of the group, a very rich one, nd attempted to give some idea of the glorious views over the plain of taly which are obtained from many of the summits in the Eastern raians. Incidents of climbing, notices of first ascents, and an appreciative account of the herdsmen who are always ready to welcome the limber at the cow-sheds or châlets (which at heights of 7000 or 8000 feet ford shelter for the night) completed the lecture.

The slides exhibited were from photographs taken by Dr. Tempest nderson, of York, the well-known photographer and authority on olcanoes, who kindly lent them for the occasion. A hearty vote of hanks proposed by Mr. A. A. Pearson, who gave some of his experiences n Switzerland, was passed.

A number of new slides by Mr. James Taylor of his latest illustrations f Animal and Bird life were tested in the lantern.

LONDON COUNTY COUNCIL AND CINEMATOGRAPH ENTERTAINMENTS.

At the meeting of the L.C.C. on Tuesday last the Theatres and Music Halls Committee presented a report, which contained the following assage: "In view of the destruction by fire of a cinematograph pparatus at the Tivoli Music Hall, Strand, during a performance on the 7th inst., we have again considered the question of the use of inematograph lanterns in places under the control of the Council. We ould remind the Council that on January 25 last it adopted, upon our ecommendation, certain regulations which we had framed with respect o such entertainments, but we think, having regard to the risk of fire hich is inseparable from such exhibitions, that it is not advisable to ave any settled regulations, but that licencees should, before holding uch entertainments, submit full particulars to the Council in order that he proposed arrangements may be fully considered. We therefore ecommend that the resolution of the Council of January 25, 1898, pproving certain regulations respecting the use of cinematograph lanterns n premises licensed by the Council, be rescinded."

Mr. H. Lawson thought that, while no one would find fault with the rgument of Mr. Purchese in favour of regulations being framed to revent the possibility of such an occurrence as that referred to in the ommittee's report, yet he (Mr. Lawson) could conceive of nothing more alculated to harass the proprietors of these places than that there should e no fixed regulations, and that in each case applications should be ade to the Council with full particulars. It was surely not outside the ompetence of the Councils' officials, or of the Theatres Committee, to ame proper regulations applicable to all these places of entertainment. le hoped the Committee would reconsider the question and would frame roper rules applicable to the case referred to in the report, and to other mergencies, and he therefore moved to refer the report back.

Mr. Remnant, Vice-chairman of the Committee, observed that, if the les and regulations of the Council had been carried out, the accident at he Tivoli would not have happened. He hoped the Council would not ake their regulations less stringent; certainly they did not want to escind them.

The amendment to refer the recommendation back was adopted.

TRIPLET LIGHTNING FLASH.

R. C. E. Stromeyer, of Lancefield, West Dulbury, writes to *Nature*: At the suggestion of Lord Kelvin, I send you the enclosed photograph of triplet lightning flash which was taken during a recent thunderstorm Whitby, and under the following conditions.

"The flash must have been about two miles distant (out at sea). The ens of the camera lens was eight inches; the aperture, *f*-64; the plate, ford Empress. The camera was not stationary, but was purposely cillated by hand. It was intended that its axis should describe a rcular cone, but, from the photograph, the path appears to have been ther elliptical. Each revolution occupied about $\frac{1}{80}$ minute. From ese rough data I estimate that the three flashes followed each other th a frequency of about thirty to thirty-five per second. They are entical in shape, but the top part of the lowest (left-hand) one is miss- g, and the bottom is screened. On the negative the centre flash is rather aker than the other two. Each flash is sharply defined on the left ge and somewhat hazy on the right edge, due probably to the gradual oling of the glowing gases, and showing that the lowest (left-hand) flash the first of the three. The photograph also contains a faint image of as single flash. During this thunderstorm two other plates were exposed under the same conditions as the above, but no images were found on them. Possibly the lightning was too far off, and the aperture too small.

"In view of the importance of obtaining more definite information about lightning, I would suggest that, in the presence of a thunderstorm, photographs similar to the above should be taken. Greater accuracy than was possible under the above conditions could be attained by rigging up the following simple contrivance. An ordinary bedroom looking-glass should be placed on a table in front of an open window facing the storm. The mirror should be inclined at an angle of 45°. The camera tripod, with its legs spread as wide apart as possible, should be placed on the table so that its centre is over the looking-glass. The camera, with its objective downwards, should be suspended from this centre by means of three strings, and should be made to swing in a circle by a gentle finger pressure close to the point of suspension. The period of revolution should be noted. Should any multiple flash imprint itself on the negative, it will now be possible to accurately measure the intervals of time, except under the following conditions. If there are only two flashes, the radius of the circle described by the camera can only be guessed at. If the camera has described an ellipse, at least four lightning images are required to find its elements. A camera revolving on an axis passing through the objective would, in some respects, be more convenient to work with, but, unless it is revolved by clockwork, the time measurements would not be trustworthy. The aperture used by me, *f*-64, is probably too small except for very brilliant flashes; but, if it is intended to allow several discharges to imprint themselves on one negative, a very large aperture will be found inconvenient because of the illumination of the landscape. The size of the aperture, rapidity of plate, and distance of each lightning flash should be noted, to assist at forming some idea as to the heat generated"

SCHAUB'S PLATE-HOLDER OR DARK SLIDE.

This is designed to allow of the insertion and removal of plates with greater ease and celerity than heretofore, and by which the plates shall be more securely held in place, so that they shall be in no danger of being dislodged by jolting in travelling or otherwise.

Mr. Schaub provides the frame of the plate-holder with a movable or hinged part, or section, which is arranged at the end opposite the slide entrance. When the slide is fully inserted or closed, it engages with, and locks, the said movable section, which by slightly overlapping the sensitive plate holds it securely in place.

Fig. 1, is a perspective view of a complete plate-holder, the slide or shutter being shown partly withdrawn.

Fig. 2 is a longitudinal section of the plate holder, the slide or shutter being shown closed.

Fig. 3 is a longitudinal section of one end of the plate-holder, showing the movable section open and thrown back.

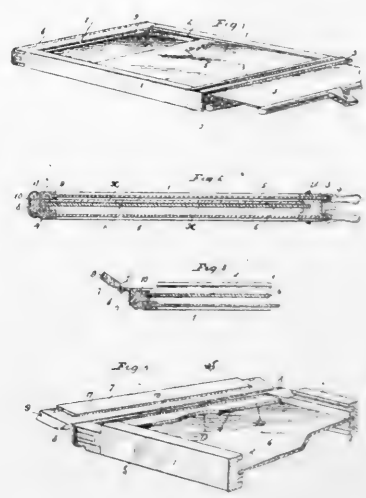


Fig. 4 is a perspective view of an end portion of the plate-holder, showing the movable section open.

Since the two sides of the double or two-plate-holder are duplicates, it will obviously be necessary to describe but one.

The rigid or fixed portion of the rectangular frame is composed of two side pieces or sections, 1, having the usual lengthwise groove, 2, in their inner sides, and two end pieces or sections, 3, 4. The section, 3, has a lengthwise slot to receive the slide or shutter, 5.

The main feature of novelty consists in hinging the other end piece or section, 7, so that it may be opened to allow more convenient insertion and removal of the dry plate, *x* (fig. 2). Such end piece or section, 7, is secured flexibly to the fixed end piece or section, 4, of the frame by means

of a strip, 8, of some flexible material, which is secured to the outer sides of the respective parts, 4 and 7, by any suitable means. In some instances, more particularly in the case of large plate-holders, the attachment may be made by means of metal hinges.

The section, 7, has an interior groove, 9, to receive the end of the slide, 5, as shown in fig. 2, whereby it is locked securely in the closed position.

The fixed frame section, 4, is cut away, or rabbeted, on its upper side (fig. 2), to form a shoulder, 10, for engagement with a corresponding shoulder, 11, of the hinged section, 7, so that, when the latter is in the closed position, as shown in fig. 2, it will be prevented from moving laterally or outward.

It will be apparent that, when the slide or shutter, 5, is withdrawn and the section, 7, opened, as shown in figs. 3 and 4, a dry plate, *x*, can be easily inserted and moved underneath the projection, 12 (fig. 2), at the slotted end of the holder. Then, upon closing the section, 7, as shown in figs. 1 and 2, it overlaps the other end of plate, *x* (fig. 2); and, when the slide, 5, is reinserted and fully closed, it enters the groove, 9, in said section, 7, and locks it in such closed position.

When the holder has been inserted in a camera, and the slide, 5, withdrawn preparatory to an exposure, the pressure on the movable frame section, 7, which is necessarily incident to its position in the camera, will prevent it opening.

To unload the plate-holder, the slide, 5, is drawn, the section, 7, opened as shown in figs. 3, 4, the cut-out portion or arch, 13, of the fixed end section, 4, allowing easy access to the adjacent edge of the plate, *x*.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, November 2, at eight o'clock. Annual Meeting.

Re H. PREECE, photographer, Bold-street, Liverpool.—The public examination of the above-named debter was fixed for Thursday, 20th inst., at the Liverpool Bankruptcy Court, before Mr. Registrar Bellringer, but on the application of the Official Receiver, the examination was further adjourned until the November sitting of the Court, pending the investigation of the affairs of an outfitter at Cheltenham, who was indebted to Mr. Preece in respect of money lent.

THE Autocopyist Company of 64, Queen Victoria-street, write: "We respectfully beg to thank you for the article in last week's BRITISH JOURNAL. We would draw your attention to the address given. You state, 72, London-wall; we have been removed from there this last ten months. Could you kindly correct this in your next edition, as it will naturally make it very annoying for people who go to London-wall and find we have been removed some time?"

THE Continental custom of making season tickets "not transferrable" by inserting a photograph of the holder has its disadvantages, says a contemporary. The recent introduction of the scheme into Switzerland has raised a great outcry from the ladies, who have demanded the return of their portrait on surrendering their expired ticket, in terms pathetic and indignant. In Belgium the portrait is never returned. But an appeal to the Swiss Federal Railway Department to compel the railway companies either to return or to destroy the photographs seems likely to be successful. The directors of the Jura-Simplon Railway, in one case at least, have gallantly complied with the pathetic request of a Lausanne lady; they loosened her picture from the *abonnements-karte* and consoled her by its restitution.

THE birthday of Princess Ena of Battenberg was celebrated on Monday evening at Balmoral Castle by a cinematograph exhibition, varied with floral and classical tableaux and dioramic effects. The entertainment was given by Royal command by Messrs. Walker & Co., of Aberdeen, most of the pictures displayed being their own production. Scenes depicting the Metropolitan Fire Brigade starting for a fire, or a train entering a tunnel, and such graphic representations as would particularly appeal to children, naturally found a place in the programme. But a series of pictures of the Braemar gathering at Balmoral was a specially noteworthy feature, since it forms the only complete record of that magnificent spectacle. Monday's entertainment was the sixth occasion on which Messrs. Walker & Co. have been employed at the Castle.

SILVER AFFECTED BY SUNLIGHT.—Erdman reports, in the *Zeitschrift fuer Naturwissenschaften*, that some tetradrachm pieces from about the year 500 before our era had experienced peculiar changes by the action of the sunlight. However strange it may appear that silver coins should be affected by the influence of light, yet chemical research has proved the correctness of the above statement. The analysis showed that the upper layer of the coins consisted of silver chloride, which probably had formed by their lying for centuries in sea water or in earth containing salt. Silver chloride, which, as regards its silver value, corresponds to an alloy of seventy-five per cent. of silver and twenty-five per cent. of copper, has by the way, already been used for coining silver pieces, *e.g.*, in the sixteenth century, at Freiberg, in Saxony, where rich finds of silver chloride had been made at that time. It had, therefore, to be decided whether the Greek coins in question might not have been coined directly from silver chloride. This supposition, however, was found to be wrong, as the silver chloride layer only constituted one half gramme, below it very pure silver containing but slight traces of copper being met with.

THE South London Photographic Society's Tenth Annual Exhibition will be held at the Public Baths, Church-street, Camberwell, S.E., on Saturday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday, March 4, 6, 7, 8, 9, 10, and 11, 1899. Classes open to members only: A, portraiture and figure study, including animals. B, architecture. C, landscape, seascape and river scenery. D, hand-camera work (direct pictures only). E, Beginners' Class, for those members who have commenced photographing since January 1, 1897. F, lantern slides (sets of four). Medals will be given in the above classes according to the number of competitors and the quality of the work. G, pictures medalled between the dates of opening of the Exhibitions in 1898 and 1899. In this class the gold medal which is offered will be given by Mr. G. A. Mault. The following are the Open Classes: H, pictures previously medalled. J, pictures not previously medalled. K, lantern slides previously medalled (sets of four). L, lantern slides not previously medalled (sets of four). M, stereoscopic slides not previously medalled (sets of four). Entry forms and further information respecting the Exhibition can be obtained from Mr. A. E. Allen, Hon. Secretary, 27, Princes-square, Kennington Cross, S.E.

AT the Bakewell County Court, before his Honour Judge Smyly, on the 19th inst, Eliza Stroyan, boarding-house proprietor of Blackpool, administratrix of John Charles Stroyan, formerly a draper of Bakewell, sued T. O. Green, photographer, of Great Longstone to recover the sum of 2*l.* 17*s.* 6*d.*, the price of a beaver coat supplied to the defendant. There was a counter claim for 3*l.* 10*s.* 6*d.* for photographs of a wedding party. The defendant admitted that he owed for the coat, and with regard to the counter claim he said he was sent by the late Mr. Stroyan to take photographs of a wedding party at Bakewell. He took several groups, and prepared several negatives. The negatives cost 10*s.*, and the retouching of the photograph of the bride and bridegroom 5*s.* The retouching of all the negatives cost 1*l.* 5*s.* He had photographed Lord Vernon's party, and also Mr. and Mrs. Gladstone. He sold 500 photographs of the late Mr. Gladstone and party. The defence was that Green had infringed the copyright by selling some of the photographs of the wedding group at Derby, but the sale was denied. His Honour, after a lengthy hearing, said he did not see anything unreasonable in charging one guinea for a group, because it was a well-known fact that groups were most difficult to take. He should therefore give judgment for the plaintiff on the claim, and for defendant on the counter claim.

Patent News.

THE following applications for Patents were made between October 10 and October 15, 1898:—

SPECTROSCOPES.—No. 21,327. "Improvements in Spectroscopes." T. THORP.

CAMERAS.—No. 21,329. "Improvements in Photographic Cameras." E. SMITH.

ANIMATED PHOTOGRAPHY.—No. 21,371. "Improved Apparatus for Taking and Reproducing Animated Scenes and Sounds." A. BARON.

CAMERAS.—No. 21,432. "Improvements in Cameras for Taking Photographs in Large Numbers." R. E. STAPLETON.

DEVELOPERS.—No. 21,595. "Improvements in Photographic Developers. Communicated by the Actien-Gesellschaft für Anilin-Fabrikation Germany. C. D. ABEL.

ARC LAMPS.—No. 21,638. "Improvements in Arc Lamps for Projection and for Laboratory or like Purposes." J. STUART and J. H. BARTON.

PROJECTION APPARATUS.—No. 21,649. "Improvements in Taking and in Projecting Photographic Images in Means therefor and in Photographic Negatives." W. FRIESE-GREENE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

October.	Name of Society.	Subject.
31	Bradford Photo. Society	*Valleys of the Rhone and Tarn* J. Laycock.
31	Camera Club	*Italy and its Architecture.* Law Bros.
31	North Middlesex	Informal Meeting.
November.		
1	Gospel Oak	Exhibition of Prize Slides.
2	Croydon Camera Club	Lantern Slides.
2	Kingston-on-Thames	Print Competition.
2	Leeds Camera Club	*Highways and Byeways in Venet* S. L. Coulthurst, F.R.P.S.
2	Photographic Club	Annual Meeting.
2	Woodford	Affiliation Slides. Set A.
3	Bolton Mutual Photo. Society	*Our Baltic Cruise.* Dr. Johnson.
3	Leeds Photo. Society	1898 *Lantern Slides* Godfrey Bingley.
3	Liverpool Amateur	*Experimental Photography.* F. W. Sa
3	London and Provincial	*Rapid Plates* versus *Slow.* W. Wilkinson.

ROYAL PHOTOGRAPHIC SOCIETY.

OCTOBER 25.—Technical Meeting,—Mr. W. B. Ferguson in the chair.

THE BEGINNINGS OF PHOTOGRAPHY.

Mr. R. B LITCHFIELD read a paper with the above title, in which he gave a complete translation of a memoir published by John Hermann Schulze, in 1727, in the transactions of a German learned Society, called the Cæsarean Academy. Schultze, born at Kolditz, in Saxony, in 1687, was a man of co-

siderable note in his time, chiefly as a linguist and philologist, and as an historian of ancient medicine. He was Professor of Anatomy and also of Greek and Arabic at the University of Altdorf, in Franconia, and afterwards became Professor of Eloquence and Antiquities at Halle. He died in 1744, and Dr. Eder's *History of Photo-chemistry* (1891) and Herr Schiendl's *History of Photography* (1891) give to him the title of "discoverer" of photography. Schultze's observations arose accidentally in the course of some experiments which he was making with regard to phosphorescent substances, particularly as to a kind of phosphorus called Baldwin's phosphorus, made by dissolving chalk in aqua fortis, and his memoir was headed, "Scotophorus Discovered instead of Phosphorus"—"scotophorus" signifying "bringer of darkness" (the darkening of a silver salt), while "phosphorus" meant "the bringer of light." He was saturating chalk with aqua fortis, and, working at an open window into which the sun was shining brightly; he was surprised to see that the colour of the surface of the mixture changed to a dark red, inclining to violet, and that the semi-fluid mass in the part of the dish not touched by the sun's rays did not show any trace of that colour. Considering that this circumstance called for further examination, he put aside his experiments in the Baldwin process and applied himself to the explanation of the phenomenon which he had observed. He put some of the saturated chalk into "a round oblong glass of the kind commonly used in dispensing liquid medicines," and upon placing it in the rays of the sun the colouration previously noticed rapidly took place. Some friends to whom the discovery was shown appeared to think that the darkening was due to heat, and various tests were tried, with the result that this theory was conclusively negatived, and it was satisfactorily proved that the change of colour depended wholly on the sun's light. Next, the fluid was mixed so as to be of uniform colour, and the greater part of the glass vessel was covered with opaque bodies; words or sentences were cut out on paper, forming a kind of stencil, which was fixed to the glass by means of wax, and exposure to the sun's rays reproduced "the words or sentences so accurately and distinctly on the chalk sediment that many people, curious in such matters but ignorant of the nature of the experiment, were led to attribute the result to all kinds of artifices." Up to this point Schultze had been under the belief that his results depended upon chalk and aqua fortis being mixed together, but a repetition of the experiments with negative results caused him to remember that he had been using aqua fortis containing a certain proportion of silver, and he subsequently found that the darkening was due to the action of the sun's light upon the silver particles. Schultze thought that his discovery might be useful for ascertaining whether silver was present in any particular mineral, and he considered it possible that "curious investigators of nature" might be led to other useful results. Mr. Litchfield, proceeding to comment upon this "memoir," did not think that any one could take from it the view that Schultze was the "discoverer of photography;" he found out, accidentally, that silver salt was darkened by sunlight, but there was not a word to suggest that he had any idea of using that fact so as to get a picture or representation of an object, which, of course was the essential idea of photography. It was an extravagant forcing of the facts to say, as Dr. Eder said, that when Schultze cut out words on a piece of paper, and stuck the paper on the bottle, he was "copying writing," for that was simply a vivid and entertaining way of showing the darkening of his mixture. He certainly made a remarkable discovery, anticipating Scheele by about half a century, but he did not discover photography. Seventy years had to pass before Thomas Wedgwood did that, by actually trying for, and getting, light pictures, though he failed to fix them; while more than a century elapsed from the time of Schultze's observation before Niépece, Daguerre, and Talbot created the art in a practical sense.

Mr. CHAPMAN JONES thought it absurd to claim for Schultze that he discovered photography, and that it was equally erroneous to attribute the discovery to Wedgwood and Davy. The discovery of photography was so gradual an evolution that it was very difficult to fix upon any one point in its evolution and say that it was then discovered. In his opinion the discovery of photography dated from about 1839, for it was then that pictures of practical utility were obtained; but the safest plan was to credit each investigator with what he had done, and so build up a complete and connected history.

Mr. W. E. DEBENHAM spoke to a similar effect, and a vote of thanks was accorded to Mr. Litchfield for his very interesting paper.

THE GRAIN OF PHOTOGRAPHIC NEGATIVES.

The HON. SECRETARY read a paper by the late Mr. E. Duncan Stoney, A.M.I.C.E. (communicated by Mr. H. de Beer), on "The Grain of Photographic Negatives," detailing the results of the microscopic examination of developed films.

Mr. CHAPMAN JONES referred to a statement in the paper to the effect that for all ordinary purposes the exact degree of coarseness of grain was of no moment, the sharpness of the picture being limited by the optical imperfections of the lens before the graining began to affect it. He said he had lately been testing two lenses of the anastigmat type, both of five-inch focal length, and both being worked at *f*·8. The image consisted of alternate lines of black and white of the same width (one-half of $\frac{1}{1000}$ of an inch), and one lens gave those lines nicely defined, but the other was much less satisfactory. With regard to the isolated clots produced on a negative when about $\frac{1}{50}$ the normal exposure was given, he thought the writer of the paper would very probably have got them with no exposure at all, for they were frequently caused by badly filtered emulsion.

Mr. DEBENHAM thought that any one who had made careful experiments on the subject would agree that, as stated in the paper, the grain was not affected by the developer. The author of the paper attributed the spreading of light to chemical spreading from the lighted parts, apparently overlooking the fact that the lighted portions acted as sources of illumination to the sensitive particles on either side, a fact which was recognised as the cause of the inferiority of gelatine plates compared with collodion for fine-line work.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 20.—Mr. Lewis Medland in the chair.

Mr. J. W. Hodges showed a new form of developing dish placed upon the market by Benetfink. The novelty about it was that the plate to be developed forms the bottom of the dish, being pressed up against a rubber rim by means of steel springs. It was pointed out by one of the members that such a dish should effectually prevent frilling, the edges of the plate being protected by the said rubber rim.

Mr. T. E. Freshwater contributed to the evening's lantern show several slides of natural-history subjects, including tortoise and eggs, spider and nest, and other miscellaneous things, some being by Mr. Cherry Kearton, of bird-photography fame, and the rest by the exhibitor.

Mr. Henderson brought up a number of old slides, amongst which were several of particular interest to the members, being groups, taken at various times, of the members at meetings and dinners, and bringing back to mind many who are now no more. There was also shown what was believed to be the first pinhole photograph (a portrait, which had an exposure of ten minutes), in addition to some very short gaslight exposures (under a second, upon a Continental opera at the Royal Aquarium), and a silhouette of himself. This latter was obtained by exciting with magnesium a luminous screen, before which the sitter was placed in profile, so as to obstruct part of the radiation from the screen, the camera standing beyond.

The other slides were by the Chairman, who showed the latest additions he had made to his series of "Fair Life," and some admirably coloured slides of Japanese scenery and customs, the work also of Japanese artists, lent through the Secretary.

Mr. BEN EDWARDS read a brief note on the alteration of the tones of lantern slides, by converting the image with ferridcyanide and bromide and redeveloping with a diluted pyro-soda developer. Comparative examples showing the effect of the treatment were exhibited upon the screen, harshness, in several cases very marked, being overcome with the production of pleasing warmth of tone.

The short discussion which followed was characterised by a desire to decide, to the satisfaction of all, the precise cause of the alteration of colour, and whether, admitting it to depend upon a molecular rearrangement, such alteration was on the side of enlarging or reducing the size of the grain.

Camera Club.—The evening meetings at the Camera Club are now in full swing, and the members are mustering in great force to take advantage of the very attractive list of lecturers who have promised this month to give the Club the benefit of their valuable experience. On Monday, last week, Mr. E. SANGER SHEPHERD, a gentleman who for a long time has been assisting Mr. F. E. Ives in his researches on colour, gave a demonstration on the

REPRODUCTION OF PAINTINGS,

and his remarks were listened to with great interest and attention, notwithstanding the circumstance that the lecturer necessarily travelled over much of the ground which had been covered on previous occasions by Mr. Ives, Captain Abney, and other well-known speakers. Mr. Shepherd's remarks had the prime advantage of being practical rather than theoretical, for he has tested various plates for colour work, and has with his own hands made screens to suit their various idiosyncrasies. He dealt, first, with the lenses which he had found most suitable for colour-reproduction work, and seemed to give the preference to those not of the newest type. Speed, of course, was not in this connexion a matter of much concern; but that lens was the best for the work which would give the finest definition over the plate. Accurate focussing is, in reproduction work, a matter of signal importance, and the lecturer recommended that the ground-glass screen of the camera should be ruled in a particular way with parallel lines and a central crossed circle, graduated marks on the middle line readily assisting the operator to place his camera square with the copy. The correct lighting of the painting to be copied is another matter of importance, and it is recommended that diffused daylight be employed for brightly painted modern pictures; while in the case of old works, with deep-brown shadows, much more detail can be secured by the use of full sunshine. When, for any reason, artificial light must be used, the lamps should be placed at either side of the canvas and rather close to the work, not anywhere near the camera, or reflections will interfere. The professional photographer is often called upon to copy miniatures, the owners of which have a natural objection to the covering glass, generally a convex one, being removed from the painting. In such cases Mr. Shepherd has met the difficulty of reflections by using polarised light, preferably by means of a Nicol prism associated with the lens. It is difficult sometimes to obtain a prism large enough for the purpose, and the alternative plans are to use a blackened mirror or a bundle of glass plates. The mirror is difficult to arrange, and the plates are apt to lead to bad definition; so, on the whole, the Nicol prism is to be preferred. Although the copying of black-line engravings did not come within the subject of the lecture, Mr. Shepherd thought that a few hints on the subject might be useful to his hearers. He recommends the employment of a small stop, a blue screen, and a photo-mechanical plate. He develops such a plate, after full exposure, with hydroquinone, until it is thoroughly blackened. Possibly the delicate lines of the picture may disappear under this treatment, but this may be neglected altogether. After such prolonged development, the plate is treated with Farmer's reducer, and finally fixed in strong hypo. By carefully following this procedure a negative may be obtained with clear lines of a distinctly wet-plate quality. The next section dealt with was the translation of colour into monochrome, and the spectrum of the arc light was thrown upon the screen. Diagrams followed, indicating the various parts of the spectrum to which different commercial isochromatic plates were sensitive, and it was pointed out that, although a certain plate might be more sensitive to red than another one, the fact that it was lacking in sensitiveness in the green actually reduced its general rapidity of action, for the falling off in the green had to be compensated for by the use of a deeper screen. No plates would give the colour-worker what he wanted, and he must rely upon the action of the coloured screen to compensate for its shortcomings. The colour-reproducer must aim at representing tints in monochrome according to their luminosity, and much had been done by Captain Abney in his colour sensitometer to simplify the work. Another most im-

portant thing was that trial measurements should be made by exactly the same kind of artificial light as was afterwards used for exposure. The necessity for such a course was indicated by some of the colour diagrams shown, which had been prepared by paraffin illumination, and which were to a great extent falsified, as shown by the arc projection lamp at the Club. Next came a consideration of the different dyes which were available for the preparation of coloured screens, and the method of making the latter which was recommended was to coat plate glass with an even layer of gelatine and to soak that plate in an aqueous solution of the selective dye for five, ten, or fifteen minutes, according to the depth of colour required for the particular work in hand. A rough, but efficient, form of spectroscope, by which colour tests could be make, was shown and explained. Although it was recognised among experts that the only successful method of representing colour was to represent it according to its luminosity, the results did not always please artists, who, in the absence of colour contrasts, seemed unable to judge of a reproduction by photography fairly. Mr. Shepherd next told his audience that, by permission of the Directors of the National Gallery, Mr. F. E. Ives had recently copied a number of the pictures hung in the National Collection, and some of these were hung for exhibition round the walls of the Club-room. He then showed the coloured screens employed in the work, noting that colours strictly analogous to the three colour sensations—red, green, and blue-violet—would not do for the negative work, although they would answer for viewing the pictures as positives. The screens must have a wide range, so that each took in a greater part of the spectrum, the colours blended in one overlapping those of the others. This system was based upon Clark Maxwell's diagram, made as long ago as the year 1861. As a conclusion to his most interesting discourse Mr. Shepherd showed on the screen, by means of Mr. Ives's triple-lens apparatus, a number of the National Gallery pictures, the true colour rendering of which evoked much applause. The reading of the paper was followed by a discussion in which many gentlemen took part. It must occur to any one who takes the trouble to look down the varied monthly programme of lectures of the Camera Club that that institution resembles a vast net with a mesh of such convenient form that all kinds of fish are caught within it. There used to be, and may be still for aught we know, a Balloon Society in London which was noted for promoting lectures and discussions upon every subject in the universe with the one exception of balloons. We cannot fairly lay the charge against the Camera Club that, while they favour all subjects, photography is neglected, for, as all know, photographic matters have always the premier place. But photography can be stretched to include not only everything relating to the art of making sun pictures, but everything capable of being illustrated by such pictures. It even goes further than that, and comprises everything which has been illustrated by other methods, provided such illustrations are copied by the camera. It was upon such illustrations that the Rev. W. K. R. BEDFORD mainly depended on Thursday evening last week when he discoursed at the Camera Club on

THE KNIGHTS HOSPITALLERS.

The reverend lecturer had evidently made a life study of this interesting subject, and was able to rattle off dates, and the names of places and men, which have long passed away from ordinary memories, without notes and with surprising fluency; indeed, he hinted that this subject was his particular fancy, and, that whatever else he might have discoursed upon, the knights hospitallers would have made themselves conspicuous, for he opened his remarks with a story of a certain sign-painter who was remarkable for the vigour of the "White Lions" he depicted upon the swinging boards of various village hostelries. Upon one occasion he was required by a certain publican, who had begun life as a sailor, to paint a signboard representing a ship in full sail. In vain did the painter protest that a white lion was a far better animal. The sailor was obdurate, and, when the artist at last settled down to the work against his will, he told his patron that he must not be surprised if the ship turned out to be very like an anæmic lion. An anecdote always puts an audience into good humour, and, having heard about the white lion, they settled down to listen to what Mr. Bedford had to tell concerning the knights. The Order of St. John seems to have been started by certain merchants at Amalfi, and in the year 1014 a hospice was founded at Jerusalem, this first foundation comprising only five members. The main idea was to succour pilgrims and to offer hospitality to all in need. At the time of the Crusades, when the position of Christians in Palestine became one of extreme peril, the Order of St. John became military, as well as charitable, and was strengthened and consolidated by various charters up to the year 1113. It is noteworthy that dames, as well as knights, figure in these first charters, and that both had to give proof of nobility before they could join the Order. When, in the course of events, the knights were compelled to leave Palestine, they settled in the island of Rhodes, and their residence there soon became, as it were, a thorn in the sides of the nations of the Mediterranean. The island is little altered since the knights occupied it. Mahomet II. was then at the height of his power, and he determined to attack the knights in their stronghold. A series of desperate fights ensued, in which the knights of St. John proved victorious. At this period in the story a dragon comes upon the scene—a dragon which ravaged the island and spread death on all sides. Various expeditions were organized against the monster without success, until at last the authorities determined to strive against it no longer, and gave orders that it was to be left alone; but an enterprising knight, named De Gossan, determined that this should not be. He had an artificial dragon made of tin plate and filled it with meat underneath, which, it seems, is the most vulnerable part of a dragon; then, after training bulldogs to attack the artificial creature and get at the meat, they were sent after the real monster and got at his meat and killed him. The courageous young knight, De Gossan, was subsequently made Grand Master of the Order of St. John. This dragon story has been immortalised by the poet Schiller. The lecturer was of opinion that the tradition had some foundation in fact, and that some gigantic saurian had given rise to it. It seems certain that a large skull—more like that of a serpent than of a quadruped—was to be seen over one of the main gates of Rhodes as late as the year 1829. The pictures illustrating the siege of Rhodes and the story of the dragon were as interesting as they were quaint, consisting of photographic copies of old and rare engravings. The successor of De Gossan had to meet a serious attack from the Turks, who came upon Rhodes with a fleet and force of 70,000 men. This siege took place in 1480, and ten years afterwards the engravings illustrating its various phases were published by Sebastian Brandt, of Strasburg, the author of that celebrated book, *The Ship of Fools*, which was so popular that it was translated into various languages. The pictures of the siege were full of most interesting details, and the lecturer said that it was quite possible to recognise in them the leading features of Rhodes as they appeared at the present time. After the close of the fifteenth century the knights were less successful in their wars with the Turks, and in 1542, when Soliman invaded Rhodes with a large force, they had to surrender. In Malta, where they founded another branch of the Order, they again suffered several attacks from the Turks, and these events again afforded opportunity for introducing various old prints, helped out by good photographs of Malta as it is, with the wonderful church of St. John. It must not be forgotten that we have in London, in the old gate at Clerkenwell, a most beautiful relic of the old Priory of St. John, which at one time covered five acres of ground. It was burnt by the rebels under Wat Tyler, and its stones were subsequently used in the erection of Somerset House.

Croydon Camera Club.—The First Lantern Night at this Club was held on Wednesday, the 19th, when a number of slides were shown, and, as needed, advice, both technical and æsthetic, given by various members who felt qualified to do so. Those showing slides included Messrs. Elkin, Chadwick Taylor, Irvine, Andrews, Dales, Fuller, G. W. Jenkins, S. H. Wratten, and H. K. Tayler, the latter of whom contributed some capital after-dark photographs, a view of St. Paul's on a wet night being specially notable; he also gained deserved applause for a riparian sunset near Penshurst, which was full of charming effect. Sixty-nine prints were submitted for the Club album; of these the best seven were selected by the voting of those present. Messrs. F. Hamilton Townly and A. Fraser Tytler were elected members.

Richmond Camera Club.—October 17, Mr. Cembrano in the chair.—Mr. GIBSON gave a demonstration of

PLATINUM TONING AS APPLIED TO GELATINO-CHLORIDE AND COLLODIO-CHLORIDE PAPERS.

Mr. Gibson spoke of the liability to double toning which existed when the gold and sulphocyanide of ammonium bath was used, and the softening effect of the sulphocyanide on gelatino-chloride papers in warm weather. He therefore advocated the use of the following bath (Cowan's):—*Solution A*: Chrome alum, 37½ grains; salt, 160, grains; water to make 8 ounces. *Toning Bath*: Solution A, ½ ounces; chloro-platinite of potassium, 1 grain; water to make 10 ounces. This was sufficient to tone one sheet of paper, and give tones from a reddish-brown, through the browns, to a greenish-black. The prints are placed direct in the toning bath without preliminary washing, and must be kept in motion during toning, the surface not touched with the fingers, and air bubbles on both sides of the print removed at once. When toned, the prints should be placed in clean water, containing a small quantity of ammonia or carbonate of soda to stop the toning action, and are then fixed in a one in ten hypo bath to which a little ammonia or carbonate of soda may also with advantage be added. The toning bath could be warmed to 70°, and this would have no softening action on the gelatino-chloride papers owing to the presence of the chrome alum in the bath. Mr. Gibson referred also to a simple method of reducing over-printed proofs by placing them, after toning and fixing in the usual way, in a bath of weak hypo (say one in ten), in which a small quantity of nitrate of uranium had been dissolved. Mr. Gibson toned some prints, and reduced some others in the way described. He also passed round mounted specimens, some of which, in reply to a question as to the permanency of the process, he stated had been made over seven years.

West London Photographic Society.—The Annual Meeting was held in the Broadway Lecture Hall, Hammersmith, on Friday, the 14th. Mr. G. F. Blackmore (President) in the chair.—The election of officers resulted as follows:—*President*: Mr. H. Selby.—*Past President*: Mr. G. F. Blackmore.—*Vice-Presidents*: Messrs. R. Horton, G. Lamley, L. Selby, J. Wilson.—*Hon. Lanternist*: Mr. R. Horton.—*Hon. Treasurer*: Mr. A. E. Cockerell.—*Hon. Secretary*: Jas. Brown, 28, Weltje-road Ravenscourt Park, W.

West Surrey Photographic Society.—October 19.—A demonstration on the toning of bromide prints was given by the President. Taking the usual formula for uranium toning, he showed how great a range of tones could be easily obtained. The main points to be observed were extreme cleanliness, freedom from iron and from hypo, and to have the prints evenly damped before toning and constantly rocked while toning. After carrying the toning on to deep red, he showed the action of a reducer in removing the black tones and by a further very weak ammonia water bath obtaining reds of several grades. He recommended washing the print face downwards in gently flowing water till the high lights were sufficiently clear and then blotting off. Taking a red-toned print and immersing it in a water bath to which a little perchloride of iron was added, he got a vivid blue green, and by the addition of a few drops of acetic acid a bright blue. Blue tones were also obtained on bromide prints without uranium toning by simple toning in a bath composed of water and acetic acid in equal parts, say, one ounce each to which were added a few drops of ferricyanide of potash solution and an equal value of ammonia citrate of iron. The lecturer pointed out that, uranium being an intensifier, it was well to have the bromides under rather than fully developed, and with any other developer than ferrous oxalate.

Bootle Photographic Society.—October 18.—The SECRETARY gave a demonstration on Messrs. Wellington & Ward's bromide papers. The papers used were Enammo, Platino-matt, Smooth, Rough, Rough Tinted, and Special Thick. All the prints were by contact from quarter and half-plate negatives. Amidol was the developer used, and those present were surprised at the simplicity of working same. The demonstrator commented on the reliability of amidol, the identical results it produces, how economical it is, and how exceedingly simple to work. A vote of thanks, moved by Captain ABTHORPE,

conded by Mr. WRIGHT, and carried unanimously, concluded the meeting. ample packets of Messrs. Wellington & Ward's bromide and silver papers ere distributed amongst those present.

Leeds Camera Club.—The Annual Dinner of the members of the Leeds amera Club was held on Wednesday evening, October 19, at the Grand estaurant, Leeds, the President (Mr. W. J. Warren) in the chair. After ie toasts of "The Queen," "Success to the Club," and "The President and fficers" had been given and ably responded to, the PRESIDENT gave "The ress," both local and photographic, and said that the occasion gave them an pportunity of acknowledging the kindness received by their Club from the ess. They felt and recognised the enormous power and influence the press ossesses, and each member should do his utmost to strengthen the Club and dvance its work, so as to show that the reports so published were appreciated, nd also that the work they aid was of value and interest to every lover of notography wherever the papers circulated. The toast was enthusiastically ceived and suitably replied to by Mr. BRADLEY. The rest of the evening as devoted to a smoking concert and a series of fine new cinematograph pictures hibited by Mr. R. Bourke.

Blairgowrie and District Photographic Association.—October 18.—Mr. D. PETRIE gave a practical demonstration on

PHOTOGRAPHIC CHEMISTRY.

e described the various chemicals and reagents now in use in the art, with actical hints on the various developers, and described the *modus operandi* of e process of fixing, reducing, intensifying, printing, and toning, finishing ith some hints on the storing of chemicals, and impurities met with. He owed that tap water contained various substances, besides actual suspended atter; various impurities, such as chlorides, carbonates (lime), sulphates agnesia), phosphates, nitrates, and ammonia. Rain water was the purest rm in nature, provided the source from which it was collected was not dirty. loride is, from a photographic point of view, the worst impurity to be eaded. This, with silver nitrate, goes to form insoluble silver chloride. is may be seen on washing P.O.P., giving that milkiness with the first shing. Distilled water was advocated for the preparation of all photo- aphic solutions, although, when not obtainable, boiled water (which has had e temporary hardness removed due to the precipitation of the carbonates lime and magnesia still retains sulphates, which give permanent hardness) ay be used with advantages. In dealing with impurities found in the emicals used by photographers, it was pointed out that sulphuric acid con- ined lead and arsenic, and the finer or pure acid was so cheap that it should used for all photographic purposes. Hydrochloric acid (commercial) con- ins, in varying proportions, iron; but this may be detected by giving a llow colouration to this acid, and so avoided. Carbonate of soda and the alies (soda and potash) precipitate the lime in tap water, and, after stand- g, should be filtered through glass, wool, or a layer of asbestos, or siphoned from the precipitate formed. In storing alkalies, the glass vessels are acted , and when stoppers are used in the bottles holding these solutions they get ed and cause endless trouble. Sulphocyanide of ammonia, when exposed to ; is very hygroscopic (greedy for water, which it absorbs). This is better ade up into a ten per cent. solution after opening a fresh bottle. Sulphites teriorate rapidly on exposure to air, and should be kept in well-stoppered ttles, full or as nearly full as possible, as the air oxidises the crystals rapidly o sulphates, in which state they are useless to the photographer. Thiosul- ite of sodium (or hypo) in solution oxidises on exposure to air and becomes d; this should be guarded against by testing with litmus paper; and neutral h bicarbonate of sodium or ammonia solution. Silver nitrate must, of rse, be kept from light, as it darkens and spoils; solutions of the above st always be made up with distilled water. Experiments were shown illus- ting the paper, showing the difference between distilled and spring or tap ter; the detection of hypo in plates after washing, and also the elimination hypo by means of the new chemical, anthion, &c.

FORTHCOMING EXHIBITIONS.

1898.		
tober 28–Nov. 5	...	Photographic Salon. Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
„ 28–Nov. 12	...	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
vember 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
„ 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
„ 17–19	.....	Hove Camera Club. Hon. Secretary, C. B. Stoner, 24, Holland-road, Hove.
„ 18	.....	Brixton and Clapham Camera Club (Members).
„ 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
„ 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
ember 27–31	.....	Borough Polytechnic. Hon. Secretary, H. C. Philcox, 103, Borough-road, S.E.
1899.		
ruary 4–25	.....	Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
rch 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PHOTOGRAPHY IN BRITISH GUIANA.

To the EDITORS.

GENTLEMEN,—I am about to take a trip for six months to Demerara, British Guiana.

Could you kindly inform me—(1) If the climate is very hot or moderately so and healthy, or subject to fevers; (2) What kind of plates and films would you recommend for the climate for me to take, or could I get them there?

I have a half-plate instantaneous and a Frena camera, which I intended taking.

Would you recommend me to only take one or both cameras? Any information that you could give me to help I should be very thankful for. —I am, yours, &c. GUIANA.

[Will some reader who has had photographic experiences at Demerara oblige our correspondent with the information he asks for?—EDS]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

W. R. Bland, Duffield, near Derby.—*Photograph of "A bit in Wirksworth Church," Derbyshire.*

F. W. Urquhart, 3, Balaclava-buildings, Trinity-court, Dingwall.—*Photograph of the Rev. John McNeill preaching at the Dingwall Cross, on Wednesday, October* 12, 1898.

RECEIVED.—F. E. G.; ENLARGER; DID; and others. In our next.

W. SMITH.—The Exchange Column was abolished three years ago.

E. R. (Kensington).—More or less of a swindle. See elsewhere in this issue.

S. D. (Calcutta).—We are withdrawing the table from the next volume. It is not correct.

R. T. WATSON.—Yes; we have seen the process worked. It is very simple, and the results are excellent.

WINDSOR.—Address the Secretary, Royal Photographic Society, 12, Hanover-square, W., who will send you the necessary forms and particulars.

THE PHOTOPHANE COMPANY.—A JOHNSON asks: "Can you inform me of the address of the "Photophane Company?"—In reply: We do not know. Possibly some reader may be able to give the information.

GAS BAGS.—H. BELFORE. We should say that a pound each would be more than the value of the bags, as you say they are very hard, and have many patches upon them. Buying old gas bags is a very speculative affair under any circumstances.

LENS.—W. W. W. The only thing to do is to use a much smaller stop. Some half-plate rapid rectilinears can be made to cover the whole plate, but only by the use of *small* stops; then, of course, long exposures are entailed. There is no remedy for that.

RUBY GLASS.—H. FOWLER. Ruby glass is supplied by most of the dealers, but we are not sure that all keep a deep "reliable pot orange." That, we have little doubt, may be obtained at Hetley & Co.'s, Soho-square. They make a speciality of coloured glasses.

S. HICKS.—1. A solution of ferrous sulphate will precipitate the platinum from the oxalate solution. The amount of platinum in the acid solution is not worth troubling about. 2. Potassium sulphide will precipitate the silver in the form of sulphide.

SUBSCRIBER AND BELMONT.—In the *Art of Retouching*, by Robert Johnson, published by Marion & Co., some chapters are devoted to the subject. There is also a little book, by Mr. A. H. Bool, published by Messrs. Percy Lund & Co., Bradford, which should be of assistance to you.

SILVERTOWN.—1. We were under the impression that the Company had ceased to exist, but that the business was being carried on by Messrs. W. B. Whittingham & Co., 91, Gracechurch-street, E.C. 2. The actual makers are a Dresden firm, we believe; but the paper can be obtained of any dealer.

PORTRAIT LENS.—T. WELLER. The sketch shows that you have replaced the glasses in their right positions, but the brass ring should be between the glasses of the back combination and not behind them as you have it. Its misplacement fully accounts for the impaired performance of the instrument.

LLWYD.—1. Address the City and Guilds of London Institute for the advancement of Technical Education, Gresham College, Basinghall-street, for the particulars of their examinations in photography. 2. Write with full particulars to Mr. Bernard Quaritch, Piccadilly. He is probably the best authority on the subject.

COPYRIGHT.—CURATE. If the music is copyright, and there is little doubt that it is, it would be infringing the law to copy it as lantern slides for the congregation to sing to. If you did so, you would render yourself liable to penalty. Possibly the publishers would give you permission to make the slides under the circumstances.

ENLARGING.—J. BERNARD writes: "I have only two lenses, a half-plate, short-focus, portrait lens, and a whole-plate rapid rectilinear ten-inch focus. Which of the two will be the better for enlarging quarter-plate negatives with? I propose to use the limelight with five and-a-half-inch condenser."—The portrait lens will be the best decidedly under the circumstances.

STAMP COPYRIGHT.—The assignment of copyright must be registered at Stationers' Hall, London. We think the document as it stands would be valid, and would not require a stamp, but your better plan would be to inquire of the Stationers' Hall authorities. You do not say whether the original photographs have been registered; this would be necessary before any assignment could take place.

ORTHOCHROMATISING.—W. SALES sends us three plates, gelatine, stained with erythrosine, and asks which of the three is nearest the right the right depth for orthochromatic work. We should say that all are too deeply dyed. If the solution used for the palest one were diluted with an equal bulk of solvent, and the plate immersed for a similar time, we should expect it would be about right.

ALPHA asks "whether it is usual for ladies employed in the retouching and finishing department to wear black dresses."—In reply: We are not aware of any rule or custom bearing on the subject; but, from the limited amount of observation we have been able to make, we should say that black dresses are worn oftener than not. Perhaps some of our readers can further enlighten "Alpha."

MISPLACED IMAGE.—S. W. says: "Do what I will, I cannot get the same image in the negative that I see in the finder of my hand camera. I always get less subject, and that not in the centre of the plate, either when the camera is used upright or sideways."—Evidently the finders are not properly adjusted, and they do not include the same angle as the lens. A very common fault with finders.

STALE PLATES.—H. H. B. The plates have deteriorated through long keeping, and always show that appearance at the edges when they have so suffered. It would be of no use complaining to the makers, as they were *sure* to have been fresh when they left them. Doubtless the country chemist had them a long time in stock before you bought them. It is to him that you must complain and seek compensation if from any one.

FACTORY ACT.—R. C. & Co. There is no question whatever that your printing and mounting establishment comes under the Factory Acts, and that the *employés* cannot be worked such long hours as they are; also, that they must have the half-holiday weekly. As the Factory Inspector has cautioned you, you had better conform to the law at once, or you will be summoned and probably fined. The Act is clear, and what you suggest will not evade it.

DESIGN FOR STUDIO.—STUDIO asks: "Can you supply designs for portable studio, dark room, and dressing-room combined? If not, shall be glad if you can inform me where to obtain same suitable for erection in garden where north light is available."—In reply: There is a book on studio construction by Mr. Bolas, published by Messrs. Marion, Soho-square, which may assist you. Messrs. E. C. Walton & Co., Muskham, Newark, would probably submit designs.

RELIEF PHOTOGRAPHY.—ANAK asks: "Can you give me any information respecting: 1. Relief photography; how made, &c.? 2. Is there any book published describing same? 3. If so, price of same, &c.? Can you give me average prices of: 4. Boudoir, 5. Imperial, 6. Panel photographs, taking cabinet size at 15*s.* per dozen for silver prints and 1*l.* 1*s.* per dozen for platinotype?"—In reply: 1. Procure our ALMANAC for 1897, in which a considerable amount of information on the subject is given. 2 and 3. Not that we are aware of. 4, 5, and 6. Sorry we cannot assist in this matter; you had better procure the price-lists of a number of photographers.

SUBSTRATUM.—H. COWDEROY writes: "Your contributor, Mr Bolton, some time ago mentioned a very good formula for substratum for carbon transparency work—I think it was composed of albumen or else precipitated gelatine dissolved in spirits. Would you be so kind as to send me particulars of same. Trusting I am not troubling you too much."—For the moment we do not remember the article referred to. But here is the formula that is almost universally used for carbon transparencies, and there is no better: Water, 1 pint; gelatine, ¾ ounce; sufficient solution of bichromate of potash to give a pale sherry colour. The plates are coated with this and allowed to dry in a strong light. They are then ready for use.

W. ANDERSON.—In Great Britain between four and five thousand. In France, Germany, and America, approximately the same. Japan and Australia, a few score in the first; a few hundreds in the second. But, with the exception of Great Britain, these are only approximate estimates.

PICTURES ON IVORY.—J. H. writes: "I am anxious to introduce locket portraits on ivory. Will you kindly tell me the simplest process for transferring the photograph to ivory? It seems to me that any single transfer will reverse the picture."—The simplest, and the most generally used, process for ivory is the carbon process. Develop the picture on flexible support and then transfer it to the ivory. The ivory should be thoroughly cleaned and immersed in a warm solution of gelatine, say an ounce of "Nelson's photographic gelatine" in a pint of water. To this are added 10 grains of chrome alum dissolved in 1 ounce of water. The picture, dried, is also immersed in the solution, the two brought into contact, and then squeegeed together and allowed to dry. When dry, the support is stripped of.

TONING.—B. T. says: "In your issue of August 19 Mr. C. B. Barnes gives toning and fixing formulæ as under, and directs that the prints be put direct into toning bath without previous washing. I have tried the baths, with pleasing results and saving of time, but would esteem the favour if you will kindly say whether you consider the prints permanent or not. Generally, the washing out of the free silver before toning is insisted upon, but Mr. Barnes instructs otherwise: 'Water, 100 ounces; sulphocyanide, 130 grains; chloride of gold, 15 grains. Prints put in direct without previous washing. Water, 1 quart; hypo, 8 ounces; liquor ammoniæ, 6 drops.'"—We certainly prefer to wash the prints before toning them, and that is our usual practice, because we consider that by so doing we get a greater chance of permanency.

CARBON CLOUD EFFECTS.—S. F. says: "I should feel very grateful if you will answer the following questions through THE BRITISH JOURNAL OF PHOTOGRAPHY: 1. I want a basis for miniature paintings. What colour carbon do I use? also is it generally transferred on to ivorine, not real ivory? 2. I wish to get sketchy and cloudy effects on plate from a plain background; how must I go to work, without using a cloud negative? I have seen some beautiful sketchy effects round vignettes?"—1. Miniature paintings are usually on ivory, not ivorine. Different colours are used, according to the taste of the artist. Autotype brown is, perhaps, the most generally used. 2. Unless the cloudy effects are on the background used for the sitter, they are put in by the artist in the finishing; that is usually the case with finished pictures.

TRANSPARENCIES.—ALPHA writes: "I would be obliged if you tell me (1) What is the best way to make a transparency for the reproduction of a negative? (2) Are there plates specially made for this purpose in quarter-plate size? (3) If so, where can I obtain them? (4) Is there any great difference in a lantern slide made for projection and a transparency made for reproduction of negatives? (5) Is it possible to make a good transparency on an ordinary negative plate, and how?"—(1) A large proportion of the transparencies used for enlarged negatives, made commercially, are by the carbon process. (2) Photo-mechanical or lantern plates answer very well. No special plates are made for the reproduction of negatives. (3) Most of the makers supply photo-mechanical as well as lantern plates. (4) The transparencies should be more exposed, and made somewhat denser in the development. (5) Yes, but as a rule not so good as on the plate referred to.

TONING DIFFICULTIES.—OPALESCENT writes: "We have for the last few weeks been troubled with a cloudiness of our toning bath, and are quite at a loss to account for it. Our method for the last three years has been to make up stock solutions of gold, 80 grains; distilled water, 40 ounces (No. 1 Solution); and, of ammonium sulphocyanide, 2 ounces; sodii bicarbonate, 120 grains; and tap water, 40 ounces (Solution No. 2), of which we take 1 ounce of each for each sheet of paper to be toned and dilute with tap water half the requisite quantity, the remaining half being the previous day's bath. About once in three weeks an entirely fresh bath is made up. The gold solution is always poured into the sulphocyanide solution (never *vice versâ*) about an hour before required for use, and is diluted with tap water and old bath immediately before use. This system has worked admirably up to within the last few weeks, but now, about ten minutes after the stock gold solution is added to the sulphocyanide solution, the mixture becomes quite turbid (opalescent). The prints tone all right, but, after the used solution has stood over night, there is a dark reddish-brown precipitate at the bottom of the jug and a slight filmy scum on top. We enclose the filtrate from one day's bath for you to let us know if possible what it is composed of. We are at present making up a fresh bath every day until we can trace and remove the cause. We have tried various samples of sulphocyanide, bicarbonate, &c., but without any effect. Our own idea is that the water supply (which comes direct from the main in a leaden pipe) must in some way have got contaminated with iron, and that this causes the precipitation of the gold. The supply is, we believe, all drawn from the chalk, but it may possibly have happened that the Water Company in consequence of the very dry weather, may have drawn a portion of their supply from other sources. We trust you will forgive the length of this letter, but our excuse must be that we wished to thoroughly explain the circumstances, in order that you might be able to give a definite opinion."—We are sorry we cannot give a definite opinion. It is very likely that it is the water that is at fault. If that contains an impurity that would reduce the gold the difficulty is fully accounted for. Try the effect of using distilled water instead of tap water. Some papers upset the toning bath more than others. We prefer to make up a new bath for each batch of prints we have to tone, mixing only sufficient for the purpose. Greater uniformity in working is thus secured. The precipitate consists largely of sulphur and probably some gold.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	705
Ancient Toning Methods.—II.	707
Leaderettes:—	
Alleged Fading of Collodio-chloride Prints—Forgery by Photography—Fortifications and Photography	707
On Things in General. By Free Lance	708
Photographic Wrinkles. By C. T. Sutton	709
Some Recent Experiments in Flashlight Work. By T. N. Armstrong	710
"Free Photography"	711
Photography by Patent. By John A. Randall	711
Progress in Radiography. By James Quick	712
The Physical Development of P. O. P.—I. By W. E. A. Drinkwater	714
The Supply of Calcium Carbide	715
Improvements in Enamels for Photography	715
Affiliation of Photographic Societies	716
The late Solar Eclipse	716
Our Editorial Table:—	
Chemistry in Daily Life—A Self-toning Paper—Catalogue received	716
News and Notes	717
Patent News	717
Meetings of Societies:—	
London and Provincial Photographic Association — Richmond Camera Club — West London Photographic Society — Woolwich Photographic Society — Leeds Camera Club—Newcastle Photographic Society	717
Forthcoming Exhibitions	718
Correspondence:—	
The Traill Taylor Memorial Lecture - Photographic Exhibitions—"Cosmos" Criticised—Photographing in India—Glazing Prints	719
Answers to Correspondents	719

EX CATHEDRÂ.

The following announcement appears in the catalogue of Messrs. Johnson, Matthey, & Co., the well-known assayers, &c., of Hatton Garden, London: "In furtherance of scientific research, professors and recognised scientific investigators will with pleasure be supplied with metals of the platinum group, in moderate quantities, and for periods to be arranged, free of charge, on condition that the precious metals are ultimately returned (in any form), and that the results of the investigations are furnished."

* * *

Our well-edited contemporary, *Commerce*, for October 26, contains a twenty-page history of the Eastman Photographic Materials Company. It is brightly and ably written, and it is full of interest for all photographers. There is not the slightest suspicion of "puffery" in the article, which is a high-toned and straightforward review of the rise, growth, and success of one of the most remarkable photographic enterprises in the world. Forty-nine phototypic illustrations accompany the article, which is decidedly worth reprinting.

* * *

On Wednesday evening, October 26th, the members of the General Committee of the Photographic Salon were at home to their friends at the Dudley Gallery, Piccadilly. Over a hundred gentlemen accepted invitations, and an agreeable evening, diversified by music, &c., was passed by the guests, some of whom had travelled distances of hundreds of miles to be present. The Salon At Home has come to be regarded as quite an event of first-rate importance in the photographic season. It gives an opportunity for the gathering together of the principal representatives of the various sections of latter-day photography, and the expenditure of an agreeable hour in the exchange of opinions upon things in general. Indeed, it has all the attributes of a "function." Mr. Craigie, the new Honorary Secretary of the Salon, worked hard to make the guests enjoy themselves, and he was entirely successful.

* * *

An object of much attraction to the many persons who pass up and down Regent-street just now is an enlargement of a portrait of Captain Dreyfus, which is hung outside the entrance door of the Romney Studio, at No. 120 in the thoroughfare named. The photograph was taken immediately after the unfortunate man had been publicly degraded and stripped of the insignia of his military rank. Looking at the firm and dignified facial expression of Dreyfus, one finds it difficult to imagine that a guilty man could have thus comported himself at the terrible moment of his disgrace. Two negatives are in the possession of the Romney Studio, and we may conjecture that if, as a result of the revision of the trial, the innocence of Dreyfus is established, there will be a vast demand for prints or reproductions from them.

* * *

A meeting of the Council of the Photographic Convention of the United Kingdom was held in London on Thursday evening, October 27. Mr. John Stuart, of Glasgow, the President, occupied the chair, and among those present were Mr. W. Crooke, Edinburgh, President-elect, and Mr. George Mason, Glasgow. The principal item on the agenda related to the winding up of sundry matters of business in connexion with the late Glasgow meeting. This having been satisfactorily disposed of, unanimous expression was given to a feeling that the Glasgow Convention was thoroughly successful throughout, and the efforts of the President and the local committee to render the meeting enjoyable were warmly recognised. In particular the Clyde and Loch Lomond excursions will be fresh

in the memories of the Southern visitors for many a day to come.

* * *

Concerning the Gloucester meeting of 1899, those who propose attending it may reasonably expect to have what it is nowadays customary to term a "good time." The Municipality has decided to officially welcome the Convention, and we have already pointed out that the natural beauty and historic interest of its surroundings makes Gloucester an ideal centre for photographic work. With regard to the more formal part of the week's proceedings—the business of the meeting, in fact—there is a strong feeling that room exists for considerable improvement, and we understand that strenuous efforts will be put forth to induce members to take a livelier interest in the meetings for the reading and discussion of papers, &c., than hitherto. The Convention is certainly to be congratulated at having as President-elect so eminent a photographer as Mr. Crooke, and we know that he is animated by a keen desire to make the meeting successful from all possible aspects. Probably an exhibition of professional portraiture will form one of the features of the Gloucester Convention, and the President-elect in his address may be expected to touch upon many matters that are of primary interest to professional photographers, a large number of whom it is to be hoped will attend to support Mr. Crooke, whose position as the greatest portrait photographer of our time gives him at once the power and the opportunity of doing a great deal for the advancement of his profession.

* * *

Photography in colours having had its cycle of worship by the leader-writers, has of late almost arrived at its apotheosis, and another fetish has to be resuscitated. This, apparently, has been found in the image of the last object visible to a dying person being impressed on the eye. Since the first discovery of the retinal, or Kühne, purple, and its capability of being impressed by external objects, there have been periodical recrudescences of the story with all kinds of embellishments. The *Lancet* has recently been taking up its lance and tilting at the latest account given, under the title of "In Dead Eyes" in a London paper. In this case, however, the image appeared, not on the retina, but on the iris of the eye, and not in one instance, but in hundreds, the exponent of the phenomenon being an enthusiastic photographer and medico. He had never seen a picture, but had distinctly traced both letters and objects when photographs had been taken. Considering the peculiar lamellar appearance of the surface of the iris, it would be rather remarkable if enlarged photographs of them did not support us. In the present case they appear to have done such simple objects as capital letters, &c. Thus "the chief scientific paper of France," says the paper referred to, "only the other day gave full particulars of a case where a woman who died in one of the hospitals had two numbers, 10 and 45, mirrored in the iris of her eyes." What this all means, if there be any real foundation at all, it is impossible to say. Probably the explanation is that the retina was meant, for it is most singular how the three leading terms in connexion with ocular matters—retina, pupil, iris—are confused in the popular mind.

* * *

There is an article in a recent number of the *Journal of Applied Microscopy* in which a method is given for giving an enduring black surface for tables exposed to rough usage as in laboratory work, and the formula on the face of it is so excellent, and the accounts given of its durability so satisfactory, that we have no doubt its usefulness will be equally great in photographic work-rooms, if not indeed for some pieces of photographic apparatus. The method is in use in the Danish laboratories, and was described by Dr. Julius Hortman, and Professor Barnes gives the actual proportions of the ingredients as then employed, which are now given to our readers.

Solution No. 1.

Copper sulphate	125	grammes.
Potassium chlorate	125	„
Water	1000	„

Boil till solution takes place.

Solution No. 2.

Aniline hydrochloride	150	grammes.
Water	1000	„

Or, if more readily procurable,

Aniline oil	120	grammes.
Hydrochloric acid	180	„
Water	1000	„

By means of a brush apply two coats of solution No. 1 while hot, the second coat as soon as the first is dry. Then apply two coats of solution No. 2, and allow the wood to thoroughly dry. A coat of raw linseed oil is next applied. It is best to use a cloth instead of a brush, so as to get only a very thin coat of the oil. The desired amount of polish is now given the wood by rubbing in the oil. In the treatment with the oil the deep black colour is partially brought out, although this does not uniformly appear until the table has been thoroughly washed with hot soapsuds. This takes out the superfluous chemicals. The finish thus secured is an ebony black, which is permanent and very highly resistant to the action of chemicals such as acids and alkalies; even concentrated sulphuric acid having little or no effect if quickly washed off. . . . . "It is not only possible to treat new table tops this way, but old ones take nearly as good a finish. In this case the old oil or paint is planed off, and the surface is treated as new wood. The tables in the bacteriological laboratories here are practically in as good condition to-day, after use by students during two school years, as they were when finished."

* * *

Workers in wet collodion know that the surface of a glass plate may be well cleaned and thoroughly washed yet be capable, upon development of an exposed film upon it, of giving ugly marks and smears that can only be attributed to some impurity within the surface of the glass. Similarly the makers of Crookes' tubes know that such surfaces occlude gases, and do not readily give them off again. Mr. Chas. F. Brush, according to the *Chemical News* last week, has been working on this ground, and made some remarkable discoveries, an account of which he recently read before the Chemical Society of Cleveland, Ohio. He found glass surfaces to give off a gas for several hours, a gas that possessed special and unusual characteristics. Following up this discovery, he powdered some glass, and then, exhausted by the aid of heat, the gas occluded. This he separated and examined, and discovered to be a new and entirely unknown gas, to which he has given the name *etherion*. Can we trace to etherion the smears and streaks so familiar to old wet-plate hands?

ANCIENT TONING METHODS.

II.

TURNING now to another phase of the question, we may consider how far the basis of the print may affect the question of permanence. At the period when gold-toning was first introduced, and previously, plain paper prints were solely in vogue, plain, at least, to the extent that the "high" surfaces of albumen, gelatine, or collodion, as now used, were then unknown. Various methods of sizing other than and in addition to that followed in the manufacture of the paper were certainly employed, but solely for the purpose of confining the image to the surface of the paper and counteracting the sunk-in appearance and lack of brilliancy that followed the use of a too-absorbent medium. But in no sense can the "surface" of the papers of those days be compared with any of those of the present day, even of the "matt" kinds.

Then it must also be kept in view that the paper itself employed in those days was considered an item of the very highest importance, studied carefully not only as regards its mere texture, but also as to quality, and only the very best qualities of the best makers received the sanction of those who knew what they were about. This, too, was in the days of "hand-made" paper, in the manufacture of which only pure linen rags were employed, and in selecting any one of the formerly recognised "brands" one might be certain of at least starting with a reliable basis on which to work. At the present day all manner of materials are introduced into the paper, and provided it possesses a suitably smooth surface so far as appearance goes, and can be bleached by modern chemical means to the requisite degree of whiteness, it matters not what unknown impurities it may contain.

How far the question of the "surface" of the paper may affect the permanence of the prints may be studied, first of all, by looking back to the method of sizing. The chief agents formerly used for this purpose were starch, or arrowroot, and gelatine, and the papers of various makers were generally known as being sized with one or other of these substances. Of the later recognised brands of photographic papers, "Rives" and "Saxe," the former was an arrowroot, and the latter a gelatine-sized paper, and the belief prevailed in bygone days, and for that matter does still, that the results obtained upon the first-named were more permanent than those of the other. Certainly, looking back upon old prints in our own possession, all those that have kept the best for periods of twenty and thirty years are those upon "Rives" paper, and those of the same periods that have hopelessly faded are, without exception, pictures of larger size, which, from the character of the tone, if not from actual knowledge, are upon "Saxe." We have before us as we write several small prints that were made certainly previously to 1865 and toned to a purple-black colour, which, so far as tone is concerned, are as fresh and bright as if toned yesterday, though the whites are slightly yellowed, but very slightly, possibly from discoloration of the paper. These we know from recollection to have been made upon a thin, rather high-surfaced "Rives" paper of French make, bearing the imprint "Marion," and were toned with either the carbonate or phosphate bath, or probably some by each.

But to return to plain paper and the possible effect of the sizing—it is not difficult to understand how the comparatively porous surface of an arrowroot-sized paper forms a less favourable breeding ground and has less hold for any germs of decay than the harder but absorptive surface of alumed gelatine. The latter swells under the influence of moisture, and any chemical substances thus absorbed can only be re-expelled by the comparatively slow process of diffusion, whereas in the case of the arrowroot surface the removal partakes more of the nature of squeezing a sponge, or, as we have heard it described once, of "shaking sand through a riddle." This brings us to the very heart of the matter, for, if so simple a thing as the sizing of the paper can exert an important influence on the amount of care requisite in its treatment, how much must that influence be intensified in the case of albumenised or emulsion paper?

There lies in fact *the* difference in the applicability of the old processes of toning to modern requirements; it is merely a question of taking the requisite amount of care in treatment. A process that may be perfectly safe in the case of plain paper might, and no doubt would, break down hopelessly under apparently similar conditions when applied to gelatino-chloride, although if the requisite care necessary with the latter paper had been exercised the result would have probably been entirely different. This, of course, refers solely to methods which involve in themselves no dangerous reactions, for where these enter there is very little certainty under any conditions that permanence is secured.

The days of sulphur-toning may be said to have practically ceased with those of plain paper, and the outcry against fading commenced with the era of albumen. Why? Simply because in the first place the additional care necessary was not observed. Then it became the fashion to blame the uncertain character of the albumen, though the majority of people laid the fault to the charge of the hypo; indeed, perhaps hypo throughout all the long years of positive printing has been the best abused chemical we have. But even albumen prints, as has been conclusively proved, do not necessarily fade, so we may exonerate both albumen and hypo, and lay the blame of all to pure carelessness.

But if the greater holding power of the albumen surface brought the need for greater care, what must be said with regard to gelatine? Without referring in any way to any chemical action that may go on between the silver and gelatine in the preparation of the paper beyond saying that we do not think under proper methods of manufacture this has any dangerous effect, we do emphatically express the opinion that the physical nature of the modern surfaced papers is the indirect cause of so much of the want of permanence complained of. More care—more intelligently applied care—is requisite in the treatment of such papers, and that being given, we have little doubt gelatine prints will stand as long as plain paper or albumen prints have done. But in the case of the use of some of the older forms of toning bath or modern combined "bath," the question arises as to whether the "game is worth the candle?"

Alleged Fading of Collodio-chloride Prints.—Reference has recently been made in the German photographic press to the yellowing of collodio-chloride pictures, and two quotations bearing upon the subject were given in the "Foreign News and Notes" last week. In England, the country of its invention, this process has always been looked upon as the most permanent of all the silver printing processes. Theoretically, because the collodion, unlike albumen or gelatine, does not form a compound with the free nitrate of silver, always present in printing-out paper; practically, because there are thousands of collodio-chloride prints in existence

made thirty and more years ago which still show no signs of deterioration, notably those by Mr. George Bruce, of Duns, who has used no other process, which, by the way, were produced on paper "made in Germany," and long before its commercial manufacture was attempted here. Why then do the present-day prints turn yellow? Such yellowing cannot be due to the collodion *per se*, as that has no affinity for silver; neither has the sulphate of baryta by itself, with which the paper is surfaced.

Seeing that neither the collodion nor the baryta combines with the silver, we must, of course, look to the vehicle with which the baryta is secured to the paper. If that be gelatine, or anything else that forms compounds with the free nitrate of silver, the trouble is fully accounted for. Shortly before the formation of the German photographic paper ring, we coated three samples of German paper, from different sources, all surfaced with "baryta" for photographic purposes. The same *batch* of emulsion was used with each. One sample became yellow in a few days; another kept its whiteness for a fortnight; while the third remained white, and printed and toned as well as it did at first after being kept a couple of months. Now, it may well be assumed that, although the sample that quickly deteriorated printed and toned as well as the others, when it was first prepared, the prints might soon turn yellow afterwards; but that would be due to the composition of the coating of the paper itself; that must not be charged to the collodio-chloride process. It, however, serves to show how completely we are at the mercy of the German paper ring. Commenting on this subject, Herr F. Stoltze, in the *Photographische Chronik*, says the business is important and lucrative, and it is a pity that some of the large paper-makers in England do not face the difficulties connected with the manufacture of photographic paper, and win the business for this country. This, coming from a German, is significant. We know more than one of our large paper merchants are enthusiastic photographers: is it not worth their attention?

Forgery by Photography.—Photography from its earliest date has been turned to account in forgeries, or rather attempted forgeries, for they have been quickly detected. The art has, however, been more largely used, and more legitimately so, in the detection of forgeries. Still forgeries, particularly of bank notes, are from time to time attempted; but more, probably, of foreign than English notes. Two or three weeks back we alluded to arrests made at Hounslow in connexion with the alleged forgery of Russian and Austrian notes by means of photogravure and other photo-mechanical processes. Last Friday at the Central Criminal Court both the accused pleaded guilty, and were awarded seven years' penal servitude each. The judge, Mr. Justice Bigham, in passing sentence, said the prisoners had prostituted their abilities to the most wickedly dishonest purposes, and they must be made an example of. A warrant is out for the arrest of a third person, who is said to be the principal in the affair. At one time it was thought that by the introduction of colours in bank notes and cheques, forgery by means of photography would be an impossibility. Orthochromatic photography has dispelled that idea long ago.

Fortifications and Photography.—A few months back we referred to the "craze" there was in Germany for pictorial post-cards. This modern mania has since been extended to other countries. The Berlin correspondent of the *Standard* telegraphs that all post-cards with views of German fortifications have been prohibited in Germany, and will be confiscated if found. This edict will not affect us much, as we much doubt if many pictorial post-cards are produced here for sale in Germany; and if we may judge from the coloured lithos made in Germany for sale in England, views of German fortifications would not be of much value or interest to any one, even if they were of British fortifications.

ON THINGS IN GENERAL.

Our Editor deserves well of the profession for at last drawing close attention to a matter which undoubtedly has some effect upon the portraitist's income; I allude to his remarks upon the "notorious free-portrait dodge," regarding which he is a little more self-restrained than the Editor of *Truth*, who boldly heads an article, extending over three pages, treating of the matter, "The Free-Portrait Swindle." Possibly our Editor has a healthy dread of the law of libel which, in Mr. Labouchere's case, has been uncomfortably often invoked. But, be that as it may, it is well that the leading organ of photography has raised its voice against one of the most impudent swindles of the century. I do not know whether a certain meed of praise should not be accorded to Tanquerey for having discovered the deepest depth of gullibility to which human nature can descend. To prove that a man or a woman, in the full possession of his or her senses, can believe that any one, a perfect stranger, would make them a present worth 4*l.* sterling, stamps the man as a genius. Possibly the letter from the Chief of the Detective Department at Scotland Yard sent to the *Standard* and other papers, unmasking the fraud, will be of benefit, but to a fool and his folly there is no end. And here, too, we actually have Lady Colin Campbell writing to contradict the Chief thus: "M. Tanquerey deserves every support, and, as he is unknown in England, he has adopted a perfectly legitimate means of advertisement!" This advertisement must be worth a thousand pounds at least to the man Tanquerey. If every photographer in the kingdom would do as the Editor recommends, write to the local press, exposing the natureof the free-portrait "scheme" (careful Editor!), the nefarious system of trading upon fools would be put a stop to.

Having now stroked the Editor the right way, I feel called upon to reverse the process, and ask him what he means, after the strong fashion he once wrote upon the matter, by writing in such a way as to actually countenance the methods of the publishers of Messrs. Charles Letts & Co.'s diaries. Their precious method is best described in the quotation given (p. 642, The British Journal of Photography). After stating that Messrs. Letts & Co. are asking photographers to take free photographs of the owners of the book on presentation of a coupon placed in that volume, they give the firm's words as follows: "The owner must, between January 1 and June 30, 1899, present the volume to the nearest photographer, who will tear out the coupon, and, having taken the necessary negative, will supply a well-finished copy, free of all cost, of *carte de-visite* size, or on payment of 2*s.* if cabinet size." Now, it should not be necessary to state that, if a photographer has so flourishing a business that he finds it necessary to take photographs without a charge, it is hardly necessary for him to call in the aid of Messrs. Letts or any other firm to enable him to carry out his philanthropic desires. I heard of one photographer whose intention, upon receipt of their circular, was to demand an apology for the insult, coupled with the expression of the writer's intention to kick off the premises any one who should attempt to make such an offer in *propriâ personâ*. Yet it is an absolute fact that there have been scores, nay, hundreds, of professional photographers who have taken up the "agency." Yes, even before the plan was introduced of making a charge of any sort for cabinet pictures. Yet, in the face of such facts, here am I, in company with others, laughing at the gullibility of the public in swallowing the Tanquerey free-portrait bait! How true Sam Slick's dictum, "There is a deal of human natur, &c."

Noting the editorial remarks upon the fugitiveness of the rose tint in photographic printing papers, it may be observed that excessive rapidity in the fading of such tint is owing to either parsimony, ignorance, or carelessness. There are, and have been for years, known to commerce a goodly number of dyes which will retain their colour, or most of it, for a lengthened period. Among the best of these will be found the alizarine colours and an alizarine sulphuric acid salt should answer every purpose of the paper-maker. If, however, he elect to use a rosaniline salt, better known as magenta or fuchsin, his wares are bound to perish in the light.

is marvellous to observe the rapidity with which some reds will ɔcumb to strong light. I can vouch for a case where a lady, with ık ribbon trimmings to her bonnet, during a call she made upon a end, sat near the window, where the sun caught one side of her ad. When she rose to finish her call, the bonnet was white on one le and pink on the other (the shaded) side. If such a dye was ed in photographic paper, the effect need not be described.

Earl Crawford's speech at the Royal Photographic Society will ɔbably mark an epoch in photograph-making. The faddists of all es have been laughed at, yet often they have left their mark hind in imperishable traces. The pre-Raphaelite movement was ce the scoff of the profession; yet what has it not done for art? e all laughed at the Greenery Yallery Grosvenor Gallery, but who all say its whimsicalities have been without influence? And so—

"The mud-like thing
Of the Linked Ring"

s afforded plenty of sport, heightened, as it has been by the super-ious bathos of the notorious "Forewords." But that it has had a st influence with both the herd and its keepers a glance at the present ɔyal Photographic show will prove. Of all the lamentable, dreary, nereal-looking dens that I ever entered where art was supposed to ign, this Exhibition holds first place as regards these characteristics. e make merry over a flock of sheep following their leader, but what all we say of the flock, not of sheep, rather of geese, who have, void of one spark of originality, run after Salon methods and bbeted themselves in the monstrosities of effects and absurdities, ıdities, ignorance of decorative effect, or unity of idea, in frames w to be seen at 5A, Pall Mall. The President has put his foot wn; the mud-like thing has arrived at its apogee, and for the ture we may hope to see the precíseness and mechanical effect, at was wont to characterise so many of the older photographs, ppily blended with the possibilities suggested by the Salon work, ıich itself this year is so much superior, as it is further removed ɔm its earlier style. The time will come when it will be impos-ɔle to have a landscape framed and hung upside down and labelled "naval review," as has been done in the present Salon.

Mr. Sandell is an excellent plate-maker, and I should listen with spect to anything he had to say about multiple film plates, but if is correctly reported in the JOURNAL for October 14, I should t rely upon him for advice upon lenses. He is reported to have id that "the rapid rectilinear, whilst enjoying good definition over e whole of any desired plane, is less capable" (than a wide angle) ɔf sharply defining a series of planes." It might have been thought at by now every one knew that definition in various planes was a nction not of the curves and separation of a lens's constituents, t of its aperture, and that alone. Probably the reporter has ıitted to include some such limiting clause as "when used at full erture," on the occasion of his delivering the above-quoted dictum.

That the "policeman's lot is not a happy one" we have on high thority; but what must an editor's be when he has to read, under-ınd (or try to), and answer such a query as the last given on ɔtober 14. How the sulphocyanide toning bath is made, *i.e.*, in ıat proportions its constituents are put together, as given in this ery, is entirely beyond my powers of comprehension, yet I have ıd it several times—forwards, backwards, and sideways.

I have often spoken of the crass ignorance of the photographer ıo could believe that the putting his name under copies of his otographs could be any pecuniary benefit to him, yet the writer of e query placed immediately above the one just referred to has idently some such idea, for he appears actually to have given per-ssion to a publisher to use his pictures without any reward or pay-ıt, save only the having his name placed as producers of the ginal. He sells a batch of photographs for 1*s.* 2*d.* a piece and no arge for copyright fees. Evidently he is not a member of the pyright Union. On October 7 a writer, under the pseudonym of Copyright," does me the honour to ask my advice about the proper ɔs to obtain for his work. Well, to begin with, he will find it ficult to get a sufficient fee after having accepted a universal half-guinea; as, further, in many cases it is an amiable weakness of some editors, when more than this is asked, to be struck with the holy horror I referred to, and to reply about the "usual fee," &c. They find it convenient to assume that there is such a recognised thing as "the usual fee," and there isn't! We have it on the authority of the learned Hudibras that "the value of anything is just as much as it will bring," and so it is with copyrights. It is difficult to give a general rule; but, where a subject is of exceptional interest, and *no one else* has a photograph of it, the value must be reckoned in guineas. Take the examples he names. There may be a dozen photographers at work on the boatrace; hence he would not expect to get more than the Copyright Union sum or fee of half-a-guinea, where not over cabinet size, when reproduced. The big railway smash taken by some one who happened to be near by, if it included the sufferers, would be a case of many guineas; but taken at a time when all the world knows of it, and could Kodak it, "the usual." The *Graphic* would pay well for any fancy study it accepted. The recently appointed Bishop of the Cannibal Islands would come under "the usual" also, unless he happened to have figured on the Cannibal Island sovereign's *menu* among the *rôti*, in which case a fancy price would be given by the big weeklies, if no one else had photographed him. Similarly, if the anthropophagistic chief in question had only eaten me, "the usual." The smaller monthlies will rarely give more for anything. Finally, if "Copyright" chooses to send one or two that he thinks likely under cover to the Editor for me, I will give my opinion, if he marks on them in pencil what he thinks they should be worth.

FREE LANCE.

PHOTOGRAPHIC WRINKLES.

IT is surprising what a little is understood about the properties and composition of the various articles used in everyday photography by photographers, both amateur and professional, and photographic dealers or their assistants. I suppose being able to obtain all the articles ready-made in these days accounts for a lot of it, as in the old wet-plate days it was necessary for a photographer to know a little, at all events, of the scientific part of his business; but now he buys his plates, papers, and chemicals all ready for use, generally with full instructions enclosed. If he is a careful man, he works to them; but, if careless, he works as near as he thinks he will; should anything go wrong he blames the materials and changes to another make. It can hardly be expected that he should know much about the manufacture of gelatine dry plates and emulsion papers, as it is almost impossible for the average photographer to make these articles himself, requiring, as they do, expensive machinery and a large amount of chemical knowledge, but it seems strange that he does not understand the main principle of them.

I had occasion some short time ago to call at a large photographic dealer's for a packet of a new brand of collodio-chloride P.O.P. which I wanted to try. The assistant did not seem to understand what I wanted; he went to inspect their stock, and, turning to me, said, "We have —— and ——," mentioning two well known makers of gelatino-chloride. I said, "They are gelatino-chloride, I want collodio-chloride; they are made with gelatine, I want a paper made with collodion." He replied, "We only keep the gelatine, we don't keep the chloride;" and I find this is a common mistake with most amateurs and many professionals. One often hears the remark made, "I only use P.O.P., I never use the chloride;" or, "I do not care for those chloride papers. I always use albumen." And very few seem to be aware that printing-out papers, of whatever description, are of necessity chloride papers, as, up to the present, chloride of silver is the only silver haloid which has been found suitable for printing-out purposes, the difference being that, with albumen, the chloride is formed in the paper itself, while with collodio-chloride and gelatino-chloride, an emulsion of the chloride is formed in a solution of collodion or gelatine, and the paper is afterwards coated with this emulsion.

Another stumbling-block to many is distilled water; the question is often asked, "Are not boiled water and distilled water the same?" and, when told "No," the reply is, "What is the difference?" Distilled water certainly is boiled water, but boiled water is not necessarily distilled, the latter being water which has been boiled, and the evaporated steam condensed in stills, similar to the way spirit is distilled. Many photographers cannot understand the necessity of using distilled water in toning baths, and often ask, "Why is it necessary?" Water is the most universal solvent known, and consequently is never found in a pure state, naturally, rain water being the purest; but, even this contains traces of carbonic acid gas, and other impurities of the atmosphere, more especially in towns; ordinary tap water generally contains carbonate of lime or chalk, sometimes sulphate of lime or gypsum, and traces of iron, &c., which, if made up into gold solutions, would precipitate the gold, and

render the solution useless, the idea of the action of the toning bath being, that the gold which is held in solution by the water, is precipitated upon the print, through the already reduced silver, which attracts the gold; therefore any foreign matter which attracts the gold robs the bath of a certain amount of the noble metal, which should have been received by the print, and most impurities will reduce chloride of gold to the metallic state, as it is a very unstable salt, hence its value as a toning agent. Of course, water which has been boiled and filtered, if contaminated with carbonate of lime or chalk, is very much purer than ordinary unboiled water, as boiling drives off the carbonic acid gas, which enables the water to dissolve the lime, consequently the lime is deposited; this is well seen in what is commonly known as "furring" of kettles and other kitchen utensils, and the incrustations of boilers. This is known as temporarily hard water. Sulphate of lime or gypsum cannot be got rid of so easily, as boiling does not precipitate the sulphate, which can only conveniently be removed by distillation. This is known as permanently hard water. Well, spring, and river waters are contaminated with the different strata they filter through or flow over, and sometimes with organic matter which is dissolved by the water.

I have known amateurs to use boiled tap-water for making up toning solutions, under the impression there was no difference between that and distilled water, and the result has been that they have been unable to tone their prints, as the whole of the gold has been precipitated either at the bottom of the bottle which holds the stock solution, or in the toning dish. Distilled water should be odourless, tasteless, and unpalatable.

Hyposulphite of soda is another article which is sometimes used in an unscientific manner, being very often dissolved up, and used at once, which is a great mistake, as hypo in dissolving makes the solution intensely cold, and, if used in that condition, does not have the proper effect upon plates or prints.

Hypo should always be dissolved a day or two before using, as it frequently deposits sulphur, and other impurities, probably accounting for fading and yellowness, and in addition is very often quite acid, a condition which generally results in great reduction of plates or prints; this latter fault may be easily remedied by the addition of a small quantity of ammonia.

It is always advisable to use a strong solution of hypo, in preference to a weak one, as a weak solution forms an insoluble hyposulphite of silver, which is a cause of trouble later on. On the other hand, a strong solution forms the soluble hyposulphite of silver, which is easily dissolved away in the final washing.

C. T. Sutton.

SOME RECENT EXPERIMENTS IN FLASHLIGHT WORK.

Since the introduction of flashlight working, by means of projecting dry magnesium powder or such in combination with some other material into a flame of gas, or other equally suitable radiant, for the ignition of the powder, it may be said that very little attention or improvement has been effected in the method of procuring this powerful light for photographic and other purposes, and no doubt the great simplicity of such operation has to a large extent arrested any further attempts in the way of obtaining improved results. It was not long after the great utility of this light became recognised that the markets were almost flooded with contrivances for burning dry magnesium powder, these contrivances in almost every instance took the form of some hand lamp, and if any proof were wanted of utility being sacrificed to portability in photography such was abundantly provided in the form and shape of these toy lamps, very many of which were absolutely of no practical value where serious photography had to be accomplished.

These hand lamps may be divided into two classes, viz., those in which there was provision for the powder being burned in limited charges of one flash only by means of a flame of gas, and those in which provision was made for a succession of flashes all emanating from the same central point or flame. In each case, however, these hand lamps all burned the powder at the same contracted point or area in proportion to the size of the flame. Very often this flame area was not more than one inch in circumference, and in but a few instances were lamps made where such went beyond two and a half inches, the result being a brilliant flash, generally in an upward direction, and varying in extent according to the height of the flame and the amount of powder consumed. Among the earliest of my experiments in conjuction with Mr. Hugh Reid, of Glasgow, was the blowing of dry magnesium powder into quite a variety of gas flames, *i.e.*, the shapes of the flames were altered in order to discover the best form of gasburner for not only entirely consuming the powder, but likewise the shape of the flame that yielded the most suitable light; and even at this early period in flashlight procedure Mr. Reid tried the mixing of dry magnesium powder with other ingredients, a practice he has since learned from experience to be a most disastrous one, and which he would never now think of doing.

As an outcome of these experiments, it was abundantly proved that the best photographic results were not obtained with the aid of any flash that emanated from a contracted point, such as was yielded by burning a few grains of powder in a small upright flame of, say, one inch in circumference, but, in proportion as the size of the light increased laterally, so likewise were secured better results in every way. This was first observed by the use of a flat pan eight inches long by about three inches broad, having a piece of flannel running its entire length, that yielded a flame by burning methylated spirits. This flat pan was attached to the nozzle or escape pipe of an eight-ounce wash bottle, containing about half an ounce of *absolutely dry* magnesium powder, and here it should be expressly noted that, when this form of lamp is being used, it is imperative that not only the powder, but likewise the bottle and all its tubes, must be absolutely dry if the utmost light obtainable is to be secured. The least damp will materially affect the success of this form of working. But, on the other hand, if care be observed that every particle of the lamp and its connexions is scrupulously clean and dry when such is used in conjunction with the flame from a spirit pad in an eight-inch pan as described, a light of extraordinary power is obtained entirely different from what is obtained by blowing the powder into a upright flame of, say, six inches in height, and a wash bottle, as described many years ago in the columns of The British Journal of Photography, was probably the best flash lamp known for years, and one that I still continue to use under certain circumstances where other more exacting conditions do not exist. The extended pan attached to the nozzle of the wash bottle, however, clearly demonstrated to me the advisability of producing a light otherwise than from one fixed or central point, as would be the case when powder was projected into or through the thin flame of one bat's-wing burner, or upright into a column of flame yielded by a Bunsen burner. This led to the employment of more than one light or lamp being used at one and the same time, the outcome of which was the yielding of a more or less crossing of light, which in portraiture at least required considerable practice and skill to work effectively so that the one light should balance the other in the proportion desired. At this period there was also tried (in fact, demonstrations were given by its means before the Glasgow and West of Scotland Photographic Society) the burning of the powder in conjunction with a limelight jet in an enclosed glass case three feet broad by five feet in height, but the same defects were apparent under these conditions as were noticed in the case of where the light was burned from a too central point. It had therefore become apparent that a happy medium required to be adopted between a radiant that was too concentrated and the use of two or more radiants that were at varying distances from each other. This led to a further series of experiments, in which the powder was consumed at a number of nozzles in what may be termed close proximity to each other, all the lights being produced at the same moment of time.

This was accomplished by my getting a gasfitter to cut a one-inch brass tube into a length of twenty inches, and boring at intervals of about two inches holes into which quarter-inch brass tubes were screwed; on a half-inch hole was then drilled in the side and centre of the large brass tube, into this was soldered another half-inch brass tube about six inches long, and the ends of the large tube were closed with metal caps, so that no air could escape. On to the ten quarter-inch pipes were screwed little metal cups in shape something like the socket of a candlestick (in fact I took the idea from a candelabrum which burned either gas and candles). Around the outside of the metal cups is a narrow gutter into which sits the bottom edge of an asbestos cone, cut to the size of the circumference of the metal cup and joined together by a wire ring. These asbestos cones are easily made by cutting a sheet of asbestos card into strips about one inch wide. The cones are, when the lamp is going to be used, saturated with methylated spirit and slipped over the metal cups in their gutters. The cups then receive each a charge of dry magnesium powder; a light is then applied to the asbestos cones, and a good steady blow through a long length of rubber tubing (which must be attached to the half-inch blowpipe) will produce a light that certainly astonishes the beholders, even those having some experience in flashlight working. What the candle power of this form of magnesium light may be no one can say, simply because it will depend upon the amount of powder placed in each metal cup. The light produced from a charge of thirty grains in each cup is simply tremendous, and with such any ordinary villa could be photographed at night. If I remember rightly, I think a lamp similar to the one I have described was mentioned some years ago in which common tobacco pipes were used much after the same manner, and I see no reason why even such should not be effective, although, doubtless, they would be very liable to get broken.

This is the most powerful form of flash lamp I have ever witnessed or used personally, and its great advantage lies in its portability, for practically it is unbreakable and packs into small compass, at the same time there is no spilling of spirits for the cones are saturated apart from the lamp altogether.

Being desirous from time to time of overcoming, or at least reducing, the smoke nuisance, which is an inseparable accompaniment of flashlight working, I somewhat recently carried out a series of experiments by means of the form of lamp just described; but, instead of blowing the powder by means of the mouth and lungs, I determined to try the effect produced by projecting the powder into the flame by means of compressed gases. Two cylinders of gas, the one hydrogen and the other oxygen, were procured, and, in order to secure a sudden emission of gas from the cylinders, fine adjustment valves were screwed on to their nozzles. The brass lamp was charged and lighted in the usual way, and the rubber tubing attached to the nozzle of the hydrogen cylinder. The atmosphere,

must be stated, was fairly dry at the time, and the moment the fine ljustment tap was opened an immense body of flame burst from the mp that was quite startling. The gas was at once turned off for an spection of the amount of smoke that was apparent; it cannot be said, owever, that this method of carrying the powder by means of compressed as did effectually burn the smoke, although it was apparent that an ppreciable lessening of the quantity of fuel was effected, and the same as noticeable when the oxygen cylinder was employed; but the amount light was considered superior when the hydrogen was used. An im-ortant point when using compressed gas is to provide a stop cock at ne junction of the half-inch tube with the main tube, by means of which ll atmospheric air is excluded from the lamp prior to opening the linder valve.

T. N. Armstrong.

"FREE PHOTOGRAPHY."

N the City of London Court, on Tuesday, the 25th inst., before Mr. egistrar Wild, the case of Letts *versus* Oldershaw was heard. The laintiffs, Messrs. Charles Letts & Co., 3, Royal Exchange, E.C., sued ne defendant, of Leicester, to recover 1*l.* 14*s.* 6*d.*, a balance of account or almanacs and diaries supplied. The plaintiffs' representative said hat the item in dispute was dated November 25, 1897, and amounted to *l.* 4*s.* This was a definite purchase, but the defendant, after five nonths, wanted to make some returns, which the plaintiffs refused to llow him to do. The defendant said that the almanacs were distinctly ought on sale or return, and the plaintiffs had refused to allow him for ertain almanacs which he had returned. It was the custom of the trade or returns of almanacs and diaries to be made in April. The plaintiffs' epresentative said that the invoice supplied with the goods distinctly tated that the goods were sold. The defendant said that, after the re-eipt of the invoice, he wrote to the plaintiffs calling attention to the act that he had ordered the almanacs on sale or return. It was denied hat any such letter was received by the plaintiffs. The defendant said hat, if the Court was against him on the question of sale or return, he vished to point out that part of the order was obtained by a fraudulent tatement made in connexion with the *British Almanac*, published by laintiffs. The *British Almanac* contained certain coupons by which ersons could obtain goods from the advertiser free. There were coupons n the *British Almanac* by which a purchaser, upon cutting one out and resenting it to a photographer, could have his photograph taken free. In the sample almanac shown him by the traveller, the name of a cele-rated photographic artist of Leicester (Frank Brown) appeared. Any ne purchasing one of the almanacs and taking the coupon to the artist ould have his photograph taken free. Upon seeing the name of the artist, he told the traveller that he should certainly be able to sell a large number of them. When the almanacs arrived, he found the name of a fourth or fifth-rate photographer on the coupons instead of the name of Frank Brown. He wrote to the plaintiffs about the matter.

The plaintiffs' representative said that, when the objection to the photographer was received, they agreed to allow almanacs for 1899 in exchange for those of 1898, and to this they (plaintiffs) received no reply. The traveller who took the order was simply engaged on commission. Mr. Registrar Wild said that the defendant swore the goods were ordered on sale or return, and he must have the evidence of the traveller before him. The plaintiffs' representative said he thought the invoice sent to the defendant would have been sufficient. Mr. Registrar Wild said it must not always be considered that such invoices would settle matters. The defendant had sworn that he sent a letter to the plaintiffs containing his version of the order, and his evidence as to the order was uncontradicted. The plaintiffs' representative said he could produce a signed order of the defendant's if an adjournment were granted. Mr. Registrar Wild said he was surprised that the witness, knowing what the defence was going to be, had not brought the document with him. The defendant's expenses from Leicester would have to be paid if an adjournment was granted. The case was then adjourned.

PHOTOGRAPHY BY PATENT.

The striking increase of late years in the number of patents granted in connexion with photography, an increase out of all proportion to the expansion of photographic commerce or the practical developments of original scientific research, holds out the possibility of a somewhat unpleasant state of affairs for the practitioner of the immediate future. Even now it is barely possible to follow any branch of photography without using some article or piece of apparatus marked "by letters patent;" should the present activity of the patentee continue, there seems every likelihood of the twentieth-century photographer being entirely hemmed in and assailed by patents from every direction. His business will be conducted by the employment of monopoly articles, retailed at monopoly prices, a most undesirable condition, which can only result in strangling enterprise, and thus checking commercial progress.

If the Patent Office records are a reliable index to the state of matters photographic, we are now enjoying a feast of original photographic discoveries and a multitude of ideas new-born from the inventor's brain. Critical examination dispels this pleasing and optimistic vision. The growth in the number of patents granted is undoubted, as the following summary will show:—

Year.	Patents.
1856	20
1866	33
1876	23
1886	86
1896	170

In 1856 only twenty patents were completed; thirty-three during 1866; whilst in 1876, a time of good trade, the amount fell to the earlier figure. With 1886 we come to the dry plate, the consequent expansion of trade, and a jump to 86; finally, in 1896, not including photo-mechanical printing methods, the total is 170. This jump between 1886 and 1896 cannot arise from a genuine inventiveness. So far as the introduction of new processes and better apparatus is involved, the periods named were not behind 1896, if anything, especially 1856 and 1866, they were years of greater fertility. The increase must be explained on other grounds, these being the growing money value of a photographic patent and the consequent reluctance of inventors to forego such advantages. Every trifling improvement is therefore patented which in former times would not have been thought profitable.

Analyse the photographic patents of the last few years and these facts will be evident. A large class consists of patents for minor improvements in lenses, cameras, dark slides, dark-room lamps, shutters, printing frames, &c. A second of processes and apparatus once in use but long forgotten, and repatented in the hopes of a slight pecuniary gain. A third, and small, class, of distinctly new things, this last, though small, containing the greatest number dealing with the same inventions. For instance, under zoetropes and kinetoscopes in 1896 are twenty-four patents.

Surely there are not twenty-four distinct methods of producing living pictures, nor twenty-four original inventors. The majority must be granted to persons who neither originated the idea nor the apparatus, but have introduced some modification, that may be no improvement, solely for the purpose of securing the profits arising from the sale of a marketable commodity. Perhaps such men fulfil in part a useful function in financing and putting on the market inventions that would not otherwise be seen, though it is questionable if this service could not be as readily performed without creating a monopoly by means of a patent. Practically these twenty-four patents cover the whole subject of animated photography; it is now a monopoly until the patents lapse, since in no way can the photographer practise it without risking a legal action. The original inventor is also shunted out by the remaining twenty-three. In theory the Patent Office exists to protect the man who has spent time and money in perfecting an invention of general utility; actually, it leads to the creation of a class who make a monopoly by exploiting the ideas of individuals. In numerous instances the inventor sees his work patented by others, depriving him of all pecuniary reward, and oftentimes of his claim to be the originator of the device. This has happened in photography, a prominent case being those instruments for calculating exposure. To show the manner in which the patent monopoly grows, its course, evil influence, and also how very easy it is to deprive photographers of the free use of common possessions, I will trace the history of the exposure meter.

The first to start the idea appears to have been Professor Burton, who in 1882 published a table of exposures based on his own work; this was soon in general use. Later on, in conjunction with Dr. Scott's table of comparative light values. Burton did not attempt to calculate exposure; this was first tried in this country by W. Goodwin in 1885, he advocating the use of an actinometer for that purpose. Goodwin first made a trial exposure, finding that his sensitive paper required ten seconds to reach the standard tint; he goes on:—

"We have ascertained the correct exposure with a given stop on one class of view, with light of given quality, but now suppose all the conditions altered. Let the view have heavy foliage coming close up to the camera, the stop be a larger size than that used in our first experiment, and the day rather dull. The table tells us what the exposure would be with this stop, on this view, on a bright day, and, if the actinometer take twenty seconds to reach the painted tint, then we must double the exposure given in the table."

From this we see that Goodwin had a clear idea of using an actinometer test as a guide to exposure. In the following year (1886) Mr. A. S. Platts published more complete details, giving four tables of factors, and stating the method of calculating any exposure from these data. Platts employed a subject and light factor, and a few weeks later I. Watts suggested displacing this by an actinometric test of the light previous to exposure. From the publications of Burton, Goodwin, Platts, Watts, and others we have the method and data of calculating exposure; these have not been supplanted nor greatly improved. The next step was the publication in 1888, of Mr. Ackland's *Photographic Exposure Scale*, which consisted of circular logarithmic scales printed on a disc to calculate the exposure by mechanical means. I cannot trace a patent nor find any description of this instrument although it was on the market in 1888. In the same year the first patent was granted to

Hurter & Driffield for the actinograph, a slide-rule instrument on Platts' principle only supplying the light factor of Dr. Scott by a scale of values worked out by the authors. The speed scale is also improved being based on accurate determinations. The authors also claim the use of an actinometer in place of their light scale. This patent covers the whole ground, and, although it discovers nothing new, the manner in which the details are worked out place it far beyond previous efforts. The next patent is dated 1890 for the Watkins' meter, an actinometer instrument containing nothing photographically new, though showing considerable ingenuity in its mechanical arrangements. These two patents enclosed every field that had been opened up by investigators from Burton to Ackland, and henceforward no person is at liberty to use the information supplied by Platts or Goodwin without infringing one or the other. The matter has thus suddenly passed from a common possession to a very close monopoly. Subsequent inventors, traders, &c., endeavour to invade this monopoly by modified instruments, and patent after patent is granted for arrangement which to the common intelligence are no different from the originals, each patent making the monopoly still closer as against the outside photographer.

Any interested persons may be satisfied that these patents contain no single idea not already in the possession of photographers by reading and comparing the literature and patent specifications tabulated below:—

Date.		
1882.	*B. J. P.*, p. 529	Burton. Table of Exposure.
1884.	Léon Vidal.	Calcul des Temps de Pose. Paris.
1885.	*B. J. P.*, p. 184.	Goodwin. Aids to Correct Exposure.
,,	,, p. 318.	Dr. Scott. Table of Light Values.
1886.	,, p. 288.	Platts. Systematic Exposure.
,,	,, p. 370.	Watts. Exposure Tables.
1888.	*Photo News*, p. 242.	Ackland. Exposure Scale.
,,	Hurter & Driffield.	Patent No. 5545.
1890.	Watkins.	Patent No. 1388.
,,	*B. J. P.*, p 247.	Watkins. Calculation of Exposure.
,,	Competitive Papers.	Exposure.
,,	De La Baume Pluvinel.	Le Temps de Pose. Paris.
,,	Gabriel de Chapel D'Espinassoux.	Détermination, &c. Paris.
1893.	Wynne.	Patent No. 10,617.
,,	Watkins.	Patent No. 14,364.
,,	*Photography*, p. 341.	Exposure and Exposure Tables.
1894.	Savage.	Patent No. 3701.
,,	Phillips.	Patent No. 8515.
,,	Watkins.	Patent No. 25 000.
1897.	*English Mechanic*, June 18.	Watkins. Exposure Meter.
,,	*B. J. A.*	F. B. Taylor. Universal Exposure Table.
,,	Wall.	*Dictionary of Photography.*

We observe what happens. A useful notion is given to photographers; it is rapidly developed, and is on the high road to being perfected when the patentee steps in, claims it as his own; the originators of the idea are forgotten, and the patentee reaps a rich harvest. Of one of these instruments between 10,000 and 20,000 have been sold, representing some 5000*l.* to 10,000*l.*—an item of importance. Add to this the returns from all other photographic patents, and it is easy to conceive how serious a tax on industry these monopolies may become.

It may be urged that the patentee supplies the photographer with a useful instrument at a fair price, which he could not make himself, and thus effects an economy and facilitates practical operations. This is only partly true, since it is common knowledge that, when a patent runs out, competition always brings down the price of the article. In general, patent articles are sold at monopoly prices, and for this reason alone they should not be granted in the present reckless manner. As we see from the exposure meter and the kinetoscope, not only a single instrument, but every department of a subject, can be covered by patents, one overlapping the other. The claims in the specifications are so sweeping that later inventors with improved instruments cannot sustain their claims, language and the law being such as it is; hence we have the common result that, when once patented, no improvements are introduced until the patent rights are void. Stagnation, which in commerce means retrogression, is a natural consequence.

Assuming every advance in photography is to be patented, it requires but little foresight to recognise that such an overloading with monopolies must crush out the life of photographic trade. The day of the patent has certainly gone by, for the conditions of modern industry allow the inventor to find sufficient recompense in other ways. No man is required to give his inventions free to the world at large; an article that meets a demand will always find a ready sale, perfect machinery and the power of rapid distribution giving the inventor a means of establishing himself beyond fear of harmful competition. To assume men need the protection of a patent—a protection it does not give—to spur them on to invent and develop inventions is an assumption contrary to facts. Photography gives it the lie, for its history is remarkable for the number of men who have given, without restriction, time, wealth, and labour towards perfecting processes and adding to its resources. Such high traditions, perhaps, lead us to expect too much in the future, which promises a considerable descent from these high ideals of truth for the sake of truth alone.

JOHN A. RANDALL.

PROGRESS IN RADIOGRAPHY.

[*Knowledge.*]

WHEN, at the end of 1895, Röntgen reported the results of his experiments upon the photographic action of those invisible rays he was then working with, he could hardly, perhaps, have anticipated the widespread interest that was evinced upon the subject, or the extensive work that has been done, and is being carried on, throughout the world.

Probably few discoveries have been of so much service to scientific workers in general, or have claimed such universal attention, as that of the properties of the Röntgen rays.

The selective transmission of the rays being their prominent feature, the most powerful aid was, of course, given to the medical practitioner, especially to the surgeon, in localising accurately, and without the slightest pain or inconvenience to the patient, any foreign body in the system, especially if that body be of a dense nature, such as lead or steel.

Radiography has, therefore, become quite a recognised addition to hospital work and to surgeons, and in some cases where the hospital has not been so equipped, systematic work of diagnosis has been undertaken for its physicians by the college or other scientific institution in the same town. Two sets of Röntgen-ray apparatus were also provided for the Soudan expeditionary force.

The benefit derived by Röntgen's discovery, both to the doctor and to the patient, cannot be over-estimated. Many a patient, having had a foreign body somewhere in his system, or sustained a bone fracture, has afterwards left the hospital showering blessings upon the surgeon for having utilised the radioscopical or radiographical method for extraction or coaptation.

Every part of the human skeleton has now been successfully dealt with radiographically, the amount of definition obtainable depending upon the proximity of the part in question to the skin, and therefore to the plate. As the thickness of the tissues through which the rays have to pass increases, so their transparency diminishes, but, according to Batelli, not at an equal or uniform rate, while Vandevyver has shown that the necessary exposure varies as the cube of the thickness of the object, and also depends on the distance (and not on the square of the distance) between the focus tube and the sensitive plate.

Not only have X-ray pictures of the various portions of the body been taken at successive exposures and fitted together, but Dr. W. J. Morton has succeeded in obtaining, at one exposure, a life-size radiograph of the entire skeleton of a full-grown living woman—a most remarkable achievement and a striking picture—even the heart and other soft-tissue organs being visible. The apparatus employed was a twelve-inch coil, worked from a 117-volt circuit. The distance of the focus tube from the plate was four feet six inches, and the time of exposure, including stoppages, thirty minutes.

In reviewing the work done by medical practitioners in this important and fruitful field for X-ray work, the number of successful cases would make by far too long a list to be adequately dealt with now. It is in the treatment of fractures and luxations, and in the detection and removal of the various calculi and other foreign growths and deposits, that the most useful work has been done. Under the best adapted working conditions of apparatus for any particular case, the surgeon can examine with ease the exact condition of a fracture, or can ascertain how far reduction and fixation have been satisfactorily performed, even without disturbing any necessary splints or bandages. No difficulty is experienced with the former if they are made of wood or aluminium, or with the latter provided they are not soaked with lead lotion, or dusted with iodoform, both of which are impervious to the rays.

Until some twelve months ago, the accurate localisation of different foreign bodies in the system was a difficult matter. This question, however, has been taken up, particularly by Mr. Payne and Dr. Mackenzie Davidson, and methods have been devised whereby the examination of any case by the surgeon has been much simplified. That of Dr. Davidson deserves attention, as it is so simple and ingenious. With the necessary apparatus the exact position, to one-hundredth of an inch, of an object can at once be found, the complicated geometry required by some other methods being simplified down by the apparatus itself and reduced to the application of callipers and a divided scale. Two exposures are made with the focus tube shifted through a certain distance, and the mechanical factors are reconstructed by the employment of fine threads, the position of which corresponds to the path of the X-rays. Fortified with this beautiful method, the surgeon can now deal with many cases in much shorter time than was hitherto possible, and interesting reports have come to hand of the localisation of bullets in the brain and eye, besides many other results.

With regard to the various calcareous deposits in the system, localising the vesical calculi has been from the first a comparatively easy matter. Owing, however, to the position of the kidneys—close to the vertebral column—the depth of the cavity, and the thickness of overlying tissue, it was thought, at the earlier stages of the work, impracticable to obtain a radiograph of renal calculi, although, in the *Lancet* for July 11, 1896, a case is reported by Dr. J. MacIntyre of his having found, radiographically, a deposit in the position of the kidneys which, upon operation, proved to be a calcareous mass. A more interesting case, however, of renal calculi is reported by Dr. C. L. Leonard, the age of the

patient being nineteen years. The radiograph was made with a twenty minutes' exposure, with the anti-cathode of the vacuum tube placed at a distance of twenty inches from the plate. An eight-inch spark coil was used. The successful operation performed proved the correctness and value of the diagnosis.

Amongst the many advances that have been made in radiographing the soft tissues, MM. Remy and Contremoulin report having devised a process, based on the deposition of chromate of silver within the tissues of anatomical preparations, which gives striking results in respect of mapping out the structure of the soft parts, while at the same time the bones are more distinctly marked out than they previously have been, so that sesamoid bones hitherto unknown have been discovered.

The action of Röntgen rays, however, is not only manifested in such cases as instanced above. Experiments show that they exert an influence upon the epidermis of the skin if exposed to them, sometimes causing local inflammation, and this action may occur even deep-seated within the tissues. The heart also, in some cases, appears to be affected when exposed to the action of the rays, insupportable palpitations and violent and irregular heart-beats being produced, necessitating the complete sheltering of the heart by a thick metal shield.

In chemistry, botany, mineralogy, and other departments their properties have been discovered and applied. Their application to the detection of false gems is now well known, and a good deal about other allied results are obtained which open up interesting fields for investigation.

Turning to the practical methods of working, one finds that, in the main, apparatus of the same principle as that used at the first stages of the work is used now. The improvements and modifications have been made principally in the domain of constructive detail rather than by employing different methods. The induction-coil method of exciting the X-ray tube is still used by the majority of workers, some of whom use coils giving as much as eighteen or twenty-inch length sparks in air, although this by no means infers that successful work has not been done or cannot be done with coils of far smaller magnitude. Coils giving three or four-inch sparks in air are quite sufficiently large for obtaining perfect radiographs of the extremities of the body, such as the hand, the ulna and radius, or the tibia, while the writer has produced several good pictures of the adult chest with only a three-inch spark. In general hospital work and practice, however, the average size coil used is an eight or ten-inch one, and with this available spark-length all the necessary radiographic and radioscopic work is done, and pictures of most of the deep-seated hard and soft tissues are obtained. For photographic work a small frequency of interruption at the contact breaker is best, while high frequency is more advantageous for direct fluorescent-screen work. The question of adapting the contact breaker of a coil to give the rates of frequency required under different conditions of working has, therefore, occupied much time. Mercury contact breakers of different forms have been devised, and with arrangements to vary the rate of frequency of the make and break. Undoubtedly this form of break possesses a great advantage over the ordinary spring form, as with it there is no danger of what is known as "jamming" between the two connecting surfaces, which takes place sometimes in the ordinary break, and which is so fatal to the primary of the induction coil. Mercury breaks, however, are troublesome to work, and the resulting vapour very poisonous, of course. A great point is to have the mercury and the connecting platinum point perfectly clean, and to assure that the latter enters and leaves the former with a perfectly vertical motion. Sparking is much decreased by so doing.

The form of induction coil made by Apps or Apps-Newton has probably up to the present been the most efficient one in use, but it bids fair to be surpassed by a coil recently patented by Mr. A. L. Davis, and which is now about to be put on the market. By a special ebonite disc plan for the insulation of the secondary coil, the spark is considerably increased for the same amount of wire. In an experimental coil there were from thirty to forty sections, each about three sixteenths of an inch thick, making a total width of just over six inches. With this coil, and using only three accumulators giving six volts in all, a continuous thick spark of ten inches was obtained. One advance with the above arrangement of insulation is that the secondary can be wound right down upon the tube insulating the primary.

When working with an induction coil great care has to be taken, of course, not to pierce the insulation, as that would be fatal; moreover, the recharging of the necessary batteries is always a trouble, unless one is near a charging station, or can get over the difficulty at home, and these drawbacks are increased very considerably when military field work or other expeditionary work is being undertaken, and there is no possible chance of getting things rectified once they go wrong.

The Wimshurst machine, as an exciter for X-ray tubes, possesses many advantages over the coil in some respects, and will probably be utilised much more in certain cases and localities. That Wimshurst machines are quite efficient for working X-ray tubes under all conditions and for all purposes has been proved by several investigators. Through the courtesy of Mr. Wimshurst, the writer has had the opportunity of testing the capabilities of the many-sized machines in the inventor's possession. These results have shown that, provided the diameter of the plates is not less than twenty inches, very excellent and uniform fluorescent-screen illumination is obtained, the rays emitted from the tube in use being of good penetrating value. A tube which previously had been found to be best adapted for a six-inch coil, worked admirably on a machine with four plates of twenty inches diameter. Using higher resistance tubes upon larger machines, and inserting in the circuit a small spark gap suitable to the exhaustion of the tube (the gap varying from one-half inch to one-and-a-half inches) much better results still were obtained. Further, the work with a Wimshurst machine proceeds noiselessly and without the flickering in the tube so often noticed with coils. The working also entails no more trouble than the mechanical turning of the plates.

At first sight the Wimshurst machine does not seem so portable as the induction coil, but when one takes into consideration the necessary important accessory of the latter, viz., the battery and the trouble it incurs, the relative portability of the machine is much increased. Furthermore, the Wimshurst, with ebonite plates, gives better fluorescent-screen results than glass, and ebonite is practically unbreakable; the prime conductors can also be much reduced in size and capacity without affecting the efficiency for X-ray work. Considering, then, that rapid radioscopic work upon the field of battle is of much more importance than radiography, there is no doubt that, so long as the minimum size of plates is attained, and the machine made as compact as possible, it should prove of very great value to the army surgeon.

There only remains one more important practical item to be considered, namely, the vacuum tube for exciting the X rays. In principle this remains the same as the "focus" form originally introduced by Professor Jackson, of King's College, in which the cathode rays, emanating from the cathode, impinge upon the anode or anti-cathode and are scattered out through the glass as Röntgen rays. Two difficulties, however, presented themselves. Firstly, under different conditions of working and different spark lengths, the one tube with its one degree of exhaustion and one value of resistance could not be adapted. Secondly, upon continued working it was found that the exhaustion, and therefore the penetrating value of the tube, increased, so that, finally, in spite of repeated heatings by a flame so as to increase the pressure inside, the resistance of the tube was so high that discharge could not take place under the same conditions it was originally selected for.

These difficulties have been overcome chiefly owing to the persistent, patient work of Mr. A. A. C. Swinton, whose results upon the *modus operandi* in the interior of the tube and also upon the conditions affecting the emissions of X-rays have proved of very great importance in the work. Among other things, Mr. Swinton found, with experimental tubes made in his laboratory, that if the anode of the tube be so arranged that the distance between it and the cathode could be adjusted, then a ready and very simple means was at hand whereby the resistance and penetration could be altered to suit the varied conditions imposed. The nearer the anode is placed to the cathode the higher the resistance and, consequently, the higher the penetration of the tube, and *vice versâ*. In moving the anode of a tube, however, the point of origin of the X-rays is also moved for each adjustment, which is certainly a disadvantage, especially when a difficult radiograph, requiring a lengthy exposure, is being taken. While, therefore, taking advantage of Mr. Swinton's very useful principle of varying the distance between anode and cathode, Dr. Dawson Turner, in conjunction with the writer, has reversed the arrangement by making the cathode moveable and keeping the anode fixed; and has added a further modification in that the cathode is adjusted by magnetic means, so that movement may be made easily, without disturbing the tube at all, while it is in any desired position. If the tube is constructed so that the cathode, in its movement, slides in and out of the side annex blown in the bulb, so as to keep it in proximity to the glass throughout its movement, it is found that the latter has a greater influence upon the resistance of the tube than mere movement to and fro when the cathode is quite out into the bulb space, and affects it in the reverse way; that is, the nearer the cathode is to the anode the lower the resistance, and this increases as the cathode is gradually drawn back inside the annex. The above modifications for the variation in the penetration in the tube are certainly an advance over the older, uncertain methods of potash tubes, &c.

Taking advantage of the fact, first suggested by Professor S. P. Thompson, that the higher the atomic weight of the anode the higher the penetration of the tube, a further advance has been made by Dr. Mackenzie Davidson, in the use of osmium as an anode. The scarcity of the metal, however, is the one great drawback to its use.

Little has to be said in regard to the fluorescent screen. Potassium-platino-cyanide and barium-platino-cyanide are almost the only salts used, as nothing has yet been found to approach them in efficiency. The latter is preferred on account of the ease in working it. The salt now obtainable is by far purer than that of two years ago, consequently screens are made with much more uniform and brilliant surfaces.

Mention must be made, however, of the great assistance screens offer in shortening the time of exposure, especially of the more inaccessible parts of the body. The salts fluorescing green, however, such as barium-platino-cyanide, are by no means so active as calcium tungstate, which fluoresces blue, and which has, therefore, a greater photographic activity. Placing the fluorescing surface of the screen in contact with the film of the plate, the exposure is, in some cases, reduced to one-fifth of the time

otherwise required. Special plates, however, give the best results, and it is difficult to eliminate the granulation of the screen.

What, now, is the mechanism producing Röntgen rays? Do they consist of molecular streams, or are they of the nature of vibrations—transverse or longitudinal? Here we are confronted with a host of hypotheses and theories that would demand much more space than is here possible to discuss adequately.

Experiments by Röntgen, Batelli, and others, have tended to show that Röntgen and cathode rays are of the same nature, but that the former constitute only part of the latter. The clear distinction, however, between actual similarity is expressed by the absolute non-deviation of Röntgen rays in a magnetic field, while this phenomenon is a strong characteristic of cathode rays. The numerous researches by Swinton and others seem to place beyond doubt the molecular nature of cathode rays, and to prove that they consist of electrified atoms or ions in rapid progressive motion, while the general opinion of physicists seems to be settling towards a wave or ether theory for the Röntgen rays. The difficulty of formulating a perfectly satisfactory theory is great, however, when one has to contend with the fact that there is no direct proof of reflection, refraction, or even polarization of the rays. If polarization could be proved it would simplify matters, as it would show the vibrations to be transversal. The three principal hypotheses under discussion at the present time are:—Firstly, the ultra-corpuscular theory, by Professor J. J. Thomson; secondly, that the rays are transverse ether waves, and of such excessively short wave lengths that they are an extreme case of ultra violet light; thirdly, the hypothesis of Sir G. Stokes, that they consist of transverse waves in the same manner as light waves, but that they differ from the latter in that they do not form regular trains of wavelets—half a million or more, on the average, in each train—but are solitary waves, each "train" consisting of but one or two wavelets at the most.

The first of these theories is truly a startling one, for it assumes that the atoms of ordinary matter can be pulverised into still finer particles, and that even solid bodies may be penetrated by the flight of such subatoms travelling with enormous velocity. It also opens up the question of the divisibility of the atom, which, to say the least of it, is an amazing one to face.

Stokes' theory amounts to this:—That cathode rays consist of negatively charged missiles, shot in showers like hedge-firing, from the negative electrode against a target (the anti-cathode), which receives and suddenly arrests them; and that the Röntgen rays are due to the independent pulses propagated through the ether when the advances of itheir negative charges are thus abruptly stopped or altered. The radiaton from the target reaches the object which is being skiagraphed as an undulation consisting of irregular pulses.

This view has been advanced by Johnston Stoney in analysing these irregular undulations and resolving them into trains of waves of different wave-lengths, among which waves of short wave-length are abundant if the hedge-firing has been sufficiently violent and irregular. The object will then be opaque to the longer waves, but transparent to the short ones, and the Röntgen effects follow. This explanation tends to bring Stokes' theory into agreement with the above theory of Sagnac and others, that the rays are of the nature of light waves, but with excessively short, ultra-violet wave-lengths.

JAMES QUICK.

THE PHYSICAL DEVELOPMENT OF P.O.P.

I.

Now the dull days are upon us again, the consideration of any scheme that will economise light is worthy of the time devoted to it. It is proposed here to give an actual record of some experiments that were conducted in March last, and to offer some comments on the possibilities thereby suggested. In some cases, notably one, complete success resulted, and the process has been repeated on a commercial scale with great satisfaction.

It may be premised that the aim of the experiments was to produce, by direct development, a colour which in itself should be acceptable as a finished result, and also with the idea of entirely obviating gold toning. The process first described by Mr. Wilson, of the Paget Company, has already put in the hands of the professional photographer a great power; but there are certain drawbacks to it. The preliminary bath of potassium bromide has such a softening effect on the gelatine, that great care is necessary in handling the paper throughout the operations; the judgment of the exact point at which to stop development is not easily attained, and the added cost of the developer to that of the gold bath is a consideration the professional cannot afford to overlook.

The older process of Dr. Liesegang's, in which a partially printed proof is developed with gallic acid, was more in the direction aimed at by the present writer, but here, again, came in a difficulty. By this means it is easy to attain a distinctly green colour, very suitable for some subjects, but obviously out of question with others. A portrait printed in green would be an absurdity, or, at least, would not meet with approval from the general public. When the following experiments were started, it was with a strong conviction that purple tones could not be expected without recourse to gold toning, and that seems to be substantiated by experience. Therefore, a good warm brown or sepia was aimed at, and attained, such a colour being known to be acceptable to the public, and to have the added advantage of the approval of those who strive for artistic effects. Incidentally, other results were also attained, which suggest further possibilities not within the present scope.

For the purpose of the experiments, six negatives were selected of medium printing power, and prints made in batches of six at a time, and developed at once. The developer in each case was flowed directly over the dry print without any preliminary bath whatever, and at the conclusion of development the prints were transferred, without intermediate washing, to an acid fixing bath containing hypo and potassium metabisulphite.

First set of prints. The six frames were exposed simultaneously to bright diffused light on the usual printing board of a commercial portrait studio for sixty seconds. To give an idea of the printing value of the light, it may be stated that the date was March 13, and time three p.m.

No. 1.—Developer: Water, 3 ounces; dry pyro, 3 grains; to which was added 10 minims of a saturated solution of potassium bichromate. The result was unexpected. The print immediately rushed up into full detail, and, as the action was much too rapid for any judgment to be formed, it was, at the end of thirty seconds, transferred to the fixing bath. After fixation, it proved to be a green print, similar to one produced by the slower method of development by gallic acid, but very flat and unequal, owing to the enormous speed of development. It was suspected that the large proportion of potassium bichromate was the cause of the quick development, and so a weaker solution was prepared containing only 10 grains of potassium bichromate to 20 ounces of water. This strength is meant in all subsequent remarks where the "bichromate solution" is referred to.

No. 2.—Developer: Water, 3 ounces; dry pyro, 1 grain; bichromate solution, 20 minims. This seemed to be more on the right track. Four minutes were occupied in development, and a good sepia colour was the result, but the print lacked vigour, and was discoloured in the high lights by the long development, probably on account of the small quantity of pyro present.

No. 3.—Accordingly, the pyro was again increased to 1 grain per ounce. Developer: Water, 3 ounces; dry pyro, 3 grains; bichromate solution, 20 minims. Time of development, one minute. The resulting print was of a good brown colour, but flat and somewhat unequal.

No. 4.—Developer: Water, 3 ounces; dry pyro, 3 grains; bichromate solution, 15 minims. Time of development, one and a half minutes. The result was a very good colour, but still somewhat unequal and with slight discolouration in the high lights. There was still apparently too much bichromate in the developer, and accordingly it was reduced for—

No. 5.—Developer: Water, 3 ounces; dry pyro, 3 grains; bichromate solution, 10 minims. Time of development, two minutes. This balance of pyro and bichromate gave a perfect result, the colour being an excellent brown. Development proceeds steadily, and full detail and density appeared before any discolouration of the higher lights set in. The colour was even throughout, with no tendency to double colours, as in some of the trials.

No. 6.—Developer: Water, 3 ounces; dry pyro, 3 grains; bichromate solution, 5 minims. Apparently no useful end was served by cutting down the bichromate to this smaller proportion. The print was good, and the time of development was two and a half minutes, but the colour was much redder than No. 5; in fact, more suitable for subsequent gold toning. The conclusion arrived at from the six prints was that potassium bichromate is an accelerator of development, and, further, has a marked effect on the colour of the print.

Another set of six prints was exposed next day on the same negative. There was at the time (noon) a bright diffused light between showers, and an exposure of five minutes was given indoors close to ground glass windows. The developer was compounded with a view to trying the effect of the presence of an acid sulphite. Accordingly the following solution was made up:—

PYRO SOLUTION.

Water	20 ounces.
Soda sulphite	2 „
Acid citric	100 grains.
Pyrogallol	90 „

No. 7.—Developer: Pyro solution, 3 ounces; bichromate solution, 20 minims. Development was stopped at the end of fifty seconds, but with very unsatisfactory results. The print was very red, and general discolouration had set in at an early stage of development, making it worthless.

No. 8.—Developer: Pyro solution, 1 ounce; water, 2 ounces; bichromate solution, 20 minims. Time of development, 60 seconds. Similar result to No. 7, but a much weaker print and more unequal.

No. 9.—For this print the bichromate was omitted altogether, developer being 3 ounces of the pyro solution. Sixty seconds still sufficed for development and the result was a distinctly red print, much stronger than the previous two, but the veiling in the high lights was, as before, very pronounced.

No. 10.—Developer: Pyro solution, 3 ounces; glacial acetic acid, 6 drops. Time of development, 2 minutes. In this print the resulting colour, or rather colours, are most peculiar. There are yellows, reds, browns, and even purples visible, but the general veiling is still very great.

No. 11.—Developer: Pyro solution, 3 ounces; bichromate solution, 50 minims; glacial acetic acid, 50 minims. Time of development, 60

seconds. This gave a bright sepia print inclining to yellow, but very flat and discoloured.

No. 12.—Developer: Pyro solution, 3 ounces; sulphuric acid, 6 drops; soda acetate, 10 grains. Time of development, 2 minutes. A strong red print but very unequal in density, and with still a large amount of discolouration.

The conclusion arrived at from this second set was that the probable reason of so much flatness and discolouration was great over-exposure, and it is possible that working on the same lines with largely diminished exposure, decent prints might have been obtained, but as the results were far below the standard of the first set, the acid sulphite developer was not proceeded with. Another set of prints were now exposed on the same negatives and under the same conditions as the first set: time, 1 p.m.; exposure, 15 seconds.

No. 13 was developed for 4 minutes in a saturated solution of gallic acid, and as no image was then visible, 20 minims of bichromate solution were added. At the end of 6 minutes there was still no visible image, and it was not proceeded with any further. Evidently very under-exposed for this particular developer.

No. 14.—Developer: Saturated solution gallic acid, 2 ounces; bichromate solution, 100 minims. This gave no image at the end of five minutes. Twenty minims of ten per cent. solution of potassium carbonate were then added and a slight image began to show. At the end of seven minutes another 40 minims of ten per cent. solution potassium carbonate were added, and the speed of development was thereby accelerated. Ten minutes' development, however, only produced a strong red print with slight veiling and was no adequate reward for the long time spent in developing.

No. 15.—For this print recourse was had to the usual metol-quinol developer in use for negative-making, taking 1 ounce of metol-quinol solution; water, ounce; and ten per cent. solution potassium carbonate, 10 minims. (One ounce of the metol-quinol solution contained roughly 2 grains metol; 2½ grains quinol; 1 grain potassium bromide, and the usual preservatives.) Development occupied fifty seconds and the resulting print was certainly curious if not satisfactory. The highest lights were distinctly purple in colour, the half-tones greenish-grey, and the deepest shadows a red-brown.

No. 16.—Developer: Metol-quinol solution, 1 ounce; water, 1 ounce; no accelerator. Much the same result as No. 15, but there was less discolouration of the higher lights and the shadows were a brighter red.

No. 17.—Developer: Metol-quinol solution, 1 ounce; water, 1 ounce; bichromate solution, 20 minims; ten per cent. solution potass bromide, 20 minims. Four minutes' development gave no image and 20 minims of ten per cent. solution potassium carbonate were added with no result. At five minutes another 40 minims' ten per cent. solution potassium carbonate was added and development then commenced. At seven minutes another 20 minims of accelerator was deemed necessary, and development was stopped at eight minutes. The result was a fairly bright print with a little general fog. The colour was green but not nearly so acceptable as the green obtained by Dr. Liesegang's method.

No. 18 is a curiosity indeed. Developer: Metol-quinol solution, 7 drachms; ten per cent. solution potassium carbonate, 1 drachm; ten per cent. solution potassium bromide, 1 drachm; water, 1 ounce. The course of development was altogether too rapid to watch; but the print was withdrawn at the end of one minute, and proved on fixation to be similar in appearance to a silver print that had by mistake been left printing in the sunlight for several days. It was bronzed in all directions, with the exception of the deepest shadows, which retained a purply brown colour. On examination by transmitted light it showed as a perfect negative, but much too dense and thick for any useful purpose. Possibly, experiment in the way of modification of the exposure and of the metol-quinol developer might lead to the elucidation of a useful means of making direct reversed negatives; but this is foreign to the aim of the present trials.

The next set of six were exposed for 90 seconds in good shade light at 3.30 p.m.

No. 19.—Developer: Sat. sol. gallic acid, 2 ounces; dry pyro, 2 grains. Six minutes' development produced a very under-exposed image, but quite clean in the lights.

No. 20.—Developer: Same as No. 19, with the addition of 10 minims of bichromate solution. Much more detail was obtained in 4 minutes' development, but still very under-exposed.

No. 21.—Developer: Sat. sol. gallic acid, 2 ounces; dry hydroquinone, 2 grains. Similar in every respect to No. 19, but apparently more under-exposed.

No. 22.—Developer: Sat. sol. gallic acid, 2 ounces; dry amidol, 2 grains. In 10 seconds the image was fully up, but lacking in density. Sixty seconds' development only resulted in an indistinct weak image, buried in general fog.

No. 23.—Developer: Sat. sol. gallic acid, 2 ounces; dry metol, 2 grains. With only one minute's development this gave a very fine print of good brown tone. The whites remained very pure, and there seemed to be an inclination towards a somewhat harder print than a printed-out image. Altogether a very successful print.

No. 24.—Developer: Sat. sol. gallic acid, 340 minims; glycerine, 50 minims; soda acetate, 15 grains; water, 340 minims. Full detail was obtained in one and three-quarter minutes, but apparently exposure had been too great, as there was a general flatness and veiling of the lights, whilst the shadows had no intensity. The colour was an unpleasant nondescript, inclining towards brown.

W. E. A. Drinkwater.

THE SUPPLY OF CALCIUM CARBIDE.

The rapidly increasing use of acetylene has pushed the demand for calcium carbide so close to the present limit of available supply that the questions of increased productive capacity, the future output, and probable price of this new and important material, assume a definite international interest. It is understood that the use of acetylene, and consequently the consumption of carbide, has increased somewhat more rapidly in America than in Europe, and that, notwithstanding the large output at Niagara Falls, the home demand has rather more than kept pace with the supply. The latter may practically be also said of Europe, at least of Germany, which country obtains almost its entire supply of carbide from Switzerland, notably from the great works at Neuhausen.

The whole carbide industry, so far as Central Europe is concerned, is now in a transition stage, and the conditions of supply and price are likely to be greatly modified by the increased production of next year. The most important accession will probably come through the operations of the great combination headed by the Schuckert Electrical Manufacturing Company, at Nuremberg, which expects to have in operation during the course of next year the following carbide factories:—

	Horse-power.
Electrical Works, Lonza, at Gampel (Wallis)	2500
Electrical Works, Hofsland, at Sarpborg, Norway	5000
Bosnian Electrical Company, Iajce, Bosnia	8000
Société Espagnole, Brega (Catalonia)	2500

The aggregate annual product of these four plants is estimated at 20,000 tons, capable of generating 211,896,000 cubic feet of acetylene. Besides these, the Aluminium Industry Company, of Neuhausen-on-Rhine, has this year increased its capital to 640,000*l.* for the purpose of constructing a 7500 horse-power plant at Land-Gastein, in Austria. All these establishments will employ the original process, by which the lime and carbon are smelted together by the heat of an electric current.

IMPROVEMENTS IN ENAMELS FOR PHOTOGRAPHY.

M. Berthelier, ceramist, of Lyons, points out that hitherto photographic enamels have been made on plates of enamelled copper of somewhat high price, or on plates of porcelain in very limited sizes, in consequence of the deformation of porcelain in baking.

His invention has for its object an improved application of transparent or coloured glass plated with enamel, or with opal on one or both sides, for the production at a low price of improved photographic enamels, imitating the said enamels on porcelain, but capable of being also employed for window panes and the like.

The improved application of these enamelled or opal-plated glass plates and the like, for the imitation of enamels on porcelain, is rendered possible by devitrifying completely or incompletely the glass forming the backing of the enamel or opal after this enamel or opal has received its decoration, by any suitable means. This total or partial devitrification is effected by heating the plates or the like, in order to bring the enamel or the opal to the necessary temperature to cause the vitrifiable colours forming the decorative design to impregnate themselves therein, after which the glass forming the backing, having reached a point approaching fusion, is suddenly cooled by causing the fire of the furnace to fall, and becomes devitrified, without breaking, by an annealing produced by a gradual cooling during a certain number of hours, the duration of the annealing varying according to the degree of devitrification which it is desired to obtain, or according to the season in which the operation is carried out, or according to the thickness and the nature of the glass constituting the backing of the enamel or opal.

This glass, devitrified in this manner, yields products resembling enamels on porcelain plaques or plates, because devitrified glass is a product which, by its molecular constitution, approaches the nearest to porcelain in beauty, colour, solidity and sonority.

It may also be pointed out that these improved enamels may be obtained at a reduced price, and also in dimensions much greater than has hitherto been the case with enamels on plates of enamelled copper or plates of porcelain.

These improved enamelled or opal plated glass plaques are applicable for any suitable pictures, religious subjects, views, portraits, landscapes, reproductions of pictures, engravings, paintings, or the like, plates and dishes, and in general for all the applications which it is desired to make of photographic enamels on the said enamelled or opal-plated glass plaques hereinbefore mentioned.

In the novel application of these enamelled or opal-plated glass plates for window panes, the glass forming the backing of the enamel or opal is not subjected to devitrification, in order that its transparency may not be impaired. It is sufficient to simply fire it in the ordinary manner in order to bring the enamel or the opal to the desired temperature, so that the vitrifiable colours impregnating themselves therein become unchangeable.

AFFILIATION OF PHOTOGRAPHIC SOCIETIES.

The thirty-first meeting of Delegates was held at 5A, Pall Mall East, on Friday, October 28, Mr. W. Thomas (Chairman) presiding.

Letters from the Newcastle-on-Tyne, Hull, Liverpool, and Rotherham Societies were read, containing suggestions as to the working of the Affiliation.

A discussion took place as to the possibility of increasing the usefulness of the Affiliation, amongst the suggestions considered being that further lectures should be obtained, and greater facilities afforded to Secretaries of metropolitan societies for the interchange of lectures.

It was agreed that at least four new lectures should be forthwith obtained and put into circulation, fifteen subjects being suggested. A vote was taken, when it was decided that (1) Exposure and Development, (2) Faults and Blemishes and their Causes, (3) The Selection of a suitable Printing Process, and (4) Home Portraiture, should constitute the four subjects.

The question of the authors of the lectures was referred to the Lecture Committee, to whom certain names were suggested in each case.

The suggestion that the forming of the Societies into groups should be carried further was discussed. The Chairman announced that steps had been taken to call a meeting in Lancashire, and another in the North of England at an early date, with a view to grouping these Societies together, and that the question of a group in the Midlands was now under consideration.

It was proposed by Mr. Tomlinson (Sheffield Photographic Society), seconded by Mr. Beckett (Hackney Photographic Society), and agreed, that the Secretary should be authorised to attend a meeting in Lancashire, in the Northern Counties, and in the Midlands, with a view to the organization of such groups.

An attack on the Affiliation in one of the periodicals was mentioned, and the paper containing it was ordered to lie upon the table. It was decided that no steps were necessary.

It was proposed by Mr. Machen (Woolwich Photographic Society), seconded by Mr. Bickerton (Richmond Camera Club), and agreed, that a sum of money should be voted from the funds of the Affiliation for the purpose of purchasing a testimonial to Mr. R. Child Bayley on his retirement from the post of Secretary to it.

THE LATE SOLAR ECLIPSE.

The making of photographs is replete with difficulties and disappointments. The first can with diligence be surmounted, but the disappointments are ever present with us. "Just like my luck" is an exclamation common to the photographic fraternity, when a dull day comes instead of a bright one, or when a group of cattle slowly vacates the field of view just before the cap is removed from the camera. Such incidents are so commonly occurring that it is a matter for wonder that photographers are not as a rule morose and melancholy men.

But, if the ordinary user of the camera has a right to complain of the manner in which fickle Fortune treats him, still more privileged to express a sense of disappointment is he who essays to take photographs of a total solar eclipse. This celestial display takes place at intervals of about three years, and is so inconveniently arranged for English observers that the only places at which it can be seen are comprised along a narrow belt of the world's surface, a large portion of which consists of ocean. Moreover, the small portion of *terra firma* from which the thing can be seen is nearly always several hundred miles away, its portraiture requires the aid of special appliances running to many tons in weight, and when all is ready and happily arranged the sky is likely to be overcast and the whole of the preparations for photographing the eclipse thrown away and wasted.

There are naturally very few men who have had the opportunity of attempting this kind of photographic work—it is something out of the ordinary to take pictures of a thing which is about 92,000,000 of miles distant from the camera. The idea has, however, much fascination about it, and, as the next best thing to personal experience is to hear a subject well described, a large audience assembled last week at the Camera Club, to hear Captain Hills's paper on "Eclipse Photography," illustrated by photographs of the apparatus employed in the work, and by the pictures obtained with that apparatus. Captain Hills, at the outset, told his audience that one of the objects of the paper was to elicit the opinions of practical men as to the methods adopted by the astronomical photographers, and to invite suggestions as to improvements.

One of the most important operations connected with a solar eclipse was the endeavour to get satisfactory pictures of the corona. It was very necessary that such records should be obtained, and at the same time it was a most difficult thing to carry out, for the solar corona presented a bright object on an illuminated background. Under such conditions it was most difficult to obtain anything like sufficient contrast. At one time it was suggested that a large lens aperture should be employed, but it was soon found in practice that the general light from the sky had a tendency to fog the plate if that recommendation were followed. Then Professor Wadsworth, of America, advised that more contrast was obtainable in dealing with a luminous body, on a bright background, by making the aperture as small as possible, and it seems certain that something is gained by a diminution of aperture.

Another point which has given rise to much discussion is the kind of plate to be employed in this kind of work. Some have maintained that a wet plate will give better results than a dry one, more especially for enlarging purposes, on account of its finer grain, and that it is also better for copying purposes and for giving good lantern slides. He would show on the screen an example of each, first a photograph of the solar corona taken on a wet plate during the eclipse of 1861; and, secondly, a similar photograph taken on a gelatine plate in January last. It would be seen that in the latter the extension of the corona into space was very much better shown. Besides this, there was no doubt that the dry plate was much more convenient for measurement and for purposes of record. The great defect of the rapid plate was its coarseness of grain, and he assumed that this coarseness was one of the conditions of rapidity from which they could not get away.

The question of efficient reproduction of these photographs was a very important one, upon which he would like to have the opinion of experts. It seemed to him that, when these corona negatives were printed from, many of the more delicate contrasts disappeared. A still more important thing was the permanence of the process employed, and here he was speaking of the permanence of negatives rather than positives. Dr. Isaac Roberts, whose magnificent astronomical photographs are so well known and highly esteemed, has lately noted to his dismay that photographic negatives on dry plates, taken less than ten years ago, have faded in the most lamentable manner, many of the fainter stars having utterly disappeared. This, of course, is a most serious matter, and every one is anxious to know whether there is a remedy for the fault.

Another matter which is much discussed by eclipse workers is that of the best form of lens to employ. Given a certain sized image, is it better to obtain it by means of a single lens of long focus, or by means of a telephoto lens? The Astronomer Royal has obtained with the tele-photo lens images of the moon four inches in diameter, and they were certainly of fine quality. Another worker employed a lens of forty feet focal length, and obtained an image of about the same size. According to the lecturer's opinion, there is little to choose between the results given by the two different systems, and, if he be right in his conjecture, the observer of the future will discard the long-focus lens in favour of the far more convenient tele photo lens.

After a few remarks as to the use of flat mirrors, which have been brought to such perfection in the hands of Dr. Common, the lecturer dealt with the spectroscopic work incidental to a solar eclipse, and showed how important it was to ascertain the condition and constitution of the corona and the sun's surroundings close down on the limb. After describing what a battle had been fought in the early days with regard to the constitution of the limb, and how the Fraunhofer lines change suddenly from dark to light in what was called the "reversing layer," a phenomenon which has a duration of only two seconds, the lecturer proceeded to indicate the use of the prismatic camera, and showed upon the screen some of the results obtained with it, thus bringing a most interesting lecture to a conclusion.

The discussion invited by Mr. Inwards, who was the Chairman of the evening, did not bring many of the audience to their feet, notwithstanding the fact that many astronomers were present. Mr. Lambert said that he could not see how a negative, which had been well fixed and washed, could lose any of its reduced silver, and suggested that the gelatine might be stained if thought desirable, and then the whole of the silver eliminated by chemical means. This would leave simply a stained gelatine image free from grain. In his reply, Capt. Hills said that fading did not so much matter in the case of stellar photographs, which could be measured and recorded absolutely when produced; but it became a most important question when photographs of the corona and of nebulæ were concerned. The proceedings closed with a vote of thanks to Captain Hills for his paper.

Our Editorial Table.

Chemistry in Daily Life.

By Dr. Lassar-Cohn. 336 pp. London: H. Grevel & Co., 33, King-street, Covent Garden.

Mr. M. M. Pattison-Muir, M.A., who translated this book from the German, tells us in a prefatory note that a course of lectures is the foundation of the volume. It appears to have been the endeavour of Dr. Lassar-Cohn to show that "chemical phenomena are intimately bound up with our daily lives, and that, whether we are conscious of it or not, we are constantly carrying on chemical operations." It will be apparent from this that the field open to Dr. Lassar-Cohn was a very wide one, and it consequently follows that the subjects selected for exposition are both diversified and numerous. Thus we have such leading themes as breathing, the nature of flame, food of plants, mixed diet, wine vinegar, tanning, oil painting, potash, glass, metals, alloys, alkaloids, each of which obviously splits itself up into several sub-heads. Dr. Lassar-Cohn gives a great deal of clearly conveyed information on many subjects that are of daily interest to most of us, and the book, besides its informative character, has all the uses of a reference volume for journalists and

others. It should be in the bookcase of every house. There are about twenty pages devoted to photography. The author states that "the true discoverer of the gelatine emulsion process was Bennett in 1878," which is not quite correct. The references to photography are so meagre that they might well have been omitted, but the book otherwise is a most instructive one, and we can recommend it as an addition to the library that is sure to be well thumbed.

A Self-toning Paper.

Sichel & Co., 52, Bunhill-row, E.C.

Some specimen prints on a new self-toning paper, which is being introduced by Messrs. Sichel & Co, have been submitted to us. The series of effects includes glossy (resembling an ordinary collodio-chloride print), sepia, and platinum. The paper prints and tones simultaneously, and all the results are of excellent quality. A paper with such admirable characteristics should be widely welcomed.

Catalogue Received.

J. Lizars, 101, Buchanan-street, Glasgow.

A tastefully printed catalogue has been received from Mr. Lizars. It illustrates and describes the firm's many well-known specialties in photographic apparatus, and should be in the possession of all amateur photographers.

News and Notes.

Photographic Club.—Wednesday evening, November 9. "Animals and their Haunts," by Mr. Charles Reid, of Wishaw.

A Photographic Society has been formed at Pudsey. At present there are about thirty members. The President is Dr. W. L. Hunter, and the Hon. Secretary Mr. R. W. Taylor, Boarding House, Fulneck, Pudsey.

Messrs. J. Epstein & Co., picture-frame makers, of 33, Broad-street, Bristol, are exhibiting some show cases of the picture-frame mouldings and mounts, &c., in the Grahamstown Exhibition, South Africa, which will be on view from Thursday, December 15, 1898, until Saturday, January 21, 1899.

Mr. J. S. Hawker, of Mutley House, Plymouth, writes: "Will you permit me to announce in your columns that the Lantern Club, established in 1889 for the circulation and exchange of slides, is about to recommence for the present season? As there are some vacancies, I should be pleased to hear at once from any ladies or gentlemen who might wish to join us. The subscription is 1s. year."

Mr. Charles Long, naval photographer, Union-street, Plymouth, underwent his public examination in bankrupty last week at Stonehouse, before Mr. Registrar Bridgman. Mr. R. R. Rodd was for the debtor. Answering questions put by the Official Receiver (Mr. T. H Geake) debtor said he began business in Union-street with 500*l.* lent by his wife. He attributed his failure chiefly to the competition of amateur photographers, who seemed to be encouraged by the naval authorities. Debtor was allowed to pass.

We have received the first number of *Sell's Commercial Intelligence*, a weekly newspaper entirely devoted to the spead of authentic commercial information. It will inform British merchants and manufacturers of new openings for foreign and colonial trade, and help them to meet the ever-increasing growth of foreign competition. Markets of the world, new and old, will be kept under constant survey, and from all parts of the globe special correspondents will inform the readers of *Sell's Commercial Intelligence* of the latest movements.

With the issue of the Christmas number Mr. Clement Shorter's responsibility for the *English Illustrated Magazine* will cease. Mr. Clement Shorter has been the editor of the magazine ever since it came into the hands of Sir William Ingram in 1893, and in his hands it received a new lease of life. The reason for his relinquishing control is that it has again changed hands, the new proprietors being a firm of colour printers in St. Albans. The new issues of the magazine will, it is understood, mark a new development in illustration in colour.

A new British industry of great interest and some importance is the manufacture of the half-tone cross-line screens used in the production of those process engravings which have made possible the great increase in illustrated publications. Until recently practically the whole of this manufacture was in the hands of Max Levy, of Philadelphia but now, according to the current issue of the *Process Photogram*, thoroughly satisfactory screens are being made in Leicester by J. E. Johnson & Co., who have been steadily experimenting in this direction since 1866.

In a memoir presented by M. Moissan to the Paris Academy of Sciences there is a suggestion of a method of obtaining ammonia from the nitrogen of the atmosphere. Using pure crystallised calcium, he finds it easy to prepare calcium nitride by direct combination of the two elements. Nitrogen has no action on calcium when the temperature is low, but, on gently warming, slow absorption takes place. At a low red heat the calcium catches fire, and the nitrogen is rapidly absorbed. M. Moissan says the reaction is best carried out in a nickel tube. With the temperature of the electric furnace the nitride is completely decomposed by carbon, calcium carbide remaining in the tube. Water decomposes it with violence, ammonia and calcium hydrate being formed. This may be a step towards fixing the nitrogen of the air.

Colouring Metals.—Metals may be rapidly coloured by covering their surfaces with a thin layer of sulphuric acid, says the *Engineering and Iron Trades' Advertiser*. According to the thickness of the layer and the duration of of its action, there may be obtained tints of gold, copper, carmine, chestnut brown, clear aniline blue, and reddish-white. These tints are all brilliant, and, if care be taken to scour the metallic objects before treating them with the acid, the colouring will suffer nothing from polishing. On making a solution of 640 grains of lead acetate in 3450 grains of water, and warming the mixture to 88° or 90°, it decomposes and gives a precipitate of sulphuret of lead in black flakes. If a metallic object be immersed in the bath, the precipitate is deposited upon it, and the colour produced will depend on the thickness of the deposit. Care must be taken to warm the objects to be treated gradually, so that the colouration may be uniform. Iron treated in this way has the aspect of bluish steel; zinc, on the contrary, becomes brown. On using an equal quantity of sulphuric acid instead of the lead acetate, and warming a little more than in the first case, common bronze may be coloured of a magnificent red or green, which is very durable. Very beautiful imitations of marble may be obtained by covering the bronze objects, warmed up to 100°, with a solution of lead thickened with gum tragacanth, and afterwards submitting them to the action of the precipitate spoken of above.

Patent News.

The following applications for Patents were made between October 17 and October 22, 1898:—

Shutters.—No. 22,142. "Improvements in Roller-blind Shutters for Photographic Purposes." S. D. McKellen and J. D. McKellen.

Albums.—No. 22,147. "Improved Attachment (Securing) for Photographic Likenesses in Albums, Railway Season Tickets, Cards, or Papers together." T. G. I. Taylor.

Photograph Cases.—No. 22,108. "Improvements in Fans applicable, for instance, to Ladies' Fans, Dressing and other Bags and Cases, Photographic and other Albums and Stands, Advertising and other Stands, and Furniture and other Structures." A. Barker.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

November.	Name of Society.	Subject.
7.....	Barnet and District	Lecture.
7.....	Bradford Photo. Society	*Linen and its Production.* G. Thistlethwaite.
7	Camera Club	Smoking Concert.
7.....	North Middlesex	Tenth Lantern-slide Competition.
7...	South London	Sets of Slides by well-known Workers.
8.....	Birmingham Photo. Society ..	*Development of Negatives.* E. Underwood and C. F. Jarvis.
8	Bootle	*Enlarging on Barnet Bromide Paper.* G. E. Wilkinson.
8.....	Lewisham	*Saturday Excursions.* F. Goddard.
9	Croydon Camera Club	Prize Slides
9.....	Kingston-on-Thames	*Lantern-slide Making.* John A. Hodges.
9.....	Leeds Camera Club.....	*Photo Ceramics.* P. Elliff.
9.....	Photographic Club	Members' Open Night. *Animals and their Haunts.* Slides by Chas Reid.
10.....	Camera Club	*Photometers for Colour Photography.* James Cadett
10.....	Darwen	Lecture: *Practical Notes on Outdoor Work with a Camera.*
10...	Liverpool Amateur	Demonstration: *Enlarging with Cresco Fylma.* T. E. C. Wilson.
10	London and Provincial	*Birch and Bracken.* W. Thomas.
10.....	Woolwich Photo. Society	*Faults, and their Remedies.* C. Churchill.
11.....	Croydon Microscopical	Trial Night: Members' Slides.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 27,—Mr. Robert Beckett in the chair.

Mr. J. Hodd reported that a friend had submitted to him two half-plate photographs, taken panoramically, by rotating an ordinary camera upon its base, with two exposures. He complained that the resulting prints did not coincide as he expected; that, while the middle might be made to agree, the foreground or the distance would be out of register, and *vice versâ*—in fact, the image of the one print was larger than that of the other. An explanation was sought.

Mr. A. Mackie thought it probable that the camera back was not parallel with the picture plane, and, if so, the occurrence would account for the difference in the prints. This seemed to him the most likely explanation.

Mr. A. L. Henderson had experienced the same thing, which might be due to two causes. Either the lens employed was of too short a focal length, or the camera was not level.

The Chairman said that if the lens were not directed exactly to the centre of the plate, the effect would be as described by Mr. Hodd.

Mr. Philip Everitt held that the camera was not level, and consequently the horizon of the two photographs differed.

Mr. Hodd took it, however, to be a question of size of image, which should remain the same in both cases, even with a tilted camera; trimming would then make any differences right.

Mr. HVERITT pointed out that no amount of trimming would cure the difference of perspective between the two pictures.

Mr. F. YORK, whose experience in this kind of work is of an extensive nature, stated, through Mr. HENDERSON, that he always found that, unless the camera were pivoted under the optical centre of the lens, the pictures would not fit well together.

FORMATE TONING.

Mr. J. E. HODD gave the results of his trials with the tabloids of formate of soda supplied by Messrs. Burroughs & Wellcome. It was notable for the ease with which toning proceeded and the rich purple tones it gave. He diluted the bath with its bulk of water, that is to say, to half strength, as he found the action too rapid as the formula stood. Toning was complete in from one to four minutes, the paper actually tried being Wellington's "Sylvio," as made for sulphocyanide toning.

Mr. W. D. WELFORD showed five prints made upon as many different samples of paper, all being of much the same colour. He found toning went on very quickly, ten seconds sufficing with a bath containing only half the prescribed quantity of water, and used warm. It was certainly a very good bath, but his impression was that it did nothing which other baths to be mentioned could not do. It was better than sulphocyanide from the point of view of absence of double tones, but no better than some other baths in existence.

Mr. W. D. WELFORD gave a lantern lecture upon

THE CUMBERLAND FELLS.

The elevated moorland range, called the Pennine Chain, which averages in width from twenty to twenty-five miles, attains considerable wildness and sterility in its passage through Cumberland, and it is of the point where the chain passes the eastern portion of the county, and upon the borders of Northumberland, that the lecturer treated in his remarks; and, although he feared that photography was somewhat of a failure in depicting the wild and lonely, which are the predominant features of this district, he hoped to show something of the sombre mood and pervading sense of monotony which the elevated fells reveal. Aston, the highest market town in England, was the centre of operations, and the slides of the town and vicinity, denoting a country of stone wall, stone cottages, heather-clad slopes, and wild moorland, were a welcome change from the prettiness of Surrey, Devonshire, and such-like scenery. Remnants of machinery and ruined works are scattered up and down the last traces of what was once a prosperous lead-mining industry. The district is rich in quaint and ancient houses, and is essentially pastoral. This was well shown in the panorama, composed of five half-plates, and measuring twenty-eight inches long, which was shown as a slide. Glorious sunsets, heavy clouds, and stormy skies make the district a famous one for cloud studies, but these are hardly of a sort for printing into pictures, and are interesting only in themselves, and the slides which were shown called forth merited appreciation.

Richmond Camera Club.—October 24, Mr. Cembrano presided.—Mr. B. Edwards, of the firm of R. W. Thomas & Co., Limited, gave a lecture entitled

HINTS ON LANTERN-SLIDE MAKING.

He devoted himself chiefly to showing how warm tones could be produced without prolonging the exposure, using pyro-soda developer, and obtaining warmth of tone simply by reducing the proportion of soda. Another method was, after fixing and washing the slide, to bleach it in a solution of ferricyanide of potassium five per cent., and bromide of potassium ten per cent., and then redevelop with a very weak developer, a brown tone being the result. A series of carefully prepared slides was shown on the screen to illustrate the results of the modes of treatment recommended.

West London Photographic Society.—An ordinary meeting was held on October 28, Mr. H. Selby (President) in the chair.—Two new members were proposed for election. The PRESIDENT delivered his annual address, in which he reviewed the history of the Society from its commencement in 1888, and referred to some of the causes which had led to its decreased membership, amongst which might be included more than one unfortunate change of headquarters, concluding with suggestions for increasing the usefulness and popularity of the Society. An Exhibition of members' lantern slides then took place. Next meeting, on November 11, will be a beginners' night; subject, "Defects in Negatives," discussion to be opened by the President.

Woolwich Photographic Society.—October 27.—The first part of the evening was devoted to reading the minutes of the annual meeting, held on the 13th inst., and also the report of the Council for the past session. The report showed that the Society was in very favourable circumstances, and a good balance was in hand, after paying off a deficit of the previous year. As President for this year, Mr. W. H. Dawson was unanimously re-elected, as were also the two Secretaries, Mr. F. W. Machen and Mr. C. H. Imrie, a vote of thanks having been given at the annual meeting to the Secretaries for their past labours. After these formal proceedings came the election of several new members, and questions were asked and answered. The event of the evening was the showing before a large audience, including many of the fair sex, the set of slides collected by the Affiliation Committee of the Royal Photographic Society, and known as "Slides by Selected Workers." The slides were very much admired, many points being learned, and several somewhat criticised as to lighting, &c. The evening was brought to a close by several members, showing some new slides. Judging by the increase of membership and good attendance, everything points to this season being the best that the Society will have had.

Leeds Camera Club.—October 26 the President (Mr. W. J. Warren) in the chair.—The SECRETARY (Mr. J. H. Gash) read a letter regretting the unavoidable absence of the lecturer who had been expected for that evening, and stated that the President, assisted by one of their members, had kindly undertaken the demonstration of

CARBON PRINTING,

as had been announced for that evening. Carbon printing, said Mr. WARREN, derived its name from the first workers using carbon, or soot, mixed into a pigment with gelatine, and evenly coated on paper. This was then made sensitive to light by being immersed for a few minutes in a bichromatised solution, which rendered the parts acted upon by light insoluble, such parts not acted upon being washed away with hot water, and so obtaining an image. This is what is called tissue. After printing, it is developed from the back, because the face which is next to the glass, or negative, is completely hardened by the action of the light, and a properly exposed piece of tissue has its depth affected exactly in proportion to the opacity of the negative. Having been exposed, the tissue is placed in a tray of clean water face upwards, the paper or other support on which it is to be transferred is also placed in the water, the tissue being allowed to remain until it lies flat. The two faces are then brought into contact under the water, and squeegeed firmly together on a piece of glass or zinc, and set aside for a short time under pressure. It is then placed, tissue-side up, in a tray of hot water about 100° to 120° Fahr., and allowed to remain until the coloured pigment is seen to be oozing from the edge. Then, by lifting carefully at one corner, the tissue is removed, when a black or coloured mass is found on the paper transfer. This is now laved with the hand until the image comes out clear and distinct. Mr. Warren demonstrated the process, showing also how considerable latitude is obtainable by using the tips of the fingers and gently rubbing to bring out the high lights. A weak solution of ammonia (one part to fifty of water) is very useful to obtain the same result. This should also be applied very gently, and with the finger tip, afterwards well laving with hot water. Prints so obtained are reversed, and, if topographical accuracy is required, they should be mounted and developed on a temporary support, then squeegeed on to a final support, and set aside to dry, when the temporary support is stripped from the face, and the picture is shown correctly. Mr. Gash then showed the method of producing the image on the plate glass or opal, preparing the plates and opals, developing, and hardening, the result being a permanent picture on a permanent support. In conclusion, Mr. WARREN pointed out the many advantages of the process. There were now, he said, a range of about twenty colours, so that the worker could choose the one most suitable to his subject. The character of the negative should be somewhat crisp, with plenty of detail and good contrasts, and the worker should develop his plates to suit whatever process he intended to print by, for the negative which on P.O.P. gave a fairly good print would not be so suitable to carbon. No visible image was seen during exposure, but it could be overcome by using a print meter, though, generally speaking, the exposure was the same as for P.O.P. from a similar negative.

Newcastle Photographic Society.—The Annual Meeting of the Newcastle and Northern Counties Photographic Society was held in the Building Trades Exchange, Art Gallery, Newcastle, on Tuesday, October 25. Mr. Parry presided.—Messrs. F. S. Buckingham, W. H. Baumann, T. J. P. Macfadyn, and W. Scutt were elected members of the Association. The HON. SECRETARY (Mr. W. Thompson) read the seventeenth annual report of the Council, which stated that the Society now numbered 104 members. The outdoor meetings of the Society had been held during the past summer at Richmond, Bardon Mill, and Holy Island. With the improved meeting-room now at their disposal, the Society looks forward to a prosperous session, and cordially invites the co-operation and attendance of any photographers in the neighbourhood who are not already members. The TREASURER (Mr. F. Park) read the financial statement, which showed a balance in hand of 23*l.* 6*s.* 2*d.* The following officers were elected for the ensuing session:—*President:* Edgar G. Lee.—*Vice-Presidents:* Messrs. J. S. B. Bell, W. E. Cowan, J. P. Gibson, and W. Parry.—*Council:* Mr. C. E. Barkas, Dr. Blacklock, Messrs. T. M. Clague, G. Elphick, Burton Braham, Godfrey Hastings, J. J. Kirkwood, Captain Sayers, G. L. Snowball, and John Watson.—*Treasurer:* Mr. F. Park.—*Lanternist:* Mr. H. Ridgway.—*Hon. Secretary:* Mr. W. Thompson, 23 Campbell street.—*Assistant Hon. Secretary:* Mr. W. Parker Brewis, 33 Osborne-road. We have just lost by death one of our best members, Mr. William Pratt, of Sunderland, a most genial man and a careful worker. Mr. Pratt was also a member of the Council of the Sunderland Society.

FORTHCOMING EXHIBITIONS.

1898.		
November 4, 5	Photographic Salon.	Hon. Secretary, R. W. Craigie, Camera Club, Charing Cross-road, W.C.
,, 4–12	Royal Photographic Society.	Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
,, 15–18	Hackney.	Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15	Yorkshire Exhibition.	Hon. Secretaries, 13, Cheham-street, Bradford.
,, 17–19	Hove Camera Club.	Hon. Secretary, C. B. Stone, 24, Holland-road, Hove.
,, 18	Brixton and Clapham Camera Club (Members).	
,, 24	Ludlow.	Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
,, 23–26	Aintree Photographic Society.	Hon. Secretary, D. Travis, Fazakerley, Liverpool.
December 27–31	Borough Polytechnic.	Hon. Secretary, H. Philcox, 103, Borough-road, S.E.
1899.		
February 4–25	Edinburgh Photographic Society.	Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
March 4–11	South London.	Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE TRAILL TAYLOR MEMORIAL LECTURE.

To the EDITORS.

GENTLEMEN,—I should be much obliged if you would permit me to remind your readers that, by kind permission of the Royal Photographic Society, the first Traill Taylor Memorial Lecture will be given at the Exhibition Gallery, 5A, Pall Mall East, on Tuesday evening, November 8, next.

Mr. T. R. Dallmeyer's lecture will be, "On the Focometry of Positive or Negative Lens-systems and their Combinations," and he will exhibit a focometer of new construction.

Sir Henry Trueman Wood, the senior trustee of the fund, has kindly consented to take the chair. The meeting will begin at 8.30 p.m., and admission to the Exhibition Gallery will be free.

As the subscribers to the fund are too numerous for me to communicate with separately by letter, I shall be obliged if they will accept this invitation to attend the meeting.—I am, yours, &c., P. EVERITT.

88, *Evering-road, N., October* 29, 1898.

PHOTOGRAPHIC EXHIBITIONS.

To the EDITORS.

GENTLEMEN,—Even at the risk of being accused of rushing into print, I will venture a few remarks (by your kind permission) mainly to express my very hearty endorsement of our noble President's sentiments expressed by him in his splendid address. He indeed truly struck a chord—not exactly the "lost chord," but certainly a lost-sight-of chord—when he said that "the commercial side of photography is undeniably of deep importance," &c. Success cannot attend any undertaking without "bread and butter." One must live, or they cannot advance the interests of art, science, manufacture, or their own pockets, and, unless the commercial aspect of photography is more studied in the future, the above-mentioned pockets will become directly comparable to Euclid's definition of a point, namely, "that which has position but no magnitude."

I have not submitted any pictures for exhibition at the Society this season, so trust that the "smart man" will not cunningly remark that this letter is the "gasp of one of the snubbed ones." But is it not lamentable that, at one of our most important exhibitions, professional work, particularly portraiture, is conspicuous by its absence? I wish it distinctly understood that this letter is not an attack on anybody, but merely to rouse some person or persons to suggest some means of bringing about a more desirable state of affairs. Naturally, few, if any, firms of photographers will waste time and money in preparing and sending work to any exhibition knowing full well that it is a foregone conclusion that they will be told that their work is "not selected, and may be fetched away at any time," &c. This would almost be to the effect of telling the senders that it would be more appropriate to "hang themselves" than their pictures. It may possibly be said by some that these arrangements are necessary for keeping up the high standard of exhibitions. To an extent this is true. But who says that the high standard *is* kept up, and are the opinions of those in authority infallible? After viewing an exhibition, the irresistible wish comes over one to see all or some of the pictures that were rejected; and, if the wish could be fulfilled, oh, what a revelation there would be! Most truly the general public do not appreciate the impressionist effects, these "symphonies" in dirty water, of a colour that may be called nondescript, no definition, absolutely no "anything," the only advantage of such a picture being that it will do for any subject; it would do for Solitude, A Mist at Evening Glow, also for An Approaching Storm (or a departing one). If a person desires a certain object, they will not obtain it by getting something else, and being told that, if they can strongly imagine that it is the article they require, it will answer the same end. To really admire the majority of portraits at photographic exhibitions is quite an acquired taste, and, like toothache, a very little of them go a long way. What would our average sitter think, and say too, if we submitted proofs of such "atrocities in burnt umber," certainly the male portion of their families would make an attempt to "Hooliganise" us, and, although unpleasant, I think it would be well deserved. But I think that many of the landscapes are worse than the portraits, they are misnomers, they should be called *fire* escapes, and the regrettable feature is that they did escape the fire.

In conclusion, I beg to make one or two suggestions. Firstly, that exhibitions should have two divisions, one for amateur work and the other for professional, and that the Judges and Hanging Committee should have at least half their number composed of professionals of recognised ability. I also suggest that under no circumstances should hanging or selecting committees know the names of the authors of the works sent in. Perhaps this rule is in force at some exhibitions, but I am certain it is not so at all. Having trespassed to such an extent on your valuable space, I beg to subscribe myself yours, &c.,

FREDERICK W. MUNCEY.

Studio, 80, Boundary-road, St. John's Wood, N.W.

"COSMOS" CRITICISED.

To the EDITORS.

GENTLEMEN,—It must have pained "Cosmos" to write that paragraph in last week's "Jottings," and the sentence—"The present Salon is infinitely brighter and more exhilarating than the Pall Mall show, which is quite calculated to give your old-fashioned photographer what is bluntly called the hump"—coming from his pen is little less than startling.

I admire, however, "Cosmos'" straightforward candid admission more than I do his logic. That the Pall Mall exhibits "simply out-Salon the Salon as the latter was in its worst days," indicates, not the badness of the example set by the Salon, but rather the weakness of the imitators. I do not suppose the Pall Mall committee of selection was under the necessity of accepting any of these, so-called, objectionable pictures. According to "Cosmos," in the first paragraph of his "Jottings," p. 692, they are a most independent body.

"Comos" appears no longer anxious to write that epitaph!

Possibly the infinite brightness and exhilaration induced by the present Salon are responsible for this.—I am, yours, &c., C. H. HEWITT.

Gateshead-on-Tyne.

[Our contributor "Cosmos" will doubtless reply to Mr. Hewitt in due course.—EDS.]

PHOTOGRAPHING IN INDIA.

To the EDITORS.

GENTLEMEN,—I am going to take a hand camera to the Punjab in India, and should be very much obliged if any of your readers who have experience of India would tell me whether cameras taking plates, cut films, or roller films, are preferable; also if it is necessary to have the camera brass bound. Any information on the subject will be extremely acceptable.—I am, yours, &c., RISSALA.

[A few hints from some of our readers who have photographed in India would, doubtless, be very welcome to our correspondent.—EDS.]

GLAZING PRINTS.

To the EDITORS.

GENTLEMEN,—While so many people use pulp slabs and other specially prepared surfaces for glazing P.O.P., they seem to forget that all the large mirrors in their houses offer a large and perfect glaze unequalled by anything.—I am, yours, &c., WILLIAM PEEK.

Villa Glanella, Dinard, France.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

C. Price, 117A, High-street, Croydon.—*Photograph of moat at Rougham place, near Bury St. Edmunds.*

F. G. Machmahon, 23, Academy-street, Inverness.—*Photograph of the late Mr. Murdo Paterson, chief engineer of the Highland Railway, Inverness.*

RECEIVED.—F. BAKER; A. E H.; W. H. REYNOLDS; ACETONE; and others. These in our next.

"X."—The paper named is quite pure enough for the purpose.

R. W. TAYLOR (Pudsey Photographic Society).—We do not send out prize slides.

L. BLOCK.—1. Probably a theatrical costumiers', such as Harrisons', of Bow-street, would supply you. 2. We know of none such.

E. S. DOUGHTY.—Messrs. Perken, Son, & Rayment, Hatton-garden, will make you such an apparatus. Sorry it is against our rules to reply by post.

WEEKLY READER.—Abney's *Instructions*, Townsend's *Chemistry*, Leaper's *Materia Photographica*, should satisfy your requirements. Any dealer will obtain the volumes for you.

BURNISHING.—J. M. F. says: "I notice in Answers to Correspondents lately you recommend a lubricator of alcohol and Castile soap before burnishing. I have always used the ordinary commercial spirits of wine. Is there anything in that likely to injure the prints? I use P.O.P. I shall feel obliged if you would kindly notice that in your Answers to Correspondents."—The spirit will have no injurious effect on the print.

COLONEL BIGSBY-CHAMBERLIN.—Many thanks. It is a very interesting result, and, so far as we know, unique, especially as regards the "streamers." "Black" suns are, however, not uncommon.

A WEEKLY SUBSCRIBER.—To our knowledge, no such book is published. Messrs. Percy Lund & Co., Bradford, publish one on working up in black and white, which may suit you, but it is not illustrated in the way you wish.

AJAX.—If the celluloid is *very* thin the negatives will have a tendency to curl even after a prolonged soaking. However, the curling trouble, during developing and fixing, may be quite avoided by the methods described last week.

M. G. (Holland).—It is against our rule to reply by post. The quotations you give are those of *applications* for patents, the specifications of which will probably not be published until about nine months' time. They may then be obtained at the Patent Office, London.

THE PHOTOPHANE COMPANY.—H. MORGAN writes: "*Re* inquiry in your Correspondence column by A. Johnson for address of the Photophane Company. The address, three years since, was 'Cranfield-road, Brockley, S.E.,' and I am inclined to think they may be found there still."

W. J. F.—The screens and all particulars may be obtained of the Photochromoscope Syndicate, 119, Shaftesbury-avenue, W.C. Write them. The slides are not "coloured," as you seem to suppose. Acetylene will do for the purpose, but the light will not be so brilliant as that given with a lime.

SPOILT CARBON TISSUE.—S. J.—If the tissue is all like that enclosed, it is useless. It has evidently been kept in a damp place and become mildewed. The mould can be wiped off, it is true; but, if the tissue were sensitised and printed, spots would appear in the prints where the mildew spots were.

DEVON.—1. Very probably it is still copyright, but a search at Stationers' Hall would settle the point for you. Copyright lasts for forty-two years, or for seven years after the author's death. In the latter case there is a possibility of the copyright having run out. 2. No; we do not know the other picture.

C. E. WOOD says: "Some time ago you had in your paper a notice of 'Protfalbin,' but though the maker's name was given, no mention was made of the English factors. Could you therefore oblige me with their name, and where I can get it retail?"—In reply: The agent is Mr. C. A. Rudworthy, 22, Coleman-street, E.C.

A. B. asks: "Would you please tell me if a firm of publishers can use photographers' views to illustrate a guide without some acknowledgment for same? The views are not copyrighted."—In reply: Yes. The owner of the copyright has absolutely no remedy unless the pictures have been registered at Stationers' Hall Court.

DOUBLE IMAGE.—P. MURPHY sends a picture of the interior of a chapel, and on one side of it is the image of a window which he says was not seen on the focussing screen, indeed it could not be because it was quite at the side of the building. He asks us to account for it if we can.—We can. It is caused by a minute hole in the bellows of the camera, by which a secondary image has been formed, as in the case of the "pinhole camera."

TONING.—"Will you please give me a few hints on toning through 'Answers to Correspondents?' I tone forty cabinet prints at a time, using Ilford mauve. Will you tell me how best to make bath for the above quantity of prints? The way I am working I don't think I get good enough results."—You cannot do better than use the sulpho-cyanide toning bath as recommended by the makers of the paper, the formulæ for which accompanies it. Each two grains of gold in the bath will tone prints equivalent to one sheet of paper. With that there will be no difficulty in getting excellent tones.

MEALY PRINTS ON ALBUMEN PAPER.—F. FOX writes: "Here are two or three prints to illustrate my trouble. You will see they are of a dirty tone and mealy. I use the acetate bath. They are of a very good tone if they are taken out at the brown stage, but I want purple tones, and when I tone deeply this is what I get."—Some albumen papers, especially ready-sensitised, will not bear toning beyond a red-brown colour without becoming mealy. Possibly, however, the negatives may be at fault. Rich purple tones are only obtainable when very vigorous negatives are employed. The prints sent seem to have been made from somewhat thin ones.

ELECTRIC LIGHT.—"ELECTRO says: I have been offered an electric light installation, with gas engine complete, for less than a third of what it originally cost. Would it be more economical to purchase it at that price than fit up the light, using the electricity from the mains, which is rather dear in this town, though gas is cheap?"—We should say decidedly that it would be cheaper to use the current as supplied from the mains, as it can be switched on as required, and a gas engine would require starting afresh every time the light is required, unless it is always kept running. Then, it requires almost constant attention, to say nothing of the consumption of gas.

SPOTTY PRINTS.—PUZZLED asks: "Would you please inform me, through the correspondence of your paper, the cause of the white spots on the enclosed prints? I use separate toning and fixing, forty grains of sulphocyanide of ammonia, sixteen ounces of water, two ounces of gold solution, and fix in hypo, four ounces to a pint of water. I always alum the prints after washing, and then wash again. The spots don't appear until they come off the plates. I use a new bath for each batch of prints."—We cannot say for certain, but we strongly suspect the prints were put into the alum solution before the whole of the hyposulphite was removed from them. Try omitting the alum bath, and see if the spots occur then.

VARIOUS.—E. G. asks: "1. Will you kindly inform me in your inimitable JOURNAL where I can obtain ivoline—I mean a material in imitation of ivory for a photographic support? 2. Also where I can obtain a bromide paper which is transferable. 3. Thirdly, can a person of average ability soon master the air brush? Thanking you in anticipation."—1. Guitermann, 35, Aldermanbury, E.C. 2. The Eastman Company used to supply such a paper, and we think they do so still. We know of no one else who does. 3. The manipulation of the air brush is quickly acquired, but of course some artistic ability is necessary to use it to the best advantage. If you can work with a brush, the *air brush* will be no difficulty to you.

COLLODIO-CHLORIDE PAPER.—A. WATSON says: "I am using a matt-surface collodio-chloride paper, which gives a most beautiful result, and am told it is a German paper, but my dealer will not give me its name or the name of the maker. I buy it in gross boxes, but he always cuts away part of the label. What is left of the label on one box is 'outhall Collodio-chloride Paper,' and, according to the space left, I can fit in an S; so I think it must be called Southall. Can you tell me if there is such a paper on the market, who are the London agents and makers, so that I may buy it direct?"—In reply: We cannot identify the paper; some reader, however, may be able to do so. A great deal of collodio-chloride paper is imported from the Continent.

HOME PORTRAITURE BY REFLECTION.—A. M. B. says: "I wish to trace, in THE BRITISH JOURNAL OF PHOTOGRAPHY, an article referred to at page 51 of *Photography in a Nutshell*, under the head of 'Home Portraiture by Reflection in a Mirror.' I give quotation below. If you would kindly insert a question in your JOURNAL which might enable me to find the article, I should be much obliged. The following is the quotation: 'Excellent portraits can be taken in any ordinary room by reflection in a looking-glass. . . . . I first saw this plan described in an article in THE BRITISH JOURNAL OF PHOTOGRAPHY.'"—We have searched through our file for the last twelve years, but have failed to find the article. Perhaps some reader can assist our correspondent.

COLLODION.—F. E. G. writes: "Will you kindly advise what is the best book to get for information in the making of various collodions? I want, if possible, to make a thoroughly waterproof collodion, to go on opal on which carbons are developed, to better preserve the delicate matt surface in case they get wet. Can you recommend anything that could be rubbed over the surface of the finished print that would answer the same purpose?"—Hardwich's *Photographic Chemistry* goes very fully into the manufacture of collodions for photography, though not, perhaps, of the kind for enamelling. A good one for this purpose is: Ether (·720), 10 ounces; alcohol (meth., ·820), 10 ounces; pyroxiline, 100 grains; castor oil, ½ drachm. On p. 1040 of the ALMANAC is a formula for encaustic paste, which will render the surface of prints waterproof.

STAINS ON NEGATIVES.—SWING-BACK CAMERA asks: "Could you tell me anything that will remove silver staining (by P.O.P.) out of negatives? I used to take it out quite easy with iodide and cyanide of potassium, but they were stained with albumen paper; it now seems to have little or no effect. Another question you might kindly answer: In using a swing-back, say, for a figure in a sitting position, with the hand well in front, how should the back be swung? I saw two very good hands use it in quite opposite directions."—The plan you have been using is the best. Probably the solutions are not strong enough, or the iodine was not allowed to act long enough. The position of the swing-back must depend upon the position of the parts to be brought into focus, whether they are before or behind the principal plane. The sketch shows it right for parts in front.

INTENSIFICATION.—T. S. W. M. writes: "1. Within the last three months or so you gave, in THE BRITISH JOURNAL OF PHOTOGRAPHY, under the heading of 'Foreign Notes,' I think, a formula for copper intensification, I think by Eder and Toth. Would you be so kind as to send me the number that has it? 2. Will you kindly tell me if there is any way of removing finger marks and smudges from a copper intensified negative? 3. Which do you consider the best blackening agent, silver, ammonium, hypo, ammonia, or redevelopment?"—1. No article on copper intensification has appeared in the time named. There was one on lead intensification on September 9. Shall we send you that number? 2. Probably they may be rubbed off with a silk handkerchief, carefully used. 3. All are good, and each have their advocates. In our hands they all yield good results. It is very much a matter of taste as to which is best.

LIGHT FOR ENLARGING.—ENLARGER inquires: "Can you kindly give us an opinion as to the best and most satisfactory artificial light suitable for a professional enlarger? We have hitherto used daylight only; but as this is not very plentiful during the winter, we want the best substitute possible. 1. Would you advise electricity—(corporation supply)—or lime light? 2. Can the enlargements be made as good by artificial as by daylight? 3. We have seen some enlargements made by lantern which showed every mark and speck on or in the negative, and also brought out the retouching extremely sharp and bad. Is this a drawback in all cases of artificial light, or can it be avoided in any way? 4. We are in favour of the electric light, and propose having the light outside the enlarging room. What would be the power required, and is it necessary to have a specialist to wire, &c.? 5. The more important question is, Are the results as nice and soft by any light as by daylight? Your kind advice will be greatly esteemed."—In reply: 1. Electricity it would be less trouble. 2. Yes. 3. It is not a necessity. 4. We presume that condensers would be used, and it will be well to interpose a piece of ground glass between the condenser and the negative, or between the two glasses of the condenser; this will serve to ameliorate the defects referred to. We should advise the fitting to be placed in the hands of an electrician. One to two thousand candle-power will suffice for enlarging purposes. 5. Yes, when rightly used.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 2010. Vol. XLV.—NOVEMBER 11, 1898.

Contents.

	PAGE
X Cathedrâ	721
ormate "Toning"	723
eaderettes:— The Lantern Season—Panoramic Photography—Photographs of Mirages — Photographing the Interior of the Stomach — Cameras at English Fortifications — Balloon Exploration — Another of Wren's Churches Doomed — The New Element, Etherion	724
y the Way. By Dogberry	725
hotography at Home by Artificial Light.—I. By John Warrack, jun.	726
n Australian Photographic Libel Action—A Question of Permanency	727
ighways and Byways in Venetia	730
he late Mr. Latimer Clark	730
he Traill-Taylor Memorial Lecture	731
ur Editorial Table:— *Pictorial Photographs: A Record of the Photographic Salon of 1897*—The "M. Q." Developers—The Lumière" Vitrose Films—*Kodak and General Price List*—Catalogue Received	731
News and Notes	732
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—Kingston-on-Thames and District Photographic Society—North Middlesex Photographic Society—Liverpool Amateur Photographic Association—Plymouth Photographic Society—Sheffield Photographic Society—Edinburgh Photographic Society	732
Forthcoming Exhibitions	734
Patent News	734
Correspondence:— Photographing Lightning—Keeping Qualities of Films—A Lens Query—Photography and Painting—Photographic Patents—The Free Portrait Swindle	734
Answers to Correspondents	736

EX CATHEDRÂ.

'his (Friday) evening, November 11, at eight o'clock, there 'ill be a special meeting of the members of the Royal 'hotographic Society in the Exhibition Gallery, No. 5A, Pall Iall East, S.W. The meeting will be asked to take into onsideration the desirability of securing new premises for the ociety. An opportunity presents itself for acquiring on avourable terms an entire house in Russell-square, which ffers accommodation greatly superior in extent and conenience to that at present possessed by the Society in Ianover-square. It is to be hoped that a large attendance of iembers will result, so that the matter may be adequately iscussed by a representative meeting.

* * *

Two of the Sydney (New South Wales) photographers of hose florid advertisements in the local press of cheap photoraphs and enlargements we have previously made mention ave recently formed the parties to a libel action that was tried n Sydney in September. A Mr. Blow made a speciality of Rococo (or glazed bromide) photographs, and a Mr. George opied the name, whereupon Mr. Blow entered an objection to Mr. George's use of the term "Rococo." Mr. George, however, was not to be dismayed. He carried the war into the enemy's country by attacking the Rococo process, which in effect he said was old, inartistic, and not permanent. Mr. Blow retaliated by entering an action for libel against Mr. George, claiming 2000*l.* damages. The case occupied the Court for a week, and terminated in a verdict for the defendant.

* * *

In another part of the Journal we make copious extracts from a report of the case, for which we are indebted to our contemporary, *The Australian Photographic Review*. There is a great deal of interesting and amusing reading in the evidence, and the conflicting ideas on the subject of permanency have a strong resemblance to many utterances on the same subject that we have heard at home. In going through this evidence, it is apparent that not one of the witnesses had any considerable acquaintance with the theoretical aspects of photographic printing processes. One gentleman argued that platinotype was less permanent than silver printing; another, that bromide was more permanent than platinotype—indeed an analysis of the evidence shows that ideas as opposite as the poles appear to prevail among Sydney photographers and "experts" on points of theory concerning which practical unanimity prevails among those in this country who have given printing processes special study. The case is well worth reading through, as showing the conditions under which professional photography is practised in Sydney.

* * *

Concerning the parties to the suit, a friend, who is thoroughly acquainted with them, says: "You will note, in the advertisement of the defendant, Eden, that he carries on a cheap tailoring establishment in conjunction with his portrait business; he was, for some years, in business in New Zealand. Blow was formerly a provision dealer in a small way in this country. They both spend great sums in advertisements in the Sydney press. I am informed that the costs of the trial came to considerably over four figures." Our friend also makes some further references to several of the Sydney photographers indicative of a want of sympathy with them, on the ground that their business methods do not accelerate photographic progress in Australia. We can quite believe it.

It is stated that the authorities of the National Gallery have decided not to open the Gallery on Sundays during the winter months. A contemporary points out that there is no longer any question of principle involved, as the Gallery has been opened on Sundays throughout the summer. Obviously, in the winter people would be more likely to avail themselves of an opportunity to inspect the nation's art treasures than in the summer, when outdoor recreation is at once more possible and more enjoyable. What then, it is asked, can be the reason for such an unintelligent decision as that with which the authorities at the National Gallery are credited? Is it a question of light? Even so, there is usually sufficient daylight during the morning and early afternoon, even in the depths of a London winter. We doubt whether a sufficient amount of interest is taken in the nation's art treasures by the non-leisured classes of London to justify the opening of the National Gallery on Sundays during the winter; indeed, we suspect that the authorities are guided in their course of action by the fact that so few people are likely to take the trouble to leave their firesides for the purpose of looking at pictures, however great or noted they may be.

* * *

We pen the foregoing *apropos* of a suggestion made to us recently that the Royal Photographic Society should throw its Exhibition open free one Sunday, so as to give those who could not otherwise attend an opportunity of studying the best available productions of photography. The experiment, if feasible, might be worth trying, and, though we are sceptical of its meeting with appreciable success, we should none the less be pleased to find it otherwise. Another suggestion has also been made to us that the Royal Photographic Society's Exhibition should be thrown open free on the last day it is opened. The idea is that those to whom the payment of a shilling is a matter of difficulty would very largely avail themselves of the opportunity of studying a collection of up-to-date photographs, and thus an interest in photography would be created or extended among the poorer classes. Possibly so.

* * *

The prospectus of Kodak, Limited, has been issued. The Company has been formed for the purpose of acquiring the business and property of the Eastman Photographic Materials Company, Limited, of London, including the shares of the German Eastman Kodak (Gesellschaft mit beschränkter Haftung), and the French Eastman Kodak (Société Anonyme Française), and not less than ninety-five per cent. of the shares of the American Eastman Kodak Company, thereby bringing under a single control all the Eastman Kodak companies covering the whole world. Messrs. Price, Waterhouse, & Co. have certified the net profits to be as follows: For the year ending December 31, 1895, 49,656*l.* 14*s.* 4*d.*; for the year ending December 31, 1896, 122,676*l.* 19*s.* 3*d.*; for the year ending December 31, 1897, 185,232*l.* 0*s.* 1*d.*; and for the six months ending June 30, 1898, 103,459*l.* 3*s.* 4*d.* The capital of the new Company will be 1,600,000*l.*, divided as follows: Six per cent. cumulative preference shares of 1*l.* each, with preference also as to capital, 600,000*l.*; Ordinary shares of 1*l.* each, entitled to the remaining profits available for dividend, 1,000,000.

* * *

It is stated that, including the one-third of each class of shares taken by the vendor in part payment of the purchase money, upwards of 250,000 preference shares and 700,000 ordinary shares have been taken by shareholders in the British and American companies, and will be allotted in full. Applications are invited for the remainder of the issue, which will be approximately as follows: 350,000 preference shares at par, and 300,000 ordinary shares at 1*l.* 5*s.* Assuming that the profits of the new Company will be equal only to those of the existing companies in 1897, and disregarding the small percentage of the profits of the American Company which the new Company may not become entitled to, they will suffice to pay the following dividends on the new capital: Dividend of six per cent. on 600,000 cumulative preference shares, 36,000*l.*; dividend of ten per cent. on 1,000,000 ordinary shares, 100,000*l.*; leaving for reserve fund and further dividends on ordinary shares, 49,232*l.*; total 185,232*l.* The new Company will control a working cash capital of upwards of 150,000*l.* The management of the Company will include Mr. George Eastman and Mr. George Dickman as Joint Managing Directors, assisted by Mr. George Davison, Mr. Andrew Pringle (the Chairman of this Company), and Mr. Henry A. Strong (the President of the Rochester Company), as directors. Each of these gentlemen will hold a large interest in the new share capital. It is not intended to issue debentures or debenture stock. The factories, warehouses, and offices in Rochester are all freehold, the factory at Harrow is also freehold, and no mortgage exists upon any part of the property.

* * *

From an advanced copy of the prospectus we learn that no part of the capital offered has been underwritten or guaranteed. The list opens on Monday next, and closes on the Wednesday following. The assets of the various companies, other than goodwill and patents, are figured out at 561,664*l.* 2*s.* 11*d.*, representing freehold land and buildings, plant and machinery, &c., stock in trade, cash and book debts, &c. The nature of the business is, of course, too well known to our readers to need description, but it is interesting to note that the Company's *employés* in Europe and America number about 2000. Lord Kelvin and Sir J. Pender, Bart, M.P., Director of the Direct United States Cable Company, Sir H. T. Wood and Sir G. W. Des Vœux will occupy seats on the board of the new Company, the advanced prospectus of which has been extremely well received by the daily and other newspapers.

* * *

We note that one of the papers (the *Daily Mail*) in its comments appears to cast doubt on the permanency of Kodak photography in particular and inferentially of amateur photography in general. The two things are, of course, inextricably bound up together, and with the vast weight of cumulative evidence to the contrary at hand it is absurd, as it is also indicative of mental belatedness, to suggest that the hold which camera work has obtained upon all sections of civilised communities throughout the world is in any danger of being weakened. The practice of amateur photography is coeval with photography itself, and it cannot possibly die out while the sun continues to shine. Photography is a necessity of the age in which we live; it is destined to spread with the growth of knowledge, and even to enter with increasing fulness and indispensability into the daily lives of the people at present placed on this globe, and of those that are to come after them. To cast doubts on the "permanency" of Kodak photography

s to express a belief that photography in general is nearing ecay. One may as well venture the opinion that newspaper eading is likely to fall into desuetude—an impossible condition f things, although, to judge by the absurd ideas that so requently find their way into print, one could not be surprised f such a theory were some day promulgated.

* * *

THE Hon. Secretary of the Pittsburgh Photographic Society vrites: "Referring to the announcement of our coming Salon, ve beg to make the following correction. In said announcement we stated that 'nothing is to appear on front of pictures.' We have decided that this ruling, referring to the appearance f names, &c., on pictures, will not debar any good work from cceptance; in other words, we will permit the exhibitor to ign his or her work."

* * *

AT the Society of Arts, on November 30, Mr. C. H. Bohamley will read a paper on "Photographic Developers and Development." The Cantor Lectures will be delivered by Professor Vivian B. Lewes. The subject is "Acetylene," and he four lectures will be given on Monday evenings at eight 'clock, as follows:—Lecture I., November 21: The history of cetylene; methods of formation; the chemistry of acetylene; he part played by acetylene in ordinary luminous flames. ecture II., November 28: The commercial production of cetylene; calcic carbide and its properties; the electric furace and the various modifications in use for carbide manuacture; carbide without electrical power; carriage and torage of carbide. Lecture III., December 5: The commercial generation of acetylene; the types of generator in se; the actions taking place in the acetylene generators, and he effect upon the gas produced; the purification of acetylene or domestic consumption. Lecture IV., December 12: The ombustion of acetylene; acetylene burners; smoking and arbonising of burners; burners for heating; acetylene for gas ngines; diluted acetylene and its applications.

FORMATE "TONING."

A RECENT report of a meeting of the London and Provincial Photographic Association contained some remarks by Mr. A. L. Henderson upon a new toning formula which, he claimed, would do away absolutely with double tones in gelatino-chloride prints.

In the first place, it would be as well to consider whether it s a toning process. The usually accepted theory to explain toning is that the silver salts in the paper, of which we need only now take into account the chloride, is, by the action of ight, converted into the sub-chloride of silver, which, in the presence of auric chloride, is converted into silver chloride, the gold being deposited according to the equation

$$3Ag_2Cl + AuCl_3 = 6AgCl + Au.$$

If the image is also considered to consist, in part or wholly, of metallic silver, we have then the equation

$$3Ag + AuCl_3 = 3AgCl + Au.$$

Most of the toning baths employed at the present time, however, do not contain the gold in the auric, but rather the aurous state, in which case we have the chemical process represented by the equation

$$Ag + AuCl = AgCl + Au,$$

or

$$Ag_2Cl + AuCl = 2AgCl + Au.$$

The particular formula recommended by Mr. Henderson was a mixture of chloride of gold and formate of soda, and this salt was also recommended by Mr. Haddon, in conjunction with formic acid, to make a platinum toning bath; the platinum salt employed being the platinic chloride, and not the platinous salt, the chloro-platinite of potassium.

The first use of formic acid or a formate is due to J. Reynolds in 1886 (*Bull. Soc. Franç. Phot.*, vol. xxxiii. p. 311), his formula being—

Platinum perchloride	0·25 gramme.
Water	1000 c. c.

Carefully neutralise with potassium carbonate, and add 12 grammes of borax dissolved in a little hot water, and then add 30 c. c. of a ten per cent. solution of oxalic acid, or 60 drops of formic acid. The idea of reducing the platinic chloride was also suggested later by Gastine in 1890.

It is an open question whether we can assume that there is any actual toning process, and whether what takes place is not actually nothing more than physical intensification.

The use of the formate of soda in conjunction with platinic chloride was suggested by Hübl in 1895 (*Der Platindruck*, 1895, p. 123), for he suggests the use of the following for intensifying weak platinum prints:—

1.

Formate of soda	10 grammes.
Water	100 c. c.

2.

Platinum perchloride.....	2 grammes.
Water	100 c. c.

For use, mix 100–200 c. c. water with 5 c. c. of No. 1 and 5 c. c. of No. 2. In the above-mentioned book Hübl also suggests the use of gold with formic acid.

It is, of course, a well-known fact that it is possible to make an extremely dilute solution of silver, gold, and platinum salts, and mix the same with a reducing substance, and yet have no precipitate; but, the moment a grain or nucleus for the deposit of the metal is provided, the metal is at once precipitated on the same, a fact which was taken advantage of in the physical intensification of collodion negatives.

From some experiments with several makes of gelatino-chloride papers, printed under a print meter with numbered squares, and then treating them with the normal sulphocyanide of gold and chloro-platinite of potassium and phosphoric acid toning baths, and with the formate of soda and gold and platinum baths, there is strong evidence that the latter act as intensifying baths; but to actually determine whether any of the silver is replaced by platinum is a tedious task which, at the present moment, we have not the time to do.

Some considerable time ago, about four years, we think, it was suggested that the addition of a few drops of chloro-platinite solution to a normal acetate or sulphocyanide bath effectually prevented double toning, and here we had precisely a similar action, the platinite quickly reducing the gold to the metallic state; but when the solutions were used dilute, and not much platinite used, the gold was precipitated very slowly, till a silver print was immersed, when it was readily deposited on the image.

In our experiments with the formate baths we have found it advisable to use a much stronger salt bath, preliminary to toning, than was suggested by Messrs. Henderson and Haddon, the stronger bath, ten per cent. solution, yielding decidedly

purer whites, and without any prejudicial effect on the toning. We have also found that, unless the prints are thoroughly washed after toning, there is a decided tendency to the degradation of the whites when a fixing bath that had been used only two or three times was employed, the formate of soda, doubtless, reducing some of the silver salt present in the bath.

The Lantern Season.—About the middle of November the lantern season may be said to commence, and a good thing too that it has for the secretaries of many photographic societies. Without the lantern, now that there are so many societies, it is difficult to conceive how pabulum could be provided for their meetings, particularly during the winter months. Indeed, many societies might be more directly classed as lantern societies than photographic societies, for less of the technics of either the lantern or photography is dealt with than the exhibition of slides of places of interest, or as illustrating the travels of the exhibitor, accompanied by a lecture on the places visited. They are, however, highly interesting, generally attract good attendance, and tend to keep the members of societies together. As showing the interest taken in this branch of photography it will be seen, from the reports of the different societies, that several demonstrations of lantern slide-making have already been given.

A FEW weeks back we pointed out the desirability of securing a good stock of cloud negatives while the opportunity existed, for what is more monotonous than to see an exhibition of a hundred or so slides in which clouds were introduced and all from five or six negatives, with some lighted diametrically opposite from the lighting of the view; but that is what we saw at a lantern show a year or two ago. A November day, if fine, is often not too late to take cloud negatives. As we write, we could have secured a dozen or more cloud negatives, all of an entirely different type, that would have suited a great variety of views.

Apropos of lantern matters, we notice that the railway companies have not relaxed their restrictions with regard to the conveyance of cylinders of gas. We notice at a suburban station of the North London Railway a freshly posted bill, that cylinders of compressed gases would not be conveyed as passenger luggage, and that the conditions upon which they would be carried could be ascertained "at the time of booking." We also notice that the District Railway "go one better," or worse? It will not admit the cylinders on its premises under any conditions. Still, we imagine they often do, and will continue to do, while leather bags and portmanteaus are taken by passengers. Only a few days ago a fellow passenger in our compartment had an apparently heavy bag, which was long enough to contain a ten-feet cylinder, while under his arm he carried an unmistakable lantern-slide box for fifty slides. Of course we do not know that the leather bag contained a gas cylinder, though it might have contained two or more, for it was large enough.

Panoramic Photography.—At the meeting of the London and Provincial Photographic Association last week, a case was cited of two photographs taken panoramically, by rotating the camera on its stand, not coinciding. Half a dozen circumstances might account for that, but there is no reason why these pictures should not have coincided had the proper conditions, which have frequently been explained in these columns, been conformed to. When they are not, however, the discrepancy may be greatly, if not entirely, overcome by mounting the different sections of the panorama an eighth of an inch apart on the mount. In that way, inequalities, whether in the perpendiculars or the falling off of the lens at the margins, will be greatly ameliorated, while the panorama will still show as a good picture of the scene depicted.

Photographs of Mirages.—These mirages are not the famous illusions of the desert, where lakes of pure water and oases of refreshing verdure tantalise the thirsty traveller; but they are produced by similar causes, the refraction of the rays of light from distant objects by heated air, and are reproductions of curious effects in the streets of a busy city, San Francisco. Mr. R. W. Wood, of the Madison University, Wisconsin, writes to *Nature*, under date of September 20 last, describing the effects, and enclosing a photograph taken with a tele-photo lens, which that journal reproduces. If an explanation had not been given, every one would say that the representation was caused by the reflection of the objects shown by a pool of water or a damp pavement. Here we have two children, with their limbs apparently reflected by a glossy surface, and the little doll's carriage belonging to one is reproduced in exact facsimile. The writer says: "In order to observe the phenomenon, it is necessary that a considerable stretch of level pavement be foreshortened into a very narrow slip. This is the condition in the photograph: The camera stood just below the brow of the hill. . . . . The apparent reflections, due to the bending upward of the rays by the thin layer of heated air, come out very clearly in the photograph, but the camera fails to give a correct representation of the extreme brilliancy of the reflecting layer of air. It is, however, evident from the production of this actual photograph that, if any belated traveller carrying a hand camera in the desert should see a mirage, he ought also to be able to photograph it." We are afraid that, after this publication, we shall be presented ere long with a variety of weird "desert mirages."

FOLLOWING Mr. Wood's letter is another on the same subject over the signature of C. T. Whitmell, which we may give in its entirety. "Mr. R. W. Wood, who describes mirages . . . may like to refer to the second volume of *Nature* (p. 337, August 1870), where he will find an account of mirages seen by looking closely along a wall which was exposed to a hot afternoon sun. The mirage must be very common, and needs only looking for. Mr. Wood's interesting letter may lead others to photograph this curious phenomenon in our own country. A wall will be easier to deal with than a pavement."

Photographing the Interior of the Stomach.—Our contemporary, the *English Mechanic*, has a very remarkable article describing a new apparatus, the invention of Dr. E. O. Schauf, of Newark, New Jersey, for taking direct photographs of the interior of the stomach, and it is easy to imagine that any simple modifications of it may be utilised to photograph other portions of the body where sound may be introduced. The instrument consists of a tin cylindrical camera mounted at the end of an elastic probe, its side being prolongations of the probe. Some little distance from the camera, and forming a portion of the elastic rod, is a cylindrical glass case containing a miniature electric incandescent lamp, its position being so calculated that it illuminates the stomach when the camera is introduced to the required region, this being ascertained after a previous washing out of the stomach by a preliminary external examination with the illuminator introduced. The silver water-tight camera holds a circular film, three-eighths of an inch in diameter, and is furnished with a lens protected by a gelatine cap which quickly dissolves when the whole is introduced, owing to the introduction of a quantity of water to keep the walls distended. This is a triumph of photo-surgical diagnosis, and it is asserted that the negatives are capable of being enlarged to three feet in diameter as this means about thirty times, we must be excused for expressing a little incredulity as to the probability of any useful sharpness of result being so obtainable.

Cameras at English Fortifications.—We have frequently recorded the inconvenience to which English photographic tourists have been put, and the indignities they have suffered, by being arrested and put for a time in "durance vile" for using their cameras in the neighbourhood of foreign fortifications. It is not so generally known perhaps, as it should be, that foreigners, and our

own countrymen as well, run the same risks with regard to English ortifications, and for that reason they sometimes find themselves in n unpleasant position. Not long ago, three English tourists with a amera were arrested in the West of England and detained some ours for using the apparatus near one of the forts. Just now there s little doubt that the authorities are somewhat extra-vigilant in the natter than hitherto, as we read that one day last week a gentleman suspected as a Russian spy was arrested at Landguard Fort, Harwich, for putting some questions to one of the sentries, but, after being detained some hours, was released.

On another day we read that one of the staff of the *Windsor Magazine* was "run in" for taking photographs near a fort at Alderney, he being a suspected spy. After half an hour's detention, however, he was set at liberty. Had this gentleman been a Frenchman, or a Russian, unable to speak the English language, he would probably have found himself in a similar unpleasant position that English photographers have under like circumstances on the Continent. English photographers should take note, for there are many forts round the coast that are scarcely observable. Some in the neighbourhood of Freshwater and the Needles, Isle of Wight, for instance, are not noticeable, and they are close to some interesting views.

Balloon Exploration.—A correspondent of the *Standard*, telegraphing from Irkutsk under date November 2, says, "We are now starting to cross from the Lena Delta to the mouth of the Olenck, and if we arrive in safety we shall proceed in sledges to Chatanga, the Taimyr Peninsula, and the mouth of the Yenisei, in our search." This dispatch was sent a distance of 2000 miles by hand, from the Lena Delta to Irkutsk, for transmission to England, and up to then there were no tidings of Andrée, his companion, or the balloon. Herr Julius von Payer, one of the discoverers of Franz Josef Land, lecturing in his native town of Teplitz one day last week, said that Herr Andrée's undertaking was insufficiently prepared, and that it was probable that, until a steerable balloon is discovered, balloon expeditions in the Polar regions will never succeed. He added that it is probable the balloon landed on the east coast of Franz Josef Land, in which case Andrée would have to make his way over ice lakes and open sea to the Siberian coast, and, even if he succeeded in doing that, he could not be heard of till next autumn. Even if Andrée is safe, we must not, we fear, expect much in the shape of photography from his expedition.

Another of Wren's Churches Doomed.—The old church of St. Michael, Bassishaw, in Basinghall-street, is shortly to be pulled down. The original church dates 1676–9, with the exception of the older tower, which survived the Great Fire of London. One by one Wren's works are disappearing, to make way for improvements in the City, where ground is becoming more and more valuable every year. Many have already gone, and nothing remains in remembrance of them but photographs, and, in some cases, not even them. Some day a complete collection of photographs of Wren's City churches will be interesting. It is not a little surprising that, until a well-known building, fine church, or the like, is marked out for destruction, it receives so little attention at the hands of photographers, and then it is often too late, unless some unsightly hoarding or other is included in the photograph. Some of the City churches are not easy to get photographs of on account of the narrow streets in which they are situated, but that does not apply to the interiors, which generally contain some fine architecture. Yet how rarely are they photographed.

The New Element, Etherion.—In our last we referred to the supposed discovery of a new element, and discussed the possibility of its occlusion by the surfaces of glass (the source from which it was obtained) being an explanation of the vagaries of wet-collodion experiences. We have now to point out that Sir W. Crookes, in the current number of the *Chemical News*, presents a masterly discussion of the matter, summing up the conclusions he draws from the scant data at present available in the suggestion that the new element is—water vapour! However, let the separated gas be a new element or water vapour, it has been conclusively shown that the surface of glass obstinately retains traces of water, only expelled entirely when the glass is brought to melting point, and it may readily be seen how the glass may, by friction or otherwise, be irregularly denuded, so to speak, of its aqueous envelope, and so liable to irregularity of action under the sensitive conditions of wet-plate developmeat.

BY THE WAY.

Notwithstanding the labours of Messrs. Hurter & Driffield, we seem to be as far as ever away from a definite understanding of what constitutes a perfect negative. The definition given by those gentlemen was, if I remember rightly, something to the effect that the ideal negative is one that will yield a print in correct graduation in the shortest time, that is to say, its "scale" must be as perfect as possible with the least density, and without any useless deposit in the shape of fog. I have just had the opportunity and the necessary time to devote to it of making comparative trials of a large number of different papers both for development and direct printing, and I have come to the conclusion that nearly every brand requires its special character of negative in order to give the best result. Not only is this the case, but it seems that different batches of the same brand will often vary more or less in the vigour or delicacy of the prints they give from the same negative.

Twenty years, or less, ago, when the photographer was practically limited in his choice to the much-abused albumen paper, it rested with himself—at least, if he sensitised his own—what character of print he produced as a staple article; and, provided he made his negatives to a tolerably uniform standard, it was purely his own fault if he could not turn out prints of a perfectly level quality. Of course, this involved the proper care of the bath, and some system in sensitising and generally treating the paper, but, at any rate, matters rested in his own hands. Even when ready-sensitised albumen paper came into use chiefly by amateurs, the amount of variation between different makes and different batches was comparatively small, and gave no more trouble than the ordinarily observant photographer was fully able to cope with, and he went on turning out the same type of negative from year end to year end.

But with the present host of different kinds of paper and different brands of the same kind it is difficult to decide what sort of negative to adopt as a standard. Of course, the man who is in the happy position of being able to please himself will select the kind of paper that best suits the type of negative he is in the habit of making and stick to it, and, if it is a fairly reliable brand, it will not give him much trouble. On the other hand, the man who is constantly changing his paper, whether from sheer carelessness, inability to make up his mind, or from love of experiment, is likely to suffer, and little wonder, nor can any one feel much sympathy for him; but the one who really is to be condoled with is the professional who is called upon to supply any and every style of picture that may come into vogue for however short a period. It is not every professional photographer who is in a position to say to his customers "I will only give you such-and-such a style of print." The public likes to have what it fancies at the moment, and unfortunately the public is not unanimous in its fancies, and fashions come and go so rapidly, and overlap one another to such an extent, that the photographer who wishes to keep his business, instead of sending it to his nearest neighbour, must be prepared to execute any order tha may be presented to him.

After my experience with modern printing processes, I am impelled to ask how such a man can fix a standard to which to work in negative-making? With albumen, gelatino-chloride, collodio-

chloride, platinotype, "bromides," to say nothing of the hundred-and-one variants therefrom sailing under "fancy" names, all of them requiring more or less modification in the style of negative, he must surely be at his wits' end to meet the requirements. The printer will have his hands pretty full if he is expected to make any and every kind of print from the same class of negative, while, on the other hand, if the operator has to develop "to order" to suit the particular kind of print wanted, his job will be far from a sinecure, even if he succeed only moderately well.

This state of affairs, however, has its redeeming feature, if it can be considered so, in the fact that the habitually careless negative-maker can choose his printing process to suit individual negatives. I am not going to "own up" to habitual carelessness, but I must confess to being the proud possessor of a very varied collection of negatives resulting from experiments with different plates and different developers, and taken under conditions of almost every kind as regards light and exposure. I have amongst them many that to the eye appear almost faultless in gradation, and that yet will not give a decent print with any of the ordinary printing methods, by which I mean the regular commercial papers. Yet many of these I have succeeded in translating, properly or fairly well, from amongst the miscellaneous printing surfaces I have been trying, but it is only fair to say that the positive processes that work satisfactorily with abnormal negatives are, as might be expected, of very little use with negatives of ordinary average type.

This must always be the fault of ready-prepared papers or films. They are not amenable to modification—*pro re nata*, as the doctors have it—and that is at any rate one advantage that attaches to, and compensates for, the extra trouble of sensitising your own paper. Take ordinary albumenised paper, for instance; without going to the trouble of keeping baths of different strength—a plan that gives a wide range of power for modifying the result, and that is, after all, really no trouble if worked systematically—a very great deal may be done by varying the times of floating, by fuming with ammonia, or by partially removing the excess of silver from the paper either by blotting-paper or by washing. Then, again, the possible variations in the toning bath render it a matter of the greatest care to obtain either soft or vigorous prints at will within certain limits from the same negative. Similarly with carbon tissue altering the strength of the bath is, of course, a well-recognised means of getting almost any effect from any sort of negative; but in addition to this, the latitude and power of modification in development is almost unlimited in competent hands.

It is possibly for these reasons that carbon printing has, within the last few years, shown decided signs of increasing popularity amongst amateurs, and even albumenised paper is looking up. Of the carbon process it may be said that it will adapt itself to any class of negative, dense or thin, provided it possess gradation, but with albumen paper a negative with some "pluck" is a *sine-quâ-non*. The average type of gelatine negative of to-day is no use at all with albumen, but on the other hand it may be claimed that the negative that gives a soft and delicate print on albumen paper will give better results with the modern "print-out" papers than half the negatives that will *only* print on those surfaces.

One very curious circumstance struck me in connexion with a very rough-surfaced paper amongst those I had to try. Although of such a texture as to be only suitable for very large prints, the samples I had to try were small cabinet size. Some of these were put to negatives showing definition that might be classed as "*f*·64-type," though they were taken with one of the modern wide-aperture anastigmats. The peculiarity was that not only was the "critical" definition wasted on the rough-surfaced paper, but the results were apparently *less* sharp than prints on the same paper from negatives exhibiting far inferior definition. This probably sounds strange, but it is nevertheless true, and on another occasion I shall perhaps offer an attempt at an explanation. That it is to some extent an optical illusion is certain, and lighting and gradation rather than optical definition are accountable for the result. DOGBERRY.

PHOTOGRAPHY AT HOME BY ARTIFICIAL LIGHT.

I.

[Abstract of Paper read before the Edinburgh Photographic Society.]

I SHOULD explain that *the* photography by artificial light of which I can speak from some experience is a rather humble affair. I have nothing to say about electric light installations, or limelight, or acetylene; nor even about the more or less costly lamps for burning or exploding magnesium or similar illuminants. A few pence worth of magnesium ribbon is all that has to be bought. These more expensive arrangements have, no doubt, advantages, and with their use the range of work that can be successfully attempted may probably be widened. But with a foot or two of magnesium ribbon you can try portraiture, figure studies, still life, flower pieces, interiors, and so on—sufficient occupation during what would otherwise be the close season. And the best of your work should be as good as the best of your daylight work, though the average daylight work may probably be better than the average work done by artificial light. Working by daylight you can observe your effects and take advantage of the beauties that nature herself has arranged. With artificial light you very often *preconceive* the effect in your own mind, and then try to build it up. Each method has its advantages and offers attractions to men of particular temperaments. I think the prizes best worth having go to those who are most constant in waiting on nature. But "preconceived" effects may be, and should be, founded on previous observation. And, while to observe so as to make your exposure at the magical moment is a gift, to observe so that you can reproduce at will the conditions without letting the magic evaporate is an even better one; for the last is a closer and more analytical observation, and intimacy of observation is *the* condition of artistic work. A few weeks ago I saw in Amsterdam the magnificent special collection of some hundreds of the works of Rembrandt, who, as you know, is among all the great painters, the master of illumination. While there was no aspect of light which did not interest him, his preoccupation was not with the evenly diffused light of the photographic studios, which gives, as the phrase goes, "plenty of details in the shadows," and even comes near to abolishing the shadows altogether, but with the effects produced by a local illumination—a small window or a lamp—by which certain forms are picked out of the darkness and shown in picturesque emphasis; others can be easily distinguished or only half reveal themselves, while perhaps the greater part of the picture is darkness; not an opaque insensitive block without atmosphere or illumination, but a receding space which tingles with the real beauty and mystery of shadow. And that beauty of undistinguishable shadow, remember, is a beauty that exists in nature, and that is a genuine source of delight to those who have once really seen and felt it. Well, while going round the rooms of that great collection—with the writing of this paper looming before me—I could not help noticing how many of Rembrandt's drawings and pictures treated subjects just such as you might attempt at home with the camera by artificial light. A group of figures round a table, one of them with his back to you darkly silhouetted against the lamp, which his figure hides from your sight, and the others brightly illuminated and casting giant shadows on the wall behind them. Or, again, the shepherds coming into the stable at Bethlehem; the mother and child shown under the glare of the lantern, while the rest is in dark shadow, in which you can make out the rustic figures and peering faces of the shepherds. Of course, I do not suggest that Biblical subjects should be attempted, but that similar effects of lighting should be applied to subjects suitable for the camera.

CONTROL OF THE LIGHT.

A group arranged on the principle of this etching of the *Adoration of the Shepherds*, which I show you on the screen, could be perfectly well managed, if only the fumes of the illuminant were prevented from rising into the picture. The actual source of light is hidden, but the illumination is reflected by the various figures in the most interesting way; and you will notice the very effective passage of gradation from the bright part behind the head of Joseph to the darkness from which the shepherds emerge. Here again is a very slight sketch of a subject which, like the last, was a favourite one with Rembrandt. The light is here behind the globes at which *The Geographer* is peering. The subject would be difficult to the photographer without some readjustment, unless he had some arrangement for consuming his own smoke. Please notice the shadow cast by the nose on the cheek. I had brought with me a photograph of my own with the view of warning you against just this effect; and, though with Rembrandt it is rather piquant and expressive, it is not a lighting to choose if you want to please your sitters. One more picture of Rembrandt I show—*Jacob blessing the children of Joseph*. This time the effect of lighting, and the grouping, might be exactly copied, and such an imitation would be a very instructive exercise. By trying such a subject again and again till you felt you were really making some approach to the breadth and richness of the original, you would call into play just those powers of careful observation which will help you to reach a high standard of artistic work. And I think that one great advantage of work with a light which is completely under your control is that it teaches you this elementary but absolutely all-important lesson, namely, that light

xists not merely to make things *visible* but to make them *beautiful*. It eads you away from the cold-blooded study of persons or things as bjects in themselves to the more enchanting pursuit of light itself.

The Plate.

My object in reading this paper at this November meeting is to ncourage amateurs like myself to give some attention to photography at ome, by artificial light in the evenings of the winter that is before us. And my wish is to be practical and exact in directions as to exposure, nd so on. You will forgive me if I seem to those of you who have some xperience of such work to be too elementary and minute. In the first lace, then, while of course there are many excellent plates in the narket, any one of which will answer the purpose, provided it is not too low, I have been using the Cadett Professional, with a speed number of bout sixty, and I have never had a fault to find with them. It is lesirable, at any rate, to use a plate where any variations in the speed f successive batches is recorded, unless you have been fortunate enough o find a plate which is not subject to variation. Having fixed on your late, the next thing is to back it, for one of the risks of the work we are ngaged on is halation in the high lights. Now, the high lights are, in ll probability, just the points of culmination, interest in the picture; nd to lose modelling in them—or perhaps your sitter's face, for instance —is to sacrifice the picture. Therefore back your plates. I know this is counsel of perfection which is generally ignored; but, working at ome, the thing can be done very simply. Cut a sheet of any dark aper, black by choice, a little smaller each way than the plate; soak it n water, and then, after removing the surplus moisture, clap it on the ack of the plate. This negative of a man playing the fiddle by his fire-ide shows the result of letting the film get wet in parts before exposure. To avoid this it is better to lay the plate, film side down, on a sheet of lotting-paper, while you back it. Take care to get rid of any air ubbles, so that the sheet may be in optical contact with the glass. As ll this can be done just before you begin actual work with the camera, it s quite effective; and, if you have occasion to change plates, the sheets f backing paper can be removed and used on the new plates after ewetting, if necessary. Do not, however, leave plates so backed in the lides a moment longer than necessary, as the damp may affect the wood, nd spoil the fitting. A word as to size of plate, and this I count of very reat importance if your results are to be really satisfactory. The plate hould be a size less than the lens is meant to cover. It is not a question of illumination at the corners. My own lenses are a Ross 10×8, and a Dallmeyer whole-plate. Each will cover a size larger than it is made for. But experience leads me to use the 10×8 for whole-plate, and the whole-plate for half-plate work. In this way you get a longer focus, or, in other words, can go further away from your subject, with the result that its various parts assume a more pleasant proportion to each other, and the perspective is more comfortable to the eye. Of course, if you are working in a very small room, it may not be possible to get a sufficient distance from your subject. Then you may have to use the larger plate, but the results will never be so good.

Lens Aperture.

Another point is lens aperture. In my own practice I almost never use a stop, outdoor or indoor. It is quite difficult enough to suppress superfluous detail when you work at *f*-8, without embarrassing yourself with the square inches of irrelevant and distracting information that result from the use of a smaller aperture. Of course, there must be occasions when your objects of interest are not all in one plane, and it may be necessary to use a stop. I show you a *drawing-room group* where one figure is out of focus, and a stop might have been desirable, though something might have been done by focussing on a plane nearer the camera. But, as a general rule, use the full aperture, and you will find yourself forced to study the primary artistic problem of the simplification of the interest of the picture. Only a few objects can be in the plane of focus; you will have to select these objects carefully; the fewer the better. In a good picture you see only one thing; in a bad one, five, twenty, or a hundred. You have less temptation to crowd in miscellaneous accessories if they can only be indistinctly shown. So you make a good start by simplifying the elements of your picture. In social life the bore is the man who keeps telling you things you don't want to hear. It is the same with pictures; nothing disgusts us more than over-elaboration. The more you keep to suggestion, and avoid explanation, the more you capture the imagination of those who see your pictures. The fewer words you can tell a story in the better will it catch on. Let your picture be too empty rather than too full. But, besides the artistic reasons for a large top aperture, there are obvious reasons of expediency, for, in all home work, anything that enables us to reduce the duration of exposure is an advantage. If we are tied down to long exposures, we are limited as to the choice of pose for the sitter. Such a position as that in the next illustration, for instance, in which a man, with his head thrown back, holds above him a large earthenwhere bottle, is very hard to maintain without swaying. The pose is taken from a picture by Edouard Manet, and is interesting, I think, though it has been too trying for the model to keep up even for the very few seconds of the exposure.

John Warrack, Junr.

AN AUSTRALIAN PHOTOGRAPHIC LIBEL ACTION—A QUESTION OF PERMANENCY.

At Sydney, in September last, Mark Blow, trading as the Crown Bromide Enlargement Company, sued Eden George, a photographer, for the recovery of 2000*l.* damages for alleged libel. Mr. Bruce Smith and Dr. Coghlan appeared for the plaintiff, and Mr. Garland and Mr. Ferguson for the defendant. The alleged libel was published as an advertisement by the plaintiff in the *Star* and Sydney *Herald*, on March 26 and 30, 1898, respectively. In opening, Mr. Bruce Smith pointed out that the plaintiff had a trades-mark right to use the term "rococo" in connexion with certain photographs. He found that the rococo photos became very popular, and he advertised them largely. They increased his business, and then he discovered that the defendant was using the name. He wrote him letters, through his attorney, directing his attention to the fact that he (the plaintiff) alone was entitled to the use of the term "rococo," and gave him notice to desist. The defendant replied that he would not cease from using the term, and subsequently an advertisement was published in the *Star* and the *Herald*, in which the following passages appeared: "As a photographic firm (meaning the plaintiff) have been persistently advertising that the rococo is a new process, is their own production, and is protected to them by Act of Parliament, Mr. Eden, of the Eden Photo Studios, wishes to warn the public that such a statement is absolutely misleading. What is known as the rococo process is simply pictures printed on smooth-surface bromide paper, known to amateurs as bromyta, or star paper. It is one of the cheapest and simplest processes in photography, and is considered inartistic, and not generally used by first-class photographers. As a matter of fact, Mr. Eden cannot recommend the process known as "rococo," as it gives a cold, blue, inartistic tone, and is not permanent. What we here object to is, any firm taking up a well-known cheap process, advertising it as their own, and that others dare not use it, as it is protected to them by Act of Parliament." . . . . The plaintiff set forth that the publication of this statement meant that the plaintiff's portraits were inartistic and of little value, and that the plaintiff was a photographer of little ability, and that the plaintiff was guilty of dishonest practices in inserting his advertisements, whereby the plaintiff was injured in his credit and reputation as a photographer, and in his said business, and otherwise greatly damnified.

The defence was opened by the defendant, Eden George, a photographer, carrying on business at the Eden Studios, giving evidence. He said the "rococo" process was the cheapest known in photography. He could teach it to an operator in two hours. It was intended chiefly for the use of amateurs. That the rococo "prints," that is, exclusive of mounting, would cost 2*s.* per dozen cabinets to produce, platinotypes about 6*s.*, and autotypes about 15*s.* He knew a Mr. Grouzelle, who had been Mr. Blow's chief operator. He had opened a studio for himself since March last.

Cross-examined by Mr. Bruce Smith, witness said that his conclusions that the rococo process was not permanent was based upon his own experience in taking such photos, and his experiments with those taken by the plaintiff. He would not believe that the three rococo photos handed to him had been exposed in a show-case, in the light, for three years and a half, because they were not faded. He knew rococo photos were perishable. They would not fade perhaps if only shown in a shaded drawing-room.

Suppose they had been exposed in the vestibule of plaintiff's business place for three and a half years and yet are in the condition that you see them, would that alter your opinion as to their permanency?—No; in the first place I can hardly believe that the same photos would have been left exposed for so long, and, even if they had been so exposed, photographers know that chemically the glazed process does not endure.

Which is the more enduring, silver printing or dull bromide?—They are about the same. The glazed bromide has a tendency to turn yellow. I know baryta paper, which is that used for the rococo process.

Is the paper not first covered with baryta and then with another emulsion which gives it the high gloss?—No; the baryta gives it the gloss and the emulsion sensitises it.

Is not the emulsion used in plaintiff's rococo photos a preparation of his own?—No; I would doubt that it is his own preparation.

But you did not know when you published the libel whether it was his preparation or not?—I did not know; but I know the paper which plaintiff buys. It is Fuller's paper, and I use the same paper, and can turn out exactly similar photos. I say that the emulsion is not a trade secret. I owned an emulsion factory in New Zealand.

Do you know what the emulsion is which plaintiff uses?—Practically I do. A man may put an ounce of water more or less in the emulsion, but it is a bromide of silver emulsion all the same.

Were you informed by the newspapers when you wanted to use the word rococo, in your advertisements that they would not take the advertisement?

Mr. Garland objected, and the question was disallowed.

Did you a few months ago send a Mr. Harrington to plaintiff with a proposal that you should take an interest in plaintiff's business?—I did not. The matter has been talked over by the stock houses who thought such a combination would be a powerful one. Messrs. Baker & Rouse particularly spoke of it.

To Mr. Garland: The paper for the rococo process is imported here with the baryta solution on it, and the manufactures here cover it with a bromide of silver gelatinous substance which sensitises it. Then the photographers buy it and use it. The paper as it is imported is called baryta, and when coated with the bromide of silver emulsion it is called variously "bromyta" and "star" paper.

Witness was handed photos which he said were respectively rococo, platinotype, and silver print.

Mr. Garland: Under favourable conditions how long should a rococo photo last?—About twenty years. Autotypes are actually, and platinotypes are practically, imperishable.

Under ordinary circumstances how soon would a rococo photo begin to change?—Within a year or two. We have a chemical test to apply, and it would eat away a rococo or silver print, neither of which are permanent, before your eyes. But the chemical could not affect a platinotype photo, the image of which is itself of metal.

What does the bromyta paper for the rococo process cost?—Twelve pieces cabinet size cost 1*s.* 3*d.*, less twenty-five per cent.

John Hubert Newman, photographer, of George-street, Sydney, said he had about thirty-five years' experience as a photographer. He knew the rococo photos. Glazed bromide paper was used for them. He had known the paper for eight or nine years. Any one could buy the paper. It would not be correct to say that the glazed bromide process was Mr. Blow's production. They were about the cheapest photos that could be made. The most expensive was the carbon or autotype, and the next in order the platinotype. The silver print was considerably cheaper again. The rococo was a very sensitive process, and the print was generally taken by artificial light, daylight being too strong for it. A good negative would take about two seconds to print. The paper used for rococo was very largely availed of by amateurs, and not generally by first-class photographers. The latter used it for hurried work. As an expert, witness considered the process inartistic.

Mr. Garland: Is it a permanent process?—No process is permanent; nothing in the world is permanent.

His Honour: Even the finest oil paintings are not permanent.

Mr. Garland: In photographic language would either rococo or silver print be called permanent?—No.

Does your business increase in the summer months?—It generally falls off in the winter. Since March last at least two new studios have been opened.

To Mr. Bruce Smith: He dealt chiefly in silver prints. He made about one thousand autotypes per year. Platinotypes represented about twenty-five per cent. of his business. The extra cost of platinotypes over rococo photos was the cost of the paper and developing. Printing a platinotype would take from five minutes to two hours, according to the nature of the negative and the conditions of light, and the exposure would be a natural light. Some degree of skill was required in printing a rococo photo.

What is the cost per dozen of cabinet silver prints?—It depends on the conditions. Some men pay 3*l.* 10*s.* per week to their printers, and others only 1*l.* Rococo would cost considerably less, because the time required for printing is about one-tenth that of silver printing. I charge 15*s.* per dozen for silver print cabinets.

Do they cost you more than 3*s.* per dozen?—If they did not, I should do very much better in my business than I do. I charge 25*s.* per dozen for platinotype.

Witness was shown the two photos, one a bromide and one a platinotype. He said that in the then prevailing light he could not discriminate between them. He could produce a bromide on special paper, and defy any one without special test to say that it was not a platinotype.

And yet you charge 15*s.* for the one and 25*s.* for the other?—No; I do not use the bromide.

Do you consider the defendant a "leading photographer?"—No; I do not.

Witness named some whom he considered first-class firms, and then said that, to the best of his discernment, photographs handed to him and bearing the names of some of those firms, were on glazed bromide paper. He was also handed three photographs purporting to be rococos, which had been exposed in a show-case for three and a half years. He said they were very slightly faded, and under the conditions had stood better than some of his own productions would. He was shown another rococo.

Mr. Bruce Smith: What is inartistic about that?—The glazing.

Oh! Is glazing inartistic?—Certainly. No artist would have glazing. Then the colour is bad, and that is the great thing. This process gives cold, blue, inartistic colouring, devoid of depth and "quality."

Witness was shown half a dozen glazed bromides. He said they were an average lot got up for show purposes, and representing "actors, singers, and things."

Mr. Garland: You say Mr. George is not a "leading" photographer. Do you think Mr. Blow's photos the climax of modern photography?

His Honour: There are two kinds of climaxes.

Witness: I do not consider the work first-class.

William Rufus George, father of the defendant, said he had about thirty five years' experience as a photographer. The glazed bromide process was open to every one to use. The paper was sold as bromyta, star, or rococo. It was the cheapest and simplest process. His firm (Freeman) charged 25*s.* per dozen for cabinet silver prints, 35*s.* for platinotypes, and more than 50*s.* for autotypes. Dull bromides and platinotypes could only be distinguished by chemicals or the passage of time. The chromo paper was made specially to counterfeit the platinotype. The rococo process was inartistic on account of the glazing and colouring.

William Rufus George, under further cross-examination by Mr. Bruce Smith, said he could not name any photographers who used the glazed bromide process more than four years ago. He thought business fell off in winter in the cheaper establishments, although in the better-class houses, weather made no difference in trade. Permanence in photos was a matter of degree. It depended mainly on the atmosphere. He knew good silver prints which, subjected to atmospheric moist heat, faded in three months. He considered no other processes but autotype and platinotype to be permanent. No adverse conditions would affect the platinotype picture, but the paper itself might discolour.

Charles Kerry, photographer, of George-street, said he had over fifteen years' experience. To the best of his judgment the rococo photos were turned out by the glazed bromide process, which was not a new process, and was certainly not the property of the plaintiff. He agreed that it was the cheapest and simplest process. It was not used for first-class work. The roooco process was certainly not artistic, nor was it permanent.

Witness, in cross-examination by Mr. Bruce Smith, said he used glazed bromide paper for his cheap work. He did the greatest number of enlargements on rough-coated bromide paper.

Witness was shown the two photographs, one of which purported to be platinotype and one dull bromide. He said he could not distinguish between them. He could not see a "dull dead colour" in them. There was a "dull dead colour" always in the glazed bromide. Any glazed photograph was inartistic. He kept a burnisher, which was a warm roller used for giving a polish to certain photos. He burnished his silver prints.

Did you write this letter to Messrs. Baker & Rouse: "We have been getting some fine results lately from your star paper, and find it extremely useful for enlarging work where no artist's retouching is required," &c.?—I did. I referred to cheap work.

William Downe Ross, photographer enlarger at the Swiss Studio, said he had thirty-two years' experience.

Mr. Garland: Do you know the glazed bromide process?—Unfortunately I do. It is the process to which Mr. Blow has given the name rococo. It is about twelve years old as a process, and I should say that it was not Mr. Blow's own production. It was introduced first into England, and is one of the simplest processes known, being practically purely mechanical.

Mr. Garland: Why do the glazed bromides lack artistic character?—Well, we always aim at making photos resemble engravings, and not the tops of bon-bon boxes.

Mr. Bruce Smith: You were in the employ of Mr. George, the defendant?—Yes, I was also in the employment of Mr. Blow.

You said you were aware "unfortunately" of the existence of the glazed bromide. Why unfortunately?—Because of the great amount of labour involved for very little money.

How is the first gloss produced on this paper?—I do not know. It is a trade secret possessed by the makers in France.

Could you tell the difference between a dull bromide and a platinotype?—Yes.

Witness was handed the two photos which had been put in evidence as a bromide and a platinotype. He put them to his mouth.

Hey! What are you doing?—Licking them. (Laughter.)

What for?—To test them. The gelatine sticks.

But the public does not do that, does it?—Probably it will after this.

Well, what are they?—I am not sure even now, but I think both are bromides.

Witness looked at two rococco photographs purporting to have been in a show-case for three and a half years. He said they were "giving up the ghost," and would not last much longer. He thought they were about two years old.

Do you call yourself an artist?—Yes, I should say so. My grandfather was the great Sir John Ross. (Laughter.)

Oh! then, that is proof positive? (Laughter.)—But my work proves that I am an artist.

What is inartistic about this photograph (handing witness a glazed photograph)?—It is very inartistic.

But in what way, from your grandfather's point of view? (Laughter.) It is as if it were made by a tinsmith. (Laughter.) It has too much homogeneousness, too much closeness of texture. There is nothing left to the imagination.

Did you ever write art criticisms?—Yes, I have attempted it in England.

I will not ask you the result. Why is the glazing inartistic?—Because all our training as artists teaches us it is so.

Do you use a burnisher in your establishment?—Yes.

Do you mean to say that you would descend to put a glaze on your artist's work?—I do, unfortunately. The public demand it. We have to use it even for platinotypes because the public taste is so vitiated.

That closed the case for the defendant.

Mr. Bruce Smith called

Frederick Jenkins, who said he had been a photographer in Mr. Blow's employ for eighteen months. He understood the chemistry of photography. Bromide was a higher form of photography than silver print. A lower form again was the blue process, which was only used for making maps. There were the dull and the glazed kinds of bromide. The paper was plain white paper, chemically pure, coated with a hard surface of gelatine and chloride of barium ("baryta"). Baryta was not used, as far as he knew, for any other than the glazed bromido process. It gave the paper a gloss and prevented the emulsion sinking in. The emulsion imparted a tint to the paper, and also gave it a higher gloss. He saw the glazed bromide paper used six years ago. It was then pink in colour. Mr. Blow was the first person witness saw using the white-tinted paper; but he had seen it offered for sale previously. The bromide process, either dull or glazed, required more skill to print and develop than the silver or platinotype did. The operations required great care and skill, and experienced persons had to conduct them. There was more waste in bromide than in any other process. Bromides would cost twice as much to print and develop as the silver prints. He was often engaged in taking cinematograph photographs. He took 1500 pictures of the one object in a minute and a half.

What do you say as to the permanence of the glazed bromides?—I think it is more permanent than either platinotype or silver print. The rococo is not one of the simplest and cheapest process in photography. It is not more inartistic than other processes, and some good firms use it.

To Mr. Garland: He was not a printer. He could turn out from 60 to 100 glazed bromides in a day. The process was not the one usually adopted by amateurs. Silver printing was more easily learned. Glazed bromide was used for high-class artistic work. He had been in business as a photographer for twelve months in New Zealand and three years in Sydney.

Mark Blow, the plaintiff, examined by Dr. Coghlan, said he had been in business in Sydney for about for about ten years. He was apprenticed to photography, in England, nineteen years ago. He was some time in England in the provision business. Glazed bromide paper was introduced into Sydney, in 1893, as "nikko." The present form of the paper came on the market a year later as "star" paper. He had used practically similar paper a few months previously. Mr. Fuller, of George-street, made it for him by treating the baryta paper with a sensitising emulsion, including gelatine, bromide of silver, and other chemicals, suggested by himself and accepted by witness.

What is the rococo process? It is one by which the pictures are printed from the negative, developed, fixed, mounted, washed, burnished, and supplied to the public. The printing is highly skilled work. Witness described in detail the whole process of photography under his system.

In what particular detail does your mode of using the glazed bromide paper differ from the ordinary?—Well, it is my own secret, but, if I must tell, I must. We pass the rococo print through a solution of alum to harden the film. Then it is put under the hot burnisher, which leaves a higher gloss on it without destroying the film.

Witness, continuing, said that the silver printing process was much simpler than the rococo. Sensitising the paper could be done by a boy. Unmounted silver prints costs 9*d.* per dozen cabinets, and not 3*s.* as stated by defendant. Glazed bromides cost 1*s.* 9*d.* per dozen, and platinotypes cost 2*s.* 2*d.* per dozen unmounted cabinets. He turned out about 200,000 silver prints and 130,000 rococos per year. He claimed that the rococo were more permanent than platinotypes, chiefly because of the imperviousness of the baryta coating on the paper. The filaments on the portrait were of metallic silver, and consequently the photographs were practically permanent. The rococo photographs produced had been in his show-case for three and a half years. The bromide produced, which the experts could not distinguish from the platinotype, and which they admitted was artistic, was merely a rococo unglazed. The glazed bromide paper was used by first-class houses in Sydney and Melbourne.

In further examination by Dr. Coghlan, the plaintiff named several photographers in Melbourne who, he said, used glazed bromide paper. He recognised the six photos handed to him as glazed bromides.

Dr. Coghlan: Produced by some of the leading Melbourne photographers?

Mr. Garland objected to the question, and it was disallowed. The photos were withdrawn from evidence until the names of the producers were made illegible to the jury.

At the time you introduced the rococo photographs were any other professionals using the paper in Sydney?—No. It is true that amateurs may have used it. They always are the first to try anything new. Professional photographers are diffident about taking up these new ideas until they are shown to have merit. There was the pink "nikko" in egular use previously. Mr. Fuller imported the white paper for me and treated it. Up to that time no professional was using the white paper in Sydney. I advertised it largely as "rococo"—as a new process.

Did any other photographer use it afterwards?—Oh, yes. It is still the newest process with the exception of the recently imported "Simplex" paper, which is not used by the trade. The rococo is a wasteful process, and I always serve out sixteen pieces for twelve photos. It is a difficult process also, the printing and developing calling for great skill.

Is the rococo process "one of the cheapest and simplest" in photography as stated in the alleged libel?—It is one of the dearest and most difficult. It would be impossible to teach the process, as Mr. George said, in two hours. Mixing the chemicals could not be learnt in the time. Amateurs, when buying a new paper, are satisfied if they get one successful picture after destroying many pieces. Sometimes they might get several pictures consecutively, but that would be by luck. But to turn them out for the trade demands experience and special knowledge. My own man has twenty-two years' experience of photography, and yet it took him one month to properly learn this process.

On the question of permanency, what is your opinion of platinotype?—Changes of atmosphere will cause the paper to contract and expand, operations which tend to crumble the platinum and destroy the surface of the photo.

It is said that the rococo photographs are not artistic, and that one of their faults is their homogeneousness?—Homogeneousness is aimed at by every photographer and maker of paper.

What does it mean?—It means unity of surface and appearance. It is the climax of photography.

His Honour: I cannot understand you. Could you illustrate it?

Witness (handling a photo): Easily. There, you see, is a metallic silver image on the paper, and all round here there is unity of the surface of the whole picture, and the metallic appearance is blending into the gelatine, and, as a consequence, it produces an artistic effect.

His Honour: Ah! Would you tell that to the jury, please?

Witness repeated his explanation to the jury.

His Honour: Is homogeneousness said to be a bad feature?

Dr. Coghlan: The witness, Mr. Ross, said these pictures were homogeneous, left nothing to the imagination, and so were inartistic.

His Honour: Oh, yes. He said the other kinds let in the light and shade, and that the rococo kind does not.

Cross-examined by Mr. Garland: I was in the provision trade for about seven years in England. I next opened business as a photographer in 1888 under the style of the London Palace of Art. Then I took Peel's Studios in George-street. I think I am a skilful and expert photographer. I did know a number of trade secrets, but they are now out. One cannot trust his *employés* for keeping such secrets.

Mr. Garland: Do you mean to say that the alum bath was a secret of yours?—I was the first to use the bath for hardening the gelatine on the smooth bromide photos for the purpose of burnishing prints.

Do you mean to say that alum as a hardening substance for gelatine has not been known to all photographers for many years?—It has been so known, but only in connexion with the making of gelatine paper, and not for hardening the gelatine on prints to enable them to be burnished.

Does the alum affect anything besides the gelatine?—Yes, it affects other ingredients in the emulsion.

What are the ingredients?—That is a trade secret.

Do you say that gelatine prints were never burnished before 1894?—I do.

Do you claim the glazed bromide process as your own?—I claim to have been the first to have introduced it to the public of New South Wales in a professional way. I had not used the process before I registered the name "rococo." It had been used by amateurs for taking views. Amateurs generally pioneer these new ideas.

His Honour: An adaptation of "Fools rush in where angels fear to tread" would, perhaps, describe the meaning of the witness. (Laughter.)

Mr. Garland: Can you show me an authority which says that the glazed bromide process is absoutely permanent?—Yes, I can. Dr. E. A. Just, the greatest authority on the bromide process, says so.

Witness read extracts from Dr. Just's book to the effect that emulsion photos were proved to be permanent by tests made in 1884.

His Honour: Did you say that brilliant emulsion prints are the same as glazed bromide prints?—Practically.

Mr. Garland: I thought there were no glazed bromides in 1884?—There were none in Sydney.

Here is a photo which came out of your studio. Is it permanent?—It has not come out of my studio in the ordinary way, or, if it has, some one has afterwards applied hyposulphate of soda to it. But even if the paper of a photo fades and the image remains black it is a permanent photo.

Now, you say in your advertisement that your work is the climax of photography. Do you mean to claim that seriously?—My business is all seriousness. My work is the very climax of photography. There can be none better.

And yet you sell these perfect things for—how much?—At a price which compares reasonably with the cost.

Do you mean to say that you can produce platinotypes?—Yes, and I have personally produced them.

Did you publish that you were the only producers of the rococo process?—Yes.

Sands Howard Fuller, manufacturer of photographic goods, examined by Mr. Bruce Smith, said that in 1894, when he commenced business in Sydney, no other person was engaged in putting emulsion on paper. He prepared ordinary bromide paper for Mr. Blow, and afterwards brought

the glazed, both pink and white, under his notice. Plaintiff gave him an order for some of the white paper with the emulsion on it, and he agreed to supply no one but Mr. Blow with it until he had established a business. Witness was aware that the plaintiff had registered the name "rococo" in connexion with the paper. He regarded glazed bromide paper as more permanent than silver print or dull bromide paper.

To Mr. Garland: He did not sell the paper supplied to plaintiff to the general public under the name of "rococo." He would decline to supply an order for "rococo" paper. He sold, through his agent (Mr. Harrington), precisely the same paper to the public under the name of "bromyta." He was not a chemist, but had personally conceived the formula for the emulsion which he applied to the "baryta" paper. There were printed instructions issued with every packet of "bromyta" paper sold, and any person following them intelligently could use the paper.

John Herbert Squire, dealer in photographic stock, said he had some knowledge of photographic chemistry. Glazed bromide paper first reached Australia four or five years ago. The first he saw was pale pink in colour. He saw the first white samples at Baker & Rouse's, who, he believed, introduced it generally. He could not say whether Baker & Rouse had any white glazed bromide in stock four years ago. He had seen a glazed bromide many years ago. It was called "alpha" paper. It had to be developed first and toned afterwards. It was not a baryta paper. Platinotype paper cost 2*s.* 3*d.* per dozen cabinet pieces, glazed bromide 1*s.* 3*d.* per dozen, dull bromide 10*d.* per dozen, and silver print at the rate of 6¾*d.* per dozen.

Q. Do you get a better result from the glazed bromide than from the silver print paper?—*A.* Yes; you get far more detail, and, especially with a thin negative, you get a truer picture. The gloss is not inartistic in my opinion. Enamel is used to give a give a finish to photos. It is a mixture of gelatine and collodion, and is applied after the negative is printed.

Mr. Garland: Do you say that gloss improves the photo from an artistic point of view?—It is a matter of opinion. I would prefer to have my photo taken in platinotype.

Richard Nicholas Johnson, Commissioner of Stamps and Taxation, said that the photo which had been produced and instanced as an example of a faded rococo, was a portrait of himself. It was taken six months ago, and had since been in his office. Having read Mr. Blow's evidence, he handed the photograph to Mr. George, the defendant, on Wednesday.

To Mr. Bruce Smith: Six weeks ago I gave one photograph to Mr. George. The photos were not discoloured when I obtained them from the Crown Studios.

After other evidence, addresses by counsel for defendant and plaintiff respectively, and a lucid summing up by the Judge, the jury retired for two hours, and brought back a verdict for defendant.

HIGHWAYS AND BYWAYS IN VENETIA.

A LARGE attendance of the members of the Leeds Camera Club and their friends were present at the meeting on Wednesday, November 2, to hear Mr. Coulthurst, F.R.P.S., give his lecture on "Highways and Byways in Venetia." Mr. W. J. Warren presided. The lecture was illustrated by a series of upwards of 150 lantern slides, one of the best series, both technically and artistically, that has ever been shown in Leeds.

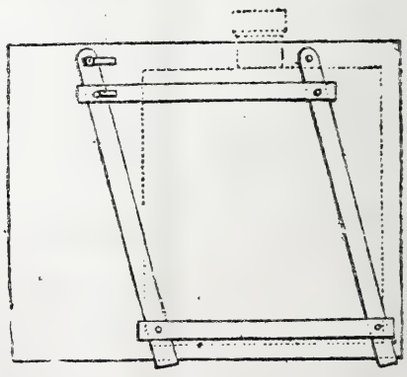
Mr. Coulthurst traced the route from Harwich, through Rotterdam to Cologne, down the Rhine past Basle, Lucerne, to Milan. Breaking the journey here, the lecturer showed the world-renowned cathedral. Leaving Milan, and speeding along through the rich plain of Lombardy, passing villages, hamlets, and houses, scarcely overtopping the profusion of mulberry trees, Verona was reached, and then began the ramble in the Venetian highways and byways. Verona, surrounded by old walls flanked with towers, and strongly fortified, is one of the most important towns in Italy—a curious and interesting place, and well worth a week to see it. Along the river on which it stands floating water-mills are to be seen, moored across the stream, so as to get the full force of the rapid flowing water. The quaint old streets, fountains, and churches of the city demand more than passing attention, while the famous amphitheatre, or arena, of Roman origin, possesses a wonderful fascination. Its height is 100 ft., its circumference 500 yards, and it is built entirely of white and red marble. The interior is almost in perfect condition, with ample room for over 30,000 people. Verona is full of Roman remains. The Porto Bossias, the Dunno, the market-square, and other places of interest were most vividly shown, and though some are at least 1600 years old, they are in good condition. The churches, numbering about forty, are rich in paintings, sculpture, and tombs, and, along with its Gothic Cathedral, with its pillars resting on griffins, form altogether a paradise for the architect. At Verona is the reputed tomb of Juliet, which, however, is of recent structure, the original having been long since destroyed. Reluctantly we pass on, feeling with force the full truth of Ruskin's words, "If I were asked to lay my finger on the spot of the world's surface which contains at this moment the most singular concentration of art treasure, I should at once lay it upon the name of Verona." Venice, with its almost endless list of attractions, was next described, and most fully illustrated by Mr. Coulthurst, who remarked that, taking a hasty glimpse down the smaller canals, it is found that the rude huts built by the original Venetians gradually took the form of more substantial buildings, rocks took the place of sand and mud, houses sought the sky, being forced like trees in a narrow compass to seek in height what was denied them in breadth. Niggard of every inch of ground, from the outset compressed into a narrow compass, no more room was allowed for the streets than was absolutely necessary for separating one row of houses from another, and all affording a narrow footway for passengers. Water was at once street, square, and promenade. The Venetians were thus forced to become new creatures, and be unlike all others, and as Venice stands to-day, a "march of improvement" has reached this famous city, and soon we may expect to see some of the canals filled up, and open streets in their stead. Beauty and ugliness are combined in Venice, each giving perhaps a charm to the other, and it may be asked whether the city is more beautiful for the much beauty she possesses or for her characteristic ugliness. One certainly enhances the other, and the balance ought not to be destroyed. The principal features of the wonderful islands of the lagoon—Donato, Morano, and the deserted island of Torcello—were shown, passing on to the Choggio, and away in the distance, seeing Venice and Torcello, like mother and daughter both in widowhood, The route, said Mr. Coulthurst, was like a highway in the sea, an avenue of posts marking the deep water. At high tide, water; at low tide, mud banks, cut in different directions, and kept open by dredgers. Dodging in and out among the quaint old streets of Choggia, dirty in themselves, open sewers running down the middle of some of them, its female population, famous for their beauty, picturesquely standing in the doorways, we feel we should like to devote more time to this dirty old town, but our journey draws to a close, and as we leave the harbour of Choggia in the fast fading light of a June evening, we feel that among the many places visited with the camera that for beauty and picturesqueness, as well as for ugliness, the highways and byways of Venetia could not be excelled.

THE LATE MR. LATIMER CLARK.

WE regret to have to announce the death on the 30th ult. of Mr. Latimer Clark, F.R.S., F.R.A.S., M.I.C.E., M.I.E.E., in his seventy-sixth year. Over forty years ago the deceased gentleman devised an arrangement for taking stereoscopic photographs with one camera and lens, its chief feature being a contrivance for rapidly moving the camera in a lateral direction without disturbing the position of the image upon the ground glass. We append Mr. Clark's original description of his invention, which has been in constant use since its introduction, and has more than once been reinvented.

"A strongly framed camera stand carries a flat table, about twenty inches wide by sixteen, furnished with the usual adjustments. Upon this are laid two flat bars of wood in the direction of the object, and parallel, and about the width of the camera asunder. They are eighteen inches in length; their front ends carry stout pins, which descend into the table and form centres upon which they turn. Their opposite ends also carry similar pins, but these are directed upwards, and fit into two corresponding holes in the tail-board of the camera.

"Now when the camera is placed upon these pins, and moved to and fro laterally, the whole system exactly resembles the common parallel ruler. The two bars form the guides, and the camera, although capable of free lateral motion, always maintains a parallel position. In this condition of things it is only suited to take stereoscopic pictures of an



object at an infinite distance; but to make it move in an arc, *converging* on an object at any nearer distance, it is only necessary to make the two guide bars approximate at their nearer end so as to converge slightly towards the object; and by a few trials some degree of convergence will be readily found at which the image will remain as it were *fixed* on the focussing glass while the camera is moved to and fro. To admit of this adjustment, one of the pins descends through a slot in the table and carries a clamping screw, by means of which it is readily fixed in any required position."

"In order, however, to render the motion of the camera smoother, it is advisable not to place it directly upon the two guides, but to interpose two thin slips of wood, lying across them at right angles, beneath the front and back of the camera respectively (and which may be fixed to the camera if preferred), and to dust the surfaces with powdered soap-stone or French chalk."

It has escaped notice that to the late Mr. Latimer Clark is due the credit of being the first to introduce the vignetting of photographs, a letter from him describing a simple apparatus for that purpose appearing in the first volume of the Photographic Society's Journal in 1853. The deceased gentleman was the father of the well-known Mr. Lyonel Clark, C.E., to whom photography is indebted for many valuable writings and devices, most of which have been noticed in this JOURNAL during the past thirteen or fourteen years.

THE TRAILL-TAYLOR MEMORIAL LECTURE.

THE first Traill-Taylor memorial lecture was given, by kind permission of the Royal Photographic Society, at the Exhibition Gallery, Pall Mall, East, on Tuesday evening last, the subject being "The Focometry of Positive or Negative Lens Systems, and their Combination," by Mr. T. R. Dallmeyer, F.R.A.S. Sir Henry Trueman Wood, the senior trustee of the Fund, occupied the chair, and there was a large and representative audience.

The Chairman explained that, when he was asked to preside on this occasion, it was understood that the Earl of Crawford would have been abroad, but his departure had been unexpectedly delayed. The President of the Royal Photographic Society would have been the proper person to take the chair, and no one was more capable than he of discussing such a subject as that which was to be dealt with. Sir H. Trueman Wood proceeded to read a letter from Mr. Dallmeyer, expressing his extreme regret that he was not able to be present, and stating that, in consequence of the condition of his health, he was not permitted to be out at night, a circumstance which the Chairman said he was sure would evoke the sympathy of all present. He thought their old friend, Taylor, could have wished for no better memorial that the periodical delivery of a lecture upon some aspect of photography, a subject in which he had been deeply interested, and with which his name was so intimately associated. Referring to the management of the Memorial Fund, Sir Henry said he would have preferred it to have been under the control of the Royal Photographic Society, which had perpetual succession, rather than that it should have been vested in trustees, for the time must come when the late Mr. Traill Taylor's friends must themselves pass away, and it was possible that the trustees who succeeded them might not be so energetic as the present very efficient Committee of the Fund. In selecting an author for the first lecture no better choice could have been made than Mr. T. R. Dallmeyer, who was eminently qualified to deal with the difficult subject of photographic optics, which did not appeal to photographers to so great an extent as other branches of the science. Mr. Traill Taylor was not a mathematician, but he was a man of a geometrical turn of mind and had the power of realising to himself the concrete forms of those facts and objects which were realised by the mathematician by means of symbols, and in that way he was in touch with those who possessed that mathematical faculty which was so essential in dealing with optics. His book on photographic lenses was not without its demerits in the eyes of scientific men, but was, nevertheless, of considerable value, and might with advantage be brought up to date—a work for which no one was more competent than Mr. Dallmeyer. A popular treatise of that nature was much needed, and it was to be hoped that some competent person would undertake the task of preparing it.

Mr. H. L. Aldis, B.A., then read Mr. Dallmeyer's lecture, which was described as an attempt to make clearer a subject that seemed to have presented more difficulties than any other to the users of modern lens systems, "On the Focometry of Positive or Negative Lens Systems and their Combinations, and a Focometer for the Purpose." It commenced with a reference to a paper, read in November 1891, by Professor Sylvanus Thompson, before the Society of Arts, on "The Measurement of Lenses," in which all the known methods of focometry were considered, and a new and very beautiful focometer was introduced, applicable to any positive lens system in which the two optical centres, or Gauss points, were situated within or near the mounting of the lens itself. This focometer, however, was not applicable to the determination of the focal length of lens systems in which the Gauss points are situated considerably outside the mounting, and it was for this reason that Mr. Dallmeyer introduced the new one on this occasion. The lecture treated the subject in a most masterly and comprehensive manner, and it will appear in our next issue. At its conclusion a few questions were asked, to which Mr. Aldis replied, and a very hearty vote of thanks was given to him and to Mr. Dallmeyer. The thanks of the meeting were also accorded to Sir H. T. Wood for presiding, and to the Royal Photographic Society for the use of the Gallery, and a portrait of Mr. Traill Taylor having been thrown on the screen, the proceedings terminated The use of Mr. Dallmeyer's focometer was afterwards demonstrated by Mr. Aldis to many of the audience who desired to obtain a better idea of its practical application.

Our Editorial Table.

PICTORIAL PHOTOGRAPHS: A RECORD OF THE PHOTOGRAPHIC SALON OF 1897.

Reproduced in Photogravure by WALTER L. COLLS. London: Kegan Paul, Trench, Trübner & Co.

IT is rather late for the issue of an album of photogravure reproductions of pictures that were exhibited over a year ago. In the matter of exhibition photography time appears to slip by with bewildering rapidity. How many of the two or three hundred photographs that were hung in the Dudley Gallery a year ago could be called to mind by those who, unlike ourselves, do not experience the necessity of keeping *au courant* with each succeeding phase of photographic production? Even we, on a glance through Mr. Colls' seventeen plates, found that we had well-nigh forgotten all the originals save Demachy's *Fan*, Crookes's *Symphony*, Wellington's *Salhouse Broad*, and Hinton's *Melton Meadows*. We wonder how many of our readers will or can recall Stieglitz's *A Dreary Day*, Thomas's *Summer Evening*, Martin's *South-Westerly Gale*, L. C. Bennett's *Stormy Evening*, and so on. By the way, what commonplace titles these are, to be sure; and what a commonplace exhibition Mr. Colls's fine series of reproductions of, in the main, very "usual-thingy" photographs shows the Salon display of 1897 to have been! We, nevertheless, congratulate Mr. Colls on the excellence of his reproductions, in which the colours of the originals have been copied with wonderful accuracy. We thank him, too, for including Heinrich Kuhn's *A Southern Landscape*. The original is a gum-bichromate "picture." It looks as if it had been made by wildly dabbing a moistened blue bag over a bit of rough surface paper. We shall treasure this reproduction, with others *sui generis*, for the purpose of showing our children in future years to what depths of eccentricity some photographers could descend, and to illustrate what it was that made the gum-bichromate process a laughing-stock among photographers of to-day. This album of *Pictorial Photographs* should be in the possession of all those who follow the progress of pictorial photography step by step, and we trust that the care which Mr. Colls has evidently brought to his work will be rewarded by a large demand for his beautiful book.

THE "M. Q." DEVELOPERS.

John J. Griffin & Sons, 20–26, Sardinia-street, Lincoln's Inn-fields, E.C.

MESSRS. GRIFFIN send us samples of their excellent "M. Q." Developers in tubes. The "M. Q." tubes, though primarily intended for Velox papers, are also suitable for plates, bromide paper, or films.

The "M. Q." Developer is a simple combination of standard developers, accurately weighed up according to a reliable formula.

The following are the instructions for use:—

For Velox.—The best way to use the developer is to mix the powder found in the tube in four ounces of distilled or rain water. This solution should then be kept in a tightly stoppered bottle filled to the neck, in order to ensure protection from oxidation. To develop, take out just sufficient for immediate needs, using a small open vessel to hold it, and apply the solution evenly to the paper by means of a pad of cotton wool or soft badger's-hair brush. In no case return to the bottle any developer which has been once used. *After developing each print squeeze the pad or brush before recharging same with fresh solution.* The developers contain sufficient bromide of potassium for ordinary use.

For Plates, Films, or Bromide Paper.—Mix the contents in ten ounces of water. Developer which has been used for Velox will produce excellent results with plates or bromide paper. To correct over-exposure, add a few drops of ten per cent. solution of bromide of potassium. To accelerate, add tentatively ten per cent. solution of crystallised carbonate of soda.

THE "LUMIÈRE" VITROSE FILMS.

Fuerst Brothers, 17, Philpot-lane, E.C.

MESSRS. FUERST have sent us samples of the new Lumière Vitrose films. In appearance the new support resembles celluloid, but it is inferred that it is of a different nature. The new films are light and quite transparent, and do not curl in the operations of development, fixation, and washing. Sample cardboard sheaths are supplied for using Vitrose films in the camera. Messrs. Lumière are also making rollable films of the same material. It is stated that, from the Vitrose composition base, all foreign bodies have been removed which would be susceptible to alter the gelatino-bromide emulsion. "The principal question of preserving the Vitrose composition has been the object of numerous researches, and the results obtained permit of guaranteeing during six months the keeping qualities, provided the Vitrose films are kept from damp and heat." Our trials of the new film were entirely successful.

KODAK AND GENERAL PRICE LIST.

The Eastman Photographic Materials Company, 43, Clerkenwell-road, E.C.

IN this neatly printed catalogue of forty-eight pages the different kinds of Kodaks, to the number of more than a dozen, are described and illus-

trated, and in the remainder of the catalogue particulars of Kodak fittings, tripods, cases, roll-holders, films, printing papers, prices for printing and enlarging, chemicals and sundries are given in detail. To the uses of the Eastman specialities this catalogue is a necessity.

CATALOGUE RECEIVED.

WHOLESALE PRICE-LIST OF CHEMICALS.

Harrington Brothers, Shandon Works, Cork.

MESSRS. HARRINGTON'S list is of distinct use to those engaged in chemical work, for it gives prices of most, if not all, chemicals in current demand, small and large quantities being quoted for.

News and Notes.

HOVE CAMERA CLUB EXHIBITION.—Entries for this Exhibition close on Saturday, November 12, to Mr. C. B. Stoner, 24, Holland-road, Hove.

PHOTOGRAPHIC CLUB.—November 16, at eight o'clock. Beginners' Night, "The History and Principles of Photographic Emulsions," by Mr. A. Mackie.

THE Photophane Company, of Cranfield Works, Harefield Mews, Brockley, S.E., write: "Our attention has been called to an inquiry by a Mr. Johnson, in your issue of October 28, for our present address. Will you kindly note that it is as above?"

ROYAL PHOTOGRAPHIC SOCIETY.—Photo-mechanical Meeting, Tuesday, November 15, at 12, Hanover-square. "On Rapid Dry Plates for Process Work: Combined Screen and Colour Negatives for Three-colour Printing," by Mr. A. A. K. Tallent. "On the Melting and Setting Points of Gelatine Solutions and their Modification," by R. Child Bayley.

THE Hon. Secretary of the Photographic Club writes: "Herewith I send you the usual notice of meeting for the 16th inst., and I have to call special attention that an invitation is given to all interested, and to members of affiliated societies and beginners in particular, to attend these meetings, at which we shall be pleased to cordially welcome them."

TRACKED BY A TELESCOPE.—A man, alleged to be a bank manager who absconded from Aldborough three years ago, was arrested at Plymouth on Saturday last. His capture was effected in a remarkable manner. A native of Aldborough, named Thomas Criffin, signalman on board the battleship *Colossus*, was looking through his telescope towards the land, when he saw on shore a man he believed to be the missing bank manager. He immediately got leave and proceeded ashore. He gave his information to the police, and, it being found to agree with that published in the *Police Gazettee* three years ago, search was made and the man arrested. He will be brought before the magistrates to-day.

Re JOHN HENRY PREECE, photographer, lately trading as John Henry, Bold-street, Liverpool.—The adjourned public examination of the above-named debtor was appointed to be held at the Liverpool Bankruptcy Court before Mr. registrar Bellringer on the 3rd inst. Upon the case being called, Mr. Pride, on behalf of the trustee, stated that the debtor, at a previous sitting of the Court, said a Mr. Davies, of Cheltenham, who had also become bankrupt, owed him more than 500*l*. Since then Mr. Davies had been examined, and had stated that he did not owe the debtor anything. The examination of Mr. Davies had not been closed, and he should like to make further investigations. Replying to Mr. Pride, the debtor asserted that Mr. Davies did owe him the money he had stated. Eventually the examination was ordered to be further adjourned.

COLOUR PHOTOGRAPHY.—On Tuesday, November 1, a lecture was given at the Tate Institute, Silvertown, to a crowded audience, by Mr. J. Brandon Medland, on "Photography up to Date," in which he gave a description of the various known processes of photography in natural colours and in connexion with the Joly process, exhibiting the lantern slides on the screen plain, and by a method of his own coloured them by this process before the audience without removing them from the lantern; the result was exceedingly effective, the colours coming out on the slides most brilliantly, the large audience testifying by rounds of applause their appreciation of the wonderful variegated tints produced. In the Ives's method the three-coloured images are simply blended, and this is the first time that a plain lantern slide has been coloured before an audience, and Mr. Medland's method proved most successful.

Re GILBERT NEWTON FUTCHER, photographer, 28, North-street, Chichester.—The public examination of this debtor was held at the Brighton Bankruptcy Court on the 3rd inst. before Mr. Registrar Jennings. In answer to questions put by the Official Receiver, the debtor stated that he commenced business on his own account in 1895, having previously been a journeyman. At the time of starting he had about 10*l*. in cash, and lantern and photographic apparatus. He borrowed 50*l*. from a friend, however, and has since borrowed more. His first year's balance-sheet showed 80*l*. to the bad, and, although the business gradually increased year by year, he had never been able to make it pay, and still owed the loan that he had contracted to enable him to start business. He was eventually compelled to call his creditors together, and at the private meeting he made an offer of 5*s*. in the £, which was refused. He subsequently offered 7*s*. 6*d*. in the £, but that was refused also. He was now in a situation as assistant. Eventually the examination was adjourned.

X RAYS AND THE PURITY OF COMBUSTIBLES.—The diamond and wood being permeable to the X rays, whereas the silicates are not, M. H. Couriot presumes that mineral combustibles would allow the rays in question to pass through, and that the silicious matter which forms the ash upon combustion would resist the passage of the rays at the points where they may be grouped, forming an obstacle more or less impermeable in proportion to their abundance. In the experiments he has made with anthracite, lignite, coke, &c., he has always observed in all its details the intimate structure of the mineral portion of the combustible; the smallest fragment of shale, invisible to the naked eye, is revealed upon the screen as a black spot or hazy band. In the cone, for instance, one may observe, appearing in the form of black spots upon the screen, the particles of ferrous sulphide derived from the pyrites. Instead of a chemical analysis of coal being made to ascertain the proportion of coal ash it may yield, it is only necessary, by virtue of the great permeability of coal, to adopt this radioscopic method, which instantly furnishes the mineral skeleton of the block under examination, to form an appreciable idea of its purity and commercial value.

LONDON COUNTY COUNCIL AND CINEMATOGRAPH ENTERTAINMENT.—At the last meeting of the London County Council the Theatres and Music Halls Committee submitted a series of revised regulations respecting the use of cinematographic lanterns in premises licensed by the Council. The new regulations were prepared by the Council's chemist, in consultation with the chief officer of the fire brigade, the superintending architect of the Council, and some of the principal makers and operators of cinematograph lanterns in London. Mr. Emden moved the omission from the third regulation of the following clause: "The audience and seats shall at no point be less than eight feet distant from the lantern, the audience being prevented from approaching by a suitable rail or barrier." Sir Harry Poland, Q.C., acting-Chairman of the Committee, said he could not accede to this ammendment. The cinematograph was a dangerous thing unless proper precautions were taken, and in making this particular recommendation the Committee had been guided by the advice of the Council's chemist and other officials. The amendment was rejected, and the Committee's original recommendation adopted. The other regulations proposed by the Committee were also agreed to.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

November.	Name of Society.	Subject.
14	**Bradford Photo. Society**	Velox Demonstration. Representative of J. J. Griffin & Co.
14	Camera Club	Demonstration of Velox Paper.
14	North Middlesex	Lecture by E. J. Wall, F.R.P.S.
14	Oxford Camera Club	Members' Developing Competition.
15	**Birmingham Photo. Society**	Exhibition of Pictures taken upon the Summer Excursions.
15	Croydon Microscopical	*Pre-historic Man and his Modern Representatives.* E. Lovett.
15	Gospel Oak	Demonstration with Toning Bromide Paper. W. J. Ramsey.
15	**Hackney**	Annual Exhibition.
15	Isle of Thanet	Demonstration: *Transparencies.* J. H. Forwalk, V.P.
15	**Leeds Photo. Society**	*Röntgen Rays, with Demonstration of their Remarkable Properties.* J. H. Gash.
15	Royal Photographic Society	*On Rapid Dry Plates for Process Work: Combined Screen and Colour Negatives for Three-colour Printing.* A. A. K. Tallent.—*On the Melting and Setting Points of Gelatine Solutions and their Modification.* R. Child Bayley.
16	Ashton-under-Lyne	Demonstration: *Enlarging by Incandescent Light, &c.* A. E. Casson.
16	**Croydon Camera Club**	Thirty-fifth Public Lantern Show.
16	Kingston-on-Thames	Annual Dinner.—Annual General Meeting and Distribution of Certificates.
16	Leeds Camera Club	*Lantern slide Making.* W. Emmott.
16	**Photographic Club**	*The History and Principles of Photographic Emulsions.* A. Mackie.
16	Woodford	*Fred. Walker and his Pictures.* Mr. Goodwin.
17	Ashton-under-Lyne	Meeting for Conversation, &c.
17	Bolton Mutual Photo. Society	*Lantern slide Making.* Royal Photographic Society's Lecture.
17	Bootle	*What to See in the Lake District.* D. J. Kidd.
17	Leigh	Demonstration: Velox Paper.
17	Liverpool Amateur	*All about Animals.* Gambier Bolton.
17	**London and Provincial**	*My Visit to America.* H. Snowden Ward.
18	**Croydon Microscopical**	North Middlesex Society's Slides, issued by the Royal Photographic Society.
18	Plymouth	*The Hand Camera—Its Possibilities and Limitations.* E. H. Micklewood.

ROYAL PHOTOGRAPHIC SOCIETY.

NOVEMBER 8,—Ordinary Meeting,—The Right Hon. the Earl of Crawford, K.T. (President), in the chair.

NEW MEMBERS AND FELLOWS.

Fourteen candidates for membership were nominated, and nineteen who had been previously proposed were elected. It was announced that Miss Muriel Bell and Mr. H. V. Hyde had been admitted as Fellows of the Society.

RESIGNATION OF THE ASSISTANT SECRETARY.

The PRESIDENT announced that Mr. R. Child Bayley had submitted his resignation of the position of Assistant Secretary of the Society, having received an appointment more to his advantage. The Council greatly regretted that Mr. Child Bayley had found it necessary, in the exercise of duty to himself, to sever his official connexion with the Society, and that his

valuable services, which had been so zealously and faithfully rendered in the past, would no longer be at their disposal.

Sir H. TRUEMAN WOOD, as the President's immediate predecessor in the chair, endorsed all that he had said. He was glad to know that Mr. Child Bayley was about to occupy a position in which he might find a wider scope for his talents, and, having been a member of the Council since Mr. Bayley's appointment as Assistant Secretary, he was able to bear testimony to the fact that every duty which he had been called upon to perform had been discharged with the greatest zeal, earnestness, and ability.

The remarks of the President and Sir H. T. Wood were received with loud applause, and, the ordinary business being thus concluded, the remainder of the evening was devoted to the reading of the Traill-Taylor Memorial Lecture, which is referred to in another column.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 3,—Mr. A. Mackie in the chair.

Mr. A. L. HENDERSON showed two photographs illustrating the fact that lenses of very short focus, used to take a photograph panoramically by rotating the camera on its base and exposing consecutively on the different portions of the view, produced a want of registration between the several pictures forming the series. He was quite certain that the camera was level, thus eliminating any argument based on that question, but the lens used was a wide angle of two and a half inches focus. He did not think that the difference between the points of rotation of the camera and the optical centre of the lens would, in the present case, account for the disparity in the pictures shown.

Mr. R. BECKETT said that it was clear to his mind that, unless the camera were revolved at the point marking the optical centre of the lens, the results would be untrue and lose in panoramic effect.

Mr. WELFORD said he had not experienced difficulty in joining up photographs to make a panorama, and he was not aware that he had taken care to work on the optical centre. Practically speaking, the whole secret lay in the use of a sufficiently long focus lens.

Mr. P. EVERITT recommended the use of a base to the camera marked in 360°. By taking care that a certain object in the first picture is included in the next at precisely the same angle as it was in the first, the task is perfectly straightforward, it being, of course, understood that the camera is strictly level.

Mr. WELFORD said he had conveyed to Messrs. Burroughs and Wellcome what seemed to him to be the opinion of the meeting with regard to the formate of soda toning bath, to which they had replied that their object had been to provide a formula which could be recommended to amateurs who had pinned their faith on sulphocyanide. Their opinion was that these amateurs could not be induced to give up the sulphocyanide in favour of phosphate and such baths; they were apt to believe that directions not expressly recommended by the paper-makers would not answer. However, seeing that the tones of the formate bath more nearly resembled sulphocyanide tones than any other formula, that it had not the softening action on the gelatine, and that there was remarkable freedom from double tones, they thought that the introduction of an entirely new bath, like this formate bath, would get over this difficulty in some measure. Mr. Welford thought this confirmed his opinion that the bath did similar work to that of sulphocyanide, but in a better way.

Mr. HENDERSON reminded the meeting that his formula was as yet in its infancy, and it was not reasonable to expect it to be immediately taken up by paper-makers. He thought, however, that before long sulphocyanide would be afforded an opportunity for a long rest.

Mr. HENDERSON then introduced Mr. Starling, a firm believer in spirit photography, who showed a large number of photographs in which he posed as the principal subject, while round him hovered those supernatural beings. Mr. Henderson stated that Mr. Starling was not a photographer, unfortunately, and therefore he asked the meeting to suspend judgment on the pictures before it until such time when he might be able to introduce the actual photographer, Mr. Boursnell, of 58, Uxbridge-road, to afford them an opportunity of putting to the test and deciding finally this question of spiritual photography.

Mr. STARLING, to whom was given a vote of thanks, and who promised to use his influence to gratify the desire of the London and Provincial Photographic Association to clear up to their satisfaction the whole matter, stated that he personally had seen over two hundred materialised spirits.

Mr. W. T. Wilkinson contributed a paper which was read by the SECRETARY in the author's absence, the subject being

RAPID PLATES *versus* SLOW.

While admitting that the statement that slow plates yielded better results than rapid plates might hold good in the early days of the gelatine dry-plate era, when a plate of a greater speed than "ten times wet collodion" was apt to give green and other fogs, the paper points out that the rapid plates of to-day are as easy to manipulate, and give as brilliant images, as do the slow, and, moreover, have a more extended range of colour sensitiveness. Never during the past three years has the author taken out a plate measuring less than 100 H. & D. Slow plates have to answer for the bulk of the "soot and whitewash" prints, the "cotton wool" water falls, and the numberless other outrages which occur so frequently. More care, of course, is called for in exposing rapid plates, but with a Watkins or Wynne exposure meter and a good shutter working accurately to any desired exposure, all difficulties are smoothed away. In the development, considerations of subject will decide the means to be employed for the production of the best result. For an open landscape, pyro soda, of full normal strength, moderately restrained; for an ordinary landscape, pyro metol; for interiors and dark subjects, metol alone will be found good; while for well-lit landscapes with good clouds, a metol developer, with a trace of pyro to alter the blueness of deposit peculiar to the former and give a better printing colour, will answer admirably. The duration of development should be timed, for the good reason that judgment by examination is impossible, putting aside the fact that constant lifting of the plate from the solution does not conduce to brilliancy of image. The author finds the factor for pyro soda is six times, pyro-metol ten, and metol twenty-five times the period between the application of the developer and the appearance of the image. The paper advocates for general outdoor work plates ranging from 100 H. & D. to 200 H. & D., according to the season, the fastest of the plates being used in winter, except in the case of snow scenes, for which a speed of about 50 H. & D. was to be recommended.

A short discussion ensued of a general character, Mr. Beckett, Mr. Henderson, Mr. Freshwater, and the Secretary taking part.

PHOTOGRAPHIC CLUB.

NOVEMBER 2,—Annual Meeting,—Mr. Frank Haes in the chair.

The minutes of the last annual meeting and of the previous meeting having been read and confirmed, the Hon. Secretary read the annual report and balance-sheet for the year 1898. The Committee are pleased to announce the satisfactory condition of the Club financially and numerically, the contribution of many papers and demonstrations of an interesting and valuable nature during the year, the successful issue of the Travellers' Nights of the winter months, as also of the annual Ladies' Night. The Trade Nights have been continued, many novelties in apparatus having been shown, and the first of the projected Beginners' Nights was the occasion of Mr. Nesbit's paper upon "Stereoscopic Photography."

The CHAIRMAN moved the adoption of the report and balance-sheet, from which he was very glad to observe the satisfactory state of the Club and its funds.

Mr. W. D. WELFORD seconded the motion, which was put to the meeting and carried unanimously.

The election of officers for the ensuing year took place, Messrs. R. Child Bayley and E. A. Newell being appointed scrutineers. The ballot resulted as follows:—*Trustees:* Messrs. Frank Haes and F. A. Bridge.—*Committee:* Messrs. A. Bridgman, F. Dowell, A. Mackie, H. Müller, J. Nesbit, Hutton P. Smith, H. Snowden Ward, and J. R. Williams.—*Librarian and Curator:* Mr. Charles Wallis.—*Secretary and Treasurer:* Mr. W. R. Stretton.

The meeting passed a unanimous vote of thanks to the officers for their labours during the past year, coupled with one to the Chairman, after which the proceedings terminated.

Croydon Camera Club.—Wednesday evening, the 2nd inst., was devoted to the selection of lantern slides to be displayed at the public lantern show on the 16th inst. A number of slides by the following members were accepted: Messrs. Hurmen, A. K. Tayler (some striking lamplight scenes), G. W. Jenkins (below bridge Thames views), R. H. Fuller (Cornish and Somersetshire landscapes), A. E. Isaac (Stonehenge and West of England), and H. E. Carr (the Scilly Isles). The President (Mr. Hector Maclean), presented the Club with a copy of his last work, *Popular Photographic Printers' Processes*. Mr. P. Brown was elected a member.

Kington-on-Thames and District Photographic Society.—The first print competition among members was held on Wednesday, November 2, the awards being made by popular vote, every one present being endowed with six votes, which he was at liberty to dispose of as his fancy dictated. Opinions were many and varied as to the merits of the several productions, for out of sixty photographs entered, no less than twenty-four were awarded votes. Mr. East, one of the Hon. Secretaries, however, hit the popular fancy with twenty-four votes out of a possible 120 for a very good enlargement of the lion "Victor," photographed on the occasion of the Society's excursion to the Zoological Gardens, Regent's Park. Mr. Wallich was an easy second, with eleven votes for a pretty seascape, depicting a Cornish fishing smack running before a light wind, the reflection of the sails and rigging in the water being beautifully rendered. This picture suffered somewhat from the warm brown tone in which it was printed, but in platinum or blue carbon, and with a little judicious trimming, would be quite up to exhibition standard. Mr. Hodgson, who seldom fails to catch the judge's eye at the Society's competitions, came in for third honours with *A Country Roadside*, a nicely composed representation of a typical Devonshire landscape. Although the method of judging was certainly a novel one, competitors were perfectly satisfied with the fairness of the awards. No prizes were announced, but the two Secretaries presented the winners with a copy of '98 *Photograms* as a *souvenir* of a very pleasant evening.

North Middlesex Photographic Society.—October 31, Mr. J. MacIntosh in the chair.—Mr. RAWKINS said he had lately bought some 15×12 plates four years old, and found them fog on development. He used hydroquinone developer. He tried various methods of overcoming this defect, and found that the addition of one grain of ferricyanide of potassium to eight grains of hydroquinone in the developer gave a result free from fog, and showed negatives to prove it. Mr. Cox showed a print of a pleasing brown colour, untoned, prepared according to Mr. Moss's process, one half of which had been exposed to strong daylight for some months, the other being kept in the dark; on placing the two together, not the slightest difference could be detected. Mr. Rutt produced a rollable film negative and print therefrom of a view in a churchyard of a fashionable south coast watering-place, on which appeared a group of figures in the sky, about the size of a sixpence, which figures were said to resemble angels, and had caused quite a sensation in the locality. The negative was taken by a lady who was quite above tampering with it in any way. One sceptic suggested that it might have been caused by a hot thumb mark in handling the negative in development, but no other explanation was forthcoming as to the cause of this psychological phenomenon. Mr. Stuart showed two prints on P.O.P., printed from a rather thin negative by incandescent gaslight, one receiving three hours' exposure, being slightly underexposed, the other, receiving six hours, was considerably overdone. This may prove useful if a print on this paper is wanted at night. Mr. CRANE showed a lantern slide which had been developed to a warm colour with pyro and ammonia. It being slightly too thin, he had intensified it in bichloride of mercury, followed by ammonia, which had simply changed the colour to a

colder tone, and no increase of density was apparent. He asked for an explanation. One member suggested that, as the image in a warm-toned lantern was in all probability not pure silver, this might account for the result, the colouring matter being discharged by the treatment received. The prints for the two special competitions, *River with Shipping*, and *A Domestic Interior*, were handed in and viewed on the walls. They will be judged subsequently. The membership was announced to have reached ninety-five, the highest muster-roll up to the present.

Liverpool Amateur Photographic Association.—A demonstration was given in the club rooms, Eberle-street, on Thursday evening, November 3, by Mr. F. W. Saxby, who, in illustration of his title,

Experimental Photography,

explained the optical construction of the eye of the common house-fly, the cornea of which contains about 8000 separate lenses. He then proceeded to demonstrate that each of these separate lenses is capable of giving a distinct representation of an object within the field of vision, and he succeeded in producing an excellent negative of a black cross on a white ground photographed through the eye of a fly by means of a microscope and camera. Lantern slides of other objects similarly photographed were shown upon the screen, and a short discussion followed a most interesting meeting.

Plymouth Photographic Society.—November 4, Mr. H. S. Hill (President) in the chair.—Three new members were elected, one being a lady, the first and only one on the Society's membership roll. The evening was devoted to the showing of the "B" collection of lantern slides obtained from the Royal Photographic Society through the Affiliation Committee. They were considered to be of high average merit, though some of them were thought to be of a very ordinary quality. Two showed buildings a long way out of the perpendicular, making the pictures absurdities. The attendance was large.

Sheffield Photographic Society.—November 1.—In the unavoidable absence of the President, Mr. G. H. Day took the chair. A demonstration was given on

Developers and Development

by Messrs. Camp, Sygo, and Hibbert. Six plates had been exposed, three of them correctly, as per Watkins's exposure meter, and the other three were much over-exposed. Mr. Sparham Camp used the pyro-ammonia developer, Mr. J. H. Sygo the pyro-soda, and Mr. T. G. Hibbert the Hintoquinone. The efforts of the gentlemen were centred in getting negatives of the same density and gradation from the correctly and from the over-exposed plates. In this the demonstrators were very successful, getting negatives of good contrast and free from grain, and a very hearty vote of thanks was accorded them, and also to the Chairman for presiding. Mr. J. H. Murdow, 136, Steade-road, and Mr. William E. Briggs, were unanimously elected members of the Society.

Edinburgh Photographic Society.—November 2, Mr. A. Eddington, F.J.I. (President), in the chair. Mr. John Warrak, jun., read a paper, illustrated with lantern slides, on

Home Photography by Artificial Light (see p. 726).

Mr. Warrack advocated the use of magnesium ribbon as the illuminant, employing two lights, the subsidiary one to be double the distance from the subject to that of the principal light, and to act in the direction of reducing the shadows. In the course of an interesting discussion which followed, Mr. R. H. McBean pointed out the value of magnesium ribbon for copying at night. By lighting the subject to be copied from both sides, the grain of the paper was avoided, magnesium ribbon being regular in light, gave the operator absolute control over exposure. At the close, the President intimated that the Council had resolved to introduce electric light into the Society's rooms.

1898. FORTHCOMING EXHIBITIONS.

November 11, 12	.....	Royal Photographic Society. Hon. Secretary, Colonel J. Waterhouse, 12, Hanover-square, W.
,, 15–18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 15–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 17–19	.....	Hove Camera Club. Hon. Secretary, C. B. Stoner, 24, Holland-road, Hove.
,, 18	.....	Brixton and Clapham Camera Club (Members).
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
,, 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
December 27–31	.....	Borough Polytechnic. Hon. Secretary, H. C. Philcox, 103, Borough-road, S.E.
1899.		
February 4–25	.....	Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Patent News.

The following applications for Patents were made between October 24 and October 29, 1898:—

"Photography."—No. 22,361. "Improvements in Photography." R. R. Beard.

Cameras.—No. 22,377. "Improvements in and relating to Photographic Cameras." W. Cuthbertson.

Diffusing Artificial Light.—No. 22,533. "Apparatus for Spreading or Diffusing the Light in Photographing by Artificial Light." Complete specification. A. Weiss.

Smoke Trap.—No. 22,541. "Smoke and Fumes Collector Appliances for Use in Instantaneous Photography." Complete specification. A. Weiss.

Cinematographs.—No. 22,552. "Improvements in or connected with Cinematographs." H. C. Rheinlander and A. Wrench.

Developing Apparatus.—No. 22,615. "Improvements in Apparatus for Developing, Fixing, and Washing Photographic Films and the like." N. Wight.

Cameras.—No. 22,616. "Improvements in Photographic Cameras." T. R. Dallmeyer.

Cinematographs.—No. 22,631. "Improvements in or connected with Cinematographs." A. Wrench.

View-finders.—No. 22,675. "Improvements in View-finders or View-meters for Photographic Cameras." H. B. Evans.

Kinematographic Apparatus.—No. 22,713. "Improvements in Kinematographic Apparatus." P. Mortier.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PHOTOGRAPHING LIGHTNING.

To the Editors.

Gentlemen,—I shall feel obliged if you can throw any light on the cause of failure of a customer of ours in getting photographs of lightning flashes. Our customer is something more of a photographer than the average amateur, having taken lessons from us extending over a twelve-month, one hour a week, and between lessons has read up the subject in two or three standard text-books we got for him. He has a quarter-plate Frena, and during a heavy thunderstorm set his camera facing the direction the flashes were to be seen, set his shutter for time, using U.S. 8 stop (=*f*-11), waited till there had been three flashes, and changed the plate. He repeated this three times, and on developing the plates didn't get a trace of an image on any of the three plates. On his asking us to account for this, we simply had to acknowledge that we couldn't, and have penned this in the hope that you can.—I am, yours, &c., Lightning.

[The usual method of taking such photographs is as follows: Let the camera be focussed for infinity, and the lens pointed to that portion of the sky whence the lightning issues. The lens must be uncapped and the shutter of the slide withdrawn, and, after the flash has appeared, the slide must be closed and a fresh plate placed on the focal plane. Of course, we are assuming that it is night-time when these experiments are made. If we understand our correspondent to mean that his customer proceeded in this manner we cannot account for his failure.—Eds.]

KEEPING QUALITIES OF FILMS.

To the Editors.

Gentlemen,—About the spring of this year I read Mr. Drage's article on pages 798 and 799 of The British Journal Photographic Almanac, and, considering the author's position in the photographic world, I was considerably surprised, for I had kept celluloid films for nine or twelve months after exposure before developing, and found nothing amiss from their long rest. At that time I had by me a quantity of cut celluloid half-plate isochromatic films, packed away amongst glass plates of two or three different makes, and all exposed, mostly between May 24 and June 8, 1897. Twenty-five of the films were developed on the 26th and 27th ult. only, yet came up splendidly, showing no sign of deterioration, and some are numbered amongst my best negatives. This week I have developed the plates of one of the makes referred to, but, on the whole, they scarcely reach the standard of the films.—I am, yours, &c.,

Park Villa, Fulford-road, York, November 3, 1898. F. Croft.

A LENS QUERY.

To the Editors.

Gentlemen,—Will you please advise me as follows: I have to take pictures of machinery, and, suppose I take a cycle coming forwards, the front wheel looks ridiculously large.

I use a 12 × 10 rapid rectilinear, and if I try to take a full-sized picture the apparent distortion is all there. If I use the same 12 × 10 and take a small picture, *carte-de-visite* size, there is no perceptible distortion; but then I have to enlarge the negative, and I wish to take 12 × 10 direct

I was advised by Taylor & Hobson to use the back part of lens only; but I cannot get sufficient extension of camera to get a picture on at all.

I am wondering whether I had better get a teleo attachment to the 12 × 10 lens, and then, by getting a distance away, it would avoid distortion and yet get a picture as large as desired.

My camera extends nearly thirty inches from back of lens to focussing screen, and you will understand the length of focus of lens. I can take a three-quarter length figure, but not a head. It is the longest-focus lens I have. DID.

[The distortion—or rather violent perspective—is what must result when the camera is placed very near to an object situated in different planes, and the nearer it is the more violent will be the perspective. The only remedy is to place the camera further away, or to take the object more "broadside on." A longer-focus lens, or a tele-photo attachment, will enable the camera to be further away, while at the same time a large image is obtained.—EDS.]

PHOTOGRAPHY AND PAINTING.

To the EDITORS.

GENTLEMEN,—I know it will interest photographers to hear of the President of the Royal Academy being an advocate of painting from photographs. Therefore I take the liberty of offering the following facts for publication in your valuable paper:—

I painted, from sittings shortly before his death, a large portrait of the late Sir Isaac Pitman, which was generally admitted to be a striking likeness and a good picture. Sir Isaac informed me that mine was the only oil painting for which he had ever sat, though he had been photographed innumerable times and posed for a sculptured bust. This picture I offered to the Pitman Memorial Committee at an extremely moderate price (on account of hard times), but got no reply to my letter. I afterwards had the painting photographed and submitted to Mr. T. Allen Reed, Sir Isaac's biographer, who wrote that "the likeness as shown in the photo is *unmistakable*" (the italics are Mr. Reed's).

Mr. Reed had the matter again laid before the Committee, and the Hon. Secretary wrote that, "judging from the photo, the painting should be exhibited at some institution, and appropriately at some shorthand institution," and inquiring the lowest price I would accept, and, when I was brought down to the proverbial half a loaf, and negotiations had been pending some months, I recently learned that the Committee had commissioned Mr. A. S. Cope to paint a new picture of Sir Isaac Pitman. The Hon. Secretary has just informed me in a letter that Mr. A. S. Cope was 'recommended by the P. R. A., not as a photo-enlarger, but to paint a new picture of Sir Isaac Pitman. Now, as Sir Isaac Pitman is not only dead but cremated, it is difficult to see how this is to be done.

Perhaps this matter may have some bearing on the interesting letters that have recently appeared in your JOURNAL and the *English Mechanic* on "Spirit Photography."—I am, yours, &c., VINCENT DE GERNON.

3, *Lullington road, Anerley, S.E., November* 2, 1898.

PHOTOGRAPHIC PATENTS.

To the EDITORS.

GENTLEMEN,—Mr. Randall, in his article of November 4, again returns to his attack on the patent law and on those who use the law to protect their inventions.

Now, every civilised nation recognises by its patent law that an inventor is entitled to protection (call it monopoly if you will) as regards his own invention; firstly, because it is a mere act of justice to the inventor, and, secondly, because it is not to the advantage of the community that invention should be throttled by open piracy.

Mr. Randall appears to recognise neither of these principles of justice, and, by some curious logic of his own, he seems to define an inventor as one who does not patent, a patentee as one who does not invent, and a patent as a legal means of securing to one person the inventions of others.

Is it really necessary to once more point out the fact that the vital parts of a patent are the claims, that these claims must be on new and original points never before published, that any part of the invention not included in the claims remains public property, and that, if anything is included in the claims which is not original, the patent is void, and cannot be enforced.

In face of these facts, Mr. Randall's statement that "an inventor sees his work patented by others" may possibly be sometimes true, but no monopoly can be created, as the patent would be absolutely worthless.

As Mr. Randall narrows his remarks down to the history of exposure instruments, I feel no hesitation in citing my own case as one in which the protection afforded by a patent enabled an inventor to bring his invention into public use. I am an ordinary amateur photographer, having no connexion with the photographic trade except with the circumstances I shall mention.

In 1889 I became greatly interested in actinometer and exposure calculations, and, after many trials and experiments, I came to the conclusions: first, that the methods of connecting the actinometer test with the required exposure devised by Goodwin, Watts, Ackland, and others, were radically weak in one important point; and, secondly, that actinometer and slide-rule calculator should be combined in one compact instrument. I devised a fresh principle in making the calculation (Mr. Randall has denied this fact, and I shall reply to it later), and planned out and patented my instrument in 1890.

Having no wish to enter the photographic trade, I offered the invention to four leading photographic dealers and manufacturers in succession. Each firm declined on the ground that it was too complicated, and amateurs would never buy it. I made up my mind to put it on the market myself, had a number made by an optical firm, saw to the fitting up myself, arranged with a local dealer to supply retail inquiries, kept the wholesale supply on my own hands, and advertised. The result was immediate success. I had no intention of keeping in the photographic trade, and in a year's time, having established the reputation of the instrument, I turned it over to the present makers on royalty.

The point I wish to emphasise is this: If it had not been for the protection afforded by a patent, I should never have put the instrument in the hands of the public at all, for there would have been no inducement to overcome the initial difficulties, when, if it proved a success, others would step in and reap the benefit.

Now for the question whether (quite apart from patents) my exposure meter was original, or merely (as Mr. Randall has more than once hinted) a piracy of other people's inventions. Every inventor, from James Watt downwards, utilises previous investigations, and takes up his knowledge at the point where the last man left off. The outline of the history of exposure calculations up to 1890, as given by Mr. Randall, is fairly correct, if not quite complete. It is true that at that time actinometers had long been used (long before Burton's tables) for exposure calculations, that complete plans had been devised for calculating exposures from actinometer observations, and that slide rules had been used (by Ackland) to do the calculation. But in these methods (Goodwin and Ackland) the actinometer test had merely been substituted for the light tables, and the Burton subject tables retained, the value of the subject being varied according to the amount of light falling upon it, and the actinometer exposed to the open sky. The consequence was, that for interiors, &c., the exposure was still largely a matter of judgment, depending upon the value given to the subject.

I introduced the plan of making no variation for the subject (if of average colour) whether it was indoors or outdoors, in sun or shadow, and of making an invariable rule to "test the light which falls upon the subject." It was only in the case of light-coloured subjects, or where mist or haze intervened, that a smaller subject-number had to be taken. In fact, I soon found that for all ordinary work no variation need be made for variation in subject. That this was a radical change is proved by a comparison of some of my subject values and Burton's, and by the fact that, whereas previous calculating methods had been of little use for interior work, my method came into extensive use for that purpose.

SUBJECT VALUES.

	Burton.	Watkins.
Landscape with heavy foliage	1	100
Under trees up to	80	100
Fairly lighted interiors	80	100
Badly lighted interiors up to	960	100
Portraits in ordinary room	24	100

It will be seen, therefore, that, of the four usual factors (plate, stop, light, and subject) affecting exposure, I treated two (light and subject) differently to those who had preceded me

I have no intention of discussing with Mr. Randall the so-called monopoly in exposure meters, or the details of patent claims.—I am, yours, &c., ALFRED WATKINS.

Hereford, November 4, 1898.

THE FREE PORTRAIT SWINDLE.

To the EDITORS.

GENTLEMEN,—I have just read the paragraphs about the "free portrait dodge" in your paper. All things have two sides. I was myself sceptical as to the results, and out of curiosity I sent a photograph of myself, and received back an enlarged one worked up with crayon, and a very nice picture it made. I told them they might frame it if they liked, and chose a moulding. They did so, and I had to pay 24*s.* for the frame. I got the portrait for nothing, and could have had it unframed if I had liked. Of course, the price of the frame, when they get an order for one, is made to cover other expenses. The next stage is, that in a short time you get a letter with four coupons enclosed, for you to try to get four other photographs of friends, which, if sent, will be done at 8*s.* each, and, as a reward for sending them work, you are told you can have a fifth done for yourself for nothing if the four others order frames. Your bonus picture will also be sent you framed free of charge. I don't think it ought to be called a swindle, for you need not have a frame, and, even if you pay 8*s.* for a copy of your photograph, it is well done and worth the money.—I am, yours, &c., H. D. PALMER.

Kerris Vean, Falmouth, November 2, 1898.

[Our correspondent's experiences are unique.—EDS.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

T. Bourke, 213, South-street, Perth, N.B.—*Photograph of the Rev. Patrick J. Brady.*

Jesse Bontoft, Brook-street, Ilkley.—*Photograph of a group of cricketers taken at Ilkley.*

R. Fellows-Willson, 118, New Bond-street, W.—*Photograph of lady (head and shoulders).*

F. C. Macmahon, 23, Academy-street, Inverness.—*Two photographs of group of directors, officials, and friends. Opening of Aviemore line, Highland Railway.*

RECEIVED.—ROGO; AN ASSISTANT; and others. In our next.

S, HAYTER.—See an article on the subject in the JOURNAL for August 26 last.

R. C. (Huddersfield).—We note. No further reference appears to us to be called for.

ACETONE.—1. See an article on this subject in this JOURNAL for August 26. 2. Not necessary so far as we are aware.

F. BAKER (Burton-on-Trent).—The formula and the chemicals were doubtless right. The fault is due to the manipulations, as evidenced by the print sent.

COLLODIO-CHLORIDE PAPER.—A. WATSON. Messrs. Holmes Bros., 24, Southall-street, Strangeways, Manchester, inform us that they are the agents for the paper referred to last week.

PATENT SPECIFICATION.—T. WARNER. As the patent referred to was not completed, the provisional specification is not published, nor will it be; hence you will not be able to learn what the method is.

MINIATURE PAINTER.—It all hinges upon whether you had a definite order for the work. If so, your remedy would be to take out a County Court summons. We should say the procedure adopted by the photographers is quite unusual.

ADDRESS WANTED.—T. R. SINGER writes: "Can you or any of your readers give me the address of a Mr. Coaten, a publisher of photographs of masters of hounds. His last address known was Berwick House, 139, Oxford-street, London."

LENS.—C. W. W. The lens in question is one of the anastigmatic type which are now being made in France, where there is no patent for them. We have not had the opportunity of testing them, so cannot speak on their merits. They are copies of the German ones, more or less.

STAINED NEGATIVE.—S. S. S. The prints show that the negatives are stained or marked through the dish not being rocked during the development. There is no way of removing the marks from the negatives. A skilful retoucher could ameliorate them, but then the pictures are scarcely worth that trouble.

W. B. WOOD.—1. Many thanks for the information, which, you will observe, is supplied by Messrs. Holmes themselves. 2. Your description would appear to suggest that hypo had been left in the film. If you send us a slide, we will endeavour to give a more definite opinion. We do not think the acid would have that effect.

WIDEROE & TORNEO (Christiania).—1. We do not know the London address of the firm named, and we do not think they have one. 2. THE BRITISH JOURNAL OF PHOTOGRAPHY. 3 and 4. *Anthony's Bulletin* (New York) or the *Photographic Times* (New York). 5. Difficult to say, but probably the *Deutsche Photographen Zeitung.*

MEMBERSHIP OF THE R. P. S.—Walter Smith writes: "Could you kindly inform me by what means and what steps I should have to take to become a member of the Royal Photographic Society, as I am anxious to become a member?"—In reply: Address the Secretary, Royal Photographic Society, 12, Hanover-square, W.

STUDIO.—1. The spots are probably caused by small metallic particles either in wash water or floating about in the box. We doubt if they could be removed. 2. Excessive washing, no doubt; we should be sorry to give a print thirty changes of water. 3. Depends upon the value of the photograph. See what "Free Lance" said on the subject in last week's JOURNAL.

HOME PORTRAITURE BY REFLECTION.—In reply to "A. M. B." in our last, Captain Hope writes: "Reading the JOURNAL for November 4 yesterday, I noticed 'A. M. B.'s' query regarding 'Home Portraiture by Reflection,' and remember that I had once, in consequence of an article in the JOURNAL, made an attempt in that line. I looked up the date, and found it was in September 1872. I find in THE BRITISH JOURNAL OF PHOTOGRAPHY of August 26, 1892, p. 545, an article on 'Indoor Portraiture,' which discusses the question and gives directions, and think that must be what 'A. M. B.' wants, though I do not find the exact words he quotes."

STAMP PORTRAITS.—H. GARDNER. These may be produced in different ways. From life, by having a number of miniature lenses on the camera, or one lens with a repeating back; also by using several lenses and a repeating back as well. That is the more general way. In copying from a picture, one lens and a repeating back, according to the number required on the plate.

LANTERN LAMP.—H. TAYLOR. The smell from the lantern is no doubt due either to the wick being faulty or the fittings dirty. As the lamp was all right last year, there is no reason why it should not be this, provided it be thoroughly cleaned and a new wick supplied. If the lamp was put away dirty and with oil in it, it will require a lot of cleaning before it will burn free from smell.

E. VERNON BARKER.—1. The idea seems a very good one. Possibly Messrs. Hardtmuth & Co., who supply pencils for retouching, would be the best firm. Their address, we believe, is Golden-lane. 2. Difficult to say the exact process. It is probably an American-made collodio-chloride paper, toned in a phosphate bath. We fear your only plan will be to make a number of experiments with various papers and baths. Your questions came too late for our last issue.

JAPANESE PAPER.—W. N. writes: "Some six years ago the address of a firm selling Japanese paper was given. If you can, without trouble, refer me to the number or give me the address of the firm, I should be very much obliged to you, as I have stupidly mislaid it."—We do not remember the address for the moment. We believe, however, that the paper may be obtained from Messrs. Grosvenor, Chater, & Co., Cannon-street, E.C. If you do not get it there, we will make further inquiries for you.

GOLD IN TONING.—C. MAY. It is generally reckoned that two grains of chloride of gold, if it is good and contains the theoretical quantity of gold, will tone any number of prints that is equivalent to one sheet of paper. That refers to gelatino-chloride paper. Less is required for albumen paper—a grain of the chloride to each sheet is generally sufficient. But much, of course, depends upon the depth of the tones; the deeper they are the larger is the consumption of gold to obtain them. Light brown tones will not require half the gold that purple and black ones will, whatever paper is employed.

SILVER BATH; EMULSION.—A. E. H. asks: "1. What should be the strength of the silver bath to use in connexion with Mawson & Swan's collodion for wet-plate work? 2. Can I make an emulsion with such collodion? If so, what is the proper proportion of silver, and how long should be allowed for ripening? I purpose using it as a film-washing emulsion."—1. Thirty-five grains of the nitrate to the ounce of water. 2. It may very probably be used, but we have not tried it. We should prefer to use a pyroxyline specially adapted for emulsion work. Formulæ for the pyroxyline and emulsion are given on pp. 1034 and 1035 of the ALMANAC for the current year.

W. T. F.—1. We see no reason why the screen should not be used in front of the lenses; but, of course, you would have to construct a camera for your own use embodying the idea. 2. Better follow the Company's instructions. You have not grasped the principles of the system, otherwise you would perceive that the taking and viewing (or projecting) screens must be different. 3. A *slight* want of parallelism would not make any perceptible difference. 4. No. 5. A very feeble red light or none at all. 6. Yes, the carbon process would do, but we do not recommend it. 7. Yes; but the bichromated gelatine is not pigmented, as in the ordinary carbon process.

LENS—SELLÉ'S PROCESS.—W. DREW says: "I am sorry my query was not explanatory. Will you permit me to ask the question thus? 1. I have a rapid rectilinear lens which behaves admirably. I have also a compound negative attachment, which turns the aforesaid rapid rectilinear lens into a tele-photographic lens. In this condition the lens shows a chromatic image on the ground glass. What is the cause of this, and is it a fault possessed by all tele-photographic lenses, or is mine a faulty instrument? Please also inform me what will be the effect on the resultant print. 2. What is the Sellé's process of (so-called) colour photography? I have some very beautiful pictures, said to be produced by this method. Can you refer me to any work or article dealing with this process?"—In reply: The instrument should not do so. Possibly it may be found that the visual and chemical foci do not coincide. Take a negative with the instrument, and see if the object focussed upon is the sharpest in the picture; if it is not, return it to the maker. 2. Dr. Sellé's process was described on page 832 of the ALMANAC for 1897.

LENSES.—W. H. REYNOLDS asks: "Will you kindly answer the following questions and oblige. 1. I have a 9×7 rapid rectilinear, *f*-8; it will only take a half-plate group sharp at *f*-8, and it is rather slow for a group in studio. I can only just get far enough back to get a group of three on half-plate; what I wish to know is, could the lens be remounted and the lenses brought nearer together? then it would shorten the focus and make the aperture larger, say *f*-6; would the lenses be suitable for that alteration? 2. I have a Dallmeyer's lens which has been used carelessly. It is a triplet, the two outside lenses are covered with very small scratches, the negatives are not clear that I have taken with it. Could they be ground away, and would it be expensive to have it done?"—1. The lens could be remounted so as to shorten its focus, but probably not to the extent of *f*-6. If it could be, the field would be very round and it would probably require stopping down much beyond *f*-8 to be used to cover the half-plate. Better keep the lens as it is. 2. Yes; the scratches can be removed, but to do that the glasses must be reworked, and, if the instrument is a small one, the cost will possibly be more than the instrument is worth. Better send the lens to Messrs. Dallmeyer and make inquiry.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 2011. Vol. XLV.—NOVEMBER 18, 1898.

Contents.

	PAGE
Ex Cathedrâ	737
Combined Baths *versus* Separate Toning and Fixing	738
Leaderettes:— A Fine Focussing Screen—Formalin and Frilling—Deleterious Action of Developing Solutions—Is Collodion Injurious to the Health?	739
Jottings. By Cosmos	740
Photo-ceramics	741
The Traill Taylor Memorial Lecture.—No. I. By Thomas R. Dallmeyer	741
The Physical Development of P.O.P.—II. By W. E. A. Drinkwater	744
Sound by Photograph	744
Chapé's Actinometer	745
Elliott's Rocking Apparatus	746
"Free Photography"	746
New Premises for the Royal Photographic Society	747
The London County Council and Cinematograph Entertainments	747
Our Editorial Table:— The York-Schwartz' Magnesium Cartridges—Hubl's Developing Powder—Catalogue Received	748
News and Notes	748
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Manchester Photographic Society—Croydon Camera Club—Kingston-on-Thames and District Photographic Society—Putney Photographic Society—West Surrey Photographic Society—Liverpool Amateur Photographic Association	749
Forthcoming Exhibitions	750
Patent News	750
Correspondence:— The Free-portrait Swindle—Photographic Patents	751
Answers to Correspondents	751

EX CATHEDRÂ.

Too late for reference in our last issue, we obtained particulars of the process "of photography in natural colours," which has been "invented" by Mr. John Wallace Bennetto, of Newquay, Cornwall. Mr. Bennetto's name is not unfamiliar to our readers. Over two years ago his process, of which absolutely no details were forthcoming, formed the subject of considerable controversy in our columns. Results were shown at the Society of Arts and the Camera Club, and they elicited some amount of admiration. Mr. Bennetto declined to allow the transparencies to be handled or inspected. We must credit him with considerable tenacity in refusing to make a statement of the precise way in which his results were obtained, and perhaps, on the whole, he would have done well if he had entirely refrained from entering into correspondence on the subject, for an inventor, when defending a secret process in the course of a paper warfare, is naturally apt to magnify rather than to under-estimate the value of the claims he makes, and this, we fear, has been the case with Mr. Bennetto.

* * *

Let us direct the reader's attention to a letter by Mr. Bennetto, which appeared in the columns of this Journal for November 6, 1896.* In the course of that letter, which was elicited by an article of our own on the stained film method of producing coloured transparencies, Mr. Bennetto claimed that his results were "as easy and certain to produce as an ordinary silver print" (which, to say the least of it, is a large order in natural-colour photography); and he suggests that he tried the carbon process for the purpose, and the inference is that he abandoned it, "the brown image of the bichromate spoiling the purity of the colours." Then he adds these momentous words regarding his process: "*I have a jewel, and may surely decide its setting before it leaves my hands*" (our italics, of course). He adds: "I possess my soul in peace, and not even the exquisite pleasantries and sarcasm of 'Cosmos' disturb me from the even tenor of my way." These words were written two years ago; the application for the patent is dated December 6, 1897—thirteen months afterwards.

* * *

Now let us examine the mysterious process of photography in natural colours, which is as easy and certain to work as silver printing, which does not rely on the carbon process for the positives, and which, above all, is "a jewel." We shall shortly publish Mr. Bennetto's description, *verbatim et literatim;* in the meanwhile we present the reader with our own account of Mr. Bennetto's method of working. It is very easily grasped and understood. For the purpose of taking the three negatives required (yes, incredible as it may seem, the Bennetto process is simply our old friend three-colour photography once more!), Mr. Bennetto employs an ordinary camera, in the body of which a "red glass" is inclined at an angle towards the focal plane. The ordinary dark slide holds a red sensitive plate, but on the top of the camera is let in another dark slide. This is so constructed that it takes two plates, placed film to film, one "sensitised for the blue rays," the other for the green. The former is the lower, the latter the upper plate. The three negatives are taken at one exposure; the two upper by light reflected from the "red glass;" that is to say, a piece of red glass, angularly interposed in the path of the lenticular image, sends the green and blue rays up to the top of the camera, on which are placed two plates, the lower one "absorbing the blue rays," the top one the green rays!

* * *

Next we come to the process for producing the coloured positives. To our astonishment it is nothing more nor less than

* The British Journal of Photography, vol. xliii. p. 717.

carbon printing with coloured pigments. Red, blue, and yellow pigments are taken, incorporated in gelatine, sensitised with bichromate of potassium, and the negatives printed in the usual way, the red on the blue pigment, the green on the red, the blue on the yellow. The three positives so obtained are accurately superposed, bound up in transparency form, and there is your natural-colour photograph!

* * *

We are most anxious to be just and fair towards Mr. Bennetto and his process, and therefore, before pronouncing a final judgment upon this patented method of producing "photographs in natural colours," we should like to ask him a few questions regarding it. Is the above the process which he considers as "easy and certain" as silver printing? Is it the "jewel" to which he made reference in our columns two years ago? Is this the process claimed in July 1896,* by a Newquay journalistic friend of Mr. Bennetto to be "the long-sought-for philosopher's stone of photography?" Is it the process that was demonstrated *blindfold* by Mr. Bennetto before a local artist? †

* * *

Again: Has Mr. Bennetto really used the camera he describes? if so, what does he mean by a "red glass?" What spectroscopic tests does it answer? Does it really only pass "red" light and send all the other spectral rays up to the top of the camera? Does he find the lower of the two plates in the slide on top of the camera absorb all the blue rays and transmit the green to the green sensitive plate? What theory of colour vision is this process based on? The Young-Helmholtz? Is Mr. Bennetto working to the Clerk-Maxwell or Kœnig's colour sensation curves? On what principle is a blue pigment chosen for the red negative, a red for the green, a yellow for the blue? And how are the pigments selected? Finally, what is there really new about the method? What is there new about the printing process? and does Mr. Bennetto put the above-described process forward as a solution of the problem of photography in natural colours? Mr. Bennetto some time ago promised us a demonstration of his process. Doubtless through no fault of his own he has not yet redeemed his promise. As some return for our disappointment, we trust he will make it convenient to reply to our questions regarding his process, concerning which we suspend further references until next week.

* * *

The attention of photographers in the north of England will be centered towards Bradford in the course of a few days, when one of the most important pictorial exhibitions yet held in the north of England will be opened to the public. The exhibition, as already announced, will take place in the City Art Gallery, and the public will be admitted free—a privilege which it is to be hoped they will not be slow to appreciate. The pictures have all arrived, and, by the time our present issue is in the hands of the readers, no doubt the Hanging Committee will be actively at work. It is anticipated that in all from five to six hundred pictures will be hung. A bulky catalogue will be issued at the price of threepence, and containing sixteen pages of illustrations, printed on art paper, of reproductions of the work of Robinson, Calland, Hinton, Demachy, and others. The printing of this catalogue has been placed in the hands of Messrs. Percy Lund, Humphries, & Co., Limited. There will be a press view of the Yorkshire Photographic Exhibition on November 25, and in the evening of that day a *conversazione*, generously provided by Mr. Alex. Keighley, Chairman of the Exhibition Committee, who will act as host on the occasion. An influential gathering is anticipated. The Exhibition will be formally opened by Mr. John Maddocks, J.P.

* * *

The Loan Exhibition of Lithographs, which has been organized by the Department of Science and Art, at the suggestion of the Society of Arts, to commemorate the centenary of the invention of lithography by Aloys Senefelder, in 1798, will be opened on Monday, November 21, and will remain open until February 28, 1899. The Exhibition has been arranged in a building adjoining the Machinery Section, Southern Galleries, South Kensington Museum (entrance on the west side of Exhibition-road). The public will be admitted, without payment, at all hours when the museum is open.

COMBINED BATHS *VERSUS* SEPARATE TONING AND FIXING.

The vexed question of the fixing and toning of silver prints so as to ensure that their greater permanency is assured is not yet settled, and probably will not be for a long time to come, if ever it is. Some still are of opinion that the combined bath will yield as stable results as those which are toned and fixed separately. That, on the other hand, is just as frequently disputed now as it has always been in times long past. At a meeting of one of the metropolitan societies a few weeks back, one of the speakers characterised it as an absurdity to consider that prints toned and fixed separately were more permanent than those treated in the combined bath. It must, however, be borne in mind that the recent discussions on this topic have been entirely in connexion with gelatine emulsion papers, and the separate toning to the sulpho-cyanide bath, while the combined bath has been the modern one containing alum, lead, &c., as well as the gold.

One of the arguments advanced in favour of the combined bath is that there are plenty of prints in existence that were toned in a combined toning and fixing bath forty and more years ago that are still unchanged. Such an argument is, it must be confessed, a very strong one on the face of it, and that only. But it may be, and is, quite misleading when applied to modern papers and modern combined baths.

The object of the present article is to point out that any deductions drawn, one side or the other, from the ancient conditions of working in no way apply to the modern ones, whether the combined bath or the separate toning baths be employed, as the conditions are so totally different. Let us now consider in what way the conditions so widely differ.

In the first place, the negatives of forty years ago—and here it may be mentioned that the negative is a very important factor in the stability of the print—were the old pyro-developed collodion ones. These were characterised by great density in the lights, and clear glass in the shadows. Although the shadows were so clear, these negatives took hours to print in a good light, and in some cases an entire day to get though the high lights; here, therefore, is a wide difference which we will call number one.

The paper then in vogue was either the plain salted or the albumenised. At that period mostly the latter. The albumen paper of that time was, however, quite different from that of to-day; it would now almost be classed as a matt paper, so

* The British Journal of Photography, xliii. July 31, 1896.

† *Ibid.* Sept. 18, 1896.

little was the gloss upon it, because the albumen was considerably diluted with water before it was used. It was, however, very heavily salted—to two or three times the extent of that of modern albumen papers, while at the same time the silver bath was correspondingly strong—sixty to a hundred, or more, grains to the ounce of water. By reason of the water with the albumen, and the large amount of chloride in it, much of the latter penetrated into the body of the paper, where it was also followed by the silver, the result being that, when printed from strong negatives, the image was not only in the albumen coating, where it was very strongly bronzed, but was quite as much in the body of the paper as it was in its albumenous coating. With exceptionally dense negatives the shadows showed through to the back of the paper. The consequence of this was that a considerable quantity of metallic silver was reduced in forming the image. Here we will say is wide difference number two.

The combined bath used at the period referred to was a very strong one as compared with the modern one. Here is the formula of one that was in very general use, quoted from Hardwich's *Chemistry* of the time:—

Hyposulphite of soda	4 ounces.
Water	8 „
Chloride of gold	4 grains.
Nitrate of silver	16 „

The latter, by the way, was often omitted.* After mixing, the solution was allowed to stand for twenty-four hours or so, for the small quantity of sulphur, set free by the acid in the chloride of gold, and nitrate of silver, if used, to separate. In this bath the prints took from half an hour to several hours to tone, according to the tones required—often an entire day, when the deep, rich, velvety, purple-black tones of former days were desired. With this long period of toning in that strong bath there was no question of fixation so far as the dissolution and conversion of the unaltered chloride of silver is concerned, no matter whether the prints were toned lightly or darkly. This is wide difference number three.

Shortly after the period referred to, the separate toning and fixing operations became adopted, and for the same reason that the present combined bath is being condemned by those with chemical knowledge, namely, because there was the uncertainty in knowing whether the colour of the prints was obtained by gold or by sulphur toning. The baths then adopted were what are known as the "alkaline baths," the "carbonate," "acetate," "citrate," "phosphate," *et hoc genus omne*, but not a solution containing a sulphur compound such as the sulphocyanide bath. Wide difference No. 4. The alkaline baths here referred to, which are so well adapted to albumen papers, do not, unfortunately, give such good tones on gelatine emulsion papers as does the sulphocyanide bath—a point made by the advocates of the combined bath.

The object of the present article has been, as stated at its commencement, merely to point out that deductions made from the old methods of working, whether by the combined toning and fixing bath or by the separate toning and fixing method, would be based on a very slender foundation when applied to modern conditions, because they are so widely different throughout. In a future article we may possibly recur to the subject, and bring into more immediate contrast the conditions, past and present, under which silver prints were and are produced, with reference to the prospect of their future permanency.

* Some workers used a still larger proportion of the hyposulphite.

A Fine Focussing Screen.—We are constantly hearing complaints of the coarseness of ordinary ground glass focussing screens, and the consequent difficulty of getting proper definition with them, and many substitutes have been proposed, best of which in our experience is matt celluloid. But the ordinary thin sheets such as are used for negative purposes are inconvenient to use, and the special thick is not always available. Here, however, is a method by which the ordinary kind will serve the purpose perfectly. Remove the ground glass and replace it with a sheet of clear, choosing a piece as flat as possible. Cut a piece of celluloid to fit the opening in the wooden frame of the screen on the *ground-glass* side, that is on the inner side, and place it with its matt surface in contact with the clear glass. The focussing surface will then occupy the same position as the ground surface of the ordinary focussing glass. To keep the celluloid flat and in position, cut a second piece of glass, also as flat as possible, the same size as the celluloid, press it into close contact, and fasten it into the frame with small pins or by any suitable means. This forms the best focussing medium we have ever used.

Formalin and Frilling.—*Apropos* of what has recently appeared in our columns with regard to the use of formalin instead of alum in connexion with dry-plate films and prints, we have heard from one correspondent that, although as a general thing he finds it act very well, he has had a batch of plates which, treated in the ordinary way with the same solution—commercial formalin one pint to water nine parts—the film floated bodily off the glass. The occurrence commenced with a slight frilling or puckering round the edges, and then in half a minute or so the whole film lifted bodily and left the glass of its own accord. The peculiarity of the films so removed was, that they were tough enough to bear handling, and could be, without difficulty, laid out on the glass again, and, unlike ordinary films of gelatine, when removed from the glass, suffered little if any, alteration in size. He suggests this as a possible basis for a process for transferring negatives.

Another correspondent writes, that having been troubled by his "opalines" leaving the glass in drying, he thought to try the effect of formalin with a view of giving the gelatine a firmer hold. Accordingly he added, a "few drops" of formalin to the warm gelatine solution, and, after well mixing, coated the glasses at once, as he was not sure whether it would be possible to reliquefy it if it once set. In some cases the plates were allowed to dry before use, in others the wet prints were squeezed on to the gelatine after it had set; but in either case the prints left the glass more readily and completely on drying than when plain gelatine was used; but, when plain gelatine was used to coat the prints, and these were then squeezed on to the glasses prepared with the hardened gelatine, they remained firmly attached on drying, and to that extent the use of formalin was a success.

We cannot say we are greatly surprised at the result of the latter correspondent's experiment, for the hardening of the gelatine, whether by means of formalin or alum, is calculated to lessen, rather than increase, its holding power. A negative treated with a strong solution of chrome alum will often, when dry, allow the film to be stripped quite easily, and we have found, in using formalin, that, though the film may show no tendency to spontaneous peeling, it is far more easily removed than when formalin has not been employed. To the above instances we may add one of our own of the peculiar behaviour of formalin. Having coated some gelatine emulsion plates for experimental use, and requiring them in a hurry, they were immersed, when set, in a ten per cent. mixture of formalin and methylated alcohol. One was exposed while still wet from the formalin solution, and, beyond a slight puckering round the edges, showed no abnormal behaviour on development. The rest were allowed to dry, which they did in about an hour; but these films, on development, although perfectly insoluble, loosened themselves from the glass almost as soon as moistened, expanding to some extent, though not so much as ordinary films under the circumstances.

Spread upon a larger glass, and held down by the edges until dry, they resulted in negatives perfectly free from crease or wrinkle. Formalin is certainly a useful agent, but it is not without its peculiarities.

Deleterious Action of Developing Solutions.—The question has been frequently raised as to whether metol does or does not exercise an injurious action on the fingers of those who use it habitually, and, though there seems to be evidence that some operators at least do suffer in this manner, others escape without inconvenience. It has been alleged by some that the irritation set up by the solution is due, not to the metol, but to the alkali used in conjunction with it; but it seems strange, if this be the real cause, that similar troubles are not more frequently met with in the use of other developing agents with which the same alkalies in practically the same proportions are used. Personally we have never met with any inconvenience arising from the use of metol, although we have employed it alone and in conjunction with other reducing agents since its first introduction, nor indeed have we suffered similarly from any of the usual developers until quite recently. For a special purpose we have been employing a hydroquinone developer, the Austin-Edwards formula for lantern slides given in the ALMANAC, containing a very large proportion of carbonate of soda, with a normal or rather below normal, quantity of hydroquinone. As a result, we have suffered severely from tenderness, irritation, and soreness of the fingers, to such an extent indeed that we have bsen compelled to desist from using that particular formula. Here we think there can be little doubt as to the cause of the trouble, since a three-grain solution of hydroquinone, with a normal quantity of carbonate of soda, or, indeed, with caustic soda, has never previously produced anything like the effect.

PERSONAL idiosyncrasy, or even the state of health, will often give rise to different effects in individuals or at various times; but, we can scarcely believe that, after years of immunity under almost all circumstances, we should suddenly find ourselves in a condition we have never previously experienced without some particular inducing cause. In the early days of gelatine plates it was frequently alleged that constant exposure to the fumes of ammonia in the developing room gave rise to troubles, chief amongst which was a tendency to chronic catarrh. Here, again, we enjoyed a perfect immunity, at least until the necessary inducing cause arose in the shape of the breakage of a large bottle of ammonia in the confined space of the dark room, and before we could make our escape we were all but suffocated. The immediate effects were violent and painful irritation of the eyes and the mucous membrane of the nostrils, accompanied by a copious catarrhal discharge, which lasted for some days and took its course like an attack of the old-fashioned "cold in the head" before "influenza" came into notoriety. The after-result was that on the slightest exposure to ammonia vapour, even in quantity scarcely sufficient to be smelt, similar symptoms arose, and for two or three years after this accident we were compelled to relinquish ammonia development altogether. We heard of a similar case in which a chemist's assistant hurriedly applied his nose to a Winchester, supposed to contain methylated spirit, for purposes of identification. It happened, however, to contain ammonia, and the immediate consequences were alarming, and, though he "came through" all right, it was two or three days before he could open his eyes or keep them open, and he had all the symptoms of a "shocking bad cold." In this case, too, the after-effect was that the slightest suspicion of ammonia vapour in the atmosphere was sufficient to bring on a distressing attack of catarrh, which, once started, would often last for days. In the same manner we believe it has been stated that, when an individual has once suffered from "bichromate disease," the slightest contact with the salt in its solution is apt to cause a recurrence.

Is Collodion Injurious to the Health?—The above suggests another question of hygiene which has recently been brought to our notice in a revived form. It will be within the recollection of those of our readers who date back so far as the "old collodion days" that very many of the well-known photographers of that period died of Bright's Disease, which, in consequence, came to be looked upon as "the photographers' disease." In the course of conversation the other day with an old collodion amateur, he mentioned as a singular fact that many years ago he was subject to periodical fits of nephritis, and suffered constantly, more or less, from a complication of renal and vesical troubles which culminated periodically in acute fits of inflammation. But these ceased, and for some years he had been entirely free from them until a few weeks ago he laid himself out to make a stock of collodion emulsion for lantern plates, and spent several evenings in coating plates. It seemed but natural when one of his old attacks visited him just at the time, that he should connect it in some way with his return to his "old love," and when further consideration resulted in the discovery that his throwing off his old ailments dated from shortly after his adoption of gelatine plates, and that their recurrence was synchronous with his first return to collodion, it is not surprising that he should feel himself confirmed in the belief that it was a case of cause and effect. We several years ago put the question to more than one medical man as to whether habitual exposure to the vapour of ether or collodion had any tendency in the direction of Bright's Disease or similar troubles; but we failed to elicit any confirmatory opinion. Long exposure to such fumes for hours at a time did undoubtedly cause temporary troubles, though not in the direction alluded to, but these soon passed off when the cause was removed. We remember one individual a portion of whose duties consisted in preparing large batches of collodion, and occasionally of coating large numbers of dry plates, on which occasion he would be shut up with the fumes of escaping ether for several hours together. His remedy for, or rather preventive of, ill effects was to take a gallon of beer into the workroom with him.

JOTTINGS.

IT was with feelings of peculiar pleasure that I sat and listened last Friday night, in the Exhibition Gallery at Pall Mall, to the discussion that went on among the members of the Royal Photographic Society, regarding the proposal to make the commodious mansion, No. 66, Russell-square, the future home of the Society. All the speakers, from the noble President down, condemned the present premises in Hanover-square as insufficient for the requirements of the Society, the meeting room in particular coming in for some very uncomplimentary references. As a matter of fact, members have been grumbling at the place ever since the Society has been there, but it was only on Friday night that an opportunity arose for the open expression of any opinion on the subject.

What was then said sounded quite musical in my ears. Over three years ago, when the Society moved to Hanover-square, the paint in the meeting room had hardly dried before I pointed out that the new premises were very unsuitable and could not be accepted as a permanent home for the Society. I termed the meeting room a cross between a disused bath and a glorified rabbit-hutch, and denounced the library, office, council chamber, and dark-room accommodation as inadequate. More, I adversely criticised the situation of the place, and pointed out that it would repel rather than attract members. The reward for my pains was an emphatic complaint from a fellow member that there were no grounds for my criticisms. He further alleged that the premises were generally approved by members, and that the publication of my objections had harmed the Society by preventing people from joining it. Then Mr. W. S. Bird, in *Autotype News*, wrote a defence of the new premises, and lengthily took me to task for pouring cold water on them. And now, after a little over three years, a meeting of members unanimously decides to clear out of the Hanover-square rooms, which, only in 1895, were described as being "both comfortable and efficient for the work and business to be done."

I wish Mr. Bird and the other gentleman I refer to had been present at Friday night's meeting; they would at least have heard with their own ears that I made no mistake, that I had not inaccurately gauged the general feeling among the London members, when I condemned the Hanover-square rooms as being miserably inadequate to the needs of the Society. Three years' experience of the dismal place, capped by Friday night's speeches, have given me an ample revenge, so I will say no more about the matter. Turning to the future, it is to be hoped that in the lordly old mansion in Russell-square, which to me is very remindful of "Vanity Fair," the Sedleys, and Captain Osborne, who was "shot through the heart on the field of Waterloo," the Society has found a home from which it will never be necessary to turn out. At last the foremost photographic society in the world is to have a house that is worthy of itself, and of the art and science for the advancement of which it exists. The obvious aspiration that rises in the mind is that the change may bring a large number of new members into the Society. I am rather tired of reading about and listening to the urgency of obtaining "new members." The Society doesn't exist for the purpose of simply seeing how many members it can get; though, of course, a large membership is rather to be desired than to be deprecated. No; the mission of the R.P.S. is to advance the interests of photography, and it is in this respect that I earnestly hope the Society's removal to new and suitable premises will be followed by the utmost success.

Mr. C. H. Hewitt, who, on page 719, tries to be funny at my expense, evidently reads what I write, but, to all appearances, does not try to understand it. My views concerning the Salon's doctrinal arrogance, affectation of superiority and mutual admirationism, have never blinded me to the good (or bad) qualities of the photographs annually shown at the Dudley Gallery; while, as a staunch supporter of the Royal Photographic Society and its Exhibition, I try always to be quite fair in the apportionment of praise and blame to the Pall Mall display. Why, then, should I be "pained" at voicing the general opinion that this year's Salon was "brighter" than the Society's Exhibition. Matters may possibly be reversed next year; but, if they are not, I hope I shall not lack candour in anything I may write on the subject. After misinterpreting another portion of my remarks, Mr. Hewitt says I am no longer anxious to write the Salon epitaph. It has been written for months; but the accession to office of the new Hon. Secretary, Mr. Craigie, a conciliatory and enlightened man of business, will probably postpone its publication. So now Mr. Hewitt knows all about it.

My remarks on spirit photography and the alleged photograph of an aerial city [see p. 693] have brought me the following letter from Mr. W. H. Midwinter, the very well-known photographer of Bristol: "Seeing your paragraph in the BRITISH JOURNAL OF PHOTOGRAPHY relative to a photograph of an alleged 'spirit' or aerial city, I thought it might interest you to see a copy, together with the tissue of lies in the letterpress sent out with the photograph. It came into my possession some years ago through the publisher sending it to me, asking me if it really was a photograph of Bristol. I also enclose one of our photographs of Bristol taken from Brandon Hill. This Professor Willoughby must have been an awful crammer; it is a copy of a photograph of Bristol taken in the winter or early spring, the year that Prince Albert Victor came to Bristol, as the scaffolding is on the Cathedral West towers."

I am much obliged to Mr. Midwinter for the photographs. His own is a capital view of Bristol. The fraudulent photograph has been vignetted off to give the effect of mistiness. It is titled at the bottom "*Mirage of the Silent City*, taken at Glacier Bay, Alaska, by Professor R. J. Willoughby. Published by ——, San Francisco, California, copyrighted 1889." It would be hard to cite a more flagrant bit of imposture than this attempt to palm off a view of Bristol as a photograph of "mirage" seen at Alaska! But will it be believed that Willoughby was backed up in his extraordinary deceptions? According to an extract taken from the *San Francisco Examiner*, which Mr. Midwinter sends me—it is too long to reprint—"Professor" Willoughby asserts that he saw the silent city five times before he photographed it; and two other persons made affidavit that they had also seen the wonderful mirage! "Professor" Willoughby is described as an odd character, who kept a sort of museum of Alaskan curiosities. The publisher of *The Silent City* was a very well-known photographer. If that gentleman sees this paragraph, perhaps he may be disposed to say something about his experiences of Professor Willoughby. COSMOS.

PHOTO-CERAMICS.

BEFORE the Leeds Camera Club, on Wednesday evening, November 9, Mr. Eliff gave a lecture and demonstration on "Photo-ceramics." He described photo-ceramics as one of the most beautiful subjects in the whole range of photography. The materials for this work are now easily obtained, while the chemicals are few and simple, the results permanent and imperishable. The process is dependent on the action of light on a bichromatised tissue, which, after exposure to the light, takes up moisture from the surrounding atmosphere, more or less according to the parts acted upon by the light. A fine powder is dusted on with a camel's-hair brush. This adheres to the image, which has become sticky by the absorption of the moisture, until an exact image of the positive is reproduced, its density being regulated by the amount of powder, or the time it is allowed to keep accumulating. The substratum of bichromatised tissue is then removed, a coating of collodion is given to the plate, and, when set, immersed in water, when it floats off the plate, bringing the dusted-on image with it. This film is then transferred to its final support, and fired in a suitable kiln. Care, patience, and good temper are required, and, having these, there is nothing in the process which need deter any amateur from attempting the work.

Mr. Eliff demonstrated the process throughout. Taking first the negative to be produced, he showed that a positive must be obtained, a piece of glass—patent plate for preference—rubbed quite clean, and sensitised by the following solution, being evenly coated over the plate:—

No. 1.

Glucose	4 ounces.
Gum arabic	2 ,,
Water to make	10 ,,

No. 2.

Potassium bichromate	1 ounce.
Water to make	10 ounces.

Take equal parts of each, and filter just before using. The plate is now dried gently over a small spirit lamp, and placed with the positive in a printing frame, and exposed to the light of eight feet of magnesium ribbon, at a distance of, say, four or five inches. It is now ready for the dusting-on of the ceramic powder, which can be had in about fifty different colours, and are those used in china painting. The powder will gradually adhere, until the image is fully out. Flow over this a thin coating of collodion, and, when set, immerse in water, using several changes, to remove all the bichromatised solution. The collodion film now floats off the plate, and must be transferred to its final support, with the collodion at the bottom and its powder image above. The image is now right way up, and the article ready for firing.

The firing was done by Mr. Eliff in a small electric furnace, which had been specially prepared and lent by Mr. Birch. The heat is gradually brought up until the powder colour assumes a brightness all over the ceramic, and allowed then to cool in the furnace gradually.

The lecturer showed a small "muffle," or furnace, which could be used in any ordinary kitchen range. It is placed between the bars, with a good heat above it. The front is left open, and so allows the work to be visible, and is, for all practical purposes, equal to the most expensive in the market. The powder image during the firing becomes imbedded in the surface of the glass, china, or copper enamel support, on whichever it may have been placed, and, when finished, is absolutely permanent. The surface can be cleansed by water as freely as a dinner plate.

THE TRAILL TAYLOR MEMORIAL LECTURE.—No. I.

By THOMAS R. DALLMEYER, Vice-President R. P. S.

I AM very sensible of the honour which your Committee has conferred upon me by the request to deliver the first Traill Taylor memorial lecture, although I have had some misgivings as to a suitable subject to bring before you.

From the unique position in the photographic world held by the late John Traill Taylor as an editor and a member of many photographic societies, he was brought daily face to face with a host of difficulties that presented themselves to students in every branch of photography; how freely he gave advice and assistance to those seeking it, you are all well aware, and you are met to-night to honour his memory for so doing. He was never at a loss, as a lecturer, for a subject of popular interest, and

his happy and lucid delivery will long live in the memory of those who heard him.

In my discourse I shall, at any rate, endeavour to take just a "leaf" out of his "photographic encyclopædia," and try to make clearer to your minds a subject that seems recently to have presented more difficulties than any other to the users of modern lens systems:—

On the Focometry of Positive or Negative Lens Systems, and their Combination—and a Focometer for the Purpose.

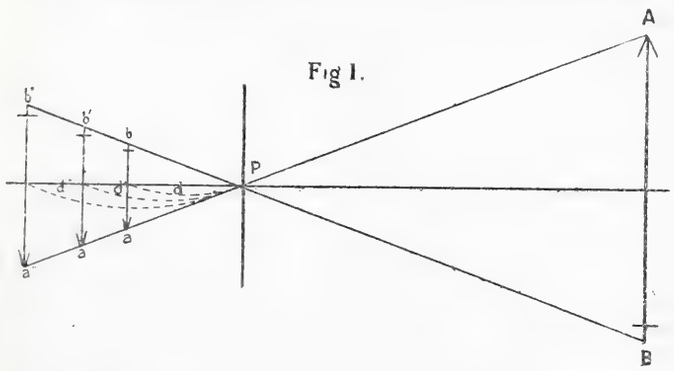
We who started our acquaintance with geometry by the study of Euclid can well remember how eagerly we welcomed the definitions and methods of modern geometry. So, too, in geometrical optics, has the student had cause for welcoming, in recent years, many important conceptions in dealing with lenses.

A few years ago (November, 1891) Professor Sylvanus Thompson delivered before the Society of Arts a most interesting and valuable paper on "The Measurement of Lenses," in which he dealt with these new conceptions, many original, described all the known methods of focometry, and introduced a new and very beautiful focometer, applicable to any positive lens system in which the two optical centres, or Gauss points, were situated within or near the mounting of the lens itself. I shall refer to it more fully a little later. His focometer is not applicable, however, to the determination of the focal length of lens-systems in which the Gauss points are situated considerably outside the mounting, and it is for this reason that I introduce a new one to your notice this evening.

From first principles we know that light travels in straight lines with uniform velocity in any homogeneous medium. This fact enables us to understand very readily how an image is formed in a "pinhole" camera. Leaving diffraction out of the question as unnecessary for our present purpose, we know that the further the screen is removed from the pinhole the greater will be the size of the image formed, and, moreover, that the sizes of these images will be *exactly* proportional to the distances between the pinhole and the screen.

If A B is a distant object, P, the pinhole, and the screen be made to

Fig I.



occupy successively positions at distances d, d', d'', from the pinhole, the sizes of the images, $a\ b$, $a'\ b'$, $a''\ b''$, will be exactly proportional to these distances.

[It is convenient to point out here that the "pinhole" camera affords us a ready means of ascertaining fairly accurately the focal length of positive lenses or lens systems. A suitable definite distance between pinhole and screen is very accurately set, and a negative taken of some distant object, the image of which will be preferably longitudinally and centrally placed, and of considerable contrast in subject. If this image be very carefully measured in length, its measurement forms a gauge for the determination of the focal length of lenses, by comparison with the images formed by them, a matter of simple proportion; *e.g.*, if the object, A B, formed an image, $a'\ b'$, with a pinhole at the distance, d', then two lenses, forming images $a\ b$, $a''\ b''$, would have focal lengths corresponding to the proportion between $a'\ b'$ and $a\ b$, $a''\ b''$ respectively, or their absolute focal lengths would be d and d''.]

Let us now proceed to examine the manner in which a pencil of rays passes through a lens, or, to use a more modern expression, how a wave-front* of the light entering a lens is acted upon by it

A lens is a portion of a refracting medium bounded by two surfaces of revolution, which have a common axis, called the axis of the lens. In general, the surfaces of revolution are spherical or plane, a plane surface being, of course, a particular case. The distance between the bounding surfaces measured along the axis or poles* is called the thickness of the lens.

For the purpose of our investigation, lenses will be classified not only according to their forms, but also according to the surface presented to the incident pencil or wave-front, and include (see fig. 2):—

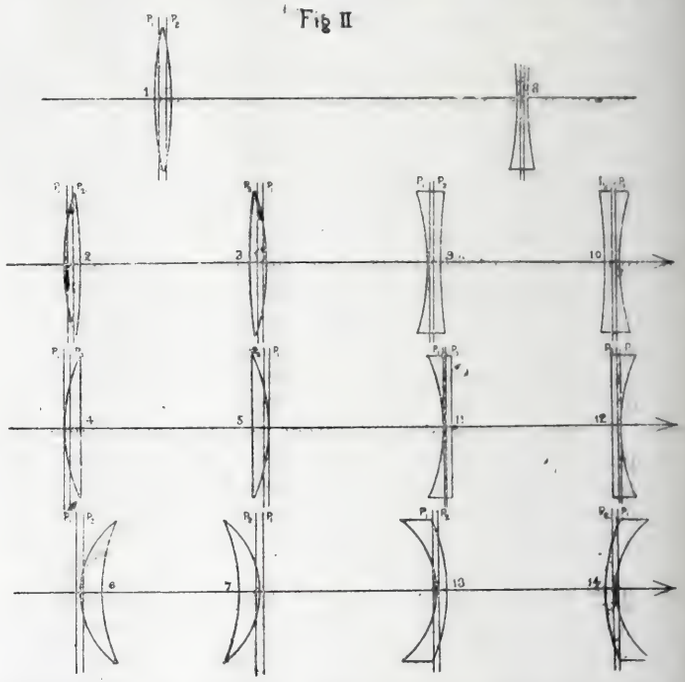
1. The equi-convex lens.
2 and 3. The double-convex crossed lens and its inversion.
4 and 5. The convexo-plane lens and its inversion.

* Prof. S. P. Thompson.

6 and 7. The positive convexo-concave meniscus and its inversion.
8. The equi-concave lens.
9 and 10. The double-concave crossed lens and its inversion.
11 and 12. The concavo-plane lens and its inversion.
13 and 14. The negative concavo-convex meniscus and its inversion.

If the axis of the pencil coincide with that of any lens, as in fig. 2, it

Fig II



passes through the poles without deviation and its direction is unaltered; every other ray of the pencil is bent towards or from the axis, a convex lens giving convergence and a concave lens divergence; or, using the modern language of geometrical optics,* the lens imprints a curvature on the wave-front of the light that enters it. If the wave is plane (consisting of parallel rays), then the lens prints a curvature positive or negative and makes it convergent or divergent. Similarly, if we have a number of lenses forming a lens-system, and the wave before impinging upon any lens forming part of the system is not a plane wave, but either convergent or divergent, then this lens will alter the curvature of the surface, the resultant curvature on emerging being simply the algebraic sum of the initial curvature and the impressed curvature.

The *focal power* is the curvature imprinted by a lens, or lens system, on a plane wave (parallel rays), and is the *reciprocal of the true or absolute focal length.*

To determine this absolute focal length we must know from what part of the lens it ought to be measured. In the old text-books we are told that every lens has one optical centre, and its true focal length is the

Fig III

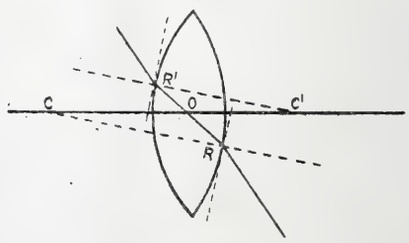
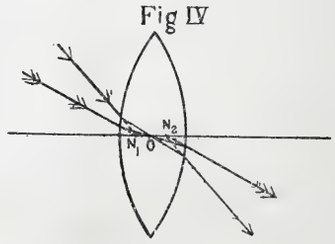


Fig IV



distance between this and the focal plane for parallel rays. Fig. 3 shows how its position is determined: parallel radii, CR, C¹R', are drawn from the two centres of curvature of any lens, the points where they meet the surfaces of the lens are joined; this line crosses the axis in a definite

* Prof. S. P. Thompson.

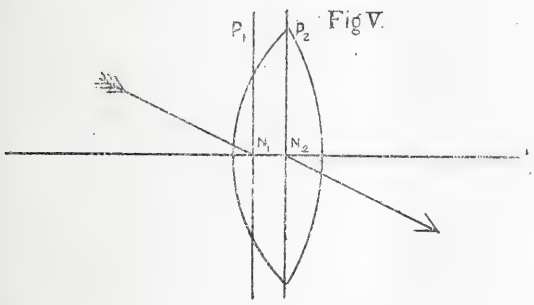
oint, O, called the "optical centre." Every ray, which, in passing hrough the lens, passes across this point (secondary axes), RR¹, is efracted just as though it had passed through a plane plate, and, there-ore, leaves the lens in a direction parallel to the incident ray. It only uffers a lateral displacement, which becomes greater as the lens becomes hicker, and therefore can only be ignored when the thickness of the lens s *negligible*.

In photographic optics we cannot and do not ignore thickness, and ence the one "optical centre" will not suffice for the determination of bsolute focal length.

Gauss has shown that there are *two* optical centres, termed "principal" r "nodal" points. If in fig. 3 we consider the case of secondary axes not oo far removed from the principal axis, and p oduce the incident rays, hey will be found to meet in one single point N, fig. 4; and similarly by roducing the emergent rays, these again will be found to meet in an ther ingle point N_2. These two points, N_1 and N_2, are the "principal" or "nodal" points of Gauss. It is evident that only when the lens is "in-initely thin" can they coincide, or become one "optical centre." The lanes that intersect these two principal points in the axis are the prin-ipal planes, fig. 5.

Their position varies with the thickness and the form of the lens. For

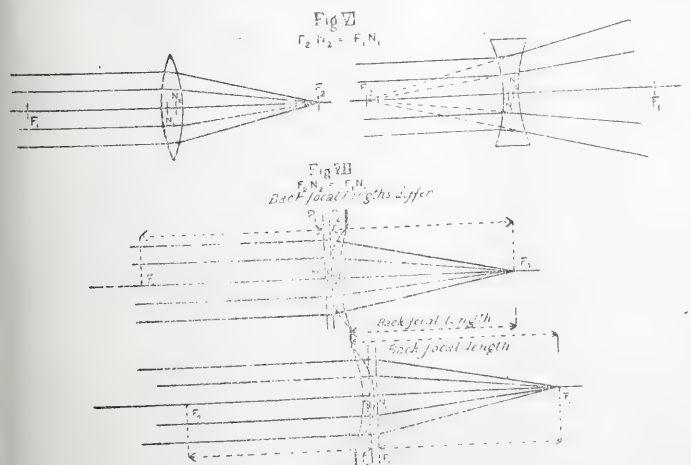
Fig V.



any given lens they are a certain distance apart, as we have seen, and act as though light however obliquely it may cross the lens were transferred from one to the other. The optical centres or principal points possess the property that light proceeding from any direction towards one of those points passes out from the lens as though it had passed through the other, as from N_1 to N_2 in fig. 5.

The "principal planes" are equi-distant between the two principal foci. If a point of light is situated at infinity, the rays meeting the lens are parallel to the principal axis and to one another, and will, after passing through the lens meet in a point called the principal focus, forming a real image in the case of convergent lenses, and a virtual image with divergent lenses, fig. 6. The distance between the lens and this point is roughly called its focal length, or better its *back* focal length, but the true or absolute focal length is its distance from the second "principal point" N_2.

It is evident that there must be a principal focal point on each side of the lens, one as we have seen being the focus, F_2, for the rays falling upon the lens parallel to the axis, and the other will be the origin of incident rays, which, after refraction, will leave the lens parallel to the axis,



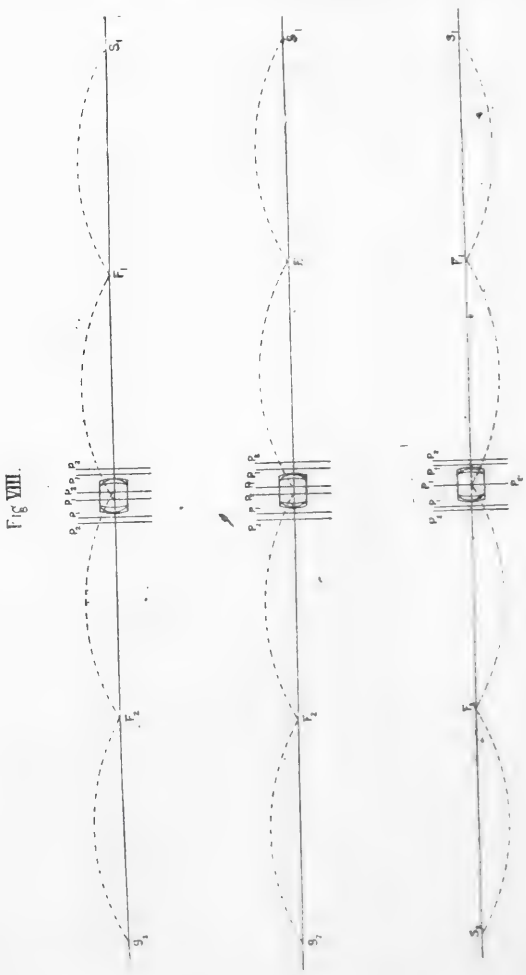
viz, F_1. If the lens is reversed the two foci will interchange. The two foci are situated at equal distances from their corresponding "principal" points, or $F_2 N_2 = F_1 N_1$.

In other words, a lens or system of lenses has the same absolute focal length whichever surface is presented to the light; but it does not follow that it has the same back* focal length in the two cases.

Fig. 7 represents a case familiar to many photographers. Here we have a meniscus lens with the principal planes, $P_1 P_2$, passing through the principal points, and the two focal points, $F_1 F_2$, where $P_1 F_1 = P_2 F_2$; it is evident that if the convex side of the meniscus were presented to the light that the back focal length of the lens would be considerably shorter than if the concave surface were so presented; still the image would be of the same size in both cases because, whichever surface is presented to the light, the lens has only one absolute focal length, $P_1 N_1$ or $P_2 N_2$. It is readily seen that the positions of these principal planes are different with every shape of lens, in double convex, or double concave lenses; both are contained within the glass of the lens (see fig 2). In a lens with one plane surface, one principal plane always passes through the "pole" of the curved surface, and in a meniscus one principal plane is always exterior to the deeper curvature. In this figure I have presented fourteen forms of lenses, as in two only, the equi-convex and equi-concave, are the back focal lengths identical when we take into consideration which surface is presented to the light. All have the same focal power, seven being positive and seven negative. In all single lenses the principal points are separated by a distance very approximately equal to one third the distance between the "poles." Exact formulæ are given in several modern works on geometrical optics. First we determine the separation of the principal points and their distances from the "poles" of a single lens, together with the distances of the principal points from the focal points, giving the absolute focal length. We can then determine these particulars for a second lens in contact with the first, and so on; and finally having determined our four "cardinal" points, *i.e.*, the two principal points and the two focal points, for one combination, the calculation for the cardinal points of any number of combinations separated at intervals is readily determined.

Most modern lenses consist of two combinations; the formula for

Fig VIII.



calculating the absolute focal length, F, the back focal length, B F, and the resultant width, W, between the principal points for the combination, are as follows:—

$$F = \frac{f_1 f_2}{f_1 + f_2 - a}$$

$$BF = \frac{f_2 (f_1 - a)}{f_1 + f_2 - a}$$

$$W = w_1 + w_2 - \frac{a^2}{f_1 + f_2 - a}$$

where a is the distance between the combinations, f_1 and f_2, their focal lengths, and w_1 and w_2 the widths between their principal points. From

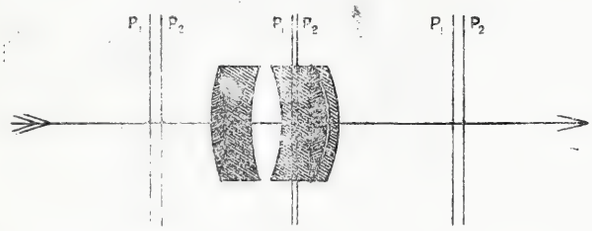
* I use the word back focal length as a measure of the distance between the back surface of the lens and the principal focus.

the first two formulæ it is evident that two exactly similar positive lenses, two dissimilar positive lenses, in shape and focal length, or a combination of positive and negative lenses may all be of the same absolute focal length, with considerably different back focal lengths. The third formula shows us that the principal points may be separated by an interval; they may coincide or even cross one another, and when positive and negative lenses are combined, may be considerably removed beyond the combination itself. Figs. 8, 9, and 10 illustrate three familar examples: The Rapid Rectilinear, the Stigmatic, and Tele-photographic type of combination.

In fig. 8 the whole-plate Rapid Rectilinear of 11 inches absolute focal length illustrated, the principal points just cross one another, so that although a symmetrical combination, its absolute focal length is slightly shorter than would be expected, shorter than the measurement from the diaphragm to the screen for parallel rays. In this form of lens they are sometimes separated, or may coincide as illustrated.

In fig. 9, the Stigmatic of 6·4 inches absolute focal length, the principal points of the front combination are slightly crossed,* near together and

Fig IX.



about six-tenths of an inch in front; in the back combination they are not crossed near together, and as much as one and a quarter inches behind the lens; for the entire combination they are very close indeed to one another, but only three-tenths of an inch from the shoulder of the back combination, so that the camera extension in using this lens as a combination would be noticeably longer than a symmetrical lens of the same absolute focus; but in using either combination as a single lens, with the diaphragm in front, the front combination would measure six-tenths of an inch and the back 1¼ inches longer in back focal length than the absolute focal length in each instance. The unexpected disposition of the principal points in this lens has given rise to not a few difficulties with those using the separate combinations.

(*To be continued.*)

THE PHYSICAL DEVELOPMENT OF P.O.P.†

The last six had five minutes' exposure at 4 30 p.m. in the shade, and for these a solution of soda acetate was made up in the proportion of 150 grains to 5 ounces of water.

No. 25.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 1 ounce. Time of development one minute, a good reddy-brown colour resulting, but a very flat print.

No. 26.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 3 drachms; water, up to 2 ounces. Time of development, one and a quarter minutes. Not quite so flat a print as No. 25, and the colour a purer brown.

No. 27.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 2 drachms; water, up to 2 ounces. Time of development, one and a half minutes. Again a slight improvement on Nos. 25 and 26, but still flat and colour again modified, the brown inclining very slightly to an olive colour, showing the approach to the predominant green of gallic acid alone.

No. 28.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 90 minims; water, up to 2 ounces. Time of development, two minutes. Still more green in the shadows, and still too flat for a presentable print.

No. 29.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 1 drachm; water, up to 2 ounces. Time of development, 1¼ minutes. This gave a bright, clear print, with no fog, and a very good light-brown colour suitable for some classes of subjects, or which could be toned to a purple in a gold bath. In fact, the colour was somewhat similar to an albumen print toned in an acetate bath, but stopped at an early stage of toning

No. 30.—Developer: Sat. sol. gallic acid, 1 ounce; soda acetate solution, 30 minims; water up to 2 ounces. Time of development, 2¼ minutes. Similar result to No. 29, but redder, and would need toning to be acceptable; in fact, a very suitable print for that purpose.

Out of the thirty exposures, three are worthy of mention and attention—viz., Nos. 5, 23, and 29 or 30. No. 5 was developed in a one grain per ounce solution of plain pyro, to which had been added an exceedingly minute quantity of potass. bichromate, amounting to only $\frac{1}{30}$ of a grain per ounce of developer. The bichromate has an almost ungovernable accelerating action when present in quantity, and probably for general use it would prove more convenient to make it up in the proportion of 10 grains to 100 ounces of water, instead of 20 ounces, and use a proportionately larger quantity, because very slight alterations in the amount have considerable effect on the colour.

This particular formula has been somewhat extensively used since the first experiments, and a point in its working was discovered later. The exposure given should not be excessive; in fact, only the deepest shadows should show before development, and those only slightly. The effect of over-exposure is to make development too rapid to be manageable, and the colour attained is redder. On the other hand, exposure must be sufficient, or development will be protracted, with the effect that the heavy shadows will begin to acquire an olive colour. Sometimes the result so produced is effective, but, on the whole, pure colours are to be desired.

The tendency of this developer to produce slightly soft results has been mentioned. It is, however, by no means a disagreeable feature, showing itself mainly by dragging detail out of the dense portions of the negative. In fact some amount of surprise has resulted with prints made in this way at the amount of high-light detail developed. With one particular negative of a landscape, clouds were visible in the sky portion of the print, the existence of which in the negative was not known until subsequent examination by strong light showed that they really were there.

The gallic acid and metol developer used for No. 23 should also prove very useful. It is a very clean working solution, and has a tendency, as before noticed, to slightly increase contrast, and therefore will be useful with a certain class of negatives.

Nos. 29 or 30 (gallic acid and acetate of soda) will be acceptable formulæ where a very warm tone is desired, or where it is intended by subsequent toning to attain the more ordinary photographic colours of purple-brown and purple-black.

With all these developers the free nitrate of silver present in the P.O.P. is an important factor, and on no account should it be washed out previous to development. In reality the operations are very much akin to the development of wet-collodion plates. For the whole of these trials the P.O.P. used was that known as Minerva, a glossy paper sold by Messrs. L. Trapp & Co., but subsequent experiment has shown that any other brand of glossy P.O.P. is equally suitable. Matt-surface P.O.P. has not proved amenable to the same treatment. This is probably due to the scarcity of gelatine in these papers, as a thick coating of gelatine would act as a mechanical restrainer, and prevent general fog. It is possible that the presence of a colloid body in the developer, such as gum arabic or albumen, would bring matt-surface paper into much the same line, but the finest matt prints are always made by using glossy paper, and subsequent matting by squeegeeing on to ground glass. This course gives prints immensely superior to a prepared matt paper, especially if enamel collodion be also used in the usual manner.

In all prints that have been made so far by physical development, a large amount of discolouration and staining has occurred at the back of the print (again showing the need of the presence of a mechanical restrainer); but, as the whites of the prints themselves remained pure, no attention was paid to this point, and such stains are entirely hidden when the prints are mounted.

Developed images stand a much greater chance of permanence than printed out images, the colours obtainable are artistic and acceptable to all, the operations are simpler and the results more certain than with gold toning, and the time saved is enormous. Surely, with Christmas-tide booming so near, such a process cannot be neglected.

W. E. A. Drinkwater.

* This may occur in *single* lenses of *considerable thickness*.

† Concluded from page 714.

SOUND BY PHOTOGRAPH.

At a recent meeting of the American Association for the Advancement of Science, Professor A. G. Webster, of Clark University, advanced the question, "How loud is a sound?" When no one was able to answer, he brought into view an apparatus which served as an absolute standard of comparison.

Light is the agency that has been called in to increase the knowledge of sound. It is by means of photography that Professor Webster measures all sorts of noises, from the roar of an explosion to sounds so low that the human ear finds it impossible to detect them, and which therefore pass under the name of silence. This device has proved that there is no such thing as silence in the ordinary acceptance of the term. What men call silence includes all noises below the limit at which the human ear will register sound, but silence is really full of sounds that pass unnoticed except by some delicate perception like that of Professor Webster's apparatus. In other words, science is comparative, and not positive. There are probably few sounds that can escape this new invention, for its maker has proved that with it he can detect and photograph the noise made by a draught of air passing through a room.

The mechanism by which Professor Webster's machine records sound ready for measurement is comparatively simple. It consists of a set of

movable mirrors and prisms which act in conjunction with a diaphragm. Any transparent substance of excessive thinness reflects brilliant colours. Examples are seen in thin laminæ of air occupying cracks in glass and ice and the insterstices between plates of mica, also in thin films of oil on water and alcohol on glass, but most remarkably in soapy water blown into very thin bubbles.

The same effect is produced if a lens of slight convexity is laid on a plane lens, and the two, after being placed together by a screw, are viewed by reflected light. Rings of colour may be seen ranged around the point of contact. The smallest rings are broadest and most brilliant, and each one contains the colours of the spectrum in their order. These are commonly called Newton's rings, because Sir Isaac Newton first investigated their phenomena. This principle of inflection, then, and a modification of the instrument used in producing Newton's rings are used in the new apparatus for measuring sound. Within a small square box Professor Webster has placed several mirrors and prisms in such a manner that Newton's rings will be projected against a moving sensitive photographic plate. On one side of the box is a globe-shaped resonator, inside of which is a sensitive diaphragm of a very thin glass.

The slightest sound will cause this diaphragm to vibrate. On the inner side of the diaphragm is attached a very small circular mirror weighing a fraction of a gramme. When a sound, however slight, enters the resonator or receiver of the instrument, the diaphragm, and consequently the small mirror, vibrate backward and forward, and a small beam of light is sent about among the other mirrors and the prisms, and is made finally to resolve itself into a series of coloured fringes. These fringes are projected through a series of slits in a screen until, by the time the light reaches the photographic plate, it takes the form of a waving line. This waving line is projected on a screen by means of a lantern, and may be viewed if necessary by a number of persons at once.

Some surprising results were shown on the screen. Thus the vibrations produced by a tuning fork were shown in the form of very regular waves across the screen. Some vowel sounds projected into the receiver were depicted in a very irregular waving line, showing that it is impossible for any person to hold the voice evenly while pronouncing a letter or a word. This is a point for musicians and singers generally to ponder over. A draught in the room produced an effect which resulted in a series of rather irregular curves having a downward trend. Silence manifested itself in a series of very regular fine waving lines. Ability to hear or see silence might occasion some surprise, but the record proved simply that there were sounds in the atmosphere which the human ear could not hear. Lord Rayleigh, after some experimentation, determined that we are capable of hearing sounds of an intensity less than one-millionth of an atmosphere. Some idea of the capabilities of this new instrument may be gained from the fact that the little mirror mentioned above will move backward and forward over even so slight a distance as 1,100,000th of an inch.

Professor Webeter's new machine may prove of great scientific value. It has recorded a sound of 16,000,000th of an atmosphere at a distance of 20 feet. At 45 feet that same sound, then reduced to 1,12,000,000th of an atmosphere was recorded. On the other hand, the sound of a whistling buoy 7¼ miles away was easily recorded. The pitch of this sound and the distance away were determined by the instrument. And this brings up the question of its utility on vessels. If the sounds made on a vessel could be recorded on other vessels carrying such an apparatus, the probability of a collision would be very much lessened, if the collision itself were not rendered absolutely impossible.

CHEAPE'S ACTINOMETER.

Mr. John Albert Cheape, of Charlottesville, Virginia, U.S.A., has designed an actinometer wherein one can determine the strength of the actinic light in two ways, first by the slightest printing of a stencil so that any slow or fast sensitised photographic paper which prints out without development may be used; and, secondly, by the printing of a paper especially prepared for the purpose, to a certain given tint.

Fig. 1 is a perspective view.

Fig. 2 is a similar view with the ends reversed and the exposure disc opened.

Fig. 3 is a bottom plan.

Fig. 4 is a longitudinal section.

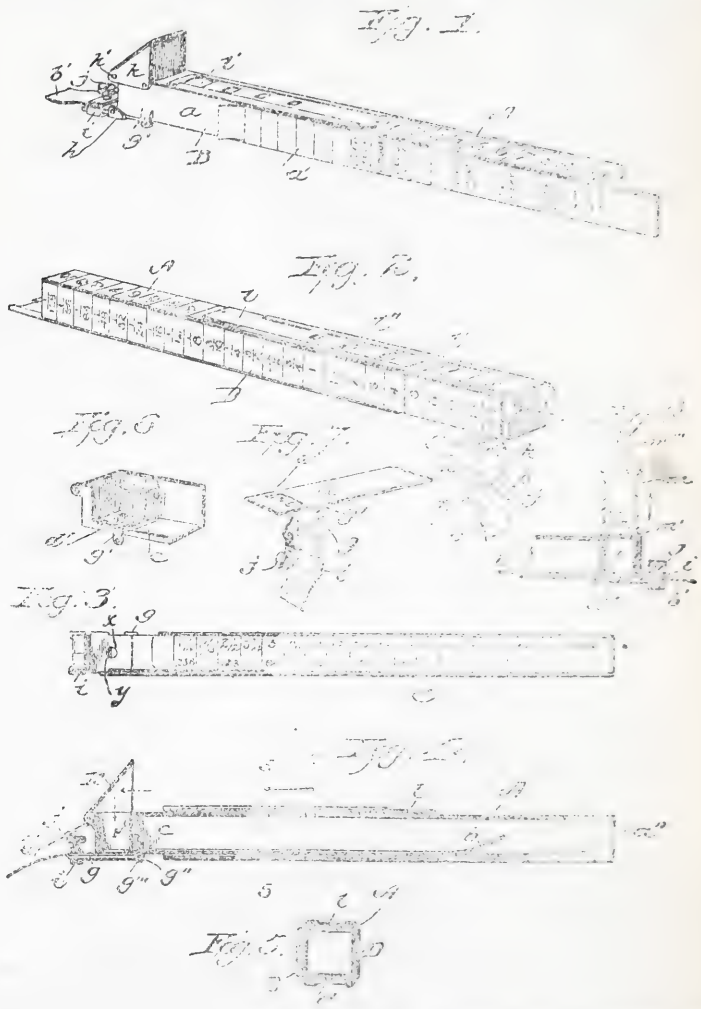
Fig. 5 is a section on line 5—5 of fig. 4.

Figs. 6, 7, and 8 are detail views.

The body, *a*, comprises a four-sided tube, preferably pocket size. The colour paper, or sensitised paper, *b*, is cut in long strips and stored within this tube. The end, b^1, of the strip, *b*, extends out of the back end of the tube, through a transverse slot, *c*, thence under a stencil plate, *d*, having a stencil, d^1, in the bottom of the exposure box, *f*. The extended end, b^1, of the sensitised paper is drawn over the face of a hinged paper-carrier, *g*, which serves as a back for the stencil, and this plate is held in closed adjustment against the stencil plate by spring clasps, *h*, which embrace the sides of the tube. The stencil plate, *d*, forms the bottom side of the tube. The free ends of the paper-carrier, *g*, is provided with a paper clasp, *i*, and clamping screw, *j*, for holding the extended end, b^1, of the sensitised paper down tightly against the upper face of the plate, *g*. In the present instance, the letter E forms the stencil in the bottom of the exposure box, *f*. This exposure box is preferably in the form of a perfect cube.

As a means for reducing and regulating the power of the light which enters the exposure box, *f*, a reflector, *k*, is attached, and consists of a triangular-shaped member hinged at k^1, to be thrown open to receive the light and to be closed to cut off light. In fig. 4 the arrows indicate the direction of the entering light as it passes into the exposure box, *f*. This reflector, *k*, can be swung back on the hinge, k^1, far enough to have no effect whatever on the light which enters the exposure box, *f*, or it can be adjusted to stand at intermediate points within the arc of a circle, in order to regulate the entrance of the light to the finest possible point.

In connexion with the exposure box Mr. Cheape provides two other instrumentalities for still further regulating the light, and they consist of an adjustible slide, *l* (fig. 2), and a bellows, *m* (fig. 8). The slide, *l*, is provided with a series of rectangular openings, l^1, technically called



"stops." The slide is adapted to be slid longitudinally between the guides, l^{11}, and can be moved backward to bring any one of the openings, l^1, over the top of the exposure box, *f*, to reduce the size of the space through which the light enters. For instance, if the first stop be moved over the top of the exposure box, the force of the light will be reduced one-half, and the stencil will require double the time. The second stop will require four times the amount of exposure and time to print and so on.

It is to be understood that each succeeding opening admits just half the amount of light of the next larger, and consequently, with its use, it requires just double the length of time to print through the stencil. By the use of these openings or stops the time of the exposure can be calculated with greater accuracy. For instance, if it takes only three seconds to print with the light passing through the largest opening, it will take six seconds through the next, and twelve through the next, and twenty-four through the fourth. Three seconds, and even six, are so short that it is difficult to time and test them, therefore it is best to admit much less light at a time by means of the slide, or its equivalent hereinafter described.

It may sometimes be found preferable to employ a bellows, *m*. This bellows will fold into the exposure box, *f*, or can be pulled out, as shown in dotted lines. The top, m^1, of the bellows is provided with a central opening, m^{11}, and a reflector, m^{111}. By the use of these regulating devices, the exact amount of exposure required can readily be ascertained.

The four flat sides, A, B, C, and D, are provided with registering *indicia* whereby the amount of exposure necessary for the plate is determined. The side, A, bears a line of numbers from 1 to 10 inclusive denoting the rapidity of the plate. The side, B, is provided with a slide, a^1, containing subject-matter *indicia*, such as "heavy foreground," "group," "building 100 feet," &c. The slide, C, is provided with a slide bearing two parallel lines of figures. The upper line commencing at the rear end of the tube denotes the number of seconds from 1¼ to 640, in which the paper colours, and the lower line, commencing at the forward end of the tubes, gives the number of lens stops from 2 to 256. The side, D, bears a line of numbers from the fraction $\frac{1}{128}$ at the front end to 24 at the rear, representing the right length of time to expose your plate. a^{11} represents a stopper which fits within the front end of the tube and closes it.

The second method of determining the strength of the actinic light is by cutting the circular hole, *x*, in the paper-carrier, *g*, and covering half the hole with tinted paper, *y*. The prepared paper goes in the instrument the same way as before, but with the sensitised side reversed.

The operation is as follows:—

Assuming that the rapidity of the plate is 10, the slide, a^1, on side, B, should be pushed to bring the arrow thereon opposite No. 10 on side, A, as seen in fig. 1. Now, if it has taken sixty seconds to colour the paper under the stencil, E, the operator should push the sliding scale on the side, C, until the numeral, 60, comes opposite the description of the kind of picture he desires to take. Upon turning the tube over to the succeeding side, D, the scale thereon will indicate the right exposure to give your plate opposite any stop which you may be using.

When the reflector, *k*, is thrown all the way back, as represented in dotted lines in fig. 4, more light will be admitted, and the stencil will print much more quickly than when the reflector, *k*, is swung over the exposure box, as shown in figs. 1 and 4.

ELLIOTT'S ROCKING APPARATUS.

Mr. Thomas Elliott, of Nottingham, has made some improvements in apparatus for automatically rocking or oscillating developing trays.

Fig. 1 is an elevation; fig. 2 a plan.

The body of the apparatus is comprised of a preferably rectangular

Fig 1.

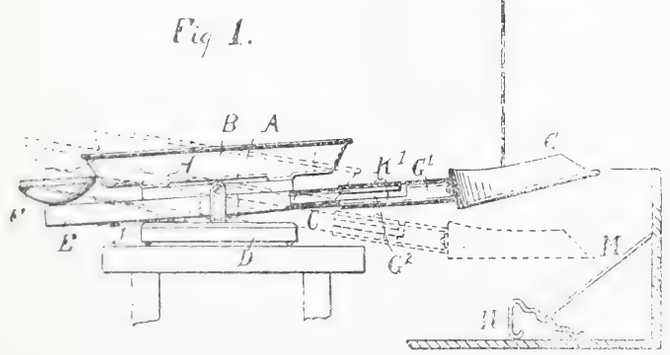
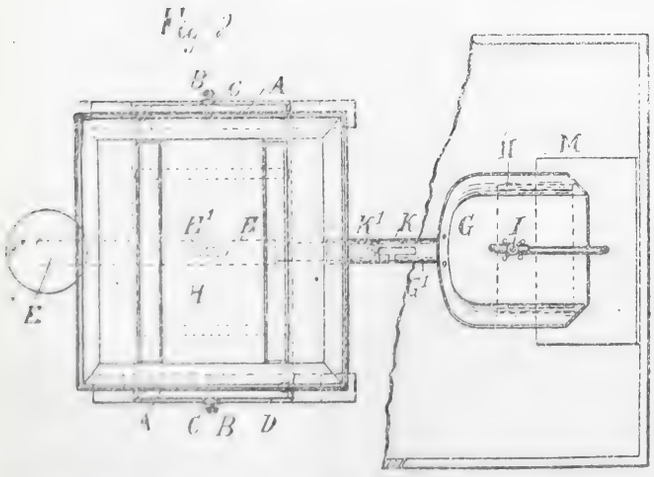


Fig. 2



platform or tray rest, A, provided at its ends with trunnions, B B, which latter are mounted in bearings, C C, secured to, or formed integrally with, a base, D, of suitable form. The platform or tray-rest, A, can thus oscillate in a plane which is transvereely to the length of, and at right angles to, the base, D.

Secured to preferably the under side of the platform or tray-rest, A, is a transverse lever, E, one end of which is provided with a weight, F, and the other with a preferably shovel-shaped receptacle, G.

The developing tray, H, is placed on the oscillating platform or tray-rest, A, and the latter caused to oscillate by adjusting the apparatus, say, for example, over a developing trough, with the receptacle, G, under a stream of water from, say, a tap, I.

The receptacle, G, as it is filled, overbalances the weight, F, and falls until it is in the position shown in dotted lines in fig. 1, where it empties itself, and is then immediately raised again to its normal position by the weight, F. This operation is constantly repeated, and a continuous rocking motion with a steady action is thus obtained.

The rapidity of the oscillations may be regulated by regulating the volume of the stream of water, or by adjusting the length of the lever or its position relatively to the tray-rest or platform, A.

The downward movement of the weighted end of the lever, E, is checked by a spring, J (see fig. 1), one end of which is secured to the said lever, and its other free end engages with the base, D. This spring acts as a buffer, and gradually checks the downward movement of the weighted end of the lever, E, and assists in starting it again in the reverse direction.

In order that the position of the lever, E, may be adjusted relatively to the platform or tray-rest, A, the said lever, E, is provided with a longitudinal slot, E^1 (see fig. 2), through which the bolt which connects it to the platform or tray-rest, A, is carried. The receptacle, G, is also provided with a tubular extension, G^1, which fits loosely on the end of the lever, E, and the working length of the lever may thus be increased by sliding this tubular part, G^1, of the receptacle on the lever, either towards or away from the point about which said lever oscillates.

To prevent the tubular part, G, from rotating on the lever, it is provided with a slot, K (see fig 2), in which a pin, K^1, on the lever, E, engages. The tubular part, G^1, is also formed with a second slot, G^2 (see fig 1), which is connected by a transverse opening to the first slot. This slot, G^2, also extends to the end of the tubular part, G^1, as shown, so that the latter can be removed from the lever without removing the pin, K^1.

To prevent the trays or vessels from slipping about the platform or tray-rest, A, when it is oscillating, raised ribs or strips of indiarubber are secured to the upper face, or flat elastic rubber bands are placed round the platform or tray-rest, A. The latter hold themselves in position, and may be readily replaced.

In the apparatus described and shown provision is only made for one developing tray, but it will be understood that, by increasing the length of the platform or tray-rest, A, provision may be made for two or more trays, which are placed side by side.

Plates, after being developed, may be washed by placing them at M, on a rest, N, as shown, in which position the water from the receptacle, G, is delivered over them. The stream of water thus performs two operations simultaneously.

"FREE PHOTOGRAPHY."

In the City of London Court on Friday, before his Honour Deputy Judge G. Pitt-Lewis, Q.C., the case of Letts *v.* Oldershaw (which was partly heard a fortnight ago, and reported in these columns on the 4th inst.) was finally disposed of. The action was brought by Messrs. Chas. Letts & Co., 3 Royal Exchange, E.C., against the defendant, of Leicester, to recover the sum of 1*l.* 14*s.* 6*d.*, balance of account for almanacs and diaries supplied. The item in dispute was for copies of the plaintiffs' *British Almanac*. The plaintiffs' case was that the defendant had purchased out and out three dozen copies of the *British Almanac*. After keeping them for five months, the defendant wanted to return them. This the plaintiffs objected to. When the case was last before the Court, it was said that a signed order of the defendant's could be produced, and the case was adjourned. When the case came before the Court on Friday, Mr. Pratt, the plaintiffs' traveller, was called, and said he remembered taking the order from the defendant in November. There was no truth in the suggestion that the almanacs were sold on sale or return. It was incorrect to suggest that he guaranteed that Mr. Frank Brown, of Leicester, would be the photographer to whom the coupons inserted in the almanac should be taken with a view of the purchaser obtaining his photograph for nothing. The defendant did not return the almanacs until April. If he had returned them before the beginning of the year, they would have accepted them and resold them elsewhere. Never in the course of his recollection had he taken an order for almanacs on sale or return. The Deputy Judge said he was a little surprised to hear that that was the custom of the trade, for he had had some experience of the trade himself. In cross-examination the traveller admitted that the fact that they issued coupons with the almanac was no doubt an inducement to the public to buy the book. The photographer to whom the public were directed to go in the 1897 almanac was Mr. Frank Brown, but he denied that he guaranteed that Mr. Brown's name would be continued. Even photographers died sometimes, and then it was not possible to have their names again inserted in the almanac. They had substituted for Mr. Brown the name of Mr. Pickering, who was, in his opinion, a first-class artist. The defendant, in his evidence, told the Court, that when

the plaintiff's traveller was setting forth the advantages of the almanac he thought it was rather a marvellous thing to offer a free photograph in a shilling book. Mr. Frank Brown was one of the most eminent photographic artists to be met with. When the case was last before the Court, he stated that Mr. Pickering was a fifth-rate operator. He would have been inclined to make the same remark again on that occasion, but a report of the case had appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY, and so the matter had leaked out. The Deputy Judge: You would now prefer to say that Mr. Pickering is not of the same standing as the other man. You would rather put it in that way under the circumstances? The defendant said he quite concurred in the description of the gentleman adopted by the Deputy Judge. The Deputy Judge told the defendant he thought he should have written immediately the almanacs arrived, pointing out that the name of Mr. Frank Brown had been eliminated, contrary to his anticipation. The defendant, in reply, said, considering the multitude of business affairs which filled his mind during December, it was not to be wondered at that a small matter like that had been overlooked. The Deputy Judge said, no doubt it was unfortunate in one sense that the defendant had such a large business, but it was very gratifying from another point of view. In giving judgment, he said he thought there was no doubt that the goods were supplied on sale or return. There must, therefore, be judgment for the defendant; but he could not allow him any costs, as he should have written to the plaintiffs immediately the almanacs arrived.

NEW PREMISES FOR THE ROYAL PHOTOGRAPHIC SOCIETY.

A SPECIAL meeting of members of the Royal Photographic Society was held on November 11, the Right Hon. the Earl of Crawford, K.T., F.R.S. (President), in the chair. The meeting was specially convened to consider the advisability of taking a lease of the premises No. 66, Russell-square for the purposes of the Society. A circular had previously been sent to the members giving a general idea of the proposal and of its financial aspect. It was stated that the want of really suitable accommodation had been felt for many years, and that efforts had been made to supply it by the rooms taken in Great Russell-street and those now occupied in Hanover-square; the latter, while serving fairly well the purpose of a meeting room, and bare shelter for the library and museum, were too confined and generally unsuitable as a central meeting place for the members of the Society and its many affiliated societies. An exceptional opportunity now offered for securing a large house on the east side of Russell-square, and on the main route from north to south *viâ* Southampton-row. If those premises were taken, it would be possible to make the Society a real focus for photographers and photographic work in all its branches; a comfortable library and reading-room would be provided, as well as a capacious meeting room, in which small exhibitions could be held periodically. There would also be ample space for displaying the Society's collections of photographs and apparatus, and spacious dark rooms and work rooms, fitted with all conveniences, and the service of an attendant could also be arranged for.

The President, in opening the proceedings, said that the Council, realising the importance of obtaining more convenient rooms, appointed a committee to consider the subject, and that Mr. Marchant, a member of that committee, had called their attention to the house mentioned, the property of the Duke of Bedford, who was willing to let it to the Society upon exceptionally favourable conditions. The committee visited the premises on three occasions, and after the most careful consideration came to the conclusion that so many advantages to the Society might be expected to arise from their acquisition, and that the inducements offered by the Duke of Bedford were so liberal, that the matter should be placed before a General Meeting of the members, and they recommended the Council to convene such meeting. Having regard to the financial responsibility which would be involved by the change, members had been invited to subscribe to a guarantee fund for three years, and this appeal had already met with a very satisfactory response.

The Hon. Secretary (Colonel Waterhouse) read the list of amounts guaranteed, the total being 171*l.* 16*s.* per annum; he also submitted letters from members unable to be present, most of whom expressed themselves in favour of the scheme and prepared to support it.

The President said Mr. Marchant had been good enough to prepare plans of the premises, and, in order to give an adequate idea of the rooms, the plans would be shown as lantern slides, which was then done, the President stating the dimensions of the several apartments and the use to which they could be put.

Mr. J. W. Marchant said the superficial area of the present meeting room in Hanover-square was 600 feet, while that of the two rooms which it was proposed to throw into one, at the Russell square house and to use for meetings and small exhibitions, was 1175 feet, providing accommodation for about 235 persons.

The Rev. F. C. Lambert suggested that it might be possible to hold the annual Exhibition at the new premises, instead of at a public gallery, but this idea met with some opposition, and was said by Mr. Marchant to be quite impracticable; the President, however, thought that one-man shows and exhibitions of apparatus and photographs of special classes might be carried on almost continuously during the sessions of the Society.

Mr. Leslie E. Clift suggested the provision of a studio, and some discussion ensued as to the adaptability of certain parts of the premises for this purpose.

Mr. G. Seamell (Hon. Treasurer) gave some statistics as to the progress of the Society during the past few years, which both numerically and financially had been most satisfactory. He remarked that there were now eighty-two affiliated societies; they were doing a most valuable work, and, as the affiliation formed a very important feature of the Royal Photographic Society, it was highly desirable that a good meeting room should be provided as a centre in which their members might meet and find a welcome when visiting the metropolis.

The President said he regarded the affiliation as an extremely important feature of the Society, and that, when addressing H.R.H. the Prince of Wales at the opening of the Crystal Palace Exhibition, he took the opportunity of pointing out that the Society was the largest scientific body in the Kingdom, numbering, with the affiliated societies, over 6000 members. He was very sorry to see that there was apparently some sort of idea in a certain direction that the Council of the Royal Photographic Society were careless of the affiliation or thought lightly of it; he could say from his own knowledge, and most emphatically, that there was absolutely no foundation whatever for such an idea. During the whole of the time that he had occupied a seat on the Council no question had been raised upon any single occasion to indicate that any members of the Affiliation felt that the Council were not doing their duty towards them, and he was therefore somewhat surprised to learn from the public press that such was the case. He was informed, however, that at the next Council meeting a motion would be brought forward for the appointment of a committee to thoroughly consider the relations between the Society and the affiliated societies, with a view to the adoption of such measures as might be deemed most advantageous to the affiliation scheme.

Mr. J. A. Sinclair moved that the Council be requested to acquire the premises, No. 66, Russell-square, on behalf of the Society upon the terms which had been offered.

Mr. Snowden Ward seconded the motion, which was then put and carried unanimously.

The President proposed that the thanks of the Society be communicated to the Duke of Bedford for his exceptionally liberal offer and for the facilities which he had consented to afford.

Mr. W. Thomas, in seconding the motion, said that at the last meeting of affiliation delegates, representing societies from all parts of England, the feeling was directly contrary to that put forward in the quarter alluded to by the President, and that the members of affiliated societies, with one or two exceptions, were in thorough accord with the policy of the Council.

The vote of thanks was then put and carried, as also was a similar recognition of the services rendered by Mr. Marchant.

THE LONDON COUNTY COUNCIL AND CINEMATOGRAPH ENTERTAINMENTS.

WE append the principal regulations adopted by the London County Council respecting the use of cinematographic apparatus on premises licensed by the Council. It will be observed that they are of a very stringent character, and quite calculated to render many cinematographic exhibitions very difficult if not impossible to hold in future:—

"No cinematograph or other similar apparatus involving the use of a lengthy combustible film shall be exhibited on premises licensed by the Council until the Council has been satisfied that all reasonable precautions have been taken against accident and danger to the public.

"Notice of any intended exhibition shall be given to the clerk of the Council by the licensee of the premises in which such exhibition is to be given, and the licensee shall be held entirely responsible for the proper and safe use of the apparatus. Such notice shall be given at least six days before the first day of exhibition. Opportunity shall also be afforded to the Council's inspector of inspecting the apparatus and seeing it at work at least three days, if possible, before the public exhibition takes place, in order to allow time for any necessary alterations to be carried out and approved by the Council before the first public exhibition takes place. A plan shall accompany the original notice to the clerk of the Council, showing the exact position of the apparatus and the surroundings within a radius of ten feet of the lantern. No gangway or exit must be in any way affected.

"The cinematograph shall stand in a suitable fireproof room, which shall be entirely enclosed, the floor also being fireproof. The door shall open outwards and be self-closing. One of the firemen of the establishment shall be in attendance near the apparatus with a wet blanket and two buckets of water. No inflammable material shall be within two yards' distance from the enclosure. The audience and seats shall at no point be less than eight feet distant from the lantern, the audience being prevented from approaching by a suitable rail or barrier.

"The body of the lantern shall be constructed of wood or other non-ducting material, and shall be coated inside with asbestos; it shall also have an inner lining of sheet iron, and an air space shall be left between the iron and the asbestos lining. In the bottom of the lantern shall

stand an iron tray, which shall be surrounded by a vertical edge at least one inch in depth. The lantern shall be provided with a metal shutter, which shall fall freely between the source of light and the condenser. This shutter shall be immediately dropped in the event of any accident to the apparatus or stoppage of the film, and shall only be raised when the film is in motion for the purpose of projection.

"Where possible, the electric arc light shall be adopted as an illuminant, the usual rules for securing safety in an electric installation being observed. Ether and other inflammable liquids shall not be employed under any circumstances for producing light. If limelight be used in the lantern, the general regulations for its safety, which are issued by the Council, shall be complied with, and any additional precautions which the Council may deem necessary for securing safety shall also be adopted. The use of acetylene gas is not permitted.

"The licensee shall be held responsible for the employment of competent, experienced, and trustworthy operators, and shall be prepared at any time to supply to the Council satisfactory credentials in this respect.

"Smoking within the lantern space shall be absolutely forbidden at all times."

Our Editorial Table.

The York-Schwartz' Magnesium Cartridges.

Wholesale Agents: A. & M. Zimmermann, 9 and 10, St. Mary-at-Hill, E. C.

These little metal cartridges contain magnesium, and in use they are suspended by a convenient metal holder supplied for that purpose. A loose tab of paper depends from the cartridge, and when this is ignited a very broad and long sheet of light, lasting from a half to two seconds, is emitted. There is scarcely any smoke. We have put the cartridges to actual trial, and find them answer very well indeed in the dwelling room. Amateurs and others attempting home photography by magnesium should find these cartridges a boon.

Hubl's Developing Powder.

Agents: Isenthal, Potzler & Co., 85, Mortimer-street, W.

This developing powder, prepared according to Baron Hubl's formula, we believe, contains glycin as the active reducing agent, and in the form in which it is sent out by Messrs. Isenthal will, doubtless, be highly appreciated by many workers. The various constituents of the developer are presented in such a form that even in moist air there is barely any reaction between them. No distilled water is required to make up the solutions. The metal capsule of each bottle serves as a measure. The instructions for use are as follows: 1. For correctly exposed plates, dissolve two capsules of the powder in 100 c. c. water. 2. For doubtfully exposed plates, take one capsule of the powder to 100 c. c. water at 15° Centigrade. 3. For greatly over-exposed plates, take one capsule to 250 c. c. water, and leave the plate therein, using a vertical bath. These solutions may be repeatedly used, and will keep for hours without discolouration. The developer is also suitable for use with bromide paper.

Catalogue Received.

R. W. Howes, Dereham, Norfolk.

Mr. Howes' 1899 list gives prices of the various kinds of enlargements he undertakes—bromide, carbon, platinum, &c.

News and Notes.

Photographic Club.—November 23, at eight o'clock. Mr. J. Willatts will show an album of very old photographs (1839 downwards) by various processes, and Mr. E. W. Foxlee will describe some of the methods by which they were made.

Royal Photographic Society.—Technical Meeting, Tuesday, November 22, at 12, Hanover-square, W., "The Action of Certain Substances on a Photographic Plate in the Dark," by W. J. Russell, Ph.D., F.R.S., F.I.C., F.C.S. Display of lantern apparatus by Messrs. Ross, Limited.

Re Tom Smith photographer, 7, School-street, Low Moor, Bradford.—This debtor came up for his public examination at the Bradford Bankruptcy Court before Mr. Registrar Lee on the 9th inst. The statement of affairs filed by the debtor disclosed liabilities amounting to 346*l.*, and a deficiency of 177*l.* Replying to questions put by the Official Receiver, he stated that he commenced business in 1875, and made a living until about six years ago, when, owing to keen competition in business, his turn-over declined from 5*l.* to 2*l.* per week. The coal strike a few years back seriously affected his trade. His wife and he separated on August 18 last. He owed her 170*l.* and interest on that sum. The principal creditor, who had objected to the deed of assignment, purchased that debt from his wife for 20*l.* His wife lent him the money to assist him in his business. In reply to the trustee, debtor said he had bought Manchester Ship Canal shares to the amount of 200*l.*, which money he drew from his business. His wife did not lend him the money to buy the shares. One of his creditors had asked him to make him a preferential creditor, but he declined to assent to that course. The debtor was finally allowed to pass his examination.

The late Mr. Gleeson White, we are sorry to say, was unable to make adequate provision for his family during his lifetime, and his wife is left face to face with poverty. A movement is on foot to procure her assistance from the Civil List, to which the services of her husband to the literature of art surely give her a claim.

The Committee on endowment of the Franklin Institute, Philadelphia, is making an appeal for subscriptions to the endowment fund. It is of the utmost importance for the future prosperity and progress of the Institute that a substantial addition to its annual revenues be acquired, not only to provide income sufficient to carry on its present work, but also to enable it to extend this in other directions.

Kollmann and Buchly have constructed a model of the head and shoulders of a young woman who lived during the neolitic period in one of the Swiss lake dwellings from a skull found in Auvernier at the Neuenburgersee. The artists are confident that their scientific knowledge has not led them astray. The lady appears to have been a good-looking person, with a high, broad, and unreceding forehead, and of a cast of features much like that of the German women of the present day.

In connexion with the Mid Cheshire Exhibition of Fine and Industrial Arts, to be held at the Verdin Technical Schools, Northwich, early in January, 1899, there will be a section devoted to photography. The following are the classes (open to county of Chester): 1, Enlargement (original negative must be produced); 2, Print of any size made by any process; 3, Collective exhibit of six photographs; 4, Technical picture; 5, Artistic picture; 6, Set of not more than six photographs depicting any industry; 7, Production of trick photography; 8, Stereoscopic work, one set consisting of four—either two prints and two transparencies or four prints. Lantern slides: 1, Landscape; 2, Architectural; 3, Seascapes or coast scenes; 4, Interiors; 5, Natural history (animals, &c., in their native haunts); 6, Domestic animals; 7, Flowers and foliage; 8, Snap-shots (animals in motion, street scenes, &c.); 9, copying; 10, Subjects not included in the foregoing classes. Slides to be standard size, $3\frac{1}{4} \times 3\frac{1}{4}$, each set to consist of not more than four. The original negatives in all cases must have been the entire work of the exhibitors. No photograph or lantern slide can be sent in for competition which has already won an award, but such photographs may be sent in for exhibition. Rules applicable to this section may be obtained from the Sectional Secretary, Mr. G. Holland, 125, Chester-road, Northwich, who will give all information.

A Photographic Society for Kirkcaldy.—A meeting for the formation of a Society was recently held at Kirkcaldy, over thirty being present. Mr. David Storrar, having been called to the chair, explained the object of the meeting, and mentioned that about sixty names had been handed in. It was resolved, on the motion of Mr. D. Landale, seconded by Mr. John Ogilvie, that a society be formed, and, after some discussion, it was agreed by a majority that professional photographers be eligible for membership. The purpose of the Society is to encourage the practice of amateur photography by providing a developing room and enlarging lantern for the use of members, besides holding meetings at which papers on the subject may be read and discussed and photographs exhibited, and also in due time by holding an exhibition, and by means of competitions stimulating the members to perfect themselves in the art. After a discussion of the ways and means, it was unanimously agreed that the annual subscription be 7*s.* 6*d.* The following office-bearers and council were then appointed:—*Vice-President:* Mr. H. P. Thomson.—*Treasurer:* Mr. A. Hanley.—*Ordinary Members of Council:* Messrs. D. Storrar, D. Landale, J. D. Swanston, J. Ogilvie, George Pringle, and Robert Forsyth.—*Secretary:* Mr. S. Stewart, 2, Salisbury-street, who will be glad to have the names of any one who desires to become a member. It was remitted to the office-bearers and Council to nominate a president, to formulate rules, and look out for suitable premises, and report to another meeting to be held on the 21st inst. A vote of thanks to the Chairman terminated the proceedings.

Re John Henry Preece, trading as John Henry, photographer, 62, Boldstreet, Liverpool.—The above-named debtor appeared for his adjourned public examination at the Liverpool Bankruptcy Court, before Mr. Registrar Bellringer, on the 9th inst. The debtor alleged his failure to have been caused through his having become surety for the payment of 20*s.* in the £ to the creditors of a friend of his named Frederick Davies, an outfitter of Cheltenham, who is now a bankrupt in the Cheltenham Bankruptcy Court, and also to his having advanced Davies sums amounting to 506*l.*, for which amount, together with 495*l.*, debtor had become liable in respect of bills held by Davies's creditors. Davies had executed a bill of sale to him as security for the money. Mr. Mahon, the trustee, stated that he had attended the public examination of Davies at the Cheltenham Bankruptcy Court a week or two ago, and had questioned the bankrupt as to the transactions between the parties, and Davies positively denied that he owed Preece any money at the time the bill of sale was given. A quantity of correspondence of an extraordinary nature had come into the hands of the trustee which had an important bearing on the *bona fides* of the bill of sale. The debtor, in reply to questions put by Mr. Pride, who appeared for the trustee, stated that he had reports of the public examination of Davies, but his statements were utterly untrue as to the bill of sale. Debtor desired fully to adhere to what he stated at his previous examination, namely, that Davies owed him 506*l.* 3*s.* for money lent on I.O.U.'s and other acknowledgments, which were destroyed when the bill of sale was given for that amount and the 495*l.* he was liable for to Davies's creditors. He admitted that some of the letters he had written were foolish, and pointed to the bill of sale being of a bogus nature, but he asserted that this was in consequence of his ignorance of legal matters, and they were written to Davies as an old friend. He admitted having written to Davies in these terms: "If any one talks in that way about the cash not being paid, you say that you had some cash over twelve months ago, and that it had gone up to 506*l.* 3*s.*; in fact, that it is more, and that we shall stand out, whatever they liked to do. Send me some old I.O.U.'s. Don't use the same paper, but send it in this way, say, December 3, 1896, I.O.U. the sum of 60*l.*, until you make up over 506*l.* 3*s.*, then we are safe, and they will get put out and have to pay heavy;

and I hope they will go for us, old man, for it will be the making of us. Do this old man, then we shall be safe, for we must pull through. Wire me in the morning, and you can tell them what a devil I am." In another letter which he admitted having written to Davies, the following sentence occurred: "If it were not for the bill of sale, and they think you owe me this money, the place would have been sold, and most likely mine too." Other letters of a similar nature were put before the bankrupt, but he asserted that they did not at all alter the fact that Davies owed him the money as stated. The Registrar: Why did you say in that letter, "They think you owe me this money?" Have you no explanation? Debtor: No. It is a pure mistake, that is all I can say. The Registrar informed the debtor that the letters were of a very serious nature, and he thought the best way would be to put them *en bloc*, and let them speak for themselves when the question of the bill of sale came to be considered. Mr. Pride concurred, and said the trustee considered it his duty to the creditors of this estate to bring the matter fully before the Court. It was of the utmost importance to the creditors to establish the *bona fides* of the bill of sale if possible. Replying to Mr. Cuff, who appeared on his behalf, the bankrupt stated that, in one of the letters read, he had only suggested the I.O.U. of December 3, 1896, 60*l*., as a sample of the form he wanted the I.O.U.'s to be in, as they were to replace previous documents that had been destroyed. Eventually the examination was adjourned until the December sitting of the Court.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

November.	Name of Society.	Subject.
21	Barnet and District	Lantern Talk. Mrs Ward.
21	Bradford Photo. Society	*Photographic Mechanism.* S. M. McKellen.
21	Camera Club	Exhibition of Members' Lantern Slides.
21	North Middlesex	*Lessons from the Exhibitions.* R. Child Bayley.
21	Shropshire	Demonstration: *Printing and Developing in Gaslight with Velox Papers.* W. J. Belton.
21	Society of Arts	*Acetylene.* Professor Vivian B. Lewes.
21	South London	Annual Excursion Slide Competition.
22	Birmingham Photo. Society	*Colour Photography, and the Rendering of Colour Photography.* J. F. Hall-Edwards, L.R.C.P., F.R.P.S.
22	Hackney	*A Revision of Printing Methods with Bichromate, Platinum and Silver Salts* Jno. H. Gear
22	Lewisham	*Lands ape Photography* F. R. Ball
22	Royal Photographic Society	*The Action of Certain Substances on a Photographic Plate in the Dark.* W. J. Russell, Ph.D., F.R.S., &c.—Display of Lantern Apparatus by Messrs. Ross, Limited.
23	Croydon Camera Club	Conversational Meeting.
23	Croydon Microscopical	Annual *Soirée.*
23	Kingston-on-Thames	Lantern-slide Competition.
23	Leeds Camera Club	*Light and Colour.* E. R. Dixon, A.P.S.
23	Photographic Club	*Some Old Photographs, and How they were Made.* Messrs. Willatts and Foxlee.
23	Society of Arts	*Long-distance Transmission of Electric Power.* Prof. George Forbes, F.R.S.
24	Ashton-under-Lyne	Conversation and Sale of Papers.
24	Camera Club	*Objects of Interest from an Editor's Portfolio.* Carmichael Thomas.
24	Darwen	Members' own Slides.
24	Liverpool Amateur	*Thames Excursion.* Dr. T. W. A. Napier.
24	London and Provincial	Open Night.
24	Woolwich Photo. Society	*Toning Prints.* C. H. Imrie.
25	Croydon Microscopical	Photographic Chat.
25	West London	*Lantern Slides.* J. A. Hodges.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 10,—Mr. W. D. Welford in the chair.

The subject of the joining up of panoramic pictures, about which some difficulty had been found in obtaining coincidence between the margins of neighbouring portions, received further attention from the meeting, the Chairman showing a long series which was particularly free from discrepancy, and this notwithstanding the fact that the long focus of the lens necessitated its racking out to a considerable distance from the camera screw, which, it had been stated, should be immediately below the optical centre of the lens. As a matter of fact, a long focus was advisable.

Mr. EVERITT said it should always be remembered that each separate picture included in the panoramic series had its own vanishing point, for which reason it could not be expected that the lines would match together or give any true idea of the original of the picture.

Mr. Rapson passed round some experimental prints toned with formate, the changes being rung as follows: Four prints were washed before toning, and four were not. One of each of these was toned according to formula, two more at half strength, two further prints in a bath of full-strength formate and half gold, the last two in half-strength formate and full gold. The differences of tint were evident, but not strongly emphasised, and, as regards the influence of washing before toning, there did not seem to be reason for saying that one course was preferable to the other.

Mr. W. THOMAS read a paper upon the photography of

BIRCH AND BRACKEN,

dealing with the particular points where variation from general procedure becomes necessary. His early remarks urged the cultivation of a better understanding of such tools and mediums as are necessary to the production of our final results, the better this understanding the less being the restrictions in their employment and the more freedom to be enjoyed in their application. Every picture should possess something of breadth, unity, and harmony, one dominant note or feature by which one may recognise the intention and meaning sought to be conveyed. Technical skill is as necessary for pictorial as less assuming work, he pleaded, and, indeed, from good technical knowledge the step towards our ultimate goal is but short; but it was a very false belief that to succeed as pictorial photographers implied the need of no knowledge on the technical side. Make yourselves good photographers, thorough masters of technique, then use it wisely—such was the advice of the lecturer. Make a speciality of some branch which appeals to your feelings for the time, and by repeated experiment become master of its peculiarities, for, the more thoroughly a particular class of work is negotiated, the less will be the failures; and not only so, but the more subtle the renderings. Birch and bracken is best from the photographer's point of view from September or October to April or May. What will strike the eye at once will be the abundant contrast of light and dark patches, the deep background of dense wood; the colour contrast of the bracken in its orange-purple, red, brown, and russet garb; and the green of the grass. Exposure should be generous (one cannot well over-do it upon such material), a plate sensitive to yellow and green and rich in silver being peculiarly suitable. To this isochromatic plate may be added a yellow screen. To avoid halation (a very probable defect unless precautions be taken), a backed plate should be taken. The exposure should be such that no forcing in development is necessary, and the developer should be so mixed as to hold back the high lights, weak in density-yielding agents.

Mr. Thomas passed round a casket of ordinary uncorrected spectacle lenses with which he was much pleased, the definition given being pretty well all he wanted as a rule. The set of lenses afforded a number of foci, and, besides doing good work, were very cheap. He found it gave him great power, wherever there was danger of under-exposure, by using a rodinal developer, and having what was known as Edwards's redeveloper alongside. As soon as all detail is present the plate is put into the redeveloper, in which takes place the gradual building up of what image had appeared in the ordinary solution. Regarding exposure, he might say that he had recently calculated by approved methods that the full exposure required on a given day for this class of subject was one-eighth of a second. However, he gave instead periods of two to six seconds in the exposures he made. Mr. Thomas then gave a running criticism of the composition, lines, and general construction of some birch and bracken pictures on the screen, and the many means he had taken to improve by alteration of point of view, trimming, and so forth.

PHOTOGRAPHIC CLUB.

NOVEMBER 9,—Mr. F. A. Bridge in the chair.

Mr. CHARLES REID, of Wishaw, very kindly gave a lantern entertainment, the slides being exclusively of animal subjects and their haunts, arranged in a progressive series extending through the four seasons of the year. Shire horses, Clydesdale and other heavy horses at the plough, Shetland ponies, in domesticated and wild state, wild rabbits, sporting and hunting pictures, retrievers and spaniels at work, and birds innumerable, successively formed the topic of an interesting chat. More particularly interesting perhaps, on account of their rarity, were the photographs of otters in the streams and on the banks, and of a beaver, with pictures of the dams thrown across the water by these animals, and half-gnawed trees and branches soon also to be stretched across the stream. The Western Highlands, and the wild cattle in all the advantages of their native surroundings, offered some striking opportunities of which Mr. Reid availed himself with unqualified success, as, indeed, was the case in every picture shown, although many must have presented no small difficulty in the taking. A very cordial vote of thanks was passed to Mr. Reid for his excellent display.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE following is a list of the officers for the season 1898–9:—*President:* Mr. James Wood.—*Vice-Presidents:* Messrs C. H. Coote, F. Edwards, J. C. Wolfenden.—*Council:* Messrs. B. J. Beckton, J. G Chapman G. Grundy, W. Thompstone, J. W. Whittaker.—*Hon. Treasurer:* W. G. Coote.—*Hon. Secretaries:* Messrs. A. E. Casson and Harry Wade.

The second monthly meeting of the forty-fifth session was held in the Society's rooms, 44 Mosley-street, on the 10th inst., the President in the chair.

Mr. Harry Wade exhibited Elliott & Son's Carbon Colour Chart, along with several prints developed by him on opal and single transfer paper, the colours being portrait brown, sepia, and red chalk, which were much admired.

Mr. W. J. BELTON, of the firm of John J. Griffin & Sons, then gave a demonstration on

VELOX PAPER.

Mr Belton first gave a description of the paper describing it as a gaslight finish for printing process, as the whole of the operations including exposure and development, can be done in one's own living room. After passing round various qualities of the paper, including carbon, glossy rough and portrait Velox, the demonstrator proceeded to expose and develop several pieces of paper, the results being highly satisfactory.

Mr. Wood, a visitor to the meeting, showed several Velox prints of a warm brown and red colour, obtained by giving an exposure of about four inches of magnesium ribbon, and developing with Thomas's hydroquinone developer.

Croydon Camera Club.—Wednesday evening, November 9, was mainly devoted to the inspection of prize slides, some 150 in number, which had been lent by the editor of a contemporary. The whole series afforde

members a good deal of instruction, and provoked at times the expression of warm approval. None the less, as regards certain of the classes, some of the more audacious of the members were of opinion that they could do a deal better, which they mean to put to the test at the next competition. While the landscaps shown cannot, as a whole, be regarded as of phenomenal attainment, there was at least one set of figure subjects that would stand out in any collection, viz., *Bath Night*, which provoked roars of laughter. Mr. William A. Fraser's moonlight, lamp light, and snow scenes were also notably fresh and good. A series of hoar frost on leaves and twigs, &c., came in for commendation, but exception was taken to the unsuitable warm tones, indicating a lack of technical knowledge, or of industry, on the part of the slide-maker. Astonishment was freely voiced at the flower studies, which took the silver medal, being placed second to the gold medal set. The architectural slides were very correctly rendered, but, although of good quality, it was felt that their subject-matter was exceedingly hackneyed, consisting, as they mainly did, of views of the English cathedrals. It should be noted that several of the winning slides were stated to be from negatives taken upon the Sandell double-coated plates, the knowledge of which gave much satisfaction, Mr. Sandell being a member of the Club. The explanatory notes sent out with the slides were read by Mr. H. S. Wratten.

Kingston-on-Thames and District Photographic Society.—November 9, Mr. Montague Robertson (Vice-President) in the chair.—A lecture by Mr. JOHN A. HODGES was read, the subject being

THE TECHNICAL AND ARTISTIC TREATMENT OF LANTERN SLIDES.

In his opening remarks Mr. Hodges said that lantern slides, from an artistic standpoint, often came in for much severe and not altogether unmerited criticism. To make a really perfect slide was not the easy matter many would have us believe. It demanded greater skill and technique than is necessary in the production of paper prints, and in proof of this he pointed out that many workers in the very front rank of photography were very indifferent slide-makers. In mounting slides for the lantern the masks used should be very carefully selected, and each slide should receive as much attention as though it were a print you were about to mount and frame. He objected to the careless method in which lantern pictures were too often projected. A small disc was, in the majority of cases, preferable to a large one, and the intensity of the light should be adjusted to the requirements of each individual slide. At the close of the lecture a short discussion ensued. Mr. SMITH, in referring to Mr. Hodges' remarks *re* mounting and selection of masks, saw no reason why lantern slides should be deprived of suitable framing and setting any more than paper prints. He showed several slides, all of which appeared upon the screen properly mounted and framed, in fact just as they should appear were they destined to adorn the walls of an exhibition. If slides require nothing more than an indefinite border of funereal blackness to enhance their pictorial qualities, then, surely, it is waste of money to invest in expensive frames for our exhibition prints. Given a coat of tar, the walls at Pall Mall or elsewhere should be ready to receive the trimmed prints, which would only require to be pasted on at the discretion of the Selection Committee. Mr Smith's practice is to dispense entirely with commercial mats and cover glasses, and to make two slides, one of the frame selected for the subject (or frame and mount according to whether the picture is to be framed close up or with a margin) and another of the picture, the two being accurately fitted and bound together film to film. To represent a gilt frame for coloured slides, the frame slide is immersed alternately in orange and yellow dyes until the desired shade is obtained. Slides toned to a warm brown or reddish colour may be framed close up in a green and gold frame of a Birket-Foster pattern, the colours being applied locally with a brush, using aniline or transparent oil colours; or the frame slide may be printed in green pigment by the carbon process, putting in the gilt parts with yellow lake. In this way, by printing in various coloured tissues, and with a little local colouring, almost any moulding can be imitated. There can be no doubt that, if lantern slides are ever to be placed in the same category as paper prints as a means of artistic expression by photography, the present method of binding up with various-shaped opaque paper masks will have to give way to the more sensible and artistic plan of fitting a transparent frame and mount carried on the cover glass. Possibly, with the assistance of enterprising dealers, this desirable revolution in slide-mounting will, in another year or so, have become an accomplished fact, and the unsightly paper mat as much out of date as the solid-tyred bicycle is to-day.

Putney Photographic Society.—Monday, November 7, Dr. Sheppard (President) in the chair.—A considerable number of new members having recently joined, the Council had arranged for a series of elementary lectures to be given for their benefit; the first of these, on the

DEVELOPMENT OF THE PLATE,

by Mr. Francis T. Beeson, F.R.P.S., occupied the evening. In his opening remarks Mr. BEESON said that, after having made himself acquainted with, and having used all the new developers, he had come to the conclusion that the old pyro-ammonia was the most generally useful, though he readily granted that for special purposes some of the others might have advantages. He used his chemicals in ten per cent. solutions. He explained the chemical action of the various solutions, remarking that ammonia was an accelerator only, carbonate of soda an accelerator and a retarder, the bromide being required to prevent reduction in the shadows. There were two methods of development, by the one, density was first obtained and the detail afterwards; by the other, detail was first brought out and density then built up with a strong developer. He recommended the latter as giving the most satisfactory results. In his dark room he preferred artificial light to daylight, owing to the great uncertainty of the latter. The lamp should be, if possible, placed outside the room. He made up as much solution at once as he was likely to want for the plates he proposed to develop, and said that the order of mixing the solution was of some importance. The ammonia should be measured out first, the bromide next; the water should then be added, and, last, the pyro; then the whole should be well stirred. He advised that, in a general way, the developer should only be used for one plate, and then thrown away; using it a second time frequently caused trouble with air bubbles and stains. The developing dish he preferred to be made of papier-mâché; it should be held with the dry plate in a slanting position, and the developer should be poured in at the lower side; the dish should then be tilted in the other direction, so that the developer may flow in an even wave over the plate, after which the dish must be gently rocked in all directions, so as to keep the developer in motion the whole time. Density must be judged by looking *through* the plate; unless one always used the same brand of plate, looking at the back was no criterion, and, with the same brand even, appearances varied. Always keep the bottles in the same order in the dark room, and have different size and shape bottles for the different solutions, so that there will be no uncertainty as to which is which in the dim light. To prevent staining the hands, Mr. Beeson recommended rubbing a small quantity of lanoline well on the fingers, particularly under the nails. Mr. Beeson then proceeded to give a practical demonstration. He had brought two sets of exposed plates of the same subjects taken under practically similar conditions; one set had been given different exposures ranging from over to under-exposure, those in the other set had all had the same exposure, as nearly correct as possible. He then showed the use of the various chemicals in order to modify the result of over and under-exposure in the first series, and in the second he showed the different results of varying developers with same exposure. The demonstration was carried out in Mr Beeson's usual able manner, and fully proved his points. He was followed throughout both lecture and demonstration with the greatest attention by all present, both new and old hands, and everybody joined in a hearty vote of thanks, which brought a very successful and interesting evening to a close.

West Surrey Photographic Society.—The demonstration last week was by Mr. OTTO SCHÖLZIG of his

NOVITAS STRIPPING FILMS.

After exposure in the way usual to printing-out papers, came the toning. For this Mr. Schölzig recommended brush working. Making a toning bath of 75 minims of a ten per cent. solution of sulphocyanide of ammonia, 100 minims of a one per cent. gold solution, added to 3 drachms of water, he added drop by drop at a time a ten per cent. bicarbonate of soda solution till the bath was clear. Laying the dry print face up on a piece of glass, he took up as much of the mixed solutions as a camel's hair mop would hold, and brushed the print over quickly but lightly till toned, which was in about two minutes. After the usual hypo bath, and twenty minutes' washing, the whole was soaked in water heated to 120°. This dissolved the gelatine substratum provided and allowed the film to be removed, and transferred, reversed or otherwise, to any hard surface required. Lantern slides and transparencies—or opals—were thus easily made. The demonstration was very complete and successful, the toning part of it especially taking the fancy of the members. In response to a vote of thanks, Mr. Otto Schölzig promised a demonstration shortly with a new paper he is preparing.

Liverpool Amateur Photographic Association.—November 10.—Mr. T. E. C. WILSON demonstrated the working of

CRESCO-FYLMA ENLARGING PROCESS,

before the members. The process appeared to be extremely simple, and was perfectly successful in Mr. Wilson's hands; it should prove useful for making enlarged negatives in the winter, when daylight is not often available for the amateur. After the demonstration some discussion took place, and several questions were asked, and answered by Mr. Wilson.

FORTHCOMING EXHIBITIONS.

1898.		
November 18	.....	Brixton and Clapham Camera Club (Members)
,, 18	.....	Hackney. Hon. Secretary, W. F. Fenton-Jones, 12, King Edward's-road, Hackney.
,, 18, 19	.....	Hove Camera Club. Hon. Secretary, C. B. Stoner, 24, Holland-road, Hove.
,, 18–Dec. 15		Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 23–26	.....	Aintree Photographic Society. Hon. Secretary, D. Travis, Fazakerley, Liverpool.
,, 24	.....	Ludlow. Hon. Secretary, J. H. Williams, Guildhall, Ludlow.
December 27–31	.....	Borough Polytechnic. Hon. Secretary, H. C. Philcox, 103, Borough-road, S.E.
1899.		
February 4–25	.....	Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Patent News.

THE following applications for Patents were made between October 31 and November 5, 1898:—

BACKGROUNDS.—No. 22,815. "Artificial Backgrounds for Photographs." T. R. WATSON.

MOUNT AND FRAME.—No. 22,816. "A New and Improved Mount or Frame for Photographic and like Prints." T. R. WATSON.

KINEMATOGRAPHS.—No. 22,903. "Improvements in, or in connexion with, Kinematograph and the like Apparatus." G. HAYDON and HAYDON & URRY, LIMITED.

PRINT-WASHERS.—No. 22,938. "Improvements in Photographic Print Washers." G. T. HARRISON.

KINEMATOGRAPHS.—No. 22,976. "Improvements in Kinematographs." L. REULOS.

COLOUR PHOTOGRAPHY.—No. 23,011. "Improvements in Apparatus for Photographing and Reproducing Moving or Stationary Objects without or with Colours." E. HUNT.

ANIMATED PHOTOGRAPHY.—No. 23,055. "Improvements in Apparatus for Exhibiting Animated Photographs." W. STARLEY and P. DINGLEY.

PHOTOGRAPH FRAMES.—No. 23,097. "An Improved Quadrant Action to be applied to Reversible Struts for the Backs of Photograph Frames, Mirrors, and all Articles requiring a Strut for Support." A. PARKES and J. STEYSKAL.

CINEMATOGRAPH SHUTTER.—No. 23,099. "An Improved Automatic Shutter to Cinematographs to prevent Accidents by Fire to Films." E. HOLMES.

ANIMATED PHOTOGRAPHY.—No. 23,130. "Improvements in Apparatus for Representing Life Movements by means of Rapidly Changing Photographic Pictures." W. F. STANLEY.

FLASH POWDER.—No. 23,277. "An Improved Method and Apparatus for Igniting Flash Powder as used in Photography." E. DEBENHAM.

STANDS.—No. 23,297. "Improvements in the Manufacture of Photographic Camera Stands." J. FROST.

KINETOGRAPHS.—No. 23,327. "An Improved Driving Mechanism for Phonographs, Kinetographs, and the like." Complete specification.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE FREE-PORTRAIT SWINDLE.

To the EDITORS.

GENTLEMEN,—I notice a letter signed by Mr. H. D. Palmer in your last issue, in which he writes favourably of the "Free-Portrait Swindle." To my mind this seems to be a never-ending source of profit to those who "run it," and, although routed out of different towns in England, I believe, seems to have the knack of turning up somewhere else. Now it comes from the gay city of Paris. Recently I had an offer to enlarge my portrait gratis from this city, "just to advertise their work, or introduce it to this particular district." As there was a well-known name quoted as having received one of their free enlargements, &c., I was at that time innocently led to believe that "there was something genuine in it," and handed the coupon over to a friend. Result: The portrait was ready, carriage would be 8*s.*, and frame an extra 24*s.*

In these days of enterprise one expects a lot for one's money, with the natural result of generally being had as a "jay," which is, I fancy, the right expression. "Something for nothing" has always been a dear way of buying, and I suppose always will be. Better go to the D—— you know than the D—— you don't know. *Verb. sap.*—I am, yours, &c.,

12, *King Edward-road, Hackney, N.E.* W. F. FENTON-JONES.
November 11, 1898.

PHOTOGRAPHIC PATENTS.

To the EDITORS.

GENTLEMEN,—I notice in your last issue that Mr. Watkins again puts forward his views with regard to patents and patentees in opposition to my own. As he raises some new and interesting points, I will, with your permission, deal with his statements. In the article, "Photography by Patent," I did not enter into questions of "justice to the inventor," &c., but took the more commercial side. English patent law takes the same standpoint, that is, a patent is nothing beyond a grant or monopoly from the Crown of the sole right to make and sell a certain article, this being given for the purpose of gaining possession of an invention for the public good at the end of fourteen years. The right to trade being all a patent gives, it follows that only one patent can exist in any subject, and that to grant six or 100 reduces the whole thing to a farce. Trade does not demand these numerous patents, and, even if a demand is proved, the practice is simply a ruinous waste of wealth, time, and resources.

Turn to the subject of photographic-exposure shutters and hand cameras, and here it is no exaggeration to describe the position as "one photographer one patent," so fertile is the ground. Let my critic devote a month to reading specifications of shutters and hand cameras and he will be inclined to think that the ingenuity, instead of being a rare possession needing encouragement, is quite common and rather requires being brought under control. In the present state of the patent laws, there is nothing to prevent there being 500 or 5000 patents dealing with exposure meters, though it is not manifest what advantage this would be to photographic commerce.

Mr. Watkins has used the word, "piracy," and on this point our main difference turns. I have not hinted or suggested "piracy" on his part, since piracy is meaningless to me, a non-supporter of monopoly; I simply reserve my judgment as to the originality of any given patent until a judge and jury, or some acknowledged body of experts, have pronounced on the matter. At present the decision as to originality is supported by the private judgment of the patentee, which carries no more weight than the opinion of our friend, "the man in the street."

Finally, Mr. Watkins makes a definite claim, giving a comparison as a proof. In the table given, Burton's figures represent relative or absolute exposures, whereas Mr. Watkins's figures are merely factors, which required to be multiplied by the number of seconds a sensitive paper takes to darken to a standard before they can compare with Burton's. The table is fallacious and proves nothing. Leon Vidal also in his little work deals with the proper position to hold the actinometer, recommending the operator to turn his back to the sunlight, having the actinometer close to the body and in shadow. All down the years this matter has been quite a common theme, and I fail to see in what the "radical change" consists.

I might enlarge on this topic, but, having given a list of original papers, &c., in my article, I leave it for each investigator to form his own opinion on that material. It is not my desire or intention to dogmatise on a question which belongs largely to the sphere of private judgment.

It is to be hoped that Mr. Watkins will complete the history of the exposure meter since 1890 by adding to my list other sources of information.—I am, yours, &c., JOHN A. RANDALL.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPH REGISTERED:—

A. Wragg, 30, Burscough-street, Ormskirk.—*Photograph of Thos. Colquitt, the champion buck-jumper of the world.*

L. P. C.—We do not think the firm liable for the expense you were put to.

W. PERRY.—Obviously we cannot insert your letter. Is not the case one for legal measures?

PYRO.—We do not answer anonymous inquirers. Send us your name and address, and repeat your question; we will then endeavour to help you.

T. GERMAIN.—1. We only mention such photographs as are registered by ourselves. 2. We are sorry that you should have had an imperfect copy.

MEDRINGTONS (LIMITED).—So far as we can see you have absolutely no remedy. We find it impossible to offer any suggestion likely to help you in the matter.

AN ASSISTANT.—The work is very good; you have all the makings of a high-class photographer. We should think you could easily command a salary of 2*l.* 2*s.* a week.

A. N. CROZLE.—1. Some trace of a slightly sensitive salt of silver must have been left in the film and it has become reduced by light. 2. No; there should be no white powder.

W. S. COPPIN.—We do not answer questions through the post. Send us the photographs and we will give you our opinion. Our publishers will effect registration for you. Send them three prints of each subject, and one-and-sevenpence for each registration.

DEXTRINE AS A MOUNTANT.—M. W. This is a very convenient medium for the purpose, but it is by no means to be recommended. Commercial dextrine is invariably acid, and therefore is not suitable for mounting silver prints with, because it would have a tendency to promote fading.

FAULTY ILLUMINATION.—C. CARDEW. The appearance, as described, is caused by the source of light, the lime not being in the axis of the optical system of the lantern. Move the light about until an even disc is obtained on the screen. That is best judged of without a slide in the lantern.

UNDER-EXPOSURE.—P. R. E. If the plates have all received a similar exposure to the one sent, they are much under-exposed. Instead of using pyro soda for the rest, try metol, using it with plenty of patience. With that and care, we doubt not that more detail may be brought out than in the negative forwarded.

ROBINSON.—A difficult thing to account for. If the heat was a little too great and concentrated in that part of the negative, that might cause it; the gelatine might have been in an exceptionally tender state. We know of no reaction between the film, the developing and washing solutions, and the varnish, which would cause it. Sorry we can offer no further explanation.

FAULTY VARNISH.—R. GENZE writes: "I made up some varnish according to the formula No. 6 on page 1031 of the ALMANAC, *and made it strictly to it.* When applied to negatives, sometimes it dries and sometimes it does not, or, if it does, it becomes tacky in a few days afterwards."—If the varnish does not dry, or becomes soft afterwards, it shows that there is hyposulphite left in the film through insufficient washing.

ROGS.—Perfectly practicable; capital results are produced by the light. We have published several articles on the subject, to which we refer you. Messrs. Thorne & Hoddle, makers of the Incanto apparatus, New Tothill-street, Westminster, S.W., will also give you information. Better write them.

AMERICAN VIEWS.—G. BLACKALL asks: "Can you let me know where I can obtain views of America, including New York and Chicago, besides the Photocrom Company? I shall be much obliged if you can supply me the information. I shall not want a quantity, but one of each view I order."—We do not know where they are to be obtained in England, unless they can be had from such houses as Wilson & Co., Aberdeen, or Valentine, of Dundee. Communicate with those firms.

ENAMELLING.—C. GORHAM asks: "Will you please tell me how the enclosed photograph is enamelled? I may tell you I have just invested in roller burnisher with heating apparatus, and am anxious to know how the enamelling is done, as professionals appear to avoid letting me into the secret."—The glossy surface of the print is obtained by simply squeegeeing the print upon a glass, or ferrotype, plate and allowing it to dry upon it. When stripped off, the prints have the gloss of that sent.

CRYSTOLEUMS.—CRYSTOLEUM asks: "Will you kindly inform me which is the best paper to use for prints for crystoleum work? I have done some prints for customers on albumenised paper, and they say that they do not take the colours as well as the prints they purchase from the picture dealers."—The prints generally used for this work are those on albumen paper, and it is very probable that those purchased from the picture dealers are also on that paper. Possibly a wash of very diluted oxgall (the prepared oxgall of the artist's colourman) will cause the prints to take the colour better.

FACTORY ACT.—H. B. is a photographic view publisher employing about a dozen hands, men, women, and boys—they work 9½ hours per day, from 9 a.m. until 8 p.m., with an hour for dinner and half-an-hour for tea, with the exception of Saturdays, when they leave at 5 p.m.—1. Does this come under the Factory Act? 2. What are the working hours specified in the Act? 3. Should the employés be paid for bank holidays?"—In reply, 1. Yes. 2. Better get an abstract of the Act from the Inspector of Factories in your district. That will give the particulars and many others that will be useful. 3. Yes, if they are weekly servants.

PROCESS BLOCKS.—FERRUM says: "We have been asked to reproduce some black and white drawings for printing in a book which is to be produced shortly in this district. The work we have done hitherto has all been intaglio engraving, and we should be glad therefore if you would let us know what is the best method of making blocks for black and white work, and what is the best book published on the subject? We presume some processes are more easily learnt, and require less outlay for apparatus, &c., than others. We should like to go in for one of these—other things being nearly equal."—Wilkinson's book, which may be had through Penrose & Co., Upper Baker-street, Lloyd square, W.C., will give the information desired.

ENLARGING WITH LANTERN.—T. WRIGHT says: "I have a lantern with three-wick lamp, and the picture it gives on a six-foot screen is all that can be desired, it is as sharp as possible; but, when I try to take an enlargement with it from a negative, the same size as a lantern slide, on 15×12 bromide paper, I cannot get a sharp picture. The image seems perfectly sharp when focussed, but when developed it is all out of focus."—The lack of sharpness is due to the objective not having its chemical and visual foci coincident. That is the case with many lantern objectives. Indeed the best, purposely, have not. Sharp enlargements may, however, be obtained by making the necessary correction after the image is focussed. The distance required can only be determined by experiment.

ELECTRIC LIGHT.—ELECTRIC writes: "Will you kindly give us through your valuable paper, the following information. In fitting up a studio with electric light, size of studio about seven yards long and five yards wide, what candle power is necessary to photograph a bust and three-quarter figure, and who would you recommend to fit the same and the amount about what it would cost to complete, only on a cheap principle, not of elaborate maghogany fixtures, but cheap and practicable. I may say the mains are close at hand."—A light of from 5000 to 8000 candle power will enable portraits to be taken with a brief exposure? Of course, a smaller light may be used by giving a longer exposure. Messrs. Gwynne & Co., Brook-street, Holborn, make a speciality of electric lighting for photographic purposes, and will forward price lists on application. We should recommend you to write for one. A local electrician can lay the current on from the mains to the lamp.

STUDIO.—ALPHA writes: "Enclosed is a plan of studio according to your suggestions, which I got a short time ago, and I would like to know. 1. If it is exactly what you meant as regards measurements? 2. Would it be any advantage to have the sides eight feet high and thirteen and a half feet ridges? 3. Is this size of studio large enough for all-round professional work? 4. What would be the length and width of the smallest sized studio in which cabinet groups could be photographed? 5. Are the ready-made studios now in the market of any use for professional work; if not, where could I obtain information on studio building?"—In reply: 1. Yes, the design is good. 2. Yes, it would be a still greater advantage to have both a further six inches higher. 3. Yes, but if space will allow, three or four feet longer would often be a convenience in taking groups. 4. That would entirely depend upon the number in the groups and the focal length of the lens used. 5. We think so. Mr. Bolas's work, published by Marion & Co., is a good one on the subject.

HIRAM asks: "Is persulphate of ammonia the same thing as protosulphate of ammonia? 2. Where can I get it? My dealer never heard of it."—In reply: 1. No. 2. Fuerst Brothers, 17, Philpot-lane, E.C.

COLLODIO-CHLORIDE.—E. P. writes: "1. Do you consider collodio-chloride satisfactory? I am asking because several writers in your paper infer that it is not lasting. Should not white, mauve, or pink paper be as permanent as gelatino-chloride, if coated by a well-known firm, and fixed, and thoroughly washed? 2. When fixing a batch, suddenly the prints turned a dirty yellow (they were toned to a deep blue), and thinking it was caused by acidity in the hypo, I lifted them to one side previous to adding ammonia. Unfortunately the bottle slipped, and nearly an ounce must have run into the (60 ounces) solution. Instead of spoiling the colour of the prints, it improved them. How do you think they will last? and what colour paper is the best to use? The ordinary thin paper is less likely to crack and more expensive, therefore should think it would be more permanent."—1. Collodio-chloride is perfectly satisfactory, and is one of the most permanent of the silver processes. 2. The ammonia would not interfere with the permanence of the prints. They should not, however, have turned yellow in the first instance. The cause of their doing so may have had an influence on their stability. The colour of the paper is a matter of taste, and does not affect stability.

MOUNTING AND A (?) COMPLAINT.—F. E. G. writes: "1. About October 24 I wrote you *re* collodion. In your issue of October 28 you acknowledged receipt, and said it would appear in next, but, after waiting another week, it still did not appear; in fact, the information asked for is now no longer required. 2. Kindly inform me through your next where I can get full particulars for 'dry mounting' by means of roller passed over, say, half a dozen at once. I understand it is a special mountant, which is brushed a day or two before on the mounts; when the print is ready the mount is merely damped with a sponge, the print laid on in correct position, a heavy roller passed over it, and it is then finished."—1. Had our correspondent taken the trouble to look through the Answers in the number in which the reply was promised, namely, November 4, he would find his query was replied to very fully. It would seem that he was not much interested in his question if he did not look for the reply. 2. The best method of dry mounting that we know of is that of Mr. Cowan. The backs of the prints are coated with starch-paste and allowed to dry. They are then trimmed. The faces of the mounts are then moistened with a sponge, and the print and mount passed through the rolling press. This secures perfect adhesion. Other cements may be used instead of starch.

ENLARGING—DISCO says: "I have a quarter-plate (five and a half inches) Beck autograph rapid rectilinear lens and a seven and a half inches Cooke lens, and a few negatives taken with each which I should like to enlarge. The time I have left for photography being limited, I do not want to invest too much money on apparatus I can rarely use, hence my queries. I shall probably be compelled to decide on an enlarging lantern as against a daylight enlarger unless you strongly advise otherwise, my daylight hours, holidays excepted, being otherwise filled. 1. Can I get a lantern suitable for enlarging by gas or acetylene and projecting slides? 2. For enlarging, would the lens (as above) with which the negative was taken be suitable as an objective, or must I get another lens? 3. What would the limit of size of enlargement be in each case presuming a sharp negative? 4. Would the Cooke lens be suitable for projecting up to a ten or twelve feet disc, or is a special objective required? 5. Would there be any danger (from heat or otherwise) to the lens by so using it for enlarging or projecting?"—1. Yes. If gas be used, better have an incandescent burner. 2. Yes, but it would be better to use the objective with which the lantern is fitted, as it will require shorter exposure. 3. Size unlimited; but, of course, the larger it is the greater will be the reduction of light. 4. Yes, but the light will not be so good as with the regular objective. 5. No.

LENSES.—SNAP-SHOT asks: "Would you kindly answer the following questions in your paper? 1. If a 5-inch lens and a 6-inch lens are both put at infinity focus, will all objects beyond, say, 15 feet (with 5-inch lens) and, say, 20 feet (with 6-inch), using, say, *f*-16, be equally sharp in both cases? 2. All things being equal (except lenses), how much larger will an object be on the ground glass with a 6-inch lens compared with a 5-inch? 3. If a $\frac{1}{10}$ of a second was exactly the right exposure with a 5-inch lens, would it be necessary to give a longer exposure with a 6-inch to get practically as good a result; and how much longer? 4. With a 6-inch lens, if $\frac{1}{150}$ of a second was sufficient with *f*-8 how much slower would I have to work the shutter when using *f*-11·3 and *f*-16? 5. My reasons for troubling you are that nine-tenths of my work is marine photography, often from small boats on rough days, and I have nearly always got sharp pictures with a quarter-plate fixed-focus camera; but this year I tried a 5 × 4 focussing camera, but could never get sharp pictures, at least, I did not seem to get the same depth of focus, although I put the lens at the infinity focus, as given in the table at the end of your Annual. 6. I am therefore thinking of getting a 5×4 magazine camera built, with fixed focus and a Thornton-Pickard Special Shutter, but I don't know if a fixed focus will work, *i.e.*, if I can get the same depth of focus beyond a certain point."—In reply: 1. Yes. 2. Roughly, about one-fifth. 3. If both lenses are used with apertures of the same ratios, the exposure will be the same. 4. The *f*-11·3 would require double the exposure, and the *f*-16 four times. 5. Supposing the two lenses were of equal merit, there should be no difference if they are sharply focussed. 6. The fixed focus will do for all objects beyond a certain distance; if that be the infinity distance, all things beyond it will be in focus.

*** Many answers to correspondents and other matter are unavoidably held over till next week.

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Contents.

PAGE

Ex Cathedrâ 753
New Uses for Old Shellac 755
Leaderettes :—
Acetylene Notes—Cinematograph and Similar Entertainments—Dealing with Inflammable Materia's—Fire-extinguishers—Instantaneous Submarine Photography—New Photometer—Photography and Star Motions—Bisulphite and Metabisulphite of Potash—The Spectacle-makers' Company's Diplomas—A New Picture Gallery for East London—November 755
Foreign News and Notes :—
Ammonium Persulphate—Bacteria and Mildew—A New Printing Process—The Alethorama—Acetylene—Washing Plates 757
The Traill Taylor Memorial Lecture 758
Exhibition of the Hackney Photographic Society 760
Brixton and Clapham Camera Club Exhibition 761
Death of Mr. George Dickman ... 762

PAGE

Our Editorial Table :—
Penrose's Collodion-emulsion Pellicle—The Penrose Pocket-books (No. 3): *Collodion Emulsion and How to Work It*—*Petits Clichés et Grandes Epreuves* 762
News and Notes 762
Meetings of Societies :—
Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Camera Club—Croydon Camera Club—Gospel Oak Photographic Society—North Middlesex Photographic Society—Richmond Camera Club—Bradford Photographic Society—Leeds Camera Club—Liverpool Amateur Photographic Association 763
Forthcoming Exhibitions 767
Correspondence :—
Bisulphite and Metabisulphite of Potash—Enlarging with Magnesium Ribbon—The Photoceramic Process 767
Answers to Correspondents 767

EX CATHEDRA.

Who shall say that the Traill-Taylor Memorial lectures do not promise to prove useful? We have already had a communication from an amateur, evidently in the earliest and enthusiastic but—well, innocent stage, saying that he is doubtful about the exact focal length of his quarter-plate rapid rectilinear, and asking if Mr. T. R. Dallmeyer's focometer can be purchased; and, if so, if it is very expensive? This reminds us of a story told by an amateur, now of a good many years' experience, anent his own very early experiments. Of course, he must construct his own lens; so, having procured the glass at great expense, and calculated the curves with a still greater amount of trouble, to make sure all was right before commencing to spoil his glass and his calculations, he wrote to an eminent optician for advice, sending a diagram of the proposed lens and the curves as calculated. The great man replied very kindly, pointing out that he had omitted to mention the refractive indices of his glass, and advising him that he would find it probably cheaper in the long run, and certainly get a better result, if he *purchased* his lens instead of making it. Nothing daunted by the gentle hint, our friend replied that, in his case, it was not a matter of cost, but the love of experiment, that prompted him in his effort; that the glass was Chance's, but he did not know its exact refractive index. To which the reply came that, the "indices of refraction being unknown, the curvature would be of little importance; probably the curves proposed would answer as well as any others *for the experiment;*" and, as our friend says, probably they would, but the lens never got finished.

* * *

Our attention has been called to an omission made in the description of the fine focussing screen in our last issue. It is that, when a clear opening is required for "critical" focussing, one or more apertures in suitable positions can easily be cut in the celluloid. We had intended referring to this convenience, and also to the fact that a more accurate adjustment of a high-power magnifier is obtainable by focussing the celluloid surface than by the usual plan of scratching the surface of the glass with a diamond and filling the scratch with colour.

* * *

A friend, writing in connexion with our remarks on the Bennetto colour process last week, points out that a method of colour printing in one working that is being "boomed" on the Continent is more than twenty years old, at least in the general idea. The precise details have not been published, but the printing surface is formed by building up a slab of coloured material while in a plastic condition, the different colours occupying the positions required in the picture, and from this slab, when finished, the proofs are pulled. We repeat that details of working are wanting, but the process on the surface looks as if either it is a very difficult one to work or else very crude in its results. But our correspondent says that twenty years ago or more a process was exploited in which a Woodburytype or carbon transparency was backed up with a roughly coloured backing of paper, and the method by which the backing was coloured was precisely that described. He states that somewhere amongst his *lares et penates* he has one of the finished pictures, as well as the transparency and backing detached.

* * *

In connexion with the Fellowship scheme of the Royal Photographic Society, the Council of the Society, having learnt that some misapprehension exists as to the method of election of Fellows and the nature of the qualifications demanded, has asked us to make public the following information on the

subject:—Applications are only received on the forms provided, which can be obtained on application at the Society's Offices, 12, Hanover-square, W., and all applicants must be members of the Society. All applications are submitted to a Committee of the Council, who investigate the qualifications of the candidates and report to the Council thereon, giving their reasons in all cases where it is recommended that the application be agreed to. The Council deliberate upon the applications at one meeting and vote upon them at the next, a majority of three-fourths of those present being necessary to secure the admission of any candidate. The Committee meets four times in each year. The next meeting will be early in December, and all applications for that meeting must be received by December 1. No decision on such applications will be given before January 11, 1899.

* * *

THE announcement of the movement in the direction of securing a permanent home for the Royal Photographic Society has brought us a number of letters couched in more or less congratulatory terms, and containing a variety of suggestions, some palpably impracticable, others of such a nature that they will, in all probability, be carried out in the ordinary course of events. But there seems to be a general opinion in favour of the desirability of forming a permanent museum or collection of objects of interest in the way of apparatus and specimens, as well as of portraits of individuals identified with the history of photography.

* * *

ONE correspondent, writing of the proposed holding of the "one-man" exhibitions in the new rooms, asks if "the one-man-show business is not quite sufficiently done in instalments spread over the exhibitions of the year, instead of collecting together the whole of an individual's delinquencies and inflicting them all at once on an already suffering public." He further says: "it is quite sufficiently exasperating, attracted by a fancy title in the catalogue, to find oneself, after hunting out the picture, face to face only with one more of the eternal 'mud bank,' or birch and bracken, or sloppy street and dripping 'gamp,' or anæmic female 'studies' that constitute the modern 'one man,' without being asked to face a whole room full of them at once. Time was—and that not so long since—when a one-man show possessed some little variety, and might be really attractive; but, for the present, at least those conditions do not prevail. Until they do come in again, for goodness sake let us stick to a mixture of 'high art' and the usual thing, even if the latter be only measured in varying grades of mediocrity. There are many people who prefer a 'high artistically' bad genuine photograph to the best of the 'fakements' that pass muster nowadays."

* * *

OUR correspondent is evidently not in complete sympathy with modern art as exemplified by the leaders of photographic fashions; but, setting on one side altogether the question of whether the tendencies of to-day are in a good or a vicious direction, there still remains something to be said against the principle of the one-man show when applied to the works of the ultra-apostles of nineteenth-century photographic art, or at least to many of them. Of course, such a collection, which originated, by the way, with our brothers of the brush, is always open to some extent to the charge of sameness. In the case of a painter, however, it is usually a sameness of style only, and seldom or never a slavish repetition of subject, a monotonous system of parody or paraphrase. Taking hap-hazard, as they occur to us, the names of a few modern or recent painters who have a "style" all their own, there is not one whose collected works might not safely be brought together without the least danger of their fatiguing the eye or exhausting the patience by their sameness of subject or repetition of theme. Take, for instance, the sea pieces of J. C. Hook; and these perhaps are the only ones that, by their mannerism of colour, the exaggerated blueness of their water and skies, might possibly cause a feeling of worry; but they present sufficient variety of subject to satisfy the most exacting. Take, among landscapists, Vicat Cole, B. W. Leader, Keeley Halleswell, Peter Graham, John MacWhirter, to select a few whose styles are as widely removed as possible, though their individual productions could be picked out with almost unerring certainty from a miscellaneous collection, each or any of them would make a one-man show that would prove an interesting lesson in the choice and variety of subject.

* * *

THEN, among figure-painters, we need only mention Leighton, Millais, Tadema, or, going further back, Reynolds, Gainsborough, and Romney, to prove that individuality of style in painting does not cover slavish sameness in subject or treatment. But the charge against the modern photographer is, that he not only fetters himself with certain rules of light and shade, and exposure and want of detail, or as he calls it, "breadth," but repeats himself over and over again with precisely the same class of subject. Of course we know it must be difficult to apply precisely the same rules that work well with mud banks to, say, "birch and bracken," though possibly they might work rather more smoothly with sloppy pavements; but the "artist" should endeavour to shake off the trammels of his "art," to step beyond its so-called "limitations," and then he might be fit for "one-man" shows. We believe this is what he professes to be aiming at, but he has a lot to do yet before he can claim success.

* * *

WITH regard to the proposal to form a permanent museum, it is to be feared that the space at disposal is not sufficient to allow of much being done in this direction, however desirable an object it may be. Last year's Historical Collection at the Crystal Palace showed how much there is in connexion with photography that is already interesting from its very obsoleteness. Half a century has witnessed the birth, growth, decay, and death of innumerable processes, and their passage into oblivion is but a question of time. Now, while the records still exist, while specimens and even portions of the machinery of production are still obtainable, is the time to do something to save the first stages of photography from passing away from memory altogether. Now, too, is the time to save, if possible, for posterity the portraits of those who assisted at the birth and in the development of the science; but whether that something is possible in Russell-square remains to be seen.

* * *

WE understand from an authoritative source that the issue of both ordinary and preference shares in Kodak (Limited) was largely over-subscribed. Although the list of applications did not close until Wednesday evening, the great bulk of the

letters of allotment and regret were posted on Thursday night. This was done by means of a large and organized extra staff of clerks, and is probably a record in the history of such matters. The business of the Company, we are informed, is prospering even more greatly in this year than in previous years, and the accounts of the combined businesses for the first nine months of 1898 are stated to show a profit nearly approaching 200,000*l*. This is considerably more than the profit for the whole of 1897.

NEW USES FOR OLD SHELLAC.

It would be difficult to find a better all-round varnish than that made by dissolving a quantity of mixed white and orange shellac in methylated spirit. It dries bright and hard, and resists the wear and tear of printing well, while shellac, however, except in large centres, is difficult to obtain, and in consequence is usually bought, when the opportunity occurs, in larger quantity than is needed for current requirements. Any overplus is best stored by keeping it in a jug or jar large enough to permit the lac being entirely covered with water. It will keep thus protected for a long time, but if neglected or the water allowed to evaporate, or not stored in water at all, it will gradually become insoluble. Some who are unaware of this property of white lac probably purchase a sample already insoluble, and when they place it in the spirit along with the orange lac do not discover the fact, and, finding the addition useless, throw up the varnish-making in disgust; and others who discover the gradual approach of insolubility are annoyed at the loss.

Then, again, those accustomed to the vagaries of the shellacs, white or coloured, have an intense feeling of dissatisfaction at the large amount of waste caused through the flocculent matter insoluble in spirits of wine which takes up so large a space and renders useless so large a proportion of the liquid mixture; the dregs will not settle, and the attempt to filter leads to clogging up the pores of the filter paper and great loss under the most favourable circumstances We believe there is on the market another kind of white lac quite different to the English make, exceedingly soluble. Were it almost entirely soluble, it would be cheap at double the ordinary price, by reason, firstly, of the whole quantity being available, loss being thus avoided both in resin and spirit, the latter not being wasted through being inseparable from the insoluble marc. Many remedies have been proposed for getting rid of the deposit: some recommend the addition of chalk, while others state the advantages to be had from the addition of "petroleum ether," which is supposed to possess the power of taking up the more waxlike constituents of the lac, leaving behind a clear liquid separate from the rest. Some years since we made a large number of experiments, the result of which went to prove the entire uselessness of this method.

We thus arrive at the position that there are two waste products in connxion with the lac—the insoluble lumps of the resinous matter, and the thick cream of insoluble shellac residue and methylated spirit. What use can be made of them? We have learnt of a very satisfactory reply to the former part of the query from a correspondent. He found it an excellent sealing wax in the following way. One pound of the waste lac and half a pound of common resin are melted together in an earthenware pipkin, and stirred with a wooden rod till well mixed. The melted product is then poured into water and kneaded and pressed into sticks before it has become hard. In this state it forms a splendid wax for sealing parcels, being far superior to the ordinary third-rate "sealing-wax" of commerce, which sells from a shilling to eighteenpence a pound. As a parcel wax or occasional cement its dull colour is unobjectionable; but, if it be wished to make it available for ordinary sealing-wax purposes also, all that is necessary is to mix with it, while in the molten condition, a certain quantity of vermilion, say about six ounces (previously well freed from lumps) to the pound of lac mixture, and stir well till the mixture begins to thicken. There is then obtained an article equal to what would cost 4*s*. per pound at the stationer's, and of very fine colour, owing to the freedom from colour of the lac itself. With regard to the large quantity of waste dregs from varnish-making, this makes an excellent basis for thick shellac varnish, a liquid which ought to be on the shelves of every photographer, its uses being almost innumerable. To make this, a wide-mouthed bottle—for example, an old pyro bottle—should be taken, and three parts filled with flakes of ordinary orange lac. A wooden stirrer should be put in the bottle, and the whole periodically stirred till all is dissolved. For all kinds of purposes and emergencies it is invaluable. Set down with spirit and a little lamp black added, it forms an excellent dead black varnish. Where wet plates are used, the inside of the dark slide should be periodically coated with it; nothing is so good a preventive of stains. For leaky glass-bottomed dishes it is very useful; the inner corners and angles should be well coated two or three times in succession. For home-made trays of cardboard, three or four coatings, each well dried before the application of the next, it is admirable, forming a damp-proof dish, capable of excellent service. For varnishing printing frames, two or three coats, put on on successive days, give a surface almost equal to French polish, especially if, when the last coat is well hardened, it is first rubbed down with fine glass paper before the final coating is laid on. These examples are but a tithe of the uses for such a varnish, but our purpose will have been served if we have shown how to turn to real use a hitherto wasted product, even though it be of slight pecuniary importance.

Acetylene Notes.—As a contrast to the British system of dealing with acetylene, we may point to the encouragement its manufacture receives on the Continent. Here there are all kinds of vexatious restrictions on its use and production, and on the storage of the needful carbide; there the demand is so great that the Schuckert Electrical Manufacturing Company combination have under their control manufactories with power to turn out annually twenty thousand tons (metric measure) of carbide, from which two hundred million cubic feet of gas would be obtainable; also "they manage those things better in France," for there we read of two small towns being lighted wholly by means of this illuminant.

There has not been any new legislation for twelve months on the subject of acetylene, but an Order in Council has been issued (No. 17), under Section 104 of the Explosives Act, which places acetylene, when in the liquid state or subject to a certain pressure, on the list of explosives under the meaning of the Act.

Cinematograph and Similar Entertainments.—In our last issue we gave the principal regulations laid down by the London County Council with reference to the use of cinematograph apparatus on premises licensed by the Council, and no doubt similar

ones will be adopted by other County Councils. The last of these is, no doubt, the most important of all, namely, that "the licensees shall be held responsible for the employment of competent, experienced, and trustworthy operators, and shall be prepared at any time to supply the Council with satisfactory credentials in this respect." Now, this regulation, if strictly enforced, would really render all the others unnecessary. Cinematograph entertainments are given month after month and no accident whatever has resulted, but they are given by operators who know their business, and the nature of the material, as well as the apparatus, with which they are dealing. When an accident happens, and unfortunately for the cinematograph there have been several lately, it has generally been traced either to the incompetency, or the carelessness, of the operator. The lamentable affair in the Paris Bazaar, so frequently quoted in the lay press, is a case in point.

The London County Council are not to be condemned, as some would condemn it, in its attempt to safeguard the public, yet how few accidents or "scares" have occurred in the public places under its control, though not through their regulations. The majority of the accidents, both with cinematograph and lantern entertainments, may be traced to amateur entertainers. It is not the mere blaze up of a few films, or the pop in the burner, or burst of the ether vessel in the case of the ether saturator, that causes the real mischief, but the scare that follows—the rush for the exits. These, in the case of schoolrooms, are often very limited; yet how frequently are entertainments given in them by amateurs, the village curate or the like, with hired apparatus which they have never seen before? It cannot be too strongly impressed upon this class of entertainers, now that the season is beginning, that they may, and often do, hold the lives of scores of people in their hands while giving their entertainments.

Dealing with Inflammable Materials.—*Apropos* of our remarks with regard to the dealing with dangerous materials, as with the cinematograph, &c., by those ignorant of their properties, a manufacturer of water-proof goods was summoned one day last week, and fined under the Petroleum Act, through an accident that occurred. One of the defendant's *employés*, it appears, according to the report in the daily press, went into the store to draw off some benzoline for immediate use, and had a lighted ordinary bull's-eye lamp with him, which he set down upon the floor some feet from the store. To know how much spirit he had drawn off, he put his arm in the vessel, and then bringing the light too near there was an explosion, and he was unable to turn off the tap of the benzoline vessel, and it sent up a flame thirty feet high. It is inconceivable that this man, if he had known the properties of what he was dealing with, would have risked his life in the way he did. Ether is not now largely used by photographers, but its vapour is quite as inflammable as that of benzoline. Spirit varnishes are, however, used for negatives, and have to be dried before the fire. The vapour from that is highly inflammable.

Fire-extinguishers.—A very extraordinary account of a fire and its mode of extinction has been going the rounds of the scientific and other papers. The story goes that at a certain pharmacist's in Holland it was discovered that a room stored with highly inflammable substances was on fire. The pharmacist's assistant seized the nearest thing that was at hand to throw on the increasing flames; this happened to be a large glass vessel full of ammonia solution—a gallon or two. To his surprise the flames rapidly disappeared and the fire was put out. Hence, say the accounts we refer to here, it is a most useful discovery, seeing that the flames were extinguished. The room can be entered at once. Well, the flames might be extinguished by the ammonia; upon that point we have no practical knowledge, but we do know what would be the effect upon any one entering a dark room after a drachm or two only of ammonia had been spilt upon the floor. The immediate entering a room when a gallon or two had been thrown down would mean practically instant death! Perhaps, however, the chlorine salt of ammonia, commonly known as "sal-ammoniac," was meant to be spoken of; its fire-extinguishing properties are well known.

Of this substance we know of an instance where it has been used as a fire-preventive. A well-known photographer has a dividing wall on his premises between a workroom and his studio made entirely of wood. To deaden the sound of voices, and this it does completely, he filled the space between the two sets of boards forming the wall (they were separated by four-inch square timber) with sawdust, thus keeping out both heat and sound. To avoid the danger accruing from so large an amount of inflammable material, the sawdust was well mixed before being placed *in situ* with a large proportion of a mixture of alum and powdered sal ammoniac, and we were told that it was expected that, in case of fire, the wall would be safer than one of brick, as it would tend to extinguish a fire already in progress when the wooden walls were attacked.

Instantaneous Submarine Photography.—We have from time to time brought before our readers accounts of the work of various experimenters in subaqueous photography, the general result being either that the turbidity of the water interfered with the production of successful negatives, or at certain depths the light was too feeble to permit of any but exposures of about half an hour's duration. But, at a recent *séance* of the Paris Academy of Sciences, M. Louis Boutau presented a paper explaining his new method of procedure, which permitted him to obtain instantaneous photographs of living objects, fish, &c., at a distance of five or six feet from the lens.

New Photometer.—At a previous *séance* M. Onimus described his new apparatus for measuring relative degrees of luminosity. His method is founded upon photographic action, the darkening of sensitised paper made under standard uniform conditions, the various degrees of tinting being composed of a series of two dozen superposed layers of tinted collodion pellicles. The apparatus, which is stated to be very simple and capable of being used by any one unacquainted with photography, enables, for example, the light of any two days, or that of one country and another, to be compared. The sensitive paper is made by a ferro-prussiate process.

Photography and Star Motions.—According to the *Astrophysical Journal*, Professor Campbell, of the Lick Observatory, has been photographing the spectra of certain stars in order to ascertain the velocity with which they travel in the line of sight. He has ascertained that their rate of motion away from us is, taking the earth itself as at rest, 53·94 in the one case, and in the other 43·68 miles per second. The method of calculation which we owe to Dr. Huggins is, as our readers may be aware, by means of observing the displacement from their normal position of certain well-defined lines in the spectrum owing to the external vibrations arriving at a slower rate, and consequently nearer the red end of the spectrum, in consequence of the retrocession as regards ourselves of the emitting body.

Bisulphite and Metabisulphite of Potash.—A rather interesting point is raised in our Correspondence columns as to whether in using metabisulphite of potash we are only employing under a "fancy" name, and at a greatly enhanced price, the much cheaper salt known as bisulphite. Another question raised is, "What is metabisulphite of potash *in solution?*" Well, *in solution*, it is simply bisulphite, for the metabisulphite, as it is called amongst photographers, or the anhydro-sulphite, as Watts' *Dictionary* has it, is simply bisulphite minus an atom of water. So far as that part of the question is concerned, they are one and the same thing despite the price; but where the *quid pro quo* for the enhanced price comes in is in the difference in the keeping properties or permanence of the two salts. The metabisulphite is stated by Watts to be "permanent in the air," and so, in comparison with the bisulphite and the normal sulphite, it is, though, as every one knows who uses it, it

gives off sulphurous acid to some extent. By virtue of its anhydrous condition as well as its crystalline form, it might be expected to have this advantage over the bi- or acid sulphite, which, in its ordinary commercial form of a coarse powder and containing water of crystallisation, is a most unstable salt and practically useless for photographic purposes, as we found many years ago. The meta-bisulphite is therefore the only form in which a salt containing free sulphurous acid can be satisfactorily stored and used, the bisulphites and anhydro-sulphites of other bases being placed out of count by their low degree of solubility.

As to the discrepancy in description referred to, we can only repeat the proverb about doctors disagreeing. We are inclined to side with Watts, since it looks far more probable that alcohol should precipitate from its aqueous solution unchanged a salt insoluble in itself than that, in the presence of excess of water, it should separate its water of crystallisation. Moreover, if sulphurous oxide be passed into solution of ammonia to neutralisation and alcohol be then added, the precipitated salt contains a certain proportion of water, showing that alcohol does not possess the power of eliminating moisture or rather water of crystallisation. Therefore, we repeat, we are inclined to side with Watts.

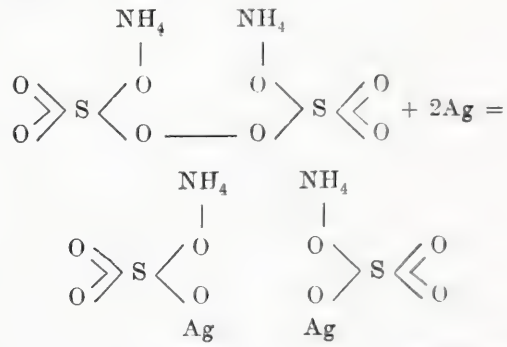
The Spectacle-makers' Company's Diplomas.—We have often referred to the ancient City companies, one by one, taking some steps in the interest of the crafts they are supposed to, and once did in a practical way, represent. One of the latest to make a move in that direction has been the Spectacle-makers' Company, and quite recently it held an Exhibition at the Mansion House, under the auspices of the late Lord Mayor, who is the Master of the Company. The show was, of course, not confined to spectacles only, but included all kinds of optical and philosophical instruments mentioned in the optician's catalogue. Some time back the Company announced that it would hold examinations and grant a diploma and the freedom of the Guild to candidates who qualified themselves for the privilege. The results of the first examination have just been issued, and it shows that two-thirds of the candidates have passed. In a sense it is gratifying to see that one-third were rejected, as it shows that the examination was not a mere figment, as some examinations are. Here it may be mentioned that, out of the number (some sixty or so) of candidates, there were only five who passed "with distinction." Of course, it is not yet necessary that all vendors of spectacles, who style themselves "opticians," should possess a diploma; but there is very little doubt that the public will prefer to deal with those who do, as it is some proof that they do know something about their business, which is more than the majority of spectacle-sellers do. The eyesight is too valuable to be tampered with as it frequently is by inexperienced opticians.

A New Picture Gallery for East London.—In the Fourteenth Annual Report of the Universities Settlement in East London, which is carried on at the Toynbee Hall, Whitechapel, special reference is made to the success that has attended the annual picture exhibitions, which we have frequently referred to when they were open. The report adds that "a further stage in its career is now to be marked by a far more important change than any hitherto accomplished, for the Whitechapel Picture Exhibition will, it is confidently expected, be housed next year in a building worthy to take rank with the principal galleries of the Metropolis." The site secured for the new building is next the Public Library. There is no question that the Annual Art Exhibitions are highly appreciated at the East End, yet there seems to be very little *art* amongst the majority of the photographers in that district, that is, if one may form an opinion from the specimens exhibited in the show cases and shop windows of the neighbourhood. Perhaps, however, they are not members of the Royal, and look more especially upon the "bread-and-butter" side than the art side of photography, and it is doubtful had they visited the last show of that Society, if they would have profited much, either in the technical or the art side of it, as applicable to their businesses or their customers' requirements.

November.—This month is not, as a rule, a propitious one for photography amongst professionals, at least in London. But still there has not been much to complain of up to the present. One day last week, however, there was a fine example of a genuine London fog; it did not last very long, though it gave ample time for *dilettanti* photographers of the "mud-and-slush" type to secure negatives, also for them to find poetic titles for the "pictures" for the next year's shows. On such occasions as that the electric light in the studio is not of the great use that some might imagine, as the fog pervades everywhere, and, however brightly the sitter may be illumined, the fifteen or twenty feet of smoky fog intervening between the sitter and the lens necessarily mars the brilliancy of the picture. Still the electric light is a great acquisition in the winter, particularly in London and other large cities.

FOREIGN NEWS AND NOTES.

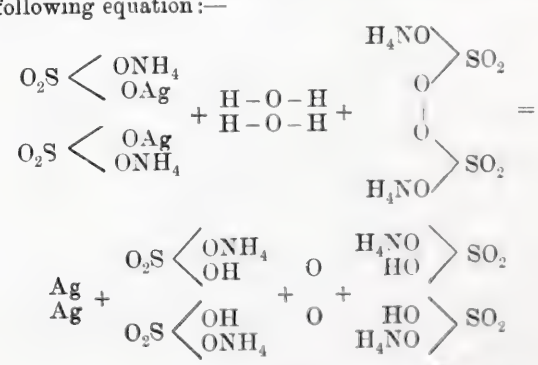
Ammonium Persulphate.—The value of this new reducing agent is fully confirmed by Herr Klepp in the *Deutsche Photographen Zeitung*, who finds that it attacks the high lights without affecting the detail in the shadows. A negative of an interior was taken as test. The shadows were full of detail, but the window very dense and the cross bars invisible. After immersion in a two per cent. solution of persulphate until the window was reduced to proper density and the cross bars became visible, a dark, badly lit oil painting was still shown upon the negative, and none of the shadow detail had been lost. Herr Klepp thinks reduction by this process may be expressed as follows:—



$$(NH_4)_2S_2O_8 + 2Ag = 2NH_4AgSO_4$$

Ammonium persulphate + Silver = Ammonium silver sulphate.

The decomposition of this silver salt in solution may be represented by the following equation:—



Ammonium silver sulphate + Water + Ammonium persulphate = Silver + Original ammonium sulphate + Oxygen + Original ammonium persulphate,

or, expressed in a more condensed form:—

$$2NH_4AgSO_4 + (NH_4)_2S_2O_8 + 2H_2O = 4NH_4HSO_4 + 2Ag + 2O$$

Ammonium silver sulphate + Ammonium persulphate + Water = Original ammonium sulphate + Silver + Oxygen.

Bacteria and Mildew.—The ravages to which negatives are subject by these growths form the subject of a very interesting article in *Das Atelier des Photographen*. Dr. Frankland published not long ago some observations he had made concerning the effect of

bacteria upon dry plates. An unexposed plate was suspended film downwards over a bacteria culture in gelatine, and left in that position for a few days in the dark. Upon development a black mark corresponding with the bacteria culture was found. When the film was placed in contact with the culture, spots were obtained by which the separate colonies of bacteria could be identified. Gelatine is one of the most suitable media for the culture of bacteria. The writer of the article also refers to his own experience when making gelatino-bromide plates for photo-micrography. A drying cupboard made of wood was used, and answered well for some time, but unaccountable spots at last made their appearance. After careful examination it was found that they were of fungoid origin and attributable to the cupboard. A careful washing with a solution of carbolic acid removed the cause, but for greater security the wood was brushed over with a solution of bichloride of mercury. Not only may gelatine plates be attacked in the processes of drying after coating, and washing and drying after development, but finished negatives, if stored in a damp place, may be ruined. To avoid the danger of these attacks, after thorough fixation, the plates should be speedily washed in running water and quickly dried and varnished. But varnish also has its dangers if the negatives are exposed to moisture. If the coat of varnish is not perfect, the gelatine may absorb moisture and split up the protecting film by expansion. In this case the varnish should be removed, and the negative immersed for a few minutes in a weak solution of soda and ammonia, which will remove the last traces of the varnish.

A New Printing Process.—The *Journal für Practische Chemie* mentions that Biehringer has discovered that prints may be made with

Tetra-methyl-diamidol-diphenyl-methan-oxide.

Their colour is red, and, if the prints are as good as the name, we trust photographers will bear it in mind.

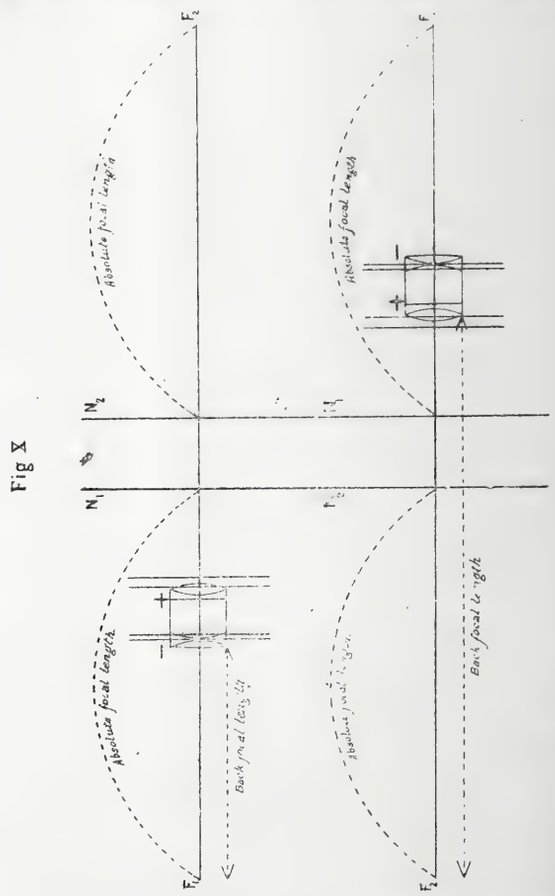
The Alethorama.—According to the Belgian paper, *Helios*, two Frenchmen, Messrs. Paul Mortier and Chéri Rousseau, have constructed a new machine surpassing the cinematograph in important particulars. Combined with sharpnesss of image, the inventors have succeeded in vastly increasing the number of exposures per unit of time. The speed of the cinematograph may be taken as 25 exposures per second, and the rapidity of the shutter about $\frac{1}{100}$ second. This is said to be too slow for photographing rapid movements. But it is professed that the Alethorama will take 2000 photographs per second. The length of image being 25 mm., the machine must use 50 metres of film per second, or not far short of two miles per minute. We congratulate the film-makers upon the prospect which lies before them, but meanwhile we suspend our judgment.

Acetylene.—M. Motais, a few months ago, made a communication to the Academy of Medicine, Paris, concerning acetylene, from the point of view of public and private hygiene. The *Revue Suisse de Photographie* publishes an extract of the same, and the following statement of facts deserves to be more widely known: A kilogramme of calcium carbide gives theoretically 350 litres of gas. Commercial carbide rarely gives more than 300 litres. The odour of pure acetylene is agreeable, and resembles ether. When the odour resembles that of garlic, it is due to the presence of phosphuretted hydrogen generated in the process of manufacture, but others affirm that this is the true smell of acetylene. The odour disappears with combustion. The density of the gas is ·92, and 92·3 per cent. of carbon enters into its composition. Acetylene under pressure of less than two atmospheres is non-explosive. Whether ignited by platinum wire, electric spark, percussion, sudden change of temperature, or fulminate, there is no explosion, and the gas decomposes only in contact with the flame without spreading to the mass. Acetylene is explosive, even under low pressure, when mixed with seven per cent. of air. Coal gas is not explosive in less proportion than thirty per cent. The illuminating power of acetylene is twelve to fifteen times that of coal gas. Owing to its weight, acetylene diffuses when liberated, but coal gas, being nearly five and a half times as light as air, ascends. Taking all factors into account, there is only one-third the risk of explosion in using acetylene. The conditions to be observed for the elimination of risk are: 1. To use low-pressure apparatus, which precludes the admixture of air in any but small proportions. 2. To avoid charging or cleaning the apparatus in proximity to a flame.

Washing Plates.—Janko states, in the *Photographische Rundschau*, that washing in running water is not so rapid as many suppose, and cannot be pronounced the most rational and quickest method. If the well-known tests for hypo are used, water which has passed through the tank may not show any reaction, but Janko's experiments have satisfied him that two hours are requisite before diffusion establishes equilibrium between the solution in the film and the bath. It is well known that, if any hypo is present in the film, the uranium intensifier will produce a red veil. Janko takes advantage of this as a test for the presence of hypo. As the result of his experiments, Janko concludes that three changes of water are sufficient to withstand the uranium test, if they are made at intervals of two hours, and $2\frac{1}{2}$ c. c. of water per square centimetre of plate surface are used for each bath. With three changes in six hours, $7\frac{1}{2}$ c. c. of water per square centimetre of surface will give sufficient washing, and with four changes and 10 c. c. of water the time may be reduced to four hours. With ten changes at intervals of five minutes, 25 c. c. of water will do the work in fifty minutes. It would, therefore, appear that washing by repeated changes of water is the most economical method.

THE TRAILL-TAYLOR MEMORIAL LECTURE.*

FIG 10 represents a combination of a positive lens of $9\frac{1}{2}$ inches focal length, and a negative lens of 13 inches focal length, separated by a distance of 4 inches. Its absolute focal length then is $16\frac{1}{2}$ inches, and its back focal length $9\frac{1}{2}$ inches. Both the principal points and planes, N_1, N_2 are in front of the positive lens. The back f cal length, in the case of light incident upon the positive lens, is $9\frac{1}{2}$ inches, but when the rays are incident upon the negative lens, the back focal length is 22 inches. In the first case the absolute



focal length is determined by the distance between the principal plane, N_1 (in front of the lens), and the focal plane behind the lens, so that the back focal length is here *shorter* than the absolute focal length. In the second case, the absolute focal length is the distance between the principal plane, N_2 (behind the lens), and the focal plane in the same direction, so that the back focal length in this case is considerably *longer* than the absolute focal length of the combination. I have purposely chosen a very moderate example of the principle involved in the telephotographic construction, because it lends itself easily to graphic representation, and also to a convenient experimental proof, by means of the optical lantern.

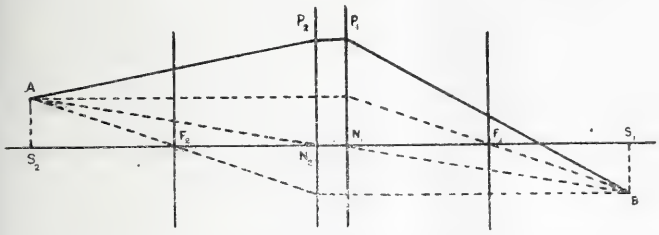
First, let us project a lantern slide upon the screen by means of this

* Continued from page 744.

lens, with the positive lens towards the screen, and note the size of the image. Let us now reverse the lens, end for end, with the negative lens now towards the screen; it will be found necessary to add about another foot of tube in order to obtain the focus upon the screen, but it will be observed that the size of the image is *in both cases identical*, proving that the lens has but one absolute focal length, through widely different back focal lengths.

In the paper referred to, Professor Thompson calls attention to another pair of points in addition to the four "cardinal" points of a lens. These points are situated on the axis beyond the principal foci, at distances respectively equal to the absolute focal length on either side. They have been shown in a previous figure, but I reproduce Professor Thompson's

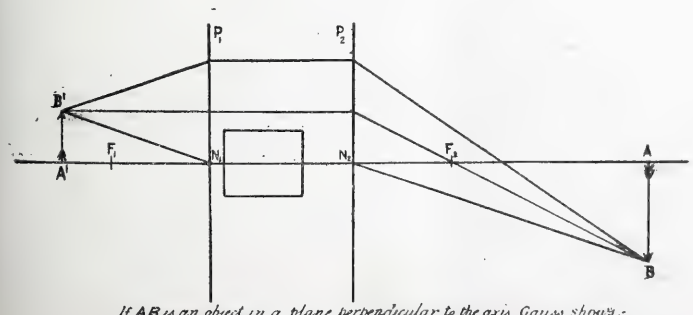
Fig. XI.



drawing here. They are marked S_1 and S_2 (Fig. 11), are conjugate to one another, and symmetrically situated, and are happily christened by him as *symmetric* points, and the planes through them *symmetric* planes. They possess the very useful properties that any object in one has an inverted image of equal size in the other, and that any ray crossing one of them at any distance from the axis will, after passing through the lens, cross the other symmetric plane at an exactly equal distance from the axis on the other side of the latter.

The focometer described and exhibited by Professor Thompson was based upon these properties of the symmetric points and planes, in conjunction with the focal points and planes. A reference to the figure will make its simplicity and beauty readily intelligible. A parallel beam of light is passed through the lens at N_2 N_1, from right to left, determining the position of F_1; similarly a parallel beam of light is passed from left to right, determining the position of F_2. Now, by a right and left-handed screw, two micrometers placed at F_1 and F_2 are moved outwards at exactly equal rates. When one of them arrives at S_1 the other will have arrived at S_2, and this is known by observing in one the inverted image of the other, coincident, but reversed in position. The distance travelled from F_1 to S_1, or F_2 to S_2, is a measure of the absolute focal length of the lens. The instrument has a further advantage, in that, by measuring off backwards from F_1 a distance equal to S_1 F_1, the principal point from which the absolute focal length is measured is arrived at, and can be marked upon the lens mount. Speaking as an optician, I fully recognise the "finish," if I may use the word, that this practice would give to our work in photographic lenses (in which the principal point sought is contained in the lens mount, chiefly double positive combinations), but I am inclined to think that in the generality of cases it would be labour thrown away, so long as we adhere to accuracy in stating the true or absolute focal length of our lenses. On the other hand, I am fully in accord with Professor Thompson in recognising the extreme importance of his suggestion when applied to microscope objectives.

Fig XII



If AB is an object in a plane perpendicular to the axis, Gauss shows:-

(1) *A'B' lies in a plane perpendicular to the axis.*

(2) $F^2 = AF_2 \times A'F_1$

(3) $AB : A'B' = \sqrt{F_2A} : \sqrt{F_1A'}$

$\frac{AB}{AE} \quad \frac{AN}{AN}$

It will readily be seen that a focometer constructed upon the above principle is not readily applicable to lens systems in which the principal points are situated outside the lens mount, particularly when they are far removed. In principle it is perfectly applicable, however, but in practice the wide separation of the focal points would make the use of the symmetric points at least clumsy. Before proceeding to the principle upon which the focometer I have brought here this evening rests, it is necessary that I should state a general case for the determination of the elements of a lens system from three observations:—

Let L (fig. 12) represent any system.

$A A^1$ the common optic axis.

F_1 F_2 the principal focal points.

N_1 N_2 the principal points.

Let A B be a small object in a plane perpendicular to the optical axis, and let A^1 B^1 be its image.

Gauss shows that—

(1) A^1B^1 lies in a plane perpendicular to the axis.

(2) That the product $A F_2 \times F_1 A^1$ is constant for all positions of A, and is equal to the square of the absolute focal length of the system

$$F^2 = A F_2 \times F_1 A^1.$$

(3) The linear dimensions of object and image are in the square root of the ratio

$$F_2 A : F_1 A'$$

Thus

$$A B : A' B' = \sqrt{F_2 A} : \sqrt{F_1 A'}$$

Since

$$F^2 = A F_2 \times F_1 A'$$

$$\frac{F_2 A}{F} = \frac{F}{F_1 A'} = \sqrt{\frac{F_2 A}{F_1 A'}}$$

Hence

$$\frac{A B}{A' B'} = \frac{F_2 A}{F} = \frac{F}{F_1 A}$$

And

$$\therefore = \frac{F_2 A + F}{F_1 A' + F}$$

So that if we take two points N_1 N_2 such that

$$F_1 N_1 = F$$
$$F_2 N_2 = F$$

as in the figure, it follows that—

$$\frac{A B}{A' B'} = \frac{A N_2}{A' N_1}$$

Hence N_2 B is parallel to N_1 B'—a property of the principal points of the system already referred to. Thus as we have seen that, to completely determine the elements of a lens system, it is sufficient to know the position of the principle N_1 N_2 and the absolute focal length F, for we can then assign the position and magnitude of the image of any object. Three observations are necessary to determine these three quantities.

Fig XIII

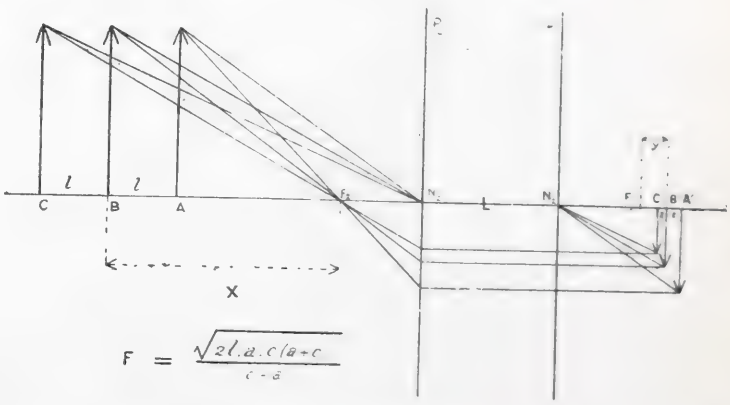


Fig. 13 represents a diagram involving the principle of the focometer before you. Let the lens, L, be in a fixed position. At some convenient distance in the axis at A, place a small graduated scale with clearly defined markings upon it; focus this accurately on a second screen at A'. The screen A is then moved through a definite distance, l (measured by a vernier on the base of the instrument), to B. Now refocus the scale at B'. Call the distance A' B' = c. Again move the screen through a further and exactly equal distance, l to C, and refocus at C', and let the distance B' C' = a.

The absolute focal length of the lens or lens system—

$$F = \frac{\sqrt{2\, l.a.c\,(a+c)}}{c - a}$$

In neither Professor Thompson's focometer nor in this is it necessary to *measure* "magnification," which is always liable to error. Accurate

focussing in this case, and the careful reading and setting of the vernier at the base, is all that is necessary to ensure a proper measurement of the absolute focal length, and it is applicable to any positive lens system, whether the principal points are within or without the lens mount. I do not think I need apologise for the very slight labour involved in working out the formula. I give in a footnote the manner in which it is arrived at.*

In addition to the focometry of any positive system, this focometer is equally applicable to the focal measurement of negative lens systems, the same formula applying. In this case a positive lens is placed in a fixed position, the rays from the scale falling upon the negative system; it is then focussed, and afterwards made to occupy two subsequent positions at definite and equal distances apart.

Before further describing this focometer, I should like to pay a tribute to the excellent workmanship of the makers, Messrs. Nalder Bros.

(*To be continued.*)

EXHIBITION OF THE HACKNEY PHOTOGRAPHIC SOCIETY.

The Annual Exhibition of the Hackney Photographic Society has become an event of importance in the photographic world. It is held immediately after the close of the Pall Mall Exhibition, and is the first "Society" exhibition of the winter season in the metropolitan district. We have always fancied that from the Hackney Exhibition we could form a fairly accurate idea of how London had progressed in pictorial photography during the year. It may be a mere coincidence, but we have found the keynote of the London exhibitions at Hackney.

Taking this experience as our guide, we may expect to find something more than the usual rate of improvement at this season's Exhibitions. At annual intervals we have had the opportunity of complimenting the Hackney Society on its progress, and we have been able to do this conscientiously. On this occasion we can be more emphatic in our praise. There is simply no comparison between this year's Exhibition and the last, and the improvement was equally noticeable in the Members' and the Open Classes. It is true that the members' exhibit had fallen off in numbers, but the deficit that had occurred was a matter for congratulation and not for condolence. For several successive years we had to point out that the Exhibition suffered from the encouragement to members to exhibit, whether their work was good or bad. Such criticism is not applicable on this occasion. The worst we can say is that there was a proportion of the work shown that was commonplace, but that could be said with equal truth of any exhibition. Among the work that did not satisfy us pictorially there was good technical photography; and we were pleased to miss the double-toned prints and efforts at photographic jokes that marred previous exhibitions. We have a word of praise, too, for the mounting and framing of the pictures. As a rule, considerable taste was displayed in this direction. The members, in past years, have been rather prone to indulge in highly ornamented mouldings, which make pretty frames but detract from the value of the pictures they surround. This year a quieter style was the rule, and, where mounts were used, harmonious tints were generally chosen. The average size of the pictures was distinctly larger.

The Exhibition was held at Morley Hall, Hackney, N.E. It was opened in the evening of Tuesday, the 15th inst., by the Right Hon. Lady Berwick and remained open during the week. The experiment tried last year of arranging the screens for the pictures in the body of the hall was not repeated, but the screens were arranged in bays round the walls, greatly to the gain of the aspect of the hall. The want of sufficient light in the evenings, which had been of great inconvenience at previous exhibitions, was remedied by an installation of acetylene gas in addition to the usual lighting arrangements. The work was carried out by Messrs. Thorn & Hoddle, who successfully overcame the engineering difficulties incident to a temporary arrangement; and the Judges signified their appreciation of this practical form of trade exhibit by awarding Messrs. Thorne & Hoddle the medal for the best trade exhibit. The Judges were Messrs. T. Bedding, F.R.P.S.; W. J. Byrne; and J. B. B. Wellington, F.R.P.S.; and the pictures were arranged on the walls, as usual, under the direction of Mr. A. Mackie, F.R.P.S.

The members' classes were this year rearranged, and, instead of being divided into Pictures taken during the year, Pictures taken during Membership, and Hand-camera Work, the classes were Portraiture, Figure and Animal Studies in a class, Architecture in a class, Landscape, Seascape, and River Scenery in a class, and Hand camera Work. This, being a more natural method of grouping, constituted an improvement, but we should like to see classes in pictures abolished altogether, and the Judges instructed to select from among the collective exhibit of the members' work as many as they thought worthy of the distinction of being medalled, on the system of the Royal Photographic Society's Exhibition. This has not been the usual system at Society exhibitions, but we look to Hackney to lead.

In Class A, in which animals, human and otherwise, were the subjects, we noticed that, in a small class of twenty-five exhibits, less than one half were portraits or figures. This class of subject is evidently not popular with the members, and we regret to find it so. It is probable that we have seen almost as good landscape photography as we shall ever see; the scope for further improvement is limited; but, in portraiture, and particularly in figure and *genre* subjects, photography has as yet but trodden on the threshold. In a progressive society this is a fact the members should not lose sight of. Specialisation is good for individuals, but not so good for a society, and that the subjects which, after all, appeal most to our human interest should be treated with almost complete neglect is not a healthy sign. Under the circumstances, a very strong class was not to be expected, but Mr. J. O. Grant's *Baby*, the silver medal picture, deserved its award. It would secure notice in far more formidable company. We believe it to be a transparency backed up, and perhaps the delicacy of the white drapery is due to this; but, whatever it is, it is a charming production. Mr. W. Selfe's *Under the Greenwood Tree* (certificate) is also a pleasing little picture, a gipsy encampment, the smoke from the fire being a feature, is its subject. It should, however, be considered as a landscape with figures rather than a figure subject. The animal subjects were a very good series; mostly they were specimens of "Zoo" photography, and naturally more of interest as natural history illustrations than as pictures. Mr. W. Selfe's *Penguins* (bronze medal) is an admirable example of this kind of work. The Hand-camera Class contained a number of animal and "Zoo" photographs, all of more than average quality.

Architecture (Class B) has not been a feature in the Society's work until recently, and it was not surprising to find that a very high pitch of excellence had not been attained; still, the work was good on the whole, if not ambitious. Mr. F. E. Roofe's series of some half-dozen little pictures contained some that were very praiseworthy, and for one of them he received the silver medal, the only award strictly belonging to the class. Mr. W. Rawlings, however, who also shows promise in this branch, received the medal for the best enlargement in the members' classes for one of his pictures. Mr. A. W. Cook, the only other exhibitor who had more than one example, deserves commendation.

By far the largest class was C (Landscape, Seascape, and River Scenery), and here the Society shows at its best. Considering the class worst end first, we were glad to find how little there was that was redundant. Even the commonplace little photographs which one finds at the tail of every Society Exhibition where all the work is accepted were here commendable in their way, and in the sense that they were not offensive, but neat and careful work, that only wanted further experience and a little soul thrown into it to be good. Most of the prominent exhibiting

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* $F^x = (x-l)\,y + c) = x\,y + x\,c - l\,y - l\,c$
$= x\,y$
$= (x+l)\,(y-a) = x\,y - x\,a + l\,y - a\,l$
$x\,c - l\,y - l\,c = 0$
$x\,a - l\,y + l\,a = 0 \qquad x\,(c-a) = l\,(c+a)$
$x = l\,\frac{c+a}{c-a}$
$(c-a)\,y = 2\,a\,c \qquad y = \frac{2\,a\,c}{c-a}$
$F = \frac{\sqrt{2\,l\,a\,c\,(c+a)}}{c-a}$

The apparent simplicity of the focometric method of comparative magnification may strike some of my hearers, so I illustrate it here; but I wish you to bear in mind that the attempt to use a micrometer for the measurement of the relative sizes of image and object is, I venture to think, much more liable to error than vernier readings in the method proposed. Fig. 14 illustrates the method:—

Fig XIV



$$\frac{1}{D} + \frac{1}{d} = \frac{1}{F}$$
$$M = \frac{d}{D}$$
$$1 + M = \frac{d}{F}$$
$$1 + M' = \frac{d'}{F}$$
$$F = \frac{d - d'}{M - M'}$$

or, the absolute focal length is the distance through which the reading screen is passed, divided by the difference in magnification.

members showed decided progress. Mr. W. A. J. Hensler—whose work formerly seemed to be the same subjects treated in the same way, and of the same size, and the same printing, mounting, and framing, and, we may add, of the same excellence, that is our impression of them—has abandoned his sameness, except as regards the excellence, and does himself greater justice. His dozen or more pictures were all good, and showed considerable variety in treatment. *An Essex Farm*, an enlargement from a "pinhole" negative, pleased us particularly. *When Eventide Draws Nigh* had awarded to it the gold medal, presented by the President for the best picture in the members' classes. We need hardly say it is a fine work. We might commend others, but will mention only *Sunset's Golden Glow*, which seemed to be the only example of gum bichromate among the Society's work. Although better than several similar, but more ambitious, attempts that we have seen, it did not convince us that the process will revolutionise our present methods. Mr. W. Carpenter's work was characterised by his usual graceful treatment. We were as pleased with his *Silver Birches* as with *A Woodland Path*, for which he received the silver medal. Mr. W. Rawlings is another member who has gone in for more variety of treatment than in the past. His work was of quite his usual excellence. *The River's Bank* received a certificate; another certificate was given to Mr. G. Guest for a *Birch and Bracken* subject. It is a brighter picture than the present fashion of dealing with the subject; indeed, its fault is too much contrast, and it would be an improvement to tone down the sky, leaving the highest lights in the white birch bark. Mr. W. Selfe has distinctly advanced. His work was always careful and good technically, but this year it was as notable pictorially. We noticed particularly *The Last Gleam*, *A Woodland Path*, and *To the Farm*. A little picture entitled *Moonrise*, by Mr. C. T. Humphrey, deserves notice as a bold and not unsuccessful attempt at a difficult subject. Its principal fault is a want of sufficient sparkle in the landscape to give a natural effect. The size of the moon has probably been criticised by his fellow-members, but we may point out that the *apparent* size of the moon is a matter of personal feeling, and thus almost beyond criticism. We were pleased with a little picture by Mr. J. Gardner, *The Waning Eve*, which has a pretty effect of early evening, when the shadows begin to lengthen. It might, however, be shown to better advantage by more suitable mounting. We must not omit to mention with praise Dr. Roland Smith's frame of woodland studies, marked "not for competition."

Class H (Hand-camera Work).—Much of the work in this class, we think, might have been entered in the class appropriate to the subject of the pictures, for there was nothing about it to suggest that a stand camera was inapplicable or a shutter necessary, and this applies to Mr. J. J. Westcott's *Sunset on the Thames* (silver medal), which is, nevertheless, a charming little picture, but hardly better than *With the Tide*, by the same author. Messrs. H. W. Dunkley, F. E. Roofe, W. Self, S. H. Hill, and A. Rose all sent work, which deserve more notice than our space will allow, and we do not condemn Mr. W. L. Barker's attempt to obtain an effect by intentional double toning, although we cannot say it was quite a success. The members' lantern slides were of about the average quality.

The open Champion Class was a strong one, at least strong for a Champion Class, which usually contains about the worst work in an Exhibition. The Judges, however, thought fit to withhold the gold medal. The silver medal was awarded to *Columbus Circle*, a night view of New York, by Mr. W. A. Fraser, medalled at this year's Pall Mall Exhibition. Mr. C. H. Oakden's *Retro Choir*, Winchester, received the bronze medal. Other notable works were shown by Messrs. J. Carpenter, G. B. Cowan, H. W. Bennett, W. Smedley Aston, R. S. Webster, Percy S. Lankester, W. D. Welford, and J. C. Warburg.

In the Portraiture and Genre Class a noticeable feature was the predominance of work by professional portraitists, and this is a feature, we think, that societies who run exhibitions will do well to encourage; and photographers, who are capable of something more in touch with modern ideas than the usual show-case kind of thing, will do well to consider whether photographic exhibitions, where the exhibits are brought to the notice of people who are able to appreciate artistic work, do not constitute a more valuable way than is usually recognised of showing their abilities. Mr. J. Stuart, of Glasgow, took the silver medal of the Class for *Nancy*, a charming head. His other three exhibits were all admirable works. Two bronze medals go to the United States, to Miss Mathilde Weil and to Mr. J. E. Dumont, for *Calling the Ferryman*, a picture that was much noticed at the recent Pall Mall Exhibition. A certificate was awarded to H. W. R. Child for a study of a head, and the same exhibitor showed some half-dozen more of considerable merit. Other noteworthy exhibitors in this class were Messrs. W. Smedley Aston, C. Marshall Wane, E. Seamell, W. Groom, P. S. Lankester, H. Ward, Graystone Bird, T. Fall, J. Auld, and W. Illingworth. The last-named gentleman obtained a certificate for a study of a little boy in the General Class, and, while we cannot withhold our praise for his pictures, we must condemn his taste in framing. Some of them, gaudy with gold and colour, entirely spoil the pictures they surround.

The general class was a large one, and the pictures as a whole were of a high standard of excellence, but space will not allow us to refer to more than a few of the good things. Viscount Maitland's *At Litlington, Sussex*, was adjudged the leading picture. *Rain*, by Mr. H. C. Leat, took the bronze medal, and the certificate was awarded to Mr. J. Illingworth, as already mentioned. The most noteworthy exhibitors in the class were Messrs. H. W. Bennett, W. Smedley Aston, R. B. Lodge, H. Vivian Hyde, Sanderdown, P. S. Lankester, Graystone Bird, W. J. Croall, W. D. Welford, and Mrs. J. A. Welford. We must not omit to notice a fine series of animal studies by Mr. T. Fall, and in speaking generally of the landscape work we should not be doing our duty if we omitted to point out that there were many examples of servile imitation of the work of Mr. A. Horsley Hinton. Mr. Hinton's work we all admire, but work of a similar kind, with its faults multiplied by ten, and its beauties divided by the same number, becomes intolerable.

The trade exhibitors were Messrs. Thorn & Hoddle, Messrs. J. J. Griffin & Son, Limited, The Prestwich Manufacturing Company, Mr. H. Mason, Messrs. R. & J. Beck, Limited, Messrs. Burrowes & Wellcome, and Messrs. J. Watson & Sons.

As usual, an excellent concert was given each evening, and there were displays of the cinematograph.

List of Awards.

Members' Classes.

A.—Portraits and Animal Studies: Mr. J. O. Grant, silver medal; Mr. W. Selfe, bronze medal and certificate.

B.—Architecture: Mr. F. E. Roofe, silver medal.

C.—Landscape, &c.: Mr. W. Henser, gold medal; Mr. J. Carpenter, silver medal; Messrs. W. Rawlings and G. Guest, certificates.

D.—Hand Camera: Mr. J. J. Westcott, silver medal; Mr. H. W. Dunkley, certificate.

E.—Lantern Slides: Mr. F. E. Roofe, silver medal; Mr. W. A. Hensler, bronze; Messrs. F. E. Roofe and A. W. Cook, certificates.

Extra prize for Best Enlargement: Mr. W. Rawlings.

Open Classes.

F.—General: Viscount Maitland, silver medal; Mr. H. C. Leat, bronze medal; Mr. W. Illingworth, certificate.

G.—Portraiture, &c.: Mr. J. Stuart, silver; Miss M. Weil and Mr. J. Dumont, bronze medal; Mr. H. W. Child, certificate.

H.—Champion: Gold medal withheld; Mr. W. A. Fraser, silver medal; Mr. C. H. Oakden, bronze medal.

I.—Lantern Slides: Mr. W. E. Cowan, silver medal; Mr. Archibald, bronze medal; Messrs. E. R. Bull and T. Ferguson, certificates.

J.—Lantern Slides Champion: Mr. E. Marriage, silver medal; Mr. W. E. Cowan, bronze medal; Mr. J. J. Westcott, certificate.

K.—Stereoscopic: Dr. Stinthorpe, bronze medal; Mr. T. S. Wilks, certificate.

Trade Exhibit: Messrs. Thorn & Hoddle.

BRIXTON AND CLAPHAM CAMERA CLUB EXHIBITION.

The Eighth Annual Exhibition of this Society was held at the Brixton Hall on Tuesday, November 15. We congratulate the members upon acquiring such commodious premises for their show and upon their arrangements; the small hall for the pictures, and the larger for the lantern, displays a most sensible idea, each being devoted to the object in view. We would recommend this system where practicable to other societies, for what is more irksome than when one has to endure a second-rate lantern lecture upon a subject of little or no interest before the lights are turned up in order to see the pictures on the walls?

The Council very wisely decided upon having but a "one-night's Exhibition," and, judging from the enormous quantity of people who completely filled the two halls, they are to be felicitated upon their foresight, for upwards of 800 tickets were taken at the doors, proving that a suburban society can be well supported when members of the same work harmoniously together.

It is very evident that the optical lantern and "animated photographs" have lost none of their fascination for the people of Brixton and the neighbourhood, judging from the manner they kept their seats for two hours, during which slides by E. Dockree, J. Gunston, and those sent in by the competitors, were shown. The lantern display was opened by a series of Japanese coloured slides, which, although ably shown by the lanternist, Mr. R. G. Mason, and well described by Mr. J. L. Lyell, are not so interesting as many would have themselves believe; we are under the impression these slides have now been shown several times by this Society, we would suggest they be not exhibited thereat again, for it is not conducive to the prosperity of a Club when its "one-night Exhibition" has forty minutes devoted to the exhibition of foreign labour, no matter how admirably the same is touched upon and explained; possibly these coloured pictures meet with warmer approval from the Brixtonians than is usual, but, from the reception accorded them by other societies. We would propose they be shelved, for we feel sure there is plenty of talent in the way of "slide-workers" in the Brixton and Clapham which would have proved more advantageous to the prestige of the Society had the same only been presented to their patrons.

A series of animated pictures were projected, and met with the warmest approval, as did also the music, so ably rendered by Messrs. Briggs

(piano), Oppermann (violin), and Edmund Faber (vocalist). Entering the smaller hall in order to view the pictures, we were indeed disappointed to see such a few on the screen. The Judges (F. P. Cembrano, Lieut.-Colonel Gale, and E. J. Wall) must have found it a very easy task to make the awards. Watching the growth of this Society as we have, and bearing in mind what it has done in the way of exhibitions, notably last year and two years before, we are compelled to exclaim, "Ichabod!" Members of the Brixton and Clapham Camera Club, pull up before it is too late, and, if you have men who, by their acknowledged merit can show you the way, elect to follow them, and accord them the hearty support their efforts, all made in your interests, are deserving of.

The frames numbered 105 only, and included twenty "not for competition," lent by Messrs. Horsley Hinton, J. Gunston, and F. W. Levett. The remainder, although so few numerically, exhibited a general good quality, those calling for approval at the hands of the Judges being Nos. 17–23, by Mr. R. Fisher, who takes the silver medal for the best collective exhibits, Nos. 64–67 receiving the bronze medal, and are the work of Mr. F. W. Levett. To No. 51, *Yarmouth Quay*, by Mr. W. E. Dunmore, is awarded a bronze medal, being the "best individual picture" not included in either of the other two sets for awards. The pictures which struck us as calling for individual attention were as follows: No. 2, *Eileen*, by Miss Alice B. Walker, a very clever piece of work, being a difficult subject efficiently rendered. No. 9, *My Chum*, by the same worker, is accorded the same praise by us. No. 8, *High and Dry*, contains two pictures, one of which is somewhat spoiled. Of Mr. R. Fisher's set of seven frames, we like No. 21, *Crypt to Chapter House*, *Wells*, best of all. This worker improves each time we see his work. In No. 19, *A Passing Cloud*, the cloud is too central, and mars an otherwise beautiful result. Mr. W. W. Redman, evidently an admirer of Mr. W. Thomas, shows a nice picture of *Birch and Bracken*.

Six prints exhibited by Mr. L.W. R. Cundall are very small, each mounted and framed separately, and look mean. Mr. W. Steers is recommended to persevere; his efforts show latent talent and knowledge of what to do. A frame of four cycling subjects, entitled *Early Lessons*, is well thought out. No. 44, *Sleep*, is very poor; No. 49, *Choir Processional, Norwich Cathedral*, is a close imitation of that done by Bulbeck & Co., and medalled two years ago at Pall Mall. The work of Mr. W. C. Dunmore is good, but in No. 50 the two boats are too much at right angles to each other. Mr. W. H. Whittard shows six pictures, all very pleasing, in fact No. 56, *A Mountain Tarn*, struck us as the best picture in the Exhibition. Mr. C. F. Archer has four prints, two of which pertain to engineering, most skilfully rendered; but he also has the most ambitious thing in the way of photography we ever saw, "a picture representing himself carrying two children down a staircase, the same being on fire;" the subject is entitled *Too Late!* Bravo, Mr. Archer! have another try! Of Mr. F.W. Levett's medalled exhibit, four in the set, we prefer No. 64, *Autumn, Born of Sunniest Hours*. No. 67 is too ambitious for us to appreciate.

The lantern slides sent in for competition were few in number, the set by Mr. R. Fisher being certainly the best, architectural in character, and to which was awarded a bronze medal.

Messrs. R. & J. Beck had a stand, upon which their well-known specialities were exhibited, the Prosser-Roberts Drug Co. showing everything in the way of apparatus and chemicals, all that any one photographically inclined could require.

DEATH OF MR. GEORGE DICKMAN.

We have to regret the sad death of Mr. George Dickman, who died at the age of fifty-two years, on Tuesday, November 15, after an illness which had lasted only six days. The funeral took place at Woking on the 18th, and a special service in his memory was held at the Quex-road Unitarian Church, on Saturday afternoon the 20th inst. This service was a very impressive ceremony and was crowded to overflowing by many friends and *employés* of the Eastman Company.

He was born at Augusta, Maine, removed to New York while still quite young, and later on, at the age of nineteen, went to China to take up a position in the China and Japan Trading Company. During his service with this Company he exhibited such extraordinary business ability that, after five years, he was appointed manager of the branch at Osaka, an important city of Japan. At this point of his career his prospects were of the most brilliant description, when his health suddenly broke down and he had to leave the country. On taking up business again he worked in California with Messrs. Bancroft & Co., and on quitting their service came to London to take up an appointment as manager of the business of Messrs. Mabie, Todd, & Bard, the well known manufacturers of the Swan Fountain pens, &c. In 1893 he was appointed director of the Eastman Photographic Materials Co., Limited, and continued the management so actively commenced in England by Mr. Walker. The history of the Company from that period will be well known to most of our readers, and Mr. Dickman has been greatly instrumental in bringing the E.P.M. Co., Ltd., to its present phenomenally successful position. As a man, those who had intimate relations with Mr. Dickman knew him as one whose rectitude and high ideals had a commanding influence on all around him. It would have been difficult to find any one with a more attractive personality. In conversation he was full of picturesque illustration, a power which served him well in business discussions as in social relations. He was an ardent cyclist and golf player.

Locally, in the neighbourhood of his home, he was actively interested in the organization of the Unitarian Church at Quex-road, Hampstead. He was chairman and treasurer in connexion with the congregation, and gave much assistance in the management of the institutions associated with the community.

Mr. Dickman leaves a widow, but no children.

Our Editorial Table.

Penrose's Collodion-emulsion Pellicle.

Penrose & Co., Upper Baker-street, W.C.

Messrs. Penrose & Co. have sent us a packet of their desiccated collodion emulsion or "pellicle" (though, as a matter of fact, it is a coarse powder), the new alternative form in which, for convenience of transmission by post or otherwise, it is now issued as well as in liquid form ready for use. The "pellicle" simply requires to be dissolved in equal parts of absolute alcohol and methylated ether of not lower grade than ·750 to form an emulsion in every way similar to that sent out in liquid form. It possesses the advantage over the latter, however, that each individual can make his emulsion as thick or as thin as he may choose to suit either his taste or the special work in hand. The directions given as to dissolving are to soak the pellicle first in the alcohol, and then to add the ether and shake well until dissolved; but, from old experience, we may add a few words more. If a five-ounce packet is to be dissolved, place the pellicle in a dry bottle, and add, say, one ounce of alcohol, shake well and allow it to soak for a short time, then add, say, half an ounce of ether. This will allow plenty of room in the bottle to render the shaking effective, and the liquid softens the pellicle gradually without massing it together in a lump, as will be the case if its solvent power is made greater by using a larger proportion of ether. The tendency to mass together is the difficulty in dissolving, and, in order to counteract it as much as possible, when the bottle is at rest it should be laid on its side, so that the undissolved pellicle presents as large a surface as possible to the solvents when shaking is resumed. The remainder of the alcohol and ether can be added when the solution is nearly complete. If the whole be added at once, and the bottle filled up, no amount of shaking does much good, and the solution will occupy possibly some days.

The Penrose Pocket-books (No. 3): Collodion Emulsion and How to Work It.

This is a handy little guide to the working of collodion emulsion for all purposes, negatives, lantern slides or "process," and, though primarily intended to apply to the emulsion sent out by Messrs. Penrose & Co., is equally applicable to collodion emulsion gene ally. It contains ample instructions in every stage of working, together with many valuable hints, and a variety of useful information that will recommend it to all collodion-emulsion workers.

Petits Clichés et Grands Epreuves.

Gauthier-Villars et Fils, Paris.

Messrs. J. Bernard and L. Touchebeuf have written this small volume as an easy guide for the amateur who wishes to make enlargements from small negatives. The advantages of small apparatus to the tourist and cyclist are so great, that a popular guide to the technique of enlarging should appeal successfully to a large circle of amateurs. Those who may be induced to take up this branch of photography will find it a delightful pastime.

News and Notes.

Photographic Club.—Wednesday evening, November 30, at eight o'clock. Travellers' Night. Mr. William Plank. *Lynton.*

The Austin-Edwards Monthly Film Negative Competition.—The prize camera for the current month has been awarded to Mr. H. C. Leat, 2, Richmond-street, Totterdown, Bristol, for his negative, *Rain.*

Society of Arts.—On Wednesday evening, November 30, a paper on "Photographic Developers and Development" will be read by Mr. C. H. Bothamley, F.C.S. The chair will be taken at eight o'clock by Colonel J. Waterhouse, Hon. Secretary to the Royal Photographic Society.

During the ceremony of the distribution of awards at the Hackney Photographic Society's Exhibition at the Morley Hall on Friday, November 18, an interesting item was a presentation by the Society to Mr. Alexander Mackie of a solid silver cigar-case suitably inscribed, as a mark of its appreciation of his valuable services as Hanging Judge, &c., both at this and previous exhibitions. In handing the gift to Mr. Mackie, the President, Mr. E. Pullock expressed to him the thanks of the members for his advice and assistance so freely and ungrudgingly given.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, December 1, at eight o'clock, Mr Charles F. Townsend will read a paper, 'Phosphorescence in relation to Photography." The Hon. Secretary will be pleased to see at the meeting any one interested on the subject, visitors are always welcome.

RÖNTGEN SOCIETY.—The next General Meeting of this Society will be held at 11, Chandos-street, Cavendish-square, London, W., on Tuesday, December 6, 1898, at eight p.m. A discussion on "Dermatitis in relation to Röntgen Ray Work," will be introduced by Mr. Ernest Payne and Dr. Walsh, who will read short papers on the subject.

THE WARWICK DRY PLATE CO.—The names of the prize-winners in the Warwick Monthly Competition for November are—1st prize, 20*l*., Miss Janet Reid, Reedwood, Redhill, Surrey; 2nd prize, 10*l*., Mr. Edward Brightman, Lyndale, Redland-road, Bristol; 3rd prize, 5*l*., Mr. Reginald B. Creak, Denmark-street, Diss, Norfolk.

THE London & Blackfriars Photographic Supply Co. inform us that they have amalgamated their two businesses, and that as from November 1, 1898, the London Photographic Supply Co. and the Blackfriars Photographic and Sensitising Co. will be carried on under the style of the London & Blackfriars Photographic Supply Co.

THE Open Classes and awards in the Fourth Annual Exhibition of the Borough Polytechnic Photographic Society to be held December 21 to 31, 1898, are as follows:—Prints not previously medalled, one silver medal and two silver medallions, one gold medallion and two silver medals; lantern slides not previously medalled, one silver medal and one silver medallion; lantern slides previously medalled, one gold medallion and one silver medal. Further particulars and entry forms can be obtained from the Hon. Secretary, Mr. H. C. Philcox, 255, South Lambeth-road, London, S.W.

ROYAL INSTITUTION.—The Christmas course of lectures, specially adapted to young people, at the Royal Institution, will be delivered this year by Sir Robert Stawell Ball, LL.D., F.R.S., Lowndean Professor of Astronomy and Geometry in the University of Cambridge. The subject will be "Astronomy," and the lectures (which will be illustrated by models and the optical lantern) will deal with the Sun, Moon, Inner Planets, the Great Planets, Shooting Stars, and New Methods. The first lecture will be delivered on Tuesday, December 27, at three o'clock, and the remaining lectures on December 29 and 31, 1898, and on January 3, 5, and 7, 1899.

HASTINGS AND ST. LEONARDS PHOTOGRAPHIC SOCIETY.—At the next meeting, November 29, Mr. Algernon Brooker will show and describe about 100 slides selected from about 150 negatives taken on a recent trip to Paris. The admission is by invitation, and His Worship the Mayor, who is an official of the Society, has consented to preside, the lecture being also under the patronage of the London, Brighton, and South Coast Railway and that of the Chemin de Fer de l'Ouest, the route described being *viâ* Newhaven, Dieppe, Rouen, to Paris. Announcements concerning the Exhibition arranged by the Society for next February will be made, details of which we hope to publish in our next issue.

SOUTHSEA AMATEUR PHOTOGRAPHIC SOCIETY.—The Eleventh Annual Exhibition of Photographic Work will be held at the Society's Rooms, 5, Pembroke-road, Portsmouth, on Monday and Tuesday, January 30 and 31, 1899. The Exhibition Secretary is Mr. F J. Mortimer, Cornwall House, Ordnance-row, Portsea, of whom all particulars may be obtained. The classes are:—A, Landscape, with or without figures; B, Seascape and River Scenery; C, Figure Studies (including groups and portraits); D, Architecture; E, Local Views, *i.e.*, Views taken within the boundaries of Portsea Island and Gosport; F, Enlargements (print not to be less than three times enlarged; direct print from original negative must be sent with enlargement); G, Lantern Slides (set of six); any subject. Open Classes—H, Landscape, with or without figures); I, Figure Studies (including groups and portraits); J, Hand-camera Work (set of six different prints, any size and subject; camera to have been held in the hand and subject to show evidence of motion); K, Lantern Slides (set of six; any subject) The awards in each class are: 1st, silver medal; 2nd, bronze medal; 3rd, certificate.

HOVE CAMERA CLUB EXHIBITION.—List of awards:—Challenge Cup: (Dieppe), C. Berrington Stoner. Class A (open)—Champion: Silver (A Snow-covered Track), Charles Job; bronze, withheld; certificate withheld. Class B (open): Silver (A Quay Side), Charles Job; bronze (On the Ouse), W. F. Slater; (Child Study), Percy Lancaster; certificate (Autumn in the Woods), E. H. Lamb. Class C (open): Silver (Set 4, *genre*), Graystone-Bird; bronze Architectural), Edgar Bull; certificate (Four Seasons). Thomas Wright. Class A (Club): Silver (The Shepherd), D. A. W. English; bronze (The Sussex Stream), C. Berrington Stoner; certificate (Morning at St. Moritz), Mrs. E. Main. Class B (Club): Silver (Dieppe), C. B. Stoner; bronze (Low Tide), R. Chrimes; certificate (Tromso), Mrs. E. Main. Class C (Club): Silver (In County Kerry), Mrs. E. Jennings; certificate (Waiting to go on Board), C. B. Stoner; (Look out below!), R. C. Ryan. Class D (Club): Bronze (North Aisle, Ely), R. Chrimes; certificate (Steps, St. Saviour, Caen), D. J. Gadsby. Class E (Club): Silver (Set II., Architectural), D. J. Gadsby; Bronze (Set I., Architectural), R. Chrimes. Class F (Club): Certificate, A. R. Sargeant.

RÖNTGEN SOCIETY.—A large number of people attended the *conversazione* given by the Röntgen Society at St. Martin's Town Hall, on Monday evening, the object of the gathering being the exhibition of various radiographs dealing with all sorts of subjects. There were also several machines about, by which means those present had an opportunity of seeing through convenient parts of their own bodies, if they cared to do so. Not the least interesting, among the many examples shown of radiography, dealt with some new and rare fish from Lake Tanganyika and the Congo. These were intended to illustrate the application of Röntgen radiography to zoological research. The details of osteology were very minutely shown, while the relation of the skeleton to the external outline was very clearly seen. Another interesting part of the programme consisted of some glass tubes with bulbs on the ends, which, when held between zinc plates charged with alternating currents from a Tesla coil, displayed many beautiful colours. Among the different machines were some wireless telegraphy receivers, on a small scale. The practical illustration of their use on this occasion was brought about by means of an electric gas lighter. When the spark on the latter appeared, a bell tinkled on the receiver, although some yards separated the latter and the agency by which the sparks were produced. Demonstrations were conducted at intervals on live subjects, including several deformity cases. The Wheatstone stereoscopic pictures were most interesting, the bones being brought into relief. The examples in this section, which was presided over by Dr. Mackenzie Davidson, included bullet wounds inflicted at Dargai.

AT the Marlborough-street Police Court, on the 18th inst., John Walter Rolt, aged eighteen, residing in Hilmarten-road, Holloway, and described as having no occupation, and Frederick Harold Corner, aged sixteen, a clerk, of Rochester-road, Kentish Town, both well dressed, were charged before Mr. Marsham with having been concerned together in stealing and receiving five cameras, and a quantity of photographic apparatus, valued at 43*l*. 10*s*., the property of Messrs. Marion & Co., of 22 and 23, Soho-square. It appeared from the evidence of Detective-sergeant Nicholls of the Y Division, that he arrested the prisoner Rolt at Highgate, where he saw him carrying the camera produced. He asked him where he got it from, and at first he declined to say, but afterwards he said he obtained it from the prisoner Corner, who was in the employ of a large photographic firm. He also stated that he had received three other cameras from Corner, and had sold one of them for 35*s*., and another for a sovereign. Witness afterwards went to Lawford-road, Kentish Town, where he saw Corner. He told him he was a police officer, and should arrest him. Corner replied, "I am done; I have been expecting this." When told what Rolt had said, he replied, "Yes, it is quite true. I gave him some of the money. I have got a lot of other articles at home at my mother's, belonging to my late master, Mr. Marion." Witness subsequently went, accompanied by a member of the prosecuting firm, to the address in Hillmarten-road, and also to Corner's home in Rochester-road, Kentish Town, where the other property belonging to the prosecuting firm was handed to him. Mr. C. F. Gill, who appeared for Corner, said the case was a painful one. Corner, who was well connected, had only left school a short time ago. He obtained a situation at the prosecuting firm's, and at different times took home photographic apparatus to use. He left his situation voluntarily, and was then afraid to take back the articles in question, consequently he very foolishly told Rolt that he had obtained the cameras as traveller's samples, and the latter, believing him, disposed of some of them. Corner's father had lately died, and his mother was now very ill. Under those circumstances he asked the magistrate to deal with Corner under the First Offenders' Act, and his friends would give assurances that he would be looked after. Mr. Arthur Gill, barrister, who appeared for Rolt, said the latter believed what he was told by Corner, and he therefore asked that Rolt might be discharged. Mr. Bishop, of the prosecuting firm, said his employers did not wish to press the charge unduly. Mr. Marsham said he did not think anybody would convict Rolt, therefore he ordered him to be discharged. Corner was ordered to find one surety in 25*l*., and to enter into his own recognisances in 25*l*., not to offend again. The necessary surety was at once forthcoming, and Corner was liberated, and left the court accompanied by his friends.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

November.	Name of Society.	Subject.
28	Ashton-under-Lyne	Lecture. L. Morgan M.D.
28	Bradford Photo. Society	*London to North Cornwall.* Godfrey Bingley.
28	Camera Club	Lecture.
28	North Middlesex	Technical Meeting.
28	Oxford Camera Club	*Practical Notes on Outdoor Work with the Camera.* Rev. A. H. Blake.
28	Society of Arts	*Acetylene.* Professor Vivian B Lewes.
29	Birmingham Photo. Society	*Practical Pictorial Photography.* A. Horsley Hinton.
29	Hackney	Paper.
29	Isle of Thanet	*Composition and Selection of Subjects in Pictorial Photography.* A. Horsley Hinton.
29	Shropshire	Prize Slides
30	Kingston-on-Thames	Practical Points in Exposure, Development, and Printing.
30	Leeds Camera Club	*Northern France* W. J. Warren
30	Photographic Club	Travellers' Night: Slides by Mr. Plank.
30	Society of Arts	*Photographic Developers and Development.* C. H. Bothamley, F.C.S.
December.		
1	Ashton-under-Lyne	Meeting for Conversation, &c.
1	Bolton Mutual Photo. Society	*Photo-micrography* F. Wilkinson, F.G.S.
1	Camera Club	G. A. Storey A.R.A
1	Darwen	Slides: *A Trip to Yarmouth and Home again.*
1	Leeds Photo. Society	Annual Meeting.—Members' Lantern Evening.
1	Leigh	Lantern-slide Making.
1	Liverpool Amateur	Discussion on Printing. Opened by Dr. Llewn Morgan
1	London and Provincial	*Phosphorescence in Relation to Photography.* C. F. Townsend.
2	Croydon Microscopical	Demonstration of Velox Paper.

ROYAL PHOTOGRAPHIC SOCIETY.

NOVEMBER 15,—Photo-mechanical Meeting,—Mr. Chapman Jones, F.I.C., F.C.S. (Vice-President), in the chair.

AN IMPROVEMENT IN THREE-COLOUR WORK.

Mr. A. A. K. TALLENT read a paper "On Rapid Dry Plates for Process Work: Combined Screen and Colour Negatives for Three-colour Work." In the production of typographic blocks for three-colour printing, he said, a considerable number of processes had to be gone through, numbering fifteen operations in all, and the making of the blocks therefore became a matter of great difficulty, not only on account of the number of operations involved, but also on account of the necessity of preserving the relations between those for each of the three colours, and the time and care required to produce successful results rendered the process expensive. If the colour-record negatives and the screen negatives could be taken at one operation on the same plates, the difficulties and the number of operations could be materially reduced, and the object of the paper was to demonstrate the possibility of such a method. Mr. Tallent said he had found that, with Lumière's panchromatic plates, it was possible to produce good printing screen negatives containing also the colour record, and he showed prints from negatives made in this manner; and, although he had not extended his experiments to the most rapid colour-sensitive plates procurable, he had no doubt that, with suitable treatment, they could be made serviceable. He said that this modified method would effect so much economy that it would convert a process, at present too expensive to work, into one the extent of application of which would only be equalled by chromo-lithography.

Mr. W. GAMBLE said the process in question had recently been demonstrated to him, and that it was possible to reduce the necessary exposures to about twenty minutes in all for three half-tone negatives.

Mr. IGNATZ HERBST said he had made some experiments in this direction, and favoured the use of different colour-sensitive plates for each colour.

Mr. SANGER SHEPHERD, alluding to the question of economising time, said the new rapid spectrum plate was eminently serviceable in this respect, as it afforded a ready means of producing the necessary negatives in a very short time, bringing the process within the bounds of commercial practicability. He emphasised the importance of making the three colour-record negatives on the same brand of plates, in preference to using different sensitive surfaces which would have different density factors or different scales of gradation. It was essential, too, that three negatives should have the same relative density; it was exceedingly difficult to get three transparencies or three negatives, with different density factors, which would yield anything like a correct result without a good deal of fine etching or retouching. With regard to reducing, the different densities of the negative were reduced at an unequal rate and the gradation was altogether upset; it was far better to make the negatives a little too thin, and to intensify if necessary, than to over-develop and rely on reduction to bring them to the same scale.

The CHAIRMAN asked whether the difference in the range of gradation was so great as to make the use of different plates an important factor in the subject. The falsification of tones produced by reduction had been brought forward theoretically for many years, but process workers and others had been very slow to appreciate the fact.

Mr. TALLENT, in replying to the above and other points raised in the course of a conversation which ensued, recommended every one interested in the subject to study the papers published from time to time by Mr. Ives, to whom a great debt was due.

A vote of thanks was accorded to Mr. Tallent for his paper.

THE MELTING AND SETTING POINTS OF GELATINE.

Mr. R. CHILD BAYLEY read a communication "On the Melting and Setting Points of Gelatine Solutions, and their Modification," in which he detailed the results of some investigations carried out with the aid of an apparatus which he described to the Society some two years ago, dealing with the various influences which could be brought to bear upon gelatine, with a view to altering the temperature at which its solutions solidify and melt. It was pointed out that the setting and melting points were not identical, the setting point being generally about 8° Centigrade below that of melting. The stronger the solution in gelatine, the higher would be the temperature at which it would set and melt, the rise being most marked in the case of the most dilute solutions capable of solidifying at all, and the effect gradually tailing off with very strong solutions. The setting and melting points were lowered by prolonged boiling, which eventually altogether destroyed the power of setting. The author had invariably noticed that in the better grades of gelatine the effect of boiling was first to slightly raise the melting point. Prolonged boiling had a marked effect upon the colour of the jelly; however white it might be at the commencement, it soon took on a distinctly yellowish tinge, and to such an extent that the time of boiling might be readily estimated by the colour alone. The effect of the addition of a large amount of potash alum was rather an alteration of the character of the melting and setting processes than a simple raising of the temperature at which they took place; the gelatine solution then ceased to have a definite melting point, and, although for complete liquefaction a higher temperature was necessary, a partial action set in at a temperature which was actually lowered by increasing the amount of alum present, while a still further increase gave total insolubility. With chrome alum, the effect of 1·2 gramme per litre of five per cent. gelatine solution produced about the same effect as 5 grammes of potash alum, and anything over 140 c. c. of commercial formaline per litre entirely destroyed all power of remelting. The paper was illustrated by several diagrams showing the results of Mr. Child Bayley's experiments, and concluded with a summary of references likely to be useful to photographers.

Mr. SANGER SHEPHERD thought the paper pointed to the fact that the whole subject of the speed of plates was dependent upon the physical state of the gelatine emulsion, and expressed the opinion that the means of further increasing speed would only be found by a study of that question.

Mr. J. B. B. WELLINGTON, Mr. W. E. DEBENHAM, and the CHAIRMAN took part in an informal discussion which followed the reading of the paper; and the passing of a vote of thanks to Mr. Child Bayley brought the meeting to a close.

NOVEMBER 22,—Technical Meeting,—Mr. John Spiller, F.I.C., F.C.S., in the chair.

EXHIBITION OF LANTERN APPARATUS.

MESSRS. Ross, Limited, exhibited specimens of their lantern apparatus, including the Radiant limelight jet, the leading advantage of which was said to consist in the fact that the luminous area was smaller than usual in proportion to the power of the jet, while the intensity was much greater, and with a smaller consumption of gas; a new limelight lantern; a projection arc lamp; a combination lantern, for projection, science work, or enlarging, and a new series of enlarging lanterns.

THE ACTION OF CERTAIN SUBSTANCES ON A PHOTOGRAPHIC DRY PLATE IN THE DARK.

Dr. W. J. RUSSELL, Ph.D., F.R.S., F.I.C., F.C.S., read a paper, in which he detailed the results of investigations to which he was led when repeating Becquerel's experiments with regard to uranium. Becquerel showed that the metal uranium and some of its salts were capable of acting upon a photographic dry plate in the dark. The lecturer thought he was correct in saying that all uranium salts had this power, and this not only as solids, but also in solution. In October 1896 he took two samples each of the nitrate, oxide, and chloride, the last-named being in solution, and one set had since been kept in the light, and the other set in the dark. They were last examined quite recently, and it was then found that the samples which had been kept in the dark were just as active on a plate as they were two years ago, and as active as those kept in the light. There was a complete and marked distinction, however, between the action of uranium and that of the substances to be referred to in the lecture, for the former would pass through glass, which was not the case with the action proceeding from the bodies now to be referred to. Taking printing-ink as a starting point, Dr. Russell showed that it had an action upon the photographic plate not only when in contact with it, but also at a distance, the action in this case, and generally, being influenced to a very great extent by temperature. When a sheet of printed paper was kept in contact with a plate for two or three weeks at ordinary temperature, a perfectly sharp and clear reproduction of the printed matter appeared upon development, the printing on the reverse side of the paper being also shown less faintly; but at a temperature of 55° C. the same result was produced in five hours. Pieces cut from three different daily papers showed a marked variation in the action of different printing inks. It was easy to guess that this action was caused by the drying oil which formed an ingredient of the ink, and it was shown that drying oil would produce similar results. Linseed oil was nearly as active, and, speaking generally, it might be said that vegetable oils were the most active, the animal oils coming next, while the mineral oils seemed to be altogether inactive. If printed paper was heated, the activity of the ink disappeared. An experiment with an advertisement printed in red and blue showed that the red letters were reproduced on the plate (of course, after development), and that the blue ones were inactive; in this case the word "Beecham's" was reproduced on the plate although it was not visible in the original, and it was found that the latter had been in contact with another page of the same periodical on which the word appeared. This peculiar property of printing ink was capable of being retained for a very long time, a fact which was demonstrated by reproductions of pages from books printed in 1895 and 1641. Copal varnish acted similarly, the active substance being turpentine, and all the terpines were exceedingly active in this respect; the same was the case with all the essential oils of commerce, which contained terpines. Alcohol, and ether, when pure, were not active, and a means was thus afforded of testing their purity. Lantern slides were exhibited to show that deal, spruce, oak, and mahogany, possessed the property of affecting a dry plate, the grain and markings of the woods being accurately and sharply reproduced; the piece of mahogany used for the experiment was between thirty and forty years old, and had been kept in a dry place all the time; and the oak was part of a box which was at least a hundred years old. The activity of the wood was stimulated by rubbing it with drying oil. Charred wood was exceedingly active, but lost its activity if heated for some time in a crucible. Such bodies as glass, fluorspar, mica, &c., would allow no trace of this activity to pass through them; but writing paper, gelatine, and gutta-percha tissue were transparent. Of the metals, zinc was one of the most active; if dulled by exposure to the air, it was quite inactive; if the surface was quite smooth and bright, it was slightly active; but, if rubbed with sand-paper, its activity became very great. The activity of metals was approximately in the following order: Magnesium, cadmium, zinc, nickel, aluminium, lead, bismuth, tin, cobalt, and antimony. Mercury was quite inactive, but a trace of zinc—so small a quantity as $\frac{1}{300}$ per cent.—made it exceedingly active. Dr. Russell's lecture dealt at much length with many aspects of the subject, and he concluded by saying that at present he strongly favoured the theory that the cause of the action under consideration was peroxide of hydrogen. He said he did not wish to discuss the point, but, as an important link in the chain of evidence, he showed some slides to prove that at all events peroxide of hydrogen would produce results exactly similar to those already exhibited, in one case a solution containing 1 part of peroxide to 5,000,000 parts of water being sufficient for the purpose.

At the conclusion of the lecture, a short discussion took place, and the passing of a very cordial vote of thanks to Dr. Russell brought the proceedings to a close.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 17,—Mr. S. Herbert Fry in the chair.

Mr. H. SNOWDEN WARD related a few of his experiences while on a recent trip to the States, and showed a collection of slides which aimed to represent the class of photographic work done by the members of societies in different parts of the United States, although some of them, perhaps, were not now thoroughly representative of the work their producers were now doing, as it happened that in a few cases he had been unable to secure their more recent results. Mr. Ward believed that there were one or two points in connexion

with American society life which might be usefully taken up on this side. In common with English experiences, the tendency on the part of members to lose interest in their societies has had to be attended to. Many schemes have been tried to remedy this state of things, and the attendant smallness of the meetings, and in several cases the much-abused social element has been introduced to this end, but in a different way to our own. In some places an idea that has worked very well is to suspend the business at a certain hour, to partake of a light supper and engage in conversational discussion. In other places "criticism evenings" are the thing. The New York Camera Club sets aside certain meetings for this, and have a painter, who is something of a photographer, to criticise the lantern slides, while in other clubs the criticising is undertaken by one of the members, and undoubtedly some benefit has accrued. American societies appear to pay more attention to their homes than is done in this country, and what are relatively small societies are often provided with good, comfortable, and well-equipped homes, which remain open all day and late into the evening, and rarely can one enter without meeting with three or four of the members. As regards the actual photographic work, it was to be observed that pure landscape, figure studies, portraiture, flower studies, and details comprised the bulk of the work done, architecture being little followed, chiefly for the reason that the material is scarce, and what there is has not the charm of age possessed by the many historic piles of this and other older countries. The first few slides illustrated the use of coloured slides, which find much more favour in the States than here, and it was conceded that, where the subject had been well chosen, the result was attractive and beautiful. Many of the slides displayed what, to English eyes, appeared to be an unnecessary degree of contrast between the lights and shadows, verging on harshness at times; but this seems peculiar to American lantern-slide work, taste ever there tending to brilliant whites and a steeper range of tones. At the same time the influence of English work is making itself felt in American slide work, a fact which was manifest in some of the pictures shown.

The CHAIRMAN, in thanking Mr. Snowden Ward for his entertainment, touched in his remarks upon the use of a white margin in some of the pictures shown, where, with some boldness, square and oval pictures had been surrounded with oval and square masks, with varying effects. While one of them seemed not unsuitable, the others did not suit his taste, but he agreed that white margins might sometimes be used to accentuate or relieve, according to the subject itself, the lights and shades in the picture proper. The slides included many excellent pictures, but he did not agree altogether that they all took his fancy technically. A greater hardness, and an insufficiency of transparency possessed by many of the slides was not attractive to him, but beyond this it was unfair to go. They were told that this was not a selection, but a collection, pure and simple, of the every-day work of American societies, and, as such, they were deserving of high commendation. He agreed that probably some societies did require a social element for their successful carrying on, but he doubted whether the many benefits which were extended by American clubs, in the way of light suppers, &c., as mentioned by Mr. Ward, could be done on the small subscription asked by the majority of English societies.

Mr. SNOWDEN WARD explained that subscriptions in the States were certainly considerably higher, ranging upwards from two guineas.

PHOTOGRAPHIC CLUB.

NOVEMBER 16,—Beginner's Night,—Mr. R. Child Bayley in the chair.

Mr. A. MACKIE read a paper on

THE EVOLUTION OF THE GELATINE PLATE,

paper which, as its title proclaims, was more of an historical and theoretical than a practical nature. The Photographic Club, he said, was created by the gelatine process, and, during the first few years of its existence, all its discussions centred on gelatine emulsions, but latterly the subject has hardly been referred to, and it was probable that nine out of ten of those photographers who had commenced during the past ten years had but the vaguest notions of how a gelatine plate was prepared. His object, he thought, would be the better accomplished by commencing from the days of the wet-plate process, tracing through successive years the gradual growth of knowledge which resulted in the present universal gelatine process. In the wet process the sensitive plate was made by coating the glass with a film of collodion with which was incorporated one of the haloid salts. This was nearly always an iodide, but iodide and bromide had been used, and possibly chloride also. For the purposes of the lecture, however, he would refer only to iodised collodion, iodide of cadmium being used. When poured upon the plate, the ether and alcohol used as the solvents of the pyroxyline soon evaporated, leaving a hard and dry collodion film. The plate so prepared was then immersed in a bath of silver nitrate for a few minutes, with the result that it assumed a milky in place of its previous colourless appearance. It was a necessary part of the process that this plate should be exposed wet, development being effected with a solution of iron. The principle of this developing action differed from that of the present time; nowadays, the reduced silver which forms the image is obtained from the silver bromide of which the film consists, but in the wet-plate process, developing with the iron developer, the silver was obtained from the nitrate of silver with which the plate was wet. The disadvantages of the wet process were, chiefly, that of necessity the plates had to be prepared, practically, just before exposure in the camera, which, in case of landscape work, entailed carrying about a dark room and materials, and that the constitution of the sensitising bath altered with the immersion of dry plate, becoming weaker in silver and accumulating cadmium nitrate and the remains of any of the ether and alcohol still present in the collodion. However, it was a vast improvement upon then existing processes, and was in now in vogue. Experimentalists endeavoured to find a means of preserving the plate longer in its wet state, and, in 1854, Spiller and Crookes on one hand, by the use of a deliquescent salt in the bath, and Maxwell Lyte and Shadbolt on the other, by the use of honey or golden syrup, contributed to this end. Mr. Mackie then reviewed the introduction of the dry plate, with collodion and gelatine, touching in turn upon the work of Taupenot, Fothergill, Sayce, Bolton, Harrison, Maddox, Burgess, and others in this connexion. The discovery of the alkaline system of development was a great impetus to dry-plate photography. It was due to Kennett that the gelatine process came into fashion as early as it did, as he afforded an opportunity by the sale in small quantities of gelatine-emulsion pellicle, to those who would not make for themselves, of trying the new process. Details of each step forward in the perfection of gelatine-emulsion making, increased speed, &c., were given at length until present-day methods were arrived at, and the lecture was concluded with a demonstration of the preparation of a small batch of emulsion by such a method.

Camera Club.—Those who went to the Camera Club on the 10th instant, in the hope of hearing Mr. Cadett's promised paper on "Colour Sensitometers," were disappointed, for the reading of the paper was postponed until a more convenient season—more convenient, that is to say, to the President of the Club, Captain Abney, who was called away to Ireland and had to go there, although he took the deepest interest in the subject of Mr. Cadett's paper. So in deference to his wishes the reading was postponed until some future date, when the President can hear it, and, let us hope, join in the discussion which it is sure to evoke. Last Thursday, however, no such *contretemps* occurred, and Professor Gardner found a large audience awaiting him, when he stepped on the platform to give his lecture on

ATHENS.

Mr. Bros was chairman, and he was essentially the right man in the right place, for Mr. Bros knows his Europe well, is an archæologist of the first water, and can find his way about Athens as easily as most of us can walk along the Strand to get to Charing Cross. Why do lecturers at the Camera Club always begin by saying that when first the Secretary wrote to them they accepted the invitation with some diffidence, because of this, that, or the other? Is there something in the atmosphere of the place which suggests this modest disclaimer all about nothing in particular, or is there a concealed phonograph hidden somewhere which compels them to repeat the rusty formula? Certainly Professor Gardner had no need to entrench himself behind an apology of any sort or kind, for he knew his subject well, his pictures were good—at least most of them were, and he had an audience to address who could be interested with details which would bore an ordinary assembly, where educated persons are always in the minority. He had no pretensions to the name of photographer—so he told us at the outset of his remarks; for some of his pictures he himself was responsible, others had been supplied by friends, and the remainder had been bought in the streets of Athens. If he succeeded in interesting his audience it would be because of the subject rather than the art of the lecturer. Then came the inevitable map, showing the Acropolis as a central point, and the various places around it, with which the lecturer intended to deal. A map at the beginning of a lecture is apt to act as a wet blanket, and lecturers would do well if they introduced it later on, when they have secured the interest and attention of their auditors. This by the way; anyhow, every one was pleased to see the last of the map, and we were presently looking over the beautiful plains of Athens, backed by the great ridge of Hymettus, which is over 3000 feet in height. And here the lecturer expressed a regret that this scene could not be done justice to by the sober tints of photography. At sunset, he said, Hymettus takes a wonderful purple colour, which is quite indescribable. A panoramic view of Athens with the Acropolis and the noble Parthenon dominating the whole—the modern town nestling at its foot—gave one a very fair idea of the aspect of the place, and knowledge became more complete as various pictures of the outskirts, bounded by olive groves, came in order upon the screen. Next we were taken to the Acropolis itself, the very centre of interest in classical Athens, with the noble range of hills at the back, from which came the marble which was used in its erection. Several views of the city, taken from this central spot, were then shown, including one of the Areiopagus, or Mars Hill, from which St. Paul said, "Ye men of Athens, I perceive that in all things ye are too superstitious." This is where the famous Council, or Areiopagus, sat, from remote antiquity acting as a criminal tribunal, and occasionally, as it would seem from the St. Paul incident just quoted, determining matters of a religious nature. The approach to the Acropolis from its principal entrance, the Propylaea, was next shown from different points of view, and its beauties pointed out. This entrance to the sacred enclosure at Athens has always been regarded as one of the most perfect examples of Greek art, and Professor Gardner dealt with it as though he loved it. From the Propylaea we found ourselves under the beautiful but much mutilated portico of the Parthenon itself, and we were reminded how the figures of the Pediment had long ago been removed by Lord Elgin, and are now the delight of art students at our own British Museum. It would, perhaps, have interested his audience if the lecturer had reminded them of what was the undoubted facts—that we really owe the Elgin marbles to Lord Nelson's victory of the Nile. By that action he began to break up the French rule in Egypt, and undermined French influence among the Turks. Greece at that time was a province of Turkey, and, as Turkey wished to make friends with the English victors, anything that we asked was readily conceded. Lord Elgin, who was an enthusiast in Greek art, and was our Ambassador at Constantinople, saw a grand opportunity for acquiring the marbles which have since borne his name. He asked for them and they were given him. Most probably if we had not thus acquired them the Turks would have destroyed them, or the French would have carried them off to the Louvre.

Professor Gardner alluded to the interesting observations first made by Penrose during his examination of the Parthenon, namely, that the base line of the building is not straight, but bowed upwards in the centre. A photograph taken from the end of the steps, and looking along them, showed this peculiarity in a very marked manner. It exhibits a refinement of architecture which few would have looked for—an attempt to obtain, by an optical deception, the appearance of stability which the building would have lacked if the base line had been quite flat. The bases of the huge columns have been cut with wonderful skill to fit them to the subtle curve of the base of the building. In 1687 Athens was besieged by the Venetians, and the Turks, ever careless of the beauties of

the place, turned the Parthenon into a powder magazine. The powder exploded, and the building was terribly knocked about. Earthquake shocks have also had their share in bringing to ruin this most beautiful example of Greek art. A view of the Erechtheum, with its beautiful female figures, or caryatides, was also shown. One of these supporting figures is now at the British Museum, and has been replaced in the original structure by a similar figure in terra cotta, the dark colour of which was noticeable in the photograph. There is much difference of opinion as to the good taste of introducing the human figure into buildings, and making them take the place of supporting columns, but however incongruous these figures may be, they have in this instance been enlisted with fine effect, and set up with most consummate skill. We have not space to describe in detail any of the other pictures which illustrated this interesting lecture. The great theatre of Dionysius, with the most beautiful central seat for the use of the priest, and the seats of honour around it, evoked much applause, as did also the mediæval Cathedral, with its patchwork made up of architectural fragments of many periods. The lecture was brought to a conclusion by a series of views illustrating the surroundings of Athens. Here we saw the great and the little harbour of the Piræus, the bay of Salamis, where the great sea fight of that name was fought; a view of the field of historic Marathon, when the Athenians made their famous charge upon their Persian adversaries; and many other spots which are enshrined in the works of classical writers. In conclusion, Professor Gardner expressed the hope that he had been able to recall the beauties of Athens to those who were acquainted with the city, and had raised a desire among others to visit a place which he regarded as being more fascinating than any other spot known to him. The proceedings closed with a vote of thanks, which was carried by acclamation.

Croydon Camera Club.—The Croydon Camera Club opened its season of lantern shows on Wednesday, the 16th inst., at the small public hall, with a programme which seemed, as it deserved, to give even more satisfaction than ever. The chief attraction of the evening was Mrs. Main, whose distinctions gained as a lady amateur photographer make her, as the President of the Club (Mr. Hector Maclean) said, in introducing her to the audience, "the foremost lady amateur of the day, and fully worthy of taking rank with Vittoria Sella, Donkin, and the other great photographic exponents of Alpine scenery." He also drew attention to the fact that Mrs. Main's fine and, in some respects, unique series of some thousands of prints have for some years past been sold for the benefit of the St. Moritz Aid Fund, an institution which assists needy invalids to winter at the famous health resort. Although some few there were who knew what to be prepared for, to many the lecturer and her series of photographs came as a great and welcome surprise, and so the pleasure derived from the truly magnificent and telling scenery, the charming personality of the lecturer, and the vivacious and sprightly flow of unforced description were all the keener. The plan adopted by Mrs. Main was to illustrate her subject by making an imaginary ascent of 16,000 feet or so from one of the Swiss hotels, and descending again, the route and incidents being illustrated by photographs taken by the lecturer. Thus many were for the first time in their lives made to clearly understand what are glaciers, moraines, crevasses, avalanches, "cornices," "bridges," and "tables," which were briefly, but very clearly, explained by word as well as by photograph. The methods of climbing as adopted by Mrs. Main and her party were very fully exemplified; in some instances the route followed seemed utterly impassable, at other times perilously difficult. The series was brought to a conclusion by a set of four surprisingly beautiful depictions of how dazzlingly white snow flowers grow upon the black ice of some of the lakes.

Gospel Oak Photographic Society.—November 15.—Mr. Ramsey, of the Eastman Company, demonstrated before the members of the above Society the ease with which bromide paper may be toned and its colour altered from the usual grey or black colour to various pleasing tones of brown, chocolate, and sepia. The process, which is a comparatively recent introduction, proved perfectly successful in the demonstrator's hands, and a brief *résumé* may be of interest. The only additional apparatus required is an enamelled iron dish of convenient size, some hypo alum, and a gas ring or other suitable means of heating the dish which is to contain the toning solution. The formula for this solution is: Sodium hyposulphite, 10 ounces; alum, 1 ounce; boiling water, 70 ounces. The hypo is to be dissolved in the water first, and the alum added slowly in small quantities. When all is dissolved the solution should be milk white. It should not be filtered, and it works better as it becomes a little old; it may be strengthened from time to time by the addition of a little fresh solution. The bath should never be thrown away entirely, but replenished in the manner stated above. The prints after development (if developed with iron, they should be treated in the clearing bath as usual) are washed, alumed, rinsed, and fixed. After a slight washing they are to be dried. It is not necessary to remove all the hypo, as a little left in the print helps matters along. The dish is now filled with the toning solution and placed on the gas ring or whatever source of heat is used, and the prints placed in the bath one by one, care being taken to see that they are all thoroughly saturated with the solution. The bath will by this time have become hot, and should be allowed to attain a temperature of about 110° or 120° Fahr. Toning may take as long as forty or fifty minutes, and, with satisfactory prints, tones of an exceedingly beautiful colour may be obtained. The prints suitable for this process are those such as have had a full exposure but are not over-exposed. They should contain plenty of gradation. Any developer may be used, and the development should be discontinued almost before the prints have obtained full density, though all detail must be visible. On the correctness of the exposure everything else depends, and satisfactory tones cannot be obtained upon a print the development of which has been forced. The resulting colour depends upon the negative, exposure, and developer. The best all-round developer for this process is ferrous oxalate or amidol. Mr. Ramsey then proceeded to tone prints on the various brands of bromide paper manufactured by the Eastman Company with satisfactory results, the colours obtained being much admired by the members who had the pleasure of watching the demonstration. In reply to questions asked by various members, the demonstrator said that the process had hardly been introduced long enough for him to say that it was absolutely permanent, but prints toned twelve months or so ago were quite perfect, and there was every reason to believe that they would remain so. He thought that the process was equally suitable for other makes of bromide paper, but he had only used it on the papers manufactured by the Eastman Company. The point, however, could easily be settled by trial. The temperature of bath might be raised to 150° to 155° if the prints were very long in toning, but there was a danger of blisters and frilling if these high temperatures were maintained. It is worthy of note that the first print toned by Mr. Ramsey was only in the bath for five minutes, and that the bath when heated gives out a very strong smell of sulphur. A vote of thanks to Mr. Ramsey brought the proceedings to a close.

North Middlesex Photographic Society.—November 14, Mr. J. MacIntosh in the chair. Four new members were elected. Mr. E. J. Wall delivered a lecture on

LIGHT AND PHOTOGRAPHY.

He began by stating that white light was a mixture of all the colours, and colour resulted when certain portions of the light rays were abstracted. He had the spectrum thrown on the screen, and showed the effect of interposing different coloured glasses in the path of the rays, certain parts of the spectrum were completely cut out according to the glass used.—A piece of cardboard, painted with different colours in squares, was placed in the light of the spectrum on the screen, and it was very instructive to see how a square of green and red pigment behaved when passed from one end to the other; when in the red, the green showed black and the red the proper colour; as it was passed along they gradually changed, the red growing darker and the green lighter, until, in the blue-green band the red appeared black, and the green its natural hue. He illustrated what black was by holding a strip of black velvet across the spectrum, it showing no colour anywhere, because all light was absorbed on falling on it. He passed round the screens used, and described how they were prepared. Pieces of patent plate, four inches square, were first coated with a two and a half per cent. solution of albumen; then, when dry, 170 minims of an eight per cent. solution of gelatine was poured on each piece of glass, carefully levelled, and allowed to set; when dry, these were soaked in various dyes. A good yellow was 20 grains picric acid dissolved to saturation in absolute alcohol, 2 ounces water, and a little ammonia. Red, a one per cent. solution of chrysoidine; orange, one per cent. aurantia; green, one per cent. naphthol green, acid green, or methyl green; violet, one per cent. methyl violet. He spoke of orthochromatic plates, and said that, in photographing most flowers with these plates, a yellow screen was unnecessary, it made the yellows and greens appear too light. Hydroquinone must not be used with these plates, it seemed to destroy the orthochromatic effect, and ammonia was bad to use in the developer. Development must not be discontinued too soon, as the blue developed first, then the yellow, but the latter came up to their proper value, which was darker than the blues if left in a sufficient time. He passed round for comparison two screens, one a commercial yellow screen, and the other a very pale pure yellow, the latter acting twice as strong in stopping the blue rays as the first. This was accounted for by the fact that the commercial screen, apparently of a deeper yellow, actually contained a considerable quantity of black, which stopped the light, but was not effective in separating the blue rays. This arose in the method of manufacture, which consisted in stirring the molten glass with willow rods, which charred and were partly disseminated in the mass.

Richmond Camera Club.—November 7, Mr. Cembrano in the chair.—Mr. Henry Little gave a display of lantern slides illustrating a tour through Algeria, and, after a short interval, showed a miscellaneous selection of slides chiefly of scenery and architecture in Italy and Spain. As is usual in the case of Mr. Little's work, the slides were of excellent quality, and were received with much favour by the audience, which comprised a large proportion of ladies, whose presence had been specially invited on this occasion.

AT the meeting on November 14, Mr. Ardasseer in the chair, Mr. E. G. Richardson gave a demonstration on enlarging without a condenser by means of burning strips of magnesium ribbon hung at certain determined distances from the negative and from each other. Mr. Gibson afterwards demonstrated the method of obtaining the same result by means of waving a strip of burning magnesium wire across the negative, care being taken that every portion received its due share of light. Satisfactory results were produced by both methods.

Bradford Photographic Society.—November 14.—Mr. Percy Lund lectured before a large audience, his subject being

TOM, DICK, AND HARRY, AMATEUR PHOTOGRAPHERS.

The lecturer spoke of the lack of culture displayed by the majority of amateur photographers in their productions. Whilst the average of technical excellence was high, on the other hand, considerations of art seemed to be almost entirely neglected. The world appeared to be too much under the spell of narrow type of utilitarianism, since the fact than man has an æsthetic nature in search of the beautiful was very generally overlooked. He believed, however, that among the rank and file of novices, dabblers, and imitative enthusiasts there were not a few genuinely interested in photography as an art and desirous of progression. These serious disposed and intelligent men he designated as Tom, Dick, and Harry, and, after dwelling on the various directions in which they generally missed the right path and become finally weary of photography he pointed out how their latent artistic capacity might be cultivated, and the stream of their enthusiasm turned into a right channel before it ran to waste. He described the more suitable forms of apparatus, new and effective methods of framing, dwelt upon the necessity for studying the works of others in the best exhibitions, and in conclusion remarked that the end and aim in studying the books and pictures of others was to cultivate one's perceptive faculties, to strengthen the interest in and open the eyes to the more subtle charms of nature. The best artists the world has produced were only a trifle less blind than Tom, Dick, and Harry. It was chiefly a question of keeping one's eyes open, and, having seen the thing as it should be seen, of making the attempt to reproduce nature by art. Tom, Dick, and Harry would soon find that a wide gulf existed between the effects they saw and the results they were

ible to produce by aid of the camera. Their best efforts would be but shadows f the original, but, if they would only read, think, and open their eyes aright, hey would at any rate be able to do far better things than the merely nechanical transcripts, the glossy mediocre work which emanated from the ank and file of photographers.

Leeds Camera Club.—November 16, the President (Mr. W. J. Warren) in he chair.—About a hundred members were present, and Mr. W. J. BELTON, f Aberdeen, gave his lecture and demonstration on the working of

VELOX PRINTING PAPER.

n the course of his remarks, Mr. Belton described Velox as a developing aper, on which the image becomes visible only after the developer is applied, s in the ordinary bromide papers, but having the great advantage of no dark oom being necessary. All the processes with Velox can be carried out in rdinary gaslight, after having made the exposure, by moving to any part of he room shielded from the direct light. The paper is made in six different rands, and is applicable to any class of negative. Its working was described s simplicity itself, if only the printed instructions given with the paper are arried out. Correct exposure is necessary to obtain the best results, and orkers were advised to practise on small strips, until they became thoroughly cquainted with its working. For development, either metol or amidol is ecommended, the formulæ for which are clearly set out by the makers, or a pecial one can be used which is sold by the dealers in the paper. After xposing the negative to an ordinary gas jet, at a distance of six to twelve ches, the best plan is then to lay the paper on a sheet of glass, first dipping in water, and with a mop camel's-hair brush spreading the developer evenly ver the print until it is fully out. It must then be transferred into the fixing ath at once, without washing, allowing it to remain about fifteen minutes, eeping it moving for the first few seconds, and taking care to keep it face ownwards. It is most important, after placing the print in the hypo, that it fingers should be rinsed in clean water, to remove any trace of hypo, efore proceeding with another print. After leaving the hypo the print is ashed in several changes of water for about half an hour, then placed face ownwards on a sheet of clean blotting-paper, and set aside to dry, when the rint will be found perfectly flat, totally unlike any bromide or gelatino-loride prints. Any streaky marks appearing on the finished print can be adily removed by rubbing gently with a tuft of cotton-wool and methylated pirits.

Liverpool Amateur Photographic Association.—November 17.—There as a crowded room at the City Hall, Eberle street, to enjoy the entertain-ent provided by Mr. Gambier Bolton's lecture, "All about Animals," which delivered under the auspices of the Liverpool Amateur Photographic ssociation. The President, Mr. Prior Christian, in introducing the lecturer, ferred to his unique position as a photographer of wild animals in all parts the world, and designated him the Landseer of photography. Mr. Bolton owed about 180 lantern pictures of admirable quality, illustrating the best-nown mammals, reptiles, and birds. The pictures of lions, tigers, giraffes ppopotamuses, kangaroos, sea lions, tortoises, eagles, and vultures were partic-larly applauded, and great interest was taken in the pet animals of the ince and Princess of Wales at Sandringham. Mr. Bolton's discourse was a nning, lucid commentary on his pictures, speaking for more than a hour and alf without relaxing his hold on the interest of all present.

FORTHCOMING EXHIBITIONS.

1898.		
ovember 25, 26	Aintree Photographic Society.	Hon. Secretary, D. Travis, Fazakerley, Liverpool.
„ 25–Dec. 15	Yorkshire Exhibition.	Hon. Secretaries, 13, Chesham-street, Bradford.
cember 27–31	Borough Polytechnic.	Hon. Secretary, H. C. Philcox, 103, Borough-road, S.E.
1899.		
bruary 4–25	Edinburgh Photographic Society.	Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
rch 4–11	South London.	Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.

We do not undertake responsibility for the opinions expressed by our correspondents.

BISULPHITE AND METABISULPHITE OF POTASH.

To the EDITORS.

ENTLEMEN,—Can you refer me to any recent work to which I could n for information as to the chemicals used in the practice of photo-phy?

leldola's work is not exactly recent, and it seems to have passed from stock of dealers. A new edition of Leaper's *Materia Photographica* ld be very acceptable, if it were brought up to date, and especially if rences were given to the authorities for the statements made. A few k pages for additions would also be desirable.

ailing such a book, might I trouble some of your chemical friends nform me precisely what metabisulphite of potassium is when *in tion?*

It is stated in the *Materia Photographica* that this salt is formed by adding alcohol to the solution of hydropotassic sulphite, the result being the abstraction of an atom of water from two of the original salt, and the formation of a fresh combination.

Now, this hydropotassic sulphite is exactly what Watts calls the acid sulphite, and it is stated in the Dictionary that the salt is precipitated by alcohol, no mention being made of change. Watts' Dictionary then speaks of an *anhydro-sulphite*, which is formed without any use of alcohol, and which has precisely the constitution of the metabisulphite; there, however, the difficulty does not quite end.

The salt my dealer supplies as metabisulphite is in tabular crystals, which is the form given by Watts for the acid sulphite slowly deposited. Both Watts and Leaper agree that the alcohol-deposited salt is in needle-shaped crystals, though they differ as to its constitution; and, lastly, the anhydrous salt, whose constitution agrees with the meta-salt, is said to deposit in hard, granular crystals on cooling, without any alcohol.

This is not a curious riddle; it is a question whether we get a cheap salt at a considerably enhanced price, under a pretentious name; and, if we really do get what costs more to prepare, whether the cost is not nullified in making a solution.—I am, yours, &c., J. F. T.

[Our correspondent will find some remarks on the subject in another column.—EDS.]

ENLARGING WITH MAGNESIUM RIBBON.

To the EDITORS.

GENTLEMEN,—In THE BRITISH JOURNAL OF PHOTOGRAPHY for the 18th inst. I see that an inquirer asks for advice as to enlarging by artificial light, and that he does not wish to expend too much money on the apparatus. He suggests a lantern to serve the double purpose of enlarging and of projecting slides on a screen, and, if he is bound to have the option of both these objects, no doubt the lantern is a necessity. In case, however, he wishes to be able to enlarge without going to the expense of either a lantern or a condenser, I venture to call your attention to the method of enlarging by means of strips of magnesium ribbon, hung at a certain distance from a ground-glass screen in front of the negative. I gave a demonstration of this process before the Richmond Camera Club lately (report already sent to you), and it was acknowledged to answer the purpose satisfactorily.

The cost of the ribbon is very small. At 1*s.* 9*d.* an ounce, I calculated that the four strips of 8 inches each required to enlarge from half-plate to 12 × 10 cost about one third of a penny. The apparatus need not cost much, especially if one makes it oneself, as I did. In any case, it is considerably less than a lantern of decent quality.—I am, yours, &c., REX.

3, *Dynevor-road, Richmond, Surrey, November* 19, 1898.

THE PHOTO-CERAMIC PROCESS.

To the EDITORS.

GENTLEMEN,—I was highly pleased to read this morning that a member of the Leeds Camera Club had delivered a lecture, with demonstrations, on "Ceramic Photography." It is a charming subject, and I am sure every lover of our art-science should endeavour to revivify, so that more and more real advancement and real permanence may come to light. I view it entirely from an enamel point of view. Twenty years ago a Parisian manufacturer sold enamel powder in packets, mixed with a portion of flux and sensitive collodion; this was cleared and afterwards placed in a muffle to fuse with heat. The late Mr. Tunny, of Edinburgh, carried this out successfully. Mr. Fletcher, of Warrington, made gas stoves to fuse the flux. Mr. Eliff's formula is quite new to me. I hope it will be tested by some of your ardent spirits in all Societies. Demonstrations are the soul of progress. I am sure we all thank Mr. Eliff for his digging up old processes—I am, yours, &c.,

JAS. ALEX FORREST.

53 *Shrewsbury-road, Oxton, Birkenhead, November* 18, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

R. W. Sharp, 43, Quarry-street, Hamilton.—*Cabinet bust portrait of Sir John Watson, Bart.*

H. E. Barns, 45, London-road, West Croydon.—*Photograph of dog with living mouse on nose, entitled "Trust."*

French & Co., 1, Railway-terrace, Wallington, Surrey.—*Seven photographs: H. Cosmo Bonsor, Esq., M.P.; A. H. Smee, Esq., J.P.; Brough Maltby, Esq.; W. W. Thomson, Esq.; J. Salter Whiler, Esq., J.P.; Duncan Stewart, Esq. T. F. Jones, Esq., J.P.*

ASSISTANT; LEX; C. T. BILBIN; J. STABB; and others.—In our next.

V. A. LATHAM.—Thanks; we note.

HILTON GRUNDY.—Received; thanks.

W. G. STRATTON (Rangoon).—Thanks for the correction.

BACKGROUND.—The address is 41 Gratton-road, Kensington.

JAS. NORVAL.—Many thanks. We shall refer to the subject later.

A. BAKER (Burton-on-Trent).—1. No. 2. Get carbonate of potash, as directed.

"PALE FACE."—The negatives are fully exposed, but under-developed. Remedy for the defect obvious.

RUPTOCK.—*Commerce* is a weekly paper, price 6*d*., published at Amberley Hous . Norfolk-street, Strand W.C.

W. S. COPPIN.—The photographs are good, and should answer your purpose, issued in bromide, collotype, or platinum.

PHOTO.—There is no reason why a properly fixed but untoned print should not last; but we have a personal preference for one toned with gold.

STOVE.—H. S. We do not know of any substitute for black lead as a stove polish that will stand heat. Possibly an oilman in your neighbourhood may know of one.

S. ALBERRY.—You had better keep the volumes for a few years. They will not only be useful for reference, but increase in value. What they would fetch at present we cannot say.

NOTWAL.—You had better get an optician or other qualified individual to ascertain the focus for you, but for your purposes we do not see that the information is of any importance.

W. A.—By registering the photographs now you can recover penalties for infringement of copyright, but probably not to the same extent as if registration had preceded instead of following infringement.

FORMULA WANTED.—S. & D. write: "Will Mr. Drinkwater kindly give formula and time for fixing P O. P. as described by him ('Physical Development of P. O. P.,' p. 744, THE BRITISH JOURNAL OF PHOTOGRAPHY, November 18) and oblige?"

K. S.—1. Registration legally secures you the copyright, any infringement of which you cannot recover for while the photograph remains unregistered. 2. It is a very fine photograph indeed, while as a humorous study, it is one of the best of its class that we have seen.

RODINAL.—1. We think not; but caustic potash would produce that effect. Probably in this case it is caused by the reducing agent, which may be metol. 2. No. 3. The equivalent weights are: potassium carb., 138·2; soda carb., 286. 4. The formula is not published so far as we are aware.

FINISHING BROMIDE ENLARGEMENTS.—B. L. E. writes: "Please tell me what is the best medium to prepare a bromide enlargement for colouring in powdered chalk?"—It requires no preparation excepting lightly rubbing over with an ink eraser. For finishing in chalks a rough paper should be used for the best effects.

HEATING STUDIOS, &C.—B. F. W. If the first cost is not a consideration, by all means fit the studio, reception, and work rooms with the hot-water pipes. By that method of heating, dust and smoke and other annoyances pertaining to coke or coal fires will be avoided and cleanliness secured. Trouble will be saved, as there will only be one fire to require attention, and that outside the building. Furthermore, it will prove more economical in the end.

SALE OF PORTRAIT NEGATIVES.—S. W. S. writes: "We would feel very much obliged if you could let us know if it would be legal for one photographer to dispose of his negatives (portraits) to any other photographer, to print or publish, or otherwise, without his customers' consent?"—The legal point is a somewhat knotty one, and, so far as we remember, has not been raised in a court of law. However, the thing is done, whether legally or not, every time a business is sold.

STEREOSCOPY.—A LEARNER says: "I am anxious to know if I can get a stereoscopic effect by using two prints from the same negative, or must I take two distinct negatives and a print from each? Of course, by the latter process I presume I should have to have a stereoscopic camera. I am told one can get stereoscopic effects just as well by simply looking at one picture through a magnifying glass; am I right in contradicting such a statement?"—In reply: 1. It is impossible to obtain stereoscopic effect from identical prints. 2. Quite right in contradicting such a statement—an absurdly erroneous one.

JAPANESE PAPER.—W. N. says: "I am much obliged for your answer to my question. I wrote to Grosvenor & Chater, but they do not keep the paper, and, moreover, only supply the trade. I therefore avail myself of your kindness in asking me to write again."—We find, on inquiry, that the paper is only supplied by the merchants by the ream, and not in small quantities. We do not know any house that supplies it retail. It is used mainly by copperplate printers, and they may let you have a few quires. Try Brooker, Margaret-street, or the Autotype Company; they both use the paper, we know. We have little doubt the latter will let you have some.

MOUNTING; VARNISHING.—A. S. W. says: "1. I am in the habit of using Marion's photographic starch for mounting my prints. The last few weeks I have had great difficulty with them. As soon as they begin to dry they peel off at the corners. Can you suggest anything to keep them from doing so? 2. When varnishing a negative I invariably find the greater part of the retouching come off. Can you give me a preventive? I use Ellis's medium."—1. Probably the starch is made too thin. Try making it thicker, and applying a thicker coating at the corners, rubbing them down well. 2. The only suggestion we can make is not to make the negative so warm before applying the varnish. All mediums are more or less prone to give up the retouching when the plates are made too warm.

RED PRINTS.—READER asks: "Could you inform me, through the JOURNAL, what kind of process those red prints are in the Steroscopic Company's window, London? They seemed to be a print-out paper; I admired them very much; in fact, a lot of the best houses in London have them in their windows at present. If you could give me any information at all, I should be most thankful to you."—We have not seen the prints in the window referred to, but they are most likely by the carbon process. The majority of the red prints shown, if not all, are by that process.

CRYSTOLEUM.—R. WILKINSON asks: "1. Will you please tell me where I will be able to get convex glasses for crystoleums? Messrs. Marion & Co. do not stock them, and I can see no mention of them in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. 2. Is there some kind of very fine thin paper to be had for this process which does not require to be rubbed down with sand paper?"—1. We cannot say. Crystoleum is so little used now; it is a thing of the past. Possibly some of the other houses, such as Fallowfields, Houghtons, &c., may have some left. 2. Not that we are aware of. There is a thin Rives paper sold, but we do not know of any one who supplies it albumenised.

COPYRIGHT.—SEVEN YEARS' SUBSCRIBER says: "Will you kindly reply to the following: 1. I wish to copyright groups of cricketers, how shall I proceed? 2. I have taken photographs of each cricketer, they sat at my invitation; I have given each sitter one photo of himself. I have arranged a group of the sitters on large card and photographed the same. Can I sell copies of the group, after being registered, to those that compose the group, and still retain the copyright?"—In reply: 1. Send our publishers three prints from each negative, and one-and-sevenpence for each subject, and they will effect registration for you. 2. So long as you have not been paid, or received "valuable consideration" for the photographs, the copyright is yours, and you can sell the prints either before or after registration. Better follow the latter plan, of course.

LENS.—A. E. D. asks: "Would you kindly answer the following questions? Before I ask them I will just say I have not taken a photo for six years, and during that time new lenses have cropped up. My work will not exceed quarter-plate size, which will consist of landscapes, groups, and two cabinets on whole-plate, and two *cartes-de visite* on half-plate. Question 1. Will the stigmatic lens as enclosed do all I have described above, or could you suggest any other more suitable form? 2. For buildings in confused places, of course I should want a wide-angle lens."—The lens will do admirably, and when stopped down it becomes a wide-angle lens. For portraiture in the studio it will, of course, not be so rapid as the portrait lens of the same name. That has an aperture of *f* 4, while the other has one of *f* 6. However, the latter will be the most generally useful of the two.

SPOTTY PRINTS.—SUSSEX writes: "Can you tell me, quite positively, whether the spots upon the two enclosed prints are due to hyposulphite of soda, or to a kind of damp mildew? Personally, I am very perplexed about them, as every precaution is taken in printing and toning departments to ensure the complete freeing from hypo, and also to prevent prior and after-contamination. Scrupulous care is taken, and separate sets of dishes are used for before toning, and after fixing operations; all washing apparatus also is cleansed every batch of prints. The spots appear only occasionally, more so upon prints mounted on mounts same as the two enclosed. Could you test the mounts and see if there be anything wrong with them? The spots appear sometimes a very few hours after mounting; sometimes not on unmounted prints at all, which fact leads me to enclose the new mounts. May I look for your very highly esteemed reply?"—We cannot say positively the cause of the spots; but as they only appear occasionally, it would indicate that they are due to something in the manipulations rather than in the materials used. We do not undertake the testing of mounts—our time will not admit of that. We should, however, suspect the manipulations before the mounts.

STUDIO.—W. W. BUSBRIDGE says: "I am about erecting a new studio on a site where the light will be more or less obstructed by buildings and trees, as a glance at the accompanying rough sketch (which is in plan) will show. In various articles on studio lighting which I have read, I have seen it advocated that, if 'papier minéral' is used to cover the glass on the inside of studio, no serious difficulty will result in using a studio so shut in. I should be obliged if you would answer me in the Correspondence column of this week's JOURNAL, whether glazing the studio with ground glass would permanently dispense with the trouble instead of using papier minéral, or is it necessary that a certain amount of direct light should reach the sitter in order to get an effective lighting, as, if glazed throughout with ground glass, the light would be all diffused? Or would you rather advise that the central part of the side facing the open garden as shown in sketch be clear glass, and each end where light is obstructed ground glass? I am also thinking of having the ridge of roof not in centre but more to glazed side as sketch, so as to get greater pitch for throwing off snow and wet. Do you think that by so doing I should get too much shadow in lighting? In the drawings of studio which I have prepared, it shows about one-third of the span of roof glass and two thirds slate, or would you suggest keeping ridge in centre of studio?"—Ground glass will dispense with the mineral paper. We regret we cannot give our correspondent any really practical advice from the very rough sketch sent, as no dimensions are given and no reference made as to the aspect of the studio, the most essential things to be considered in designing a studio. We should advise Mr. Busbridge to get Mr. Bolas's work on *Studio Building* published by Marion & Co.

*** Owing to considerable pressure on our space, we are again compelled to hold over several answers to correspondents, reviews of books, apparatus, &c., and other matter. We hope to overtake all arrears next week.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	769
The Stereoscope and Stereoscopic Cameras	770
Leaderettes:— Portrait Christmas Cards—Sammann's Hydrosulphite Developer—Isochromatic Plates and Astronomy — The Action of Light on Platinum, Gold, and Silver Chloride — Finger-mark Identity — A New Waterproof Material — The Expected Star Shower—Antarctic Exploration	771
The Yorkshire Photographic Exhibition	772
Foreign News and Notes:— Enlarged Negatives — Coloured Positives — The German Paper Ring — Stripping Films — A Black Printing Process	773
The Traill Taylor Memorial Lecture. By Thomas R. Dallmeyer, F.R.A.S.	774
Lessons from the Exhibitions	774
The Dallmeyer Focometer	775
Philosophic Deductions from the Development Process. By S. K. Lawton	775
The Bennetto Process of Colour Photography	776
An Album of Old Prints	776
McEvoy's Printing Frame	777
At the Camera Club	777
The Aintree Exhibition	778
The Bolt-court Technical School	778
Our Editorial Table:— *The International Annual of Anthony's Photographic Bulletin for 1899*—Catalogue Received	779
News and Notes	779
Patent News	780
Meetings of Societies:— London and Provincial Photographic Association — Croydon Microscopical and Natural History Club — Lewisham Camera Club — Putney Photographic Society — Richmond Camera Club—Blairgowrie and District Photographic Association — Bradford Photographic Society —Derby Photographic Society— Leeds Photographic Society — Scarborough and District Photographic Society — Southsea Amateur Photographic Society — Tunbridge Wells Amateur Photographic Association	780
Forthcoming Exhibitions	782
Correspondence:— Photo-ceramics—Studio Glazing—The Bennetto Process—Keeping Qualities of Films—A Society for Assistants—Christmas Holidays	782
Answers to Correspondents	784

EX CATHEDRÂ.

We have received the directors' report of the Britannia Works Company, Ilford, which is to be presented at the Second Ordinary General Meeting, to be held at Winchester House, Old Broad-street, E.C., on Wednesday next, December 7. According to the report, the net profit for the year's trading is 54,612*l.* 15*s.* 1*d.* The directors state that they are advised that the profits of the business from November 1, 1897, the date from which the business of the vendor Company was taken over to the incorporation of the new Company, May 17, 1898, are not available for distribution. Owing to the impracticability of taking stock at the date at which the business of the old Company was taken over, the profits of the year have been divided approximately on a basis considered by the directors to be fair and reasonable, and approved by the auditors. The profits of the business prior to May 17, 1898, are 25,237*l.*, of which 10,110*l.* 5*s* 4*d.* was paid for interest on purchase money, 2493*l.* 5*s.* 2*d.* for preliminary expenses, and the balance, 12,633*l.* 9*s.* 6*d.*, written off goodwill.

* * *

The profits made since the incorporation of the Company amount to 29,375*l.* 15*s.* 1*d.*, of which 4678*l.* 3*s.* 6*d.* has already been paid as dividend on the six per cent. preference shares. From the balance the directors recommend that a dividend be paid on the ordinary share capital at the rate of ten per cent. per annum, free of income-tax, from May 17, 1898, irrespective of the dates of calls; this will absorb 8693*l.* 3*s.*; also that 2367*l.* 5*s.* 6*d.*, making with the 12,633*l.* 9*s.* 6*d.* above mentioned the sum of 15,000*l.* 15*s.*, be written off goodwill; that 8000*l.* be placed to reserve, and the balance, 5637*l.* 3*s.* 1*d.*, carried forward. The directors have completed a negotiation for the purchase of seven and a half acres of freehold land immediately adjoining the factories, which they consider is a valuable investment. The business continues to show satisfactory progress, the sales having been considerably larger than in any previous year. We congratulate the Company on the deserved and continued success it is experiencing.

* * *

Bradford, at the opening of whose photographic Exhibition reported in this week's issue, we had the pleasure of being present, is one of the earliest provincial towns that could boast a photographic society. Founded, we believe, in or about 1860, the first Bradford Society had but a short life, as we lose all trace of its existence in 1865; but, after thirty years, a new society was established in the great metropolis of the woollen trade in 1895, and, judging from present appearances, it possesses sufficient vitality to carry it on for a very long period.

* * *

Looking back, it is interesting to note how important a share the northern counties, but especially Yorkshire and its neighbour, Lancashire, have always played in the history of photography. In fact, not only have the two vast counties, which claim the red and white roses as their emblems, ever figured very prominently in English history, but they have always, from its very earliest days, been more or less identified with photography and photographic societies. Going back to the first volume of our Almanac, published in 1861, we find that just twelve societies existed in the United Kingdom, of which five were in London. Of the remainder, two were in Scotland, one in Yorkshire, three in Lancashire, while the Midlands were represented by the old Birmingham Society. Two or three years later another Yorkshire society was established in Sheffield, but this appears to have had a very brief existence, as in 1868 we find a total of eleven societies, four of

which were in London, three in Scotland, and the remaining four in Lancashire, so that the latter county remained the sole provincial representative of photography. There is an old saying which Lancashire folk are proud to quote to the effect that "what Lancashire does to-day England will do next week" or next month, and, although this originally applied more especially to political matters, Lancashire has well proved by her steadfast adhesion to photography the truth of the saying.

* * *

A perusal of the list of officers of those old societies also affords some interesting reading. In Lancashire alone we find the names of Sir Henry Roscoe, together with Professor Joule, LL.D., F.R.S., Professor Williamson, F.R.S., and J. B. Dancer; while among the lesser lights in general science, though they are probably fully as well known in purely photographic history, there are Joseph Sidebotham, A. Brothers, Petschler, Mann, Mudd, Wardley, and the veteran J. A. Forrest. Birmingham has amongst its Council in 1861 Hill Norris, O. G. Rylander, and H. P. Robinson, so that the hardware city equally well represented the technical and pictorial side. Glasgow in the same year had amongst its Vice-Presidents John Stuart, who still happily remains to occupy a foremost position in the business capital of Scotland.

* * *

An examination of the officials of the metropolitan societies proves no less interesting, though, of course, there we expect to find more "big names" crowded together; but it will perhaps surprise many of our present-day readers to learn that the Council of the "parent" society—then the Photographic Society of London—boasted among its members no fewer than twelve who could write F.R.S. after their names, and had the Lord Chief Baron, Sir Frederick Pollock, as President. Although the present year's official list presents a fairly "ornamental" appearance, it falls considerably before that of 1861. In the same connexion it is worth mentioning that on the Council of the Blackheath Photographic Society which ran a brief course in the early "sixties," the name of Alderman Sir J. Stuart Knill, whose untimely death was recorded last week, is to be found.

* * *

While on the subject of provincial societies, it may be well to point out how, of late years, it is those rather than our metropolitan bodies that have shown the way how to do photographic exhibitions properly. For a long number of years the parent society's Exhibition may be said to have been the only one of any importance during the year, and the rare occurrence of a photographic exhibition in the provinces proved little else than a collection of members' pictures, with perhaps a sprinkling of professional work from other sources. The credit rests with the Bristol and West of England Association—though they were closely followed by the Dundee Society—of waking the world up to what even a provincial show might be, and it was said of the first of the Bristol Triennial Exhibitions, in 1881, that it "contained the 'cream' of many previous Pall Mall Exhibitions," as well as a vast amount of entirely new work. Dundee, too, in those comparatively early exhibition days, showed that Pall Mall was not alone in that line; and since then Glasgow, Liverpool, Manchester, Bradford, and a host of others, have proved their determination not to be left behind. There is time enough before the next Royal Exhibition to wake up to increased efforts in order to retain the supreme position.

* * *

At the Imperial Institute on Monday, December 5, 1898, at 8.30 p.m., there will be an illustrated public lecture, admission being free without tickets, on the subject of "A National Photographic Record," by Sir J. Benjamin Stone, M.P. Captain W. de W. Abney, R.E., C.B., D.C.L., F.R.S., will be in the chair.

THE STEREOSCOPE AND STEREOSCOPIC CAMERAS.

In conversations we have had the last few weeks with several who vend stereoscopic slides, we learn that the sale of them has increased amazingly during the last six months or so, which is largely attributed to the flooding of the English market with those cheap American stereoscopes of the Wendell Holmes pattern. These neat instruments, which are sold retail at from a shilling to half-a-crown, according to the finish, are really excellent for viewing the pictures with. Indeed, they are much better for the purpose than the majority of the old box form that used to be sold at several times the price, inasmuch as they allow of focussing the slide to suit different sights; this the greater number of the old ones did not do.

These cheap instruments will aid in popularising stereoscopic photography, inasmuch as several are to be had for the same money that formerly had to be paid for one only. Then rarely more than one or two instruments were to be found in the room, and people had to wait their turn to see a picture; now there may be many, so that each may have one to himself. When the stereoscope was formerly in vogue, one well-known house headed its advertisements, "No Home without a Stereoscope;" now, on its resuscitation, it might be paraphrased as "No home without several stereoscopes."

Seeing how these cheap instruments are bringing stereoscopic photography again to the front, it seems a little surprising that English apparatus manufacturers are doing so little to encourage amateurs to take up this, certainly the most pleasing branch of photography, by making a feature of stereoscopic apparatus. Of course, we are all aware that most of the best cameras above the 5×4 size are fitted with a diaphragm, and can be used to take stereoscopic negatives or single pictures at will. But they are heavy and cumbersome when only stereoscopic pictures are required. Furthermore, half-plates cost more than the stereoscopic size do, and one does not want a plate $4\frac{3}{4}$ inches wide to take a picture of $2\frac{3}{4}$ inches high upon. Some time back, in reference to this subject, we pointed out that a stereoscopic hand camera—and that is what is wanted for stereoscopic work in the future—need not much exceed in size or weight an ordinary quarter-plate hand camera.

While on the subject of size, it may be well to consider what is the best size to adopt for the stereoscopic plate of the future. At present the standard size is $6\frac{3}{4} \times 3\frac{1}{4}$. Why that length was adopted it is difficult to conceive, seeing that the size of the pictures must not exceed $2\frac{5}{8}$ inches, or $2\frac{3}{4}$ inches at most. Consequently, a much shorter length would suffice. We should not, however, advise the curtailment of the length more than a quarter of an inch, namely, to $6\frac{1}{2}$ inches, and for this reason: the $6\frac{1}{2} \times 3\frac{1}{4}$ is just double the size of the standard lantern

plate, hence any one having a hand camera of the size suggested would be provided with one that would enable a dozen stereoscopic negatives, or two dozen lantern pictures, to be taken at will, and the apparatus need not be, as we have said before, much larger than the quarter-plate hand camera, if any at all. The $6\frac{1}{2} \times 3\frac{3}{4}$ size would also be more convenient to the plate-makers, inasmuch as both $6\frac{1}{2}$ and $3\frac{1}{4}$ inches are the dimensions of several regular sizes, the half and whole-plate, and the quarter-plates, as well as the lantern sizes, to wit.

Portrait Christmas Cards.—Christmas and the New Year are fast approaching, and it is a little surprising that portrait photographers as a body make so little attempt to turn the season to profitable account. Out of several establishments we have visited lately, only one seemed to have made a special feature of portraits as Christmas cards; yet one would think that more enterprise in this direction would bring "grist to the mill" at this dull season. We mention the one exception, but here there was only the announcement in the reception-room that portraits were taken for Christmas cards. We heard last year of a provincial house that sent out to many of their sitters a specimen copy of their portraits taken during the year, cut down, and mounted on neat cards, with the usual seasonable greetings, with a polite circular intimating that copies like the enclosed could be supplied at so much the dozen. The experiment, we are told, proved so commercially successful, that it will probably be repeated each season. This is a good way of obtaining orders from negatives already taken, and is quite a different thing from "portraits taken for Christmas cards," because it utilises negatives already in existence, and does not entail a fresh sitting, as the quoted announcement implies.

Sammann's Hydrosulphite Developer.—Users of collodion plates for transparency or lantern-slide purposes might do well to turn their attention to a very elegant, but totally neglected, developer introduced, or rather revived, by the late M. L. O. Sammann in 1877. It was this developer, it may be noted, that first introduced the sulphites of sodium to the notice of photographers. When a solution of any of the alkaline sulphites—the bisulphites are usually recommended, but the normal sulphite appears to answer as well, if not better, for developing purposes—is allowed to act upon metallic zinc for a short time, the zinc is dissolved without evolution of hydrogen, and the zinc-sodium salt of a peculiar acid—hydrosulphurous acid—is formed. This acid, which is itself very unstable—though the salts are more permanent—possesses far greater bleaching and reducing powers than sulphurous acid or its salts, and is the substance utilised by M. Sammann.

In use, a wide-mouthed bottle is partly filled with granulated zinc, and into this is poured a saturated solution of bisulphite of soda or, as we are informed by others, of neutral sulphite, which acts in a better manner. In about twenty minutes' time the necessary reaction is complete, the solution is poured off, and, on the addition of a certain proportion of pyrogallic acid, the developer is ready for use. It acts, even on collodion plates, very gradually and with perfect regularity, yielding a peculiarly delicate image, possessing more or less of a red or pink image, the solution itself changing to a pure bright-red colour, which shows no tendency to form the muddy deposit usual with pyro, even after many hours' exposure to the atmosphere; in fact, this peculiarity was noticed in connexion with the hydrosulphite developer when it was first described in these columns in 1877; but it remained for the late Mr. Herbert B. Berkeley to first propose the addition of sulphite of soda to the ordinary pyro solution for the specific purpose of preventing discolouration of the gelatine film.

We have said that many workers prefer to use the neutral sulphite, although the acid salt or free sulphurous acid is indicated as the proper agent to use. But, although this may be the case when hydro-sulphurous acid is the ultimate object, it would seem as if different conditions prevail when a developer is required. In fact, in describing the process in a leading article in 1876, it was asserted that neutral sulphite acted as well as or better than the bisulphite, and in using the latter it was stated to be necessary to neutralise any free sulphurous acid—a recommendation also made by Mr. Sammann himself subsequently. At any rate, experiments we have made ourselves with the neutral sulphite have proved perfectly satisfactory; but, from the general behaviour of the developer, we suspect that the action arises from some decomposition of the pyro rather than from the hydro-sulphurous acid as such. It would be interesting to try it with some of the newer reducing agents. Unfortunately it does not work satisfactorily with gelatine owing to the deposition of a white powdery substance, probably a basic zinc salt, in the gelatine film.

Isochromatic Plates and Astronomy.—*Nature* last week draws attention to the necessity in laboratories and observatories, where a study is made of gaseous and metallic spectra by photographic means, to utilise all the varying powers placed at their disposal by the manufacturers of plates. "For the particular part of the spectrum which may be under investigation it is always desirable to employ the greatest photographic action possible, and this can only be done by employing plates most sensitive to this region."

The Action of Light on Platinum, Gold, and Silver Chloride.—At the November 3 meeting of the Chemical Society Mr. Sonstadt read a paper on the above subjects, and in its course brought forward some very singular results with regard to gold chloride. A solution of one part in 2500 required a long time for the light to act, but, when it was about twenty times diluted, a few hours' exposure served to initiate a change. When chloroplatinite of potassium was examined, there seemed to be little difference between the action of light and heat, bright sunshine, however, being slower than the application of heat. The experiments with silver chloride were, however, most fraught with interest, and especially so, as a matter of course, to photographic students. In reading the abstract of the paper as given at the Chemical Society some of the experiments seemed to be travelling upon old ground; but, taken as a whole, the original results were remarkable. Our readers will find a reproduction of this portion of the paper in the *Proceedings of the Chemical Society* (1898), vol. xiv. p. 25.

Finger-mark Identity.—The police at Scotland Yard, it is known, attach considerable importance to the impressions of the finger markings of criminals as a means of future identification, according to Dr. Galton's ideas. Last week a man was charged at the Swansea Police Court with burglary, and a detective proved that the prisoner's boots tallied with footprints found in the prosecutor's garden; while a local photographer, it is stated, produced photographs of finger marks on the paint of one of the windows, which he had no hesitation in saying were the same as the marks of the prisoner's fingers produced afterwards on paper. The prisoner was committed for trial. It is the first time we remember of photography being utilised under such circumstances, and it will be interesting to see what importance a jury will attach to the photographic portion of the evidence at the trial of the accused.

A New Waterproof Material.—The production of leather or rubber substitutes appears to be popular with inventors just now, and the latest invention, to which the name "perchoid" (no doubt derived from gutta percha) has been given, seems to promise well as a substitute for indiarubber, capable even of being vulcanised. It is described as a highly oxygenised oil. The oil is heated with litharge, presumably in the manner familiar to the makers of boiled linseed oil, and then allowed to cool. Specially prepared tow is then saturated with it, and, after being placed in wire buckets, ex-

posed to the air. By this means the oily covering of the tow filaments becomes completely oxydised. It is then drawn through rollers, and comes out in sheets of a substance closely resembling indiarubber, even as just stated, to the extent of combining with sulphur. A claim is made for the perchoid that it can be rolled as thin as tissue paper, and that it makes leather impervious to moisture while not resisting the passage of air. This, as we need scarcely say, is not the first time that oxygenated oils have been suggested for the production of waterproof substances, the compounds of linoleic acid possessing important properties in this direction. We may instance chloride of sulphur added to linseed oil; a substance resembling indiarubber is produced, and the like when boiled-oil birdlime is boiled for some time with nitric acid and a little water. After a time it loses all its adhesiveness and becomes almost solid, like indiarubber.

The Expected Star Shower.—The great star shower, which, if were to appear at all, should have been seen on the 23rd ult., or thereabouts, for the possible disturbing elements in the calculation were discounted by some calculators a day later than others, has not been observed. In most places the sky was so completely overcast as to render any view impossible if the shower had occurred, but here and there we hear of glimpses sufficient to prove that no shower of especial magnitude was taking place within our ken. Seeing that the heavens were unpropitious, it may be looked upon as fortunate that we still have a chance for next year. Many of our readers were not born on the occasion of the last great display, which to those who witnessed it was a sight marvellous beyond belief.

Antarctic Exploration.—Last week, in the daily press, Sir Clements Markham, President of the Royal Geographical Society, appealed for subscriptions towards the proposed expedition to the Antarctic regions, proposed jointly by the Royal and the Royal Geographical Societies. It will be remembered that a short time ago, when appealed to, the Government declined to find funds and officers for such an expedition, though, at the same time, it recognised its scientific importance. Now the above two Societies jointly propose to dispatch an expedition if the necessary funds for the purpose are forthcoming. Germany will send an Antarctic expedition in 1900, with naval officers, and fully equipped in every respect, and England should not be behind in the matter. We have sent many expeditions to the Arctic regions, but for many years the opposite pole has been entirely neglected. In the German expedition photography will be made a feature of, and so it will in the English one if it can be carried out. Photographs of that hitherto unknown region would be interesting as well as of great scientific value.

THE YORKSHIRE PHOTOGRAPHIC EXHIBITION.

(First Article.)

A new chapter in the history of photographic exhibitions was begun at Bradford on Saturday last, when the Yorkshire Exhibition was thrown open to the public at the City Art Gallery. Indeed, so striking and so important are some of the features with which this great Exhibition is invested, that we shall be surprised if they do not have the most far-reaching effect in favourably influencing the attitude of the educated public towards modern pictorial photography in particular and photography itself in general. Yorkshire has shown the way in a new departure of the highest value to photography, and the moral effect of the precedent that has been created can hardly be over-estimated. We do not despair of seeing what Bradford is doing to-day followed up by other great Corporations in the immediate future.

First let us say that the Exhibition—the avowed object of which is officially declared to be purely artistic from first to last, only those pictures being included which, in addition to good technical execution, possess a real artistic character or choice of subject, lighting, and composition—has been organized by the photographic societies of Yorkshire. We deem this Exhibition so important—we are so confident that in time to come we shall look back upon it as having great historic interest—that we append the names of the Officers and Committee who have been responsible for the work.

Officers and Committee.

Alex. Keighley, F.R.P.S., *Chairman.*
Percy Lund, *Vice-Chairman.*
Ezra Clough, Frank Nicholson, } *Hon. Secretaries.*

Local Committee.

Akam, H.	Bradford Photographic Society.
Appleton, R. J.	,, ,, ,,
Beanland, Rev. J.	,, ,, ,,
Newstead, P. E.	,, ,, ,,
Nicholson, O.	,, ,, ,,
Snowden, J.	,, ,, ,,
Stevenson, D.	,, ,, ,,
Thistlethwaite, Geo.	,, ,, ,,

General Committee.

Ashby, J. F.	Rodley Photographic Society.
Bairstow, Samuel	Keighley ,, ,,
Barham, C. H.	Barnsley ,, ,,
Beevers, W. A.	Huddersfield ,, ,,
Bingley, Godfrey	Leeds ,, ,,
Burke, R.	Leeds Camera Club.
Briggs, H. M.	Wakefield Photographic Society.
Coupland, Fred T.	Yeadon ,, ,,
Drake, W.	Cleckheaton ,, ,,
Ellis, Herbert	Sheffield ,, ,,
Georgeson, J. H.	Brighouse ,, ,,
Hemingway, H. C.	Rotherham ,, ,,
Holland, J. W.	Halifax Camera Club.
Holmes, W.	Wakefield Photographic Society.
Irwin, W. R.	Leeds Camera Club.
Keighley, H.	Batley Photographic Society.
Lambert, T.	Rodley ,, ,,
Morley, T. J.	Beverley ,, ,,
Naylor, A.	Leeds ,, ,,
Ormeroyd, A. H.	Brighthouse ,, ,,
Percy, H.	Doncaster Scientific Society.
Ramsden, H.	Bradford Camera Club.
Rhodes, F. W.	Heckmondwike Photographic Society.
Rowntree, J. H.	Scarborough ,, ,,
Saunders, J. V.	Hull ,, ,,
Senior, Albert	Heckmondwike ,, ,,
Taylor, J.	Leeds ,, ,,
Walker, F.	Bradford Camera Club.
Warren, W. J.	Leeds Camera Club.
Wells, S., F.R.G.S.	Goole Photographic Society.
Whetstone, E. H.	Bradford Camera Club.
Wilson, J. W. H.	Sheffield Optical Society.

Invitation Committee—Loan Section.

Alex. Keighley, F.R.P.S.
Percy Lund.

Jury of Selection (also Hanging Committee).

Godfrey Bingley.
A. Horsley Hinton.
Alex. Keighley, F.R.P.S.

Organizing Committee.

R. J. Appleton.
Alex. Keighley, F.R.P.S.
Percy Lund.
Ezra Clough, Frank Nicholson, } *Hon. Secretaries.*

The Exhibition is open free to the public, of whom it is estimated that between 400,000 and 500,000 will visit it by January 15, when it closes. Only on Saturday last, the first day it was opened, nearly 4000 persons passed the turnstiles. All the photographic societies within a radius of many miles are organizing official visits to the Gallery, which may be entered on Sundays as well as week days; and we have already heard of many photographers living as far south as London who intend specially going to Bradford, for the purpose of studying this thoroughly representative collection of work.

Now, it is easy to perceive that a vast benefit to photography will arise by freely laying before some hundreds of thousands of people who perhaps have never before seen any kind of photograph save that which hangs in the shop windows, the cream of the best efforts which the leading photographers have put forward during the last three or four

years. To vast numbers this display will be a revelation of what can be done by the lens, the dry plate, and the sensitised surface towards the production of pictures that charm the eye and excite the imagination, while complying with the recognised canons of lighting and composition applied to photography; but, to all, the Exhibition cannot fail to be educational, for it illustrates under one roof the best photography of the time—it synopsises pictorial photography as the end of the nineteenth century finds it.

For providing the opportunity of attempting so much that is sure to result in widespread appreciation, the Bradford Corporation deserves the thanks of every English photographer. We believe that this is the first time that the municipality of a great town has addressed itself to the duty of officially recognising the claims of photography to have, so to say, facilities for appealing to the understanding and the sympathies of the general public, as well as painting, sculpture, and other graphic arts. To this end the Corporation have not only granted the use of the magnificent Art Gallery, and provided, free of cost, a great deal of the labour incidental to the organization and arrangement of such an Exhibition, but have also voted a sum of money towards the expenses. Here, then, for the first time we have the case of an English municipality, representing the citizens of a large town, affording direct encouragement to those who are working with the aim of improving the status of photography among modern arts and sciences by popularising it among the public; and we look upon the occurrence, unique and gratifying as it is, not only as reflecting great credit upon the people of Bradford, but also as pointing the way for other towns, many of which, it is to be trusted, will be the more easily induced to encourage photographic exhibitions now that it has been shown them how simply and inexpensively the thing may be done.

But, if great credit is due to Bradford and its Corporation for its public-spirited action, no less praise should be bestowed upon those Yorkshire photographers who have brought this gratifying state of things about. It will ever be remembered in favour of the men of Bradford and district that they were the first to succeed where many others failed. Mr. Keighley, Mr. Lund, Mr. Nicholson, and Mr. Clough, and others whose names appear in the list we have previously quoted, have worked hard and well in the good cause, and the gratitude of all photographers is distinctly their due. But, indeed, the whole of the men comprising the Committees have put forth their best efforts on behalf of the good cause, and deserve grateful remembrance.

The gallery in which the photographs are hung is a noble saloon; we doubt if we have seen a finer room for the purpose. It is lofty and well illuminated. It is considerably over a hundred feet long, and about forty wide; indeed, it struck us as being so vast that photographs which appeared to us quite large at the Dudley Gallery and at Pall Mall seemed here wonderfully dwarfed in proportion. The walls are covered by a judiciously chosen brown paper, which does not "kill" any of the photographs, and, as the frames of the latter are well mixed as regards colour, and there is a pleasing variety of tones in the prints, a very happy and harmonious total effect has been secured, and this notwithstanding the fact that each exhibitor's work is hung together. In short, the hanging of the photographs is extremely well done.

The Invitation Section consists of about 400 photographs, chiefly contributed by about eighty-five British and Continental workers. The American "School"—if school it can be termed—is not much in evidence, but Puyo, Demachy, Bucquet, and other frequent exhibitors at the Salon, are fairly strong. Of native workers the most conspicuous absentee is Mr. George Davison. There is a General Section, consisting chiefly of work sent in by local men, numbering eighty-four pictures, out of about 400 that were submitted to the Selecting Committee.

On Friday evening, November 25, prior to the reception which was subsequently held, Mr. Percy Lund, who is Vice-Chairman of the Exhibition Committee, entertained the Chairman, Mr. Keighley, F.R.P.S., Mr. W. J. Warren (Leeds), Mr. A. Horsley Hinton, Mr. Thomas Bedding, Mr. H. Snowden Ward, Mr. Charles R. Rowe, Mr. S. L. Coulthurst, Mr. H. Wade (Manchester), Mr. T. Morley Brook, and other gentlemen, to dinner.

In the evening Mr. Alexander Keighley, Chairman of the Exhibition, gave a reception at the Gallery, "on the occasion of the opening of the Exhibition." Mr. and Miss Keighley received the guests, of whom a large number were present. The Exhibition was formally opened by Mr. John Maddocks, J.P., the Mayor of Bradford being in the chair. Both gentlemen made speeches highly eulogistic of the fine quality of the photographs hung on the walls, and the former, who is a well-known art connoisseur, expressed his deep appreciation of the beauty of the many schools of photography represented in the Gallery.

Music, vocal and instrumental, a capital cinematographic display by Mr. Appleton, and an exhibition of lantern slides were given throughout the evening, which pleasantly inaugurated a notable Exhibition.

Quite early in the evening some thirty pounds' worth of the photographs were sold, a signal proof of practical appreciation of the charms of pictorial photography, coming as it did from such strong art-loving men as the Bradford magnates.

Obviously, an Exhibition of this nature, containing work which is thoroughly familiar to most photographers "in the movement," hardly calls for detailed critical comment; indeed, we have already passed most of the pictures in review. We shall, however, devote a further article to the Exhibition next week, touching upon what struck us as its most salient features. This number of the JOURNAL is a very crowded one: hence we are not sorry to have the opportunity of dividing our notice of the Exhibition.

But let us in the meanwhile felicitate Bradford and the Yorkshire photographic societies on the splendid fillip they must unquestionably be giving to pictorial photography in the north of England. There is not a man on the Executive, however humbly he may have laboured, who may not congratulate himself on having done photography a service the full value of which it is difficult to exaggerate. As we said at the beginning of this article, Bradford has opened a new chapter in the history of Exhibition photography. We trust that by the time the chapter is closed, there will not be any large town or city which has not profited by so striking and useful an example of how easy it is to apply the machinery of local self-government to the furtherance and popularisation of not the least among the graphic arts.

FOREIGN NEWS AND NOTES.

Enlarged Negatives.—At a recent meeting of the Société Française, M. Bellieni strongly supported the use of bromide paper for making enlarged negatives for carbon printing, a procedure which we have recommended for some time with Wellington & Ward's negative paper. M. Bellieni suggests the making of a small positive by contact printing, and this should be vigorous and free from fog, and should practically have all the qualities of a good bromide printing negative. In making the enlarged negative, the duration of development must be judged by transparence, that is by holding the same up to the light, and the half-tones should be distinctly visible. The advantages are that the enlarged negative is not fragile; retouching can be readily done on the paper support, and closer contact can be obtained between the tissue and the negative than when glass is used, and the safe-edge can be easily made with black varnish. It is not necessary to render the paper transparent.

Coloured Positives.—In the *Bolletino della Società fotografica Italiana*, Professor Nannias describes the following process, by means of which various coloured positives may be obtained, which is based on the action of light on bichromated gelatine. Useless old negatives are freed from the silver image by cyanide of potassium or hypo and ferridcyanide thoroughly well washed, and should be immersed in a four per cent. solution of potassium bichromated and dried. They can then be exposed under a transparency till the details are all visible, and next washed. If now the plate is bathed in certain solutions and rinsed and then immersed in another solution, various colours will be obtained. The following table gives the different solutions and colours obtained; the solutions should be about five per cent.

First Bath.	Second Bath.	Colour obtained.
Barium chloride.	Sodium sulphate.	White.
Uranium nitrate.	Potassium ferrocyanide.	Dark red.
Copper sulphate.	,,	Bright red.
Ferric chloride.	,,	Blue.
Cadmium chloride	Sodium sulphide.	Yellow.
Lead acetate	,,	Black.

The German Paper Ring.—Some time ago we announced that Messrs. Steinbach & Blanchet, the manufacturers of Saxe & Rives raw paper, had combined their businesses and formed a paper ring, and raised the price considerably. Now, according to the authority of Dr. H. W. Vogel, the firm of Von Schoeller, of Burg Gretesch of Osnabrück, have been successful in their experiments, and introduced raw papers quite equal to the old papers at a very much cheaper price.

Stripping Films.—M. Roy suggests in the *Bulletin de la Société Française* the following process for stripping films from broken negatives when the film is intact, the particular feature

being the prevention of the penetration of the solutions through the crack in the glass, the actual stripping method having been suggested some time ago by Valenta. The negative is placed film downwards on a sheet of paper, and the glass is painted on each side of the crack with a strip three or four cm. broad with a two or three per cent. solution of indiarubber; on this is laid a piece of lantern-slide binding strip, and then a coating of amyl-acetate collodion given to the paper. When dry, the negative is immersed in formalin, allowed to dry, and then soaked in solution of carbonate of soda, and without washing in hydrochloric acid, and it is then readily stripped.

A Black Printing Process.—The following modification of the old Negrographic process (1880) is recommended in the *Bulletin du Photo-Club, Neuchâtel*, as giving results very much like copper engravings. Good, smooth drawing paper is coated with the following mixture:—

Gum arabic	100 parts,
Potassium bichromate	40 „
Water	300 „

and dried, and after exposure thoroughly well washed and dried. The print is then coated with a soft pad with the following mixture:—

Brown shellac	75 parts.
Lamp black	70 „
Methylated alcohol	750 „

The print is then placed in diluted hydrochloric till the whites are clear, and is then washed to remove the acid and dried.

THE TRAILL TAYLOR MEMORIAL LECTURE.*

I will now illustrate the use of the focometer with (A) an ordinary positive system, (B) a telephotographic system, (C) a negative system.

(A.) In the focometry of *any ordinary positive lens system*, make a rough approximation to its focal length by taking the mean of the two measurements of its back focal lengths, found by presenting first one surface and then the other to incident light from a distant object. With the lens under examination we find this to be about 10¼ inches. The object of this preliminary step is to arrive at convenient positions for scale, lens, and screen on the optical bench, from which to start observations. (The bench is provided with two flanges for carrying lenses; for the focometry of positive lenses, one of these is temporarily removed.) The entire length of the bench being 98 inches we know that this length determines the extreme conjugates of any lens under observation. We know by the law of "conjugate foci" that whatever multiple of the focal length the object is distant beyond the focal plane in front of the lens, the image will be removed its reciprocal of the focal length beyond the focal plane behind the lens.

The rough approximation, then, referred to above, will be a guide as to a convenient set of measurements to make in the focometry of the lens under observation. With lenses of short focal length the extreme separation of the conjugates will be chosen less than with lenses of longer foci.

To revert to our example: Place the scale about three times the approximate focal length in front of the lens, leaving sufficient length for two equal displacements of say ten inches of the scale farther away still from the lens. Now:—

(1.) Clamp the lens say sixty inches from the scale end of the bench.

(2.) Clamp the scale about thirty inches from the lens at a convenient reading point by the vernier; say the vernier reads exactly seventy inches.

(3.) Focus the scale (for the first time) accurately upon the screen, and *note the vernier reading.*

(4.) Move the scale exactly 10 inches further from the lens; $l = 10$.

(5.) Refocus the scale (second time) upon the screen, measuring the distance through which the screen has been moved by the difference of the vernier readings; giving c.

(6.) Move the scale another 10 inches exactly in the same direction; $l = 10$.

(7.) Refocus the scale (third time) upon the screen, again measuring the difference in these two vernier readings; giving a.

Substitute for l, c, and a, their values in the formula, and we find:—

$$\text{Absolute focal length } F = \frac{\sqrt{20 \times a \times c\ (a+c)}}{c-a}$$

(B.) *Telephotographic Lens.*—The separation of the positive and negative lenses is, of necessity, of great importance, there being a different absolute focal length for every variation in separation. In a case of this kind it is best, as a preliminary, to hold a screen at a distance from the flange, or back (negative) lens, equal to a convenient camera extensio focussing upon a distant object, by adjusting the distance between t combinations until the image is sharply defined.

Presuming that we are quite in the dark as to its absolute focal leng we may or may not be able to determine it with this particular focomet it will depend on the sufficiency in length of the optical bench.

Proceed then as follows:—

(1.) Place the focussing screen at the extreme end of the focussi end.

(2.) Place the scale at the other extremity of the optical bench.

(3.) Move the lens between them to ascertain if it is possible to form image of the scale upon the screen.

(*a*) If it is not possible, the absolute focal length of the combinati is too long to be measured by a focometer of this length.

(*b*) If the image is smaller or larger than the scale, then we c determine the absolute focal length. In this case we proceed with an ordinary positive system, placing the focussing scre when setting the instrument, close to the focussing end of optical bench.

It is evident that the focometer is only applicable to lenses of less fo length than one-fourth of the length of the optical bench, but it should remembered that for lenses approximating to this limit in focal leng the displacements of the scale (l) must be very much less than for len of short foci, to obtain convenient conjugate displacements c and a.

To proceed with the lens before us: By instruction (1) the back fo length is 7½ inches from the negative lens to screen for a distant object. instructions (2) and (3) we find that it is possible to determine its absol focal length.

Set the scale, say, ten inches from the scale end, the screen being the other extreme end, and move the lens between the two until an im is formed upon the screen. Then proceed as before, making the eq displacements of the scale in this case five inches each, and measur carefully the conjugate displacements.

(C.) *Negative Lens.*—In this case we require the two flanges on optical bench. Any positive lens is placed in the one next the scale, the negative system is placed behind it in the second.

(1.) Place the scale at the extreme end of the bench.

(2.) Place the positive lens (of known focal length, although necessarily known for the purpose of ascertaining the absolute fo length of the negative system) about three times its focal length a from the scale.

(3.) Place the negative lens behind this, at some position in the c verging beam from the positive lens, so that an image is formed upon screen when the latter is placed close to the screen end. Fo accurately (for the first time).

(4.) Take the distance between the negative lens and the screen given by the difference of their two vernier readings.

(5.) Move the negative lens through some convenient distance, l, a from the positive lens.

(6.) Refocus the image on the screen and measure the distance betw the negative lens and the screen as before. The difference between previous value and this one is the quantity, c, of our formula.

(7.) Move the negative lens a further distance, l, from the positive l

(8.) Refocus the screen (third time), again measure the dista between the negative lens and the screen. The difference between value and that found in (6) is the quantity, a. The equivalent fo length of the negative lens is given by the formula—

$$F = \frac{\sqrt{2\,l \times a \times c\ (a+c)}}{c-a}$$

I have purposely set forth a number of instructions for the use of focometer, but in practice its use will be found very simple by any used to physical measurements; nor indeed will the user of photogra lenses find any real difficulty in ascertaining the true focal length lens by its use.

The Royal Photographic Society are considering the necessity of a home; when it is decided upon, it will require a laboratory. I hop some not very distant date to hand over this focometer for the use o members of the Society. Thos. R. Dallmeyer, F.R.A.

LESSONS FROM THE EXHIBITIONS.

At the North Middlesex Photographic Society, on November 21, M R. Child Bayley read a paper on "Lessons from the Exhibitions," wh kept the audience amused and attentive the whole time.

The lecturer, after a few opening remarks, spoke of photogra ic criticism, and said that a lot of it was of no use at all. What as wanted was the pointing out where a man had failed, and why a ce in thing pleased, &c. In talking of size of exhibits at the Shows, he lecturer thought that *size* had no weight with the Judges in the adju a- tion of awards, although to the general public it certainly appe d. He thought 12 × 10 was large enough to see properly, and it was in he reach of all, either by taking direct or by enlargement. There ad lately been an epidemic of close-framing and sombre frames, but ere

* Concluded from page 760.

ere indications that a reaction was setting in. He had heard artists of pute remark on the good taste in framing which some photographers splayed.

A common fault with some exhibitors was printing in clouds too dark, id he mentioned some cases in which the darkest part of the clouds was dark as the shadows in the landscape.

He related some amusing reasons which some would-be exhibitors id given as a reason why their pictures (?) should have been hung.

There was a lack of originality in most exhibitors, and some made up eccentricity what they lacked in originality. The lecturer thought at undue prominence was given to pictorial photography, not that he precated pictorial work, as most amateurs devoted themselves almost tirely to that branch of photography, but he thought more attention ould be given to the scientific side, in view of the immense use photo-aphy is to the other sciences and industries.

Mr. F. W. Cox, referring to Mr. Bayley's remarks on inane criticisms, id that there was one word used in America for that kind of thing, hich he thought was very descriptive, and that was—flapdoodle.

Mr. H. W. Bennett said there was no question as to the educational lue of exhibitions; seeing your own work hung up amongst a lot of hers very often took the conceit out of you, if you had any.

Mr. Mummery said the function of a frame was to separate the picture om those surrounding it and to set it off. This did not apply when one two were hung at intervals on the walls at home; then a different yle of frame would often be more suitable.

Mr. Pither was in doubt as to whether Mr. Bayley advocated a general yle of framing, or suiting each individual photograph. With regard to iginality, he said that there was no surer way of barring a painter's ccess in the Academy than by following in the footsteps of another.

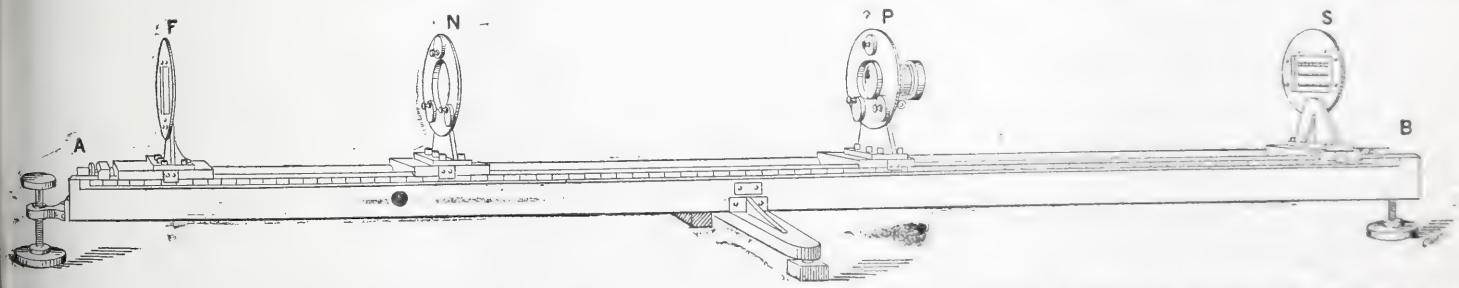
Mr. MacIntosh said that at Pall Mall there was a dead level of ex-llence, but the show was uninteresting. With regard to framing, the eal frame was one that you could not remember when calling the picture mind afterwards.

THE DALLMEYER FOCOMETER.*

HIS focometer consists essentially of a cast-iron V-and-flat bench or ntree, A B, eight feet long, graduated throughout its entire length to $\frac{1}{10}$ parts of an inch.

On this travel a transparent scale (illuminated by a lamp) and a cussing screen, S and F, with verniers attached, reading to the $\frac{1}{1000}$ of an ch, by means of which the distances that these may be moved along e bed can be accurately determined. They are also provided with amps and slow-motion screws at the feet in order to adjust them accu-tely to any given position. Between them, also moving along the bed, e two carriers, P and N, which hold the lenses under examination, one these only being required when determining the true focal length of a sitive lens; the second one is used in addition when the focal length a negative lens is being measured.

The whole stands on a firm table, the gantree being supported by rews which enable the strain to be equalised.



EXAMPLES WITH FOCOMETER.

Stereo Lens Alone.

Scale at	Screen at	Whence
90·00	57·498	$l = 10$
80·00	56·294	$c = 32·44$
70·00	23·85	$a = 1·204$

$$F = \frac{\sqrt{2\,l\,a\,c\,(a+c)}}{c-a} = 5''·190$$

Stereo Lens and 2½″ negative attachment (fully extended).

Scale	Screen	Whence
82·00	27·62	$l = 3''·00$
85·00	33·57	$c = 5''·95$
88·00	36·30	$a = 2''·73$

$$F = \frac{\sqrt{2\,l\,a\,c\,(c+a)}}{c-a} = 9·03$$

Negative Lens.

Neg. at	Screen at	Diffs. + ·1 in.	Whence
67·8	61·09		$l = ·10$
67·9	59·06	2·13	$c = 3·26$
68·0	55·90	3·26	$a = 2·13$

$$F = \frac{\sqrt{2\,l\,a\,c\,(c+a)}}{c-a} = 2·42$$

* See page 774.

PHILOSOPHIC DEDUCTIONS FROM THE DEVELOPMENT PROCESS.

THERE are many members of the clerical profession whose refined taste and culture have led them to the pursuit of photography, as a source of pleasure and as an aid to the furtherance of objects of general benevolence, and of the Church. What more appropriate than for one of them to draw moral illustrations from the principles inherent in photographic operations, for a sermon addressed to an audience of photographers, brought together, let us say, on the occasion of a Conference? The ancient Hindu philosophers have said that the entire system of the phenomenal universe is represented in every particle, and that unity in variety is the plane of the universe. The three main agents that act on an exposed plate in the developing dish appear to have their functions exemplified in the development and evolution of the visible world. The first agent is the chief actor, the second is what imparts a force to it and sets it going, and the third is one that regulates the speed and controls within the required limits the joint action of the first two.

Pyro, the actual agent of development, stands for the first of these, and the ammonia, soda or other alkali that forces the developing action represents the second, and the bromide is the third factor, that regulates the speed and keeps within proper limits the combined action of the first two agents. A familiar illustration can be found in a horse harnessed to a waggon. The main factor is the horse, the accelerator is the whip in the hands of the driver, and the rein is the restrainer that controls the action of the first two. The judicious use of the three agents by the driver will produce safe and regular motion to the carriage, just in the same way as the proper adjustment of the three ingredients in the developer will produce steady and harmonious development of the exposed plate. The driver has not to urge the horse much with the whip, but to keep a tight hold of the reins, if a light vehicle has to proceed only to a short distance. In an analogous way very little of the accelerator will be required for an extra-rapid plate exposed on a subject with little contrast, but the operator has to keep the developing action under control by a good proportion of the bromide, else it will be too rapid, and result in a flat negative. A heavily loaded cart, to go a long distance, requires more urging with the whip, and the reins should be loosely held. In the same way, a slow plate exposed on a subject with a wide range of gradations of light and shade, should be as little restrained with the bromide as possible, but treated liberally with the accelerator.

In an applied sense, moral principle and self-control can be said to be restraining agents in human actions, and ambition and desire their accelerators. A liberal disposition, not restrained by judgment, will, by injudicious benefactions, not benefit others, but only ruin one's own self, while excessive and undue precaution will stop all good and make the man appear hard-hearted. In the prosecution of a business, speculation not kept under proper limits by caution and forethought will lead to loss, while, if energy is too much hampered by excessive apprehensions of failure, no progress will be made at all. Examples will be found everywhere of action exerted without control resulting in failure and loss, and of restraint without energy producing stagnation. Returning to photography, we will state how energy without systematic control might render fruitless the efforts of the too ardent beginner in the art. If his enthusiasm makes him buy all makes of plates, and try every formula he comes across, without restraint and without carefully considering their qualities and constituents, his mind will be confused, and no progress can be attained. On the other hand, the man who is over-particular, and requires every minute point to be perfectly satisfactory before he does anything, may never meet with an occasion to uncap his lens. Metaphorically, the one is using too much of the alkali, and the other the same of the bromide.

To bring the principle still more into near application, it seems to the writer that the present article has proceeded far enough to explain the subject, and that further progress should be arrested with a large dose of the bromide. S. K. Lawton.

THE BENNETTO PROCESS OF COLOUR PHOTOGRAPHY.

We append Mr. Bennetto's own description of his colour photographic process to which we referred a fortnight ago and which is mentioned in our Correspondence column this week :—

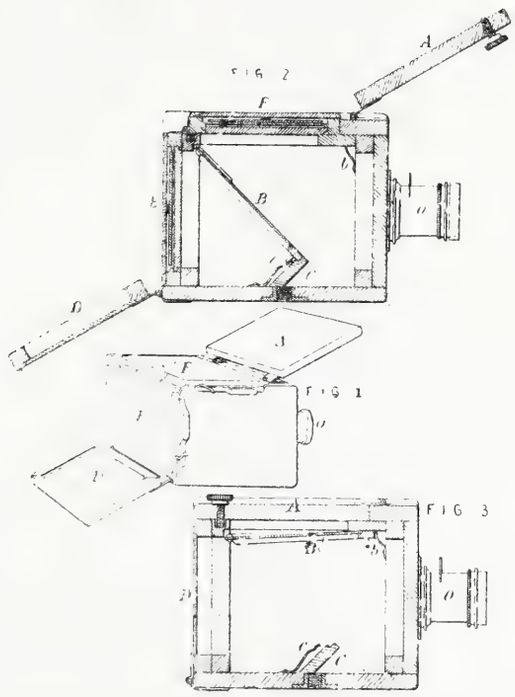
Coloured photographs have been produced by taking three negatives of a coloured object employing three screens of suitably coloured glass, and then taking positives from these negatives on coloured films, which, being superposed, produce a coloured picture.

My invention relates to a method for taking the negatives by a special apparatus and to a method of taking and superposing the positives, the chief objects which I have in view being to simplify the operations and to secure accuracy and uniformity of the products.

The apparatus which I employ for taking these negatives is represented in the accompanying drawings.

Fig. 1 is an external perspective view of the camera.

Fig. 2 is a longitudinal section partly in elevation of it, in condition



for taking the three negatives, and fig. 3 is a longitudinal section partly in elevation of the camera in condition for ordinary use.

The camera is made with an opening at the top provided with a cover, A, and it has hinged at its upper rear angle a frame in which is fixed a red glass, B. When the camera is employed for taking photographs in the usual way, the glass, B, is held up by a spring catch, *b*, as shown in fig. 3; but, when the camera is to be employed for taking three negatives, the glass, B, is let down to rest on a stop, C, where it is held by a spring catch, *c*, the plane of the glass being then inclined at 45° to the axis of the camera. The focussing door, D, and the cover, A, of the camera being opened, a pair of dark slides, E and F, which are hinged together, are placed as shown in figs. 1 and 2, the one, E, occupying the place of the focussing slide, D, and the other F taking the place of the cover, A. In the slide, E, is held an isochromatic sensitised glass or film, especially sensitive to red rays, and in F two glasses or films are held, their sensitised faces to each other, the lower having a transparent chloro-bromide film, so as to be specially sensitive to blue rays, and the upper one an isochromatic plate or film specially sensitive to green rays. When a photograph is taken some of the rays from the objective, O, pass through the red glass, B, and act on the film or glass in the slide, E, and some of the rays are reflected upwards from the glass, B, and act on both the films or glasses in, F, the lower of the two being acted on mostly by the blue rays, while the upper is acted on mostly by the green rays. The two plates or films in F may have a thin greenish yellow film interposed between them, this film acting as a screen for the upper plate or film.

In this manner I obtain three negatives, all taken at the same time under the same external conditions, and differing only in that one of them is acted on mostly by red rays, and the other two are acted on mostly by blue and green rays respectively. As the upper pair of negatives in F are produced by reflected rays, they would necessarily be inverted relatively to that in E, produced by the direct rays, but, as one of these is placed in the slide facing the other, it is inverted relatively to it.

In order to produce the positives, I proceed as follows: I first prepare three pigments, a red (such as scarlet or vermilion), a blue (such as cobalt), and a yellow (such as chrome yellow), grinding them very fine, and mixing them with gelatine or other vehicle, such as is employed in the preparation of what is commonly known as carbon tissue. I coat bands of paper of suitable widths with the three pigments.

Having sensitised these bands with bichromate of potash, I cut off lengths, each about equal to the height of the intended picture, and I place these in a printing frame with the three negatives, each on its appropriate coloured band, that is to say, the negative affected by the red rays on the blue band, the negative affected by green on the red band, and the negative affected by blue on the yellow band. After sufficient exposure, the papers are placed in cold water, and mounted in contact with a thin, transparent, flexible strip or film, which may be of prepared gelatine, celluloid, or the like, and the positives are developed in warm or hot water, the paper being stripped off and the positives being left on the film as in the known process of carbon printing. When the positives are dry, they are preferably coated with adhesive cement, and the three are placed together, the two side positives of the one band are on each side of that of the other band in correct register, and subjected to pressure till the cement is set.

Or two of the positives, one being inverted relatively to the other one, are transferred to and developed on glass plates, the third being developed on a thin film. The two glass plates are put together with the positives on them face to face, and the film positive between them. The whole is subjected to pressure, and has its edges bound with adhesive paper or fabric.

Mr. Bennetto claims :—

1. A photographic camera, having a pair of dark slides situated the one at the end, the other on the top, and an inclined red glass, the slides and glass being so situated that some of the rays of light from the objective can pass through the red glass, and act on a sensitised film or plate in the slide at the end, and that some of the rays can be reflected so as to act on two sensitised films or plates in the top slide.

2. The herein-described process for producing coloured photographs consisting of the following steps of operations: First, simultaneously taking three negatives, one resulting from rays passed through a red glass, the other two resulting from rays reflected from the glass, and one of the two being affected as if by blue rays, the other as if by green rays. Secondly, photographically printing positives from the negatives on differently coloured bands of sensitised film, forming a coating on paper. Thirdly, separating the films from the paper and developing the positives, and finally superposing the three films on one another.

AN ALBUM OF OLD PRINTS.

At the Photographic Club, on November 23, Mr. E. W. Foxlee gave an interesting chat on the processes involved in the production of an album of old prints which he had before him, the property of Mr. Willats, who also, with his brother, compiled the volume. Fox Talbot's photogenic drawing, the calotype and energiatype processes, the catalissotype and cyanotype printing methods, were all represented by one or more prints, and an outline of each was given in the course of the evening. Probably the oldest photograph in existence, a print by Redman made in 1839, was pointed out, attention at the same time being drawn to the fact that the bulk of the prints, which were only secured at the edges by paste, showed signs of fading only at such parts. The difference between the calotype and the waxed-paper processes, names which are often applied indiscriminately to any waxed-paper negative, was defined at length. One difference was that, in the first process, the waxing is the final operation, while, in the waxed-paper process, the paper is waxed at the outset. The exposure for this latter process is considerably in excess of that for the calotype process, a landscape requiring from a quarter to half an hour. The energiatype process, originally named ferrotype but not to be confounded with the present process going by that name, was one of Hunt's introductions, dating back to 1844. It was a silver process and a tolerably sensitive one, besides being one of extreme permanence, judged by the prints which were included in the album as specimens of the method. The exposure for a portrait would be about two or three minutes, doubtless with the single landscape lens, as it was not probable that the portrait lens, having only just come in, was in very general use. The catalissotype process of Dr. Woods was a very rapid process, two to thirty seconds sufficing for a landscape, and for portraits out of doors ten to fifteen seconds. Development in the case of this process proceeded in the dark, where it was put away after exposure, and further action arrested, on the completion of the image, by washing and fixing in a mixed solution of bromide and iodide of potassium. The preparation of the paper was fully described by Mr. Foxlee, from which it was easy to understand how development took place. It was first treated with iodide of iron, followed by silver nitrate, so that silver

iodide was formed with nitrate of iron in the body of the paper, and the nitrate of iron was the developing agent. Sir John Herschell's cyanotype process of 1840, now known under several names, the blue process, &c., was illustrated by one of his own prints. The details of the process have remained much as they were published by the inventor, although there were a good many variations to be performed in one way or another. Following these was a number of photographs taken by the albumen process invented by Poitevin in 1850, and sometimes confused with the collodio-albumen process. Poitevin's invention was worked out more particularly by Le Gray, and it was a process which was open to a lot of manipulation.

For instance, development, which required considerable time, might be hastened by heat, and a hot poker or a spirit lamp held beneath the plate were means often resorted to. The points of difference between the albumen and the collodio-albumen processes were dealt with minutely, both being detailed by Mr. Foxlee. Albumen prints, several in number, were pointed out especially for the absence of any signs of fading, and one difference observable between the albumen paper of those early days and that of present times was that the former had less glass. As time went on, however, the craving was for a higher gloss, weaker silver baths replaced the original generous strengths, this necessitated modifications in the salting of the albumen, negatives were made thinner so as to print quicker, and all this tended towards impairing the durability of the resulting prints. Much more valuable information was imparted by Mr. Foxlee upon the methods briefly alluded to above, and for this and the opportunity of seeing the old examples. A vote of thanks was passed to him and to Mr. Willats.

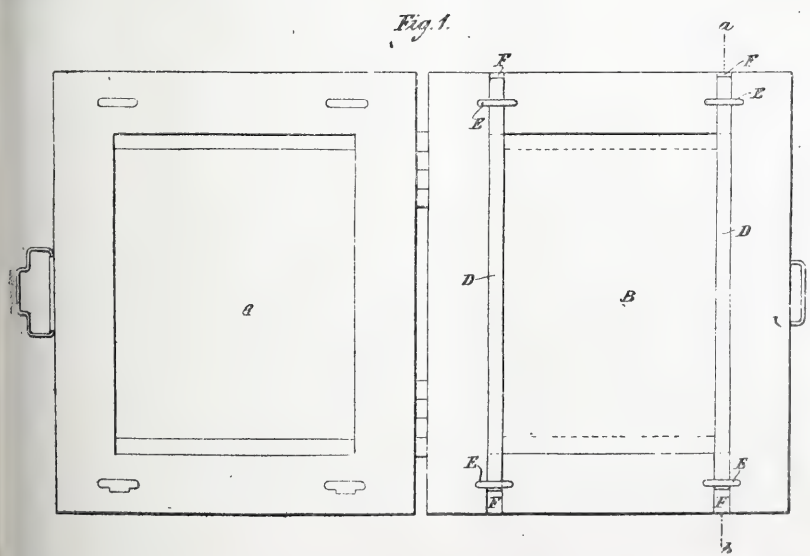
McEVOY'S PRINTING FRAME.

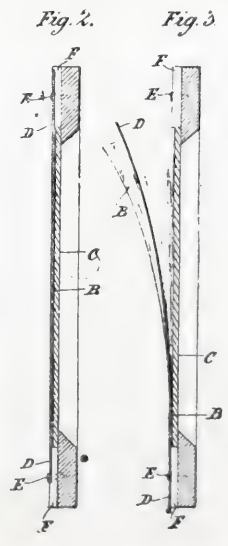
These frames are formed of two wooden frames hinged together at one side so that they may be closed together bookwise—one frame being adapted to receive the negative, the other the paper or other surface to be printed.

To adapt such printing frames for printing with film negatives, a plain glass plate is placed into a recess on the inner face of one frame. The film is laid over the surface of this glass plate, and is held down on to it along two of its opposite side edges by two thin spring blades.

The spring blades are of a curved form, and made to extend beyond the ends of the glass plate.

The central convex portion of each spring blade may be placed against the film, and one end of the blade may be passed through an eye fixed on the inner face of the frame, and the other bent down and passed under a hook, or it may be an eye, so that the spring blade then becomes approximately straight, and bears down upon the film along its whole length.





The two spring blades above mentioned may be of sufficient strength to press the glass downwards with sufficient force into the recess in which it lies to keep the glass from moving endwise; the frame can thus be used either for printing with an ordinary glass plate negative or a film negative.

Fig. 1 is a face view of the frame when open.

Fig. 2 is a section on the line, *a b* (fig. 1).

Fig. 3 is a similar section before the spring blade shown in it has been bent down and slid into position for holding the film.

In the drawing, A is the paper or surface to be printed on, held in place in one of the two frames, as described in the specification of a former patent (No. 14,376) in the year 1894, or in other equivalent manner.

B is a thin film negative. C is a plain glass plate on which this film rests. The glass plate lies in a recess in the frame, and is flush, or nearly so, with the frame's inner face.

D D are two curved spring blades for holding down two opposite edges of the film on to the glass, or, if an ordinary glass negative is used, for holding down such negative.

In figs. 1 and 2 both blades are shown in position resting upon two opposite sides of the film, both ends of each blade being bent down and passed under metallic eyes, E, which keep the blade approximately straight, and with its surface level with the face of the frame. F F are grooves in the face of the frame which the eyes, E, bridge over.

One end of each blade is bent upwards slightly, as shown in figs. 2 and 3, to facilitate the drawing the blades endwise to withdraw them from below the eyes, E.

To secure the film negative over the glass, C, one of the curved spring blades is drawn endwise into the position shown in fig. 3, so that one end of it is free. One side edge of the film is then placed between the glass and this spring blade, and the free end of the blade is bent down on to the film, and is then pressed endwise to bring it into the position shown in fig. 2, with its end, which previously was free, passed below the metallic eye, E. One side edge of the film is thereby securely held, and the opposite side edge is afterwards similarly secured.

AT THE CAMERA CLUB.

The Camera Club on Thursday, November 24, was in a jovial mood, and in truth the members had much to make them merry. For that evening technical matters were abolished, and "laughter holding both his sides" reigned supreme. The sombre blackboard was not wooed by the chaste chalk, for there were no curves to plot, nor were there any equations to solve. It was an off night, a holiday number, so to speak, for Mr. Carmichael Thomas, the Art Editor of the *Graphic*, was to give a paper entitled, "Objects of Interest from an Editor's Portfolio."

Of course, the paper had a photographic interest, for, as every one knows, photography has of late years revolutionised illustrated journalism by substituting the work of the camera for that of the engraver. The camera, too, has to a large extent supplanted the black-and-white artist, and the first pictures which Mr. Thomas threw upon the screen were intended to show how both artist and photographer were bound by certain limitations. Some subjects there are in which the camera is *facile princeps*, whilst there are many others where imagination comes into play where the artist alone can do what is wanted. Here, for example, was a snap-shot taken from one of our warships upon the occasion of the foundering of *H.M.S. Victoria*. No artist could have afforded the same information as this little camera picture. As a contrast to this we were shown a sketch of an impressive scene drawn by an artist after one of the recent battles in the Soudan, the burial of an officer by lantern light. As another example of work which was quite outside the domain of photography, the lecturer showed a picture by Mr. Small of a doctor attending a sick child in a gipsy caravan by the roadside, the grouping of the figures and the expression of their faces telling the story in a most pathetic manner. Mr. Small happened to be one of the guests present, and Mr. Thomas, in alluding to the circumstance, trusted that his eulogies of the picture would not cause the artist to clap on an extra ten guineas to his next account.

People who own cameras make a common mistake in sending to the editors of illustrated papers pictures which are remarkable for technical excellence rather than for interest of subject, a bad photograph of a good incident being much more valuable for the purpose of publication. Sometimes a comparatively poor photograph could be worked up by a clever artist with very fine effect, and one or two examples of this class of work were shown. It is also interesting to note that some of the artists who draw for the illustrated papers themselves use a camera for the initial stage of their work, enlarging the negative on bromide paper, and then working up the positive with Indian ink and Chinese white. By this means they can suppress the superfluous details which a hurried photograph always possesses, and can insert figures or objects to give balance to or improve the composition in other ways. It is observed that there are some photographic subjects with which the artist with pencil can never hope to compete, and, on the other hand, the photographer must be careful not to trench upon work which only an artist can do as it should be done. Mr. Thomas said that he had never yet

seen a really satisfactory photograph of a group on the stage of the theatre. Many such pictures had been published, especially in America, and one of these, in which the shirt collars and cuffs were the most prominent objects, while the faces were dark and expressionless, he showed on the screen.

Photographs of all sorts and sizes come to the editor of an illustrated journal, some of them being far too realistic for publication. A picture was thrown on the screen of the dead body of Piggott, the forger of the celebrated Parnell letter which cost the *Times* so much in money and reputation. The unfortunate man was photographed in a chair, to which his body was strapped. Another picture showed the dead Czar—Alexander II.—the victim of Nihilist bombs. A picture of a murderess, and one which had a very wide sale at the time that a certain *cause célèbre* was in progress, for it was the only portrait of the unfortunate female to be had, was found by Mr. Thomas to have been taken, not from life, but from a dressed up wax figure. Thus did supply follow demand, owing to the ingenuity of some artful photographer.

A picture of the "New Woman," as known in Kaffir Land—a dusky lady with scant clothing standing by her bicycle—gave Mr. Thomas an opportunity of remarking that anything in the shape of the nude seemed to act upon some people, the unco-guid, as a red rag to a bull. As surely as they published a picture coming under that designation, be it a masterpiece of Rubens or a copy from one of our own Academy works, they were deluged with letters of protest or abuse. One letter, after stigmatising one of these pictures as disgusting and obscene, and quite unfit to put before young people, ended by quoting the words, "Blessed are the pure in heart."

Another trouble which assailed the poor editor was the unwarranted translation, often in an altered form, of pictures which he published to obscure foreign journals. Here, for example, was shown the picture of a crocodile-hunter crouching behind a log, his decoy being a black baby tethered to a stump, and let out on hire for this purpose by its impecunious parents. This picture subsequently appeared in a native Indian paper, with a white girl in place of the black boy, and with an intimation to the effect that this was the horrid way in which the bloodthirsty English sportsman was accustomed to hunt wild beasts. A Russian paper was next shown, in which a picture from the *Daily Graphic* had been borrowed without permission. The original picture represented a scramble for newspapers in one of our military camps, but in its Russian guise it was boldly labelled "Battle of Omdurman," a battle without guns, smoke, or casualties.

Another amusing instance of unceremonious prigging was afforded by a triplet of pictures which were sketches of life in South Africa by Sir H. Johnstone, and which duly appeared in the *Graphic*. Some months later, the three pictures, skilfully dovetailed into one, appeared in another paper as incidents of the Matabele war. It was shown that the editor of the second paper had been victimised by an English soldier, who declared that the design was the work of a mate, that he had photographed the sketch, and plainly hinted that he expected to be remunerated if it were published.

Many other pictures were shown in illustration of Mr. Thomas's paper, which was punctuated with touches of dry humour that made his hearers often roar with laughter. He concluded his remarks by saying that he felt so doubtful of the manner in which his paper would be received by the Club, that he had submitted the MS. to two candid friends. The first said that it was far too heavy, and wanted lightening a bit, and the second said that it was far too frivolous for "the learned old buffers belonging to the Camera Club." Between these two opinions he had tried to hit the happy medium.

The Chairman (Major Nott) called upon the members present to give a hearty vote of thanks to Mr. Thomas for his admirable paper, and the members were not slow to do so.

THE AINTREE EXHIBITION.

List of Awards.

Class H.—Silver medal (No. 158), Mr. H. B. Bradley, Manchester. Bronze medal (No. 192), Mr. J. A. Wilson, Ballymena. Certificates (No. 239), Mr. J. Kearney, Jun., Liverpool; (No. 241) Mr. H. W. Bennett, F.R.P.S., London.

Class I.—Silver medal (No. 338), Mr. C. H. Taunton, Huddersfield. Bronze medal (No. 243), Mr. H. W. Bennett, F.R.P.S., London. Certificate (No. 341), Mr. J. Walker, Birkenhead.

Class K.—Silver medal (Nos. 413 to 418), Mr. T. Hartley, Waterloo. Bronze medals (Nos. 369 to 374), Mr. E. G. Boon, Italy; (Nos. 407 to 412) Mr. W. F. Ward, Bawtry. Certificate (Nos. 351 to 356), Dr. Schufeldt, Washington, U.S.A.

Class L.—Silver medal (No. 470), Miss A. E. Blake, Bedford. Bronze medal (No. 448), Mr. E. Simmett, Liscard. Certificate (No. 442), Mr. G. B. Fergusson, M.D., Cheltenham.

Class M.—Silver medal (Nos. 640 to 643), Mr. Wm. McLean, Belfast. Bronze medals (Nos. 495 to 498), Mr. W. Archibald, Newark, U.S.A.; (Nos. 523 to 526) Mr. E. Simmett, Liscard. Certificate (Nos. 635 to 639), Mr. W. A. Fraser, New York Camera Club.

Class N.—Bronze medals (No. 657), Mr. J. A. Kay, Southport; (No. 663), Mr. E. Jones, Rhyl.

Class O.—Silver medal (No. 744), Miss Weil, U.S.A. Bronze medal (No. 716), Mr. W. J. Warren, Leeds. Certificate (No. 707), Mr. J. C. Nicol, St. Helens.

Class G.—Bronze medal (No. 757), Mr. D. J. Neill, Walton.

Class A.—Bronze medal (Nos. 768 to 771), Mr. R. Walker, Aintree. Certificate (Nos. 784 to 787), Mr. J. Watson, Walton.

Class B.—Bronze medal (Nos. 824 to 829), Mr. W. Lockier, Aintree.

Class C.—Silver medal (Nos. 896 to 899), Mr. W. B. Hellon, Aintree. Bronze medal (Nos. 856 to 859), Mr. W. Lockier, Aintree.

Class D.—Bronze medal (Nos. 904 to 907), Mr. R. Bootle, Aintree.

Class E.—No award.

Class F.—No award.

Gold medal (Best picture in Exhibition) (No. 158), Mr. H. B. Bradley, Manchester.

THE BOLT-COURT TECHNICAL SCHOOL.

We have received the report of the Bolt-court Technical School for the year 1897–98. Of the many beautiful illustrations given in the volume, thirteen are in half-tone, line, and collotype, the blocks having been prepared by pupils of the school, and printed by the students of the St. Bride's Foundation Institute. The work is exceedingly fine, and Mr. Charles W. Gamble, the director of the school, is to be congratulated on the success which is attending his efforts to make the school of practical use to students of process work. We append an extract from his report, which is of a very encouraging nature!

The total entries to the classes are as follows:—

Photo process Department.

	1897–98.	1896–97.
Line Negative	55	41
Tone Negative "screen"	24	22
Tone Negative continuous	3	5
Zinc Line Etching	41	22
Copper Tone Etching	30	42
Zinc Tone Etching	30	42
Collotype	25	15
Photo-lithography	6	10
Tricolour Work	11	13
Day Classes	16	14
	241	166

Mr. Gamble proceeds: In reporting on the drawing for process class, Mr. Hutchinson states that he has had a fairly successful session, there having been a considerable increase in the membership of this class. Many of the students have benefited much by their studies, but others have suffered somewhat from a want of preliminary art training. Apart from this drawback fair progress has been made, the students being very industrious and attentive.

With regard to the work of the Photo-process Department, I am of opinion that there are reasonable grounds for satisfaction with the progress that has been made. The students have been more in earnest than in the past, realising the force of the fact, constantly reiterated, that the school is a place for serious work, and that their efforts must eventually stand the ordeal of open competition; and, in order that this fact may be impressed upon them by their surroundings, every effort is made to conduct the classes upon a practical and businesslike basis.

In judging the progress of a craft school, where very much of the work is done in evening classes, it is fair to take into consideration the fact that the large majority of the students come to the school after a day spent in constant labour under conditions which are, in many cases, both mentally and physically trying. By reason of the constant attention to small detail required on the part of those engaged in all branches of the reproducing trades, the effect of this daily work is very marked. Men in consequence come to these classes often very tired, more so than they are even aware of themselves, and though in a great many cases there is a change in the particular work done by each student, inasmuch as he engages in another branch of his craft, such change has not a recreative influence, for the "shop" is always present.

This year five students entered specimens of photo-process work for the Board's exhibitions, and two of them have achieved success.

At the International Photographic Exhibition held by the Royal Photographic Society at the Crystal Palace, April–May, the school provided an exhibit in which an endeavour was made to demonstrate by examples the stages in the conduct of some of the most important photo-mechanical processes as taught in the school, as well as many examples designed to demonstrate the chief principles underlying the work. It is hoped to utilise this exhibit as a nucleus in the formation of a small technological museum, which it is expected will prove of interest and value, not only to those who are students, but to all others engaged in the work.

Our Editorial Table.

MESSRS. MAWSON & SWAN, of Soho-square, London, and Newcastle-on-Tyne, send us a capital little book relating to the use of their dry plates and films, the chief characteristics of which are summarised. The necessary developing formulæ are included, and there are many hints on the manipulation of sensitive plates, the causes of failure, &c. A decidedly seasonable section of the little book is a lucid chapter on "How to make Transparencies for the Lantern and Stereoscope."

THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN FOR 1899.

Edited by W. I. SCANDLIN. 320 pp.

New York and Chicago: E. & H. T. Anthony & Co.

London: Percy Lund & Co.

BEAUTY of illustration and excellence of get up again characterise Messrs. Anthony's Annual. The editor has gathered together some scores of articles on photographic and process topics, and thus not only is the eye delighted, but the mind is catered for. To us most of the interest of the volume is centered in the reproductions of specimens of American portraiture. These are well worth studying. About first-rate American work there is a *chic* and go not noticeable in home productions and which is distinctly pleasing. We congratulate Mr. Scandlin on his book, which is useful and beautiful in about equal proportions.

CATALOGUE RECEIVED.

Curzon, Robey, & Co., 7, Newman-street, Oxford-street, W.

MESSRS. CURZON, ROBEY, & Co. undertake the following branches of photography: Outdoor operating, photographic printing (in silver, platinotype, and bromide), photo-mechanical printing (in collotype), bromide enlargements, half-tone engravings (in copper), frame-making, and show-card mounting. In the list before us there are some specimens of their work in colour printing and half-tone, which are singularly good. The work turned out by the firm is characterised by such excellence and beauty that they are sure of a large share of patronage. We can recommend them.

News and Notes.

PHOTOGRAPHIC CLUB.—December 7, Mr. Julius Rheinberg will give an exhibition of Multi-colour Illumination for Microscopy.

MR. A. L. HENDERSON has had the honour of submitting for Her Majesty's inspection his albums of Corsican Views. Her Majesty and Princess Henry of Battenberg expressed "great pleasure and interest" in them.

OUTRAGE ON DREYFUS'S PORTRAIT.—The portrait of Captain Dreyfus, which, outside the Romney Studio, proves such a source of attraction at the present time in Regent-street, was, says the Exchange Telegraph Company, besmirched liberally with black ink during Monday night, probably by some too enthusiastic anti-Revisionist.

AT a Council meeting of the National Photographic Record Association, held at the Camera Club, Sir J. Benjamin Stone, M.P., (President) in the chair, a number of photographs were accepted from Messrs. Harold Baker, J. Deveré, George Scamell, Hon. Secretary, and others, as contributions to the third parcel of prints now being formed for presentation to the British Museum.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, December 8, Mr. E. J. Wall and Mr. T. E. Freshwater will give a demonstration, "Experimental Work with the Lantern including Colour." The Hon. Secretary will be pleased to see at the meeting any one interested in the subject. Visitors are always welcome. The meetings are held at the White Swan, Tudor-street, Whitefriars.

AT the Thornton Heath Polytechnic, on Saturday, December 10, at eight o'clock, Mr. F. O. Bynoe, of R. & J. Beck, Limited will deliver his popular lecture on the "Camera and the Wheel," which is most instructive and amusing to photographers and wheelmen. The Mayor of Croydon will preside, and a large audience is expected. As our readers are aware, Mr. Bynoe has attracted crowded audiences at the Polytechnics in the metropolis, and it is desired to make this lecture a means of attracting others into the ranks of the photographic public. Tickets may be obtained of the Secretary. A small charge will be made to defray printing expenses.

PERTHSHIRE SOCIETY OF NATURAL SCIENCE.—In connexion with this Society a Photographic Exhibition will be held in the picture gallery of the Sandeman Public Library, Kinnoull-street, Perth, on January 25 to 31, 1899. The Judges are: Messrs. W. M. Warneuke, Glasgow; James Cox Cox, Lochee; and W. M. Fraser, Perth. The open classes are: B. (for amateurs or professionals)—1. Landscapes and seascapes, one silver and one bronze medal; 2. Portraits, figure and animal studies, one silver and one bronze medal; 3. Lantern slides in sets of four, one silver and one bronze medal. C. Manufacturers and Dealers' Competition—Best exhibit of photo materials and apparatus, one silver and one bronze medal. All communications regarding the Exhibition to be addressed to Mr. C. F. S. Burrows, 16, Princes-street, Perth.

MESSRS LEVI, JONES, & COMPANY, LIMITED, 29, Hoxton-square, Old-street, E.C. write: "It may interest some users of animated picture machines or cinematographs, to learn that we have now adapted to the 'Matograph' a form of auxiliary shutter that works automatically to prevent accidents by fire to films. As the machine is put in motion, the shutter, which entirely excludes any light from the film, is opened, and immediately the machine is stopped the same shutter again closes. It is so simple and perfectly under control that an accident is rendered practically impossible should a film by any means stick in the stage. We do not wish it to be inferred that with the Matograph the films are liable to stick in the machine, but we take every means to guard against accident. We shall be happy to show the action of this shutter to any one who is interested, by appointment at our works."

A CASCADE OF BREADCRUMBS.—It is reported that, when Professor A. H. Church resumes work next year upon the wall paintings in the Palace of Westminster, he will probably bring into use a new apparatus, which has been constructed to his order, for the better cleansing of these frescoes. The object of this machine is to produce by means of a manual air-compresser a powerful air jet charged with breadcrumbs, which are distributed over the surface of the picture. It was first tried last autumn in the Royal Gallery, where Maclise's famous paintings are situated, but had to be sent back to the makers in order that certain alterations in its construction might be effected; but, even when these were done, it did not prove altogether satisfactory. During next summer the Professor proposes to cleanse once again the whole of the frescoes in the House of Lords, as well as the four glazed paintings in the Peers and Commons corridors, the surfaces of which are covered with numerous dark patches, which he believes to be of fungoid growth.

PICTORIAL HISTORY.—All true lovers of Cape Town will rejoice at the determination of the Cape Town Photographic Club to devote at least one afternoon to using their cameras in the streets of the city; not necessarily the streets as streets, but the buildings in them which have claims to remembrance for their beauty or historic interest. It is regrettable that when the idea was originated years ago it was not carried out, for Old Cape Town has become to such an extent New Cape Town that the object of a photographic survey is necessarily to a large extent defeated. It was the Adderley-street, the St. George's street, the Plein-street of ten years ago we wanted put on record, but these would hardly be recognisable by the older generation among us. We welcome the proposal, however, though it be a little belated, and venture to hope that the Club will take steps to have the results published in a form that will make them available for the general public. Before then, perhaps, if they act promptly, and decisively, a harried and worried Government, "going through its ledgers in the trenches," will lend a hand in the way of copy-righting photographs as desired by the Club.—*The Cape Argus.*

PHOTOGRAPHIC SOCIETY OF IRELAND.—The following are the classes and rules for competition at the Annual Exhibition of Photographs and Photographic Apparatus, to be held in the large hall of the Society, 35, Dawson-street, Dublin, from February 13 to 18, 1899. Members only—Silver and bronze medals in each class. Early entry to consist of not less than three pictures: 1. Landscape and Marine, any size above quarter-plate; 2. Landscape and Marine, quarter-plate size and under; 3. Pictures with objects in motion, any size; 4. Figure and Animal Studies, and Portraits (if not taken in a professional studio); 5. Historical, Architectural, and Archæological; 6. Lantern Slides (sets of four); 7. Photographic Apparatus. Members who have never won a medal in any Society—Bronze medals: 8. Prints, any subject, any size; 9. Lantern Slides, any subject. The "Werner" special medal, presented to the Society. To be awarded to the member of the Photographic Society of Ireland, whose picture will be judged the best in artistic merit. Open Class (for all comers)—Gold, silver, and bronze medals. 10. For best picture, any subject or size, produced by any process. N.B.—The gold medal will not be awarded unless there are at least 100 entries. There is an entry fee of 1*s.* for each picture sent in. All exhibits must be delivered at the Society's premises before January 28.

THE Borough Polytechnic, which was formally opened only eight years ago, has been steadily increasing in size and importance, and the number of students is now over 3000. For some time the trade classes, which have been started to meet the demand made by artisans and apprentices, have been carried on under considerable difficulties, through insufficient space; indeed, all the work of the institute has been hampered by the want of class rooms and workshops. A new and very extensive addition has now been made to the buildings previously existing. The new buildings include an excellent carpenters' and wheelwrights' workshop, fitted with all the necessary appliances, while next door is the boot and shoe workshop. Classes in this trade are held both for men and women. A new class room for instruction in bookbinding has also been added, and some finished specimens of the students' work which were on view showed that the training given had produced excellent results. The printing class is a very large one, numbering 134 pupils, and for them also a new workshop has been provided. Evening classes have been organized for the benefit of apprentices who have been granted permission to attend by many of the firms with whom they are employed. But the Polytechnic is particularly proud of its new machine bakery, to which a laboratory is attached for research work in fermentation. This is the first practical bread and confectionery school organized in connexion with a public institution, and the experiment has met with great success. Above the workshops a fine gymnasium has been built, called the Victoria Gymnasium, as the cost was defrayed from the proceeds obtained from letting seats for the Jubilee procession.

Patent News.

THE following applications for Patents were made between November 7 and November 19, 1898:—

SHUTTER FOR LANTERNS.—No. 23,399. "Circular Shutter for Optical Reflectors, Projecting Lanterns, and Analogous Appliances." Communicated by the Elektrizitäts-Aktiengesellschaft vormals Schuckert & Co., Germany. Complete specification. J. WETTER.

PRINT-CUTTER.—No. 23,520. "Improvements in and relating to Cutting Devices for Photographic Prints and other uses." C. H. WORTHEN.

CINEMATOGRAPH.—No. 23,591. "An Improved Camera and Apparatus for producing Cinematograph and other Pictures, and for Exhibiting Cinematographic Pictures." A. DARLING and A. WRENCH.

FILM AND PLATE-HOLDERS.—No. 23,693. "Improvements in Photographic Film and Plate-holders." G. J. G. JENSEN and J. C. LYELL.

DEVELOPING APPARATUS.—No. 20,720. "Improvements in or relating to Photographic Developing and like Apparatus." L. Cannier and A. Lafille. Complete specification. A. J. BOULT.

STEREOSCOPIC HAND CAMERAS.—No. 23,776. "Improvements in Stereoscopic and other Hand Cameras." H. SMYTH.

PRODUCING PICTURES.—"Improvements in the Method of and Means for producing Photographic Pictures." Complete specification. C. A. BURGHARDT.

PHOTOMETERS.—No. 23,961. "Improved means for Testing the Light in Working Places, Studios, Schools, and so forth." H. COHN.

RULED SCREENS.—No. 24,047. "Improvements in Screens or Gratings for use in Photographic and Photo-mechanical Work." W. FREETH.

WASHING PRINTS.—No. 24,230. "The Process of Washing Photographic Prints and Films and the like." R. GREENLAND.

CINEMATOGRAPHY.—No. 24,290. "Improvements in Cinematographic Apparatus." R. SIMONAU.

X RAYS.—No. 24,471. "An Electrical Resistance for use with Alternating Currents in the production of X Rays." F. HOLMES.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

December.	Name of Society.	Subject.
5	Barnet and District	Demonstration: *Bromide Printing.* T. McWalter.
5	Bradford Photo. Society	*The Production of a Photograph.* W. Thomas.
5	Liverpool Amateur	Prize Slides.
5-7	North Middlesex	Annual Exhibition.
5	Putney	*Lantern-slide Making.* W. Martin.
5	Society of Arts	*Acetylene.* Professor Vivian B. Lewes.
5	South London	*From the Sun to the Plate.* W. Harris.
6	Gospel Oak	Lecture: *Practical Points in Exposure and Development*
6	Hackney	*Optics, as Applied to Photography.* Jno. Gear.
6	Lewisham	*Lantern-slide Making.* B. Davidson and others.
6	Rotherham	*Hand camera Work with a View to Making Enlargements.* J. H. Gear.
6	Society of Arts	*The Yangtse Basin and the British Sphere.* Archibald Little, F.R.G.S.
7	Brentford	Lantern Evening.
7	Croydon Camera Club	Demonstration: *Enlarging on Bromide Paper by the Gas Lantern.* Charles Boxall.
7	Kingston-on-Thames	Practical Instruction in Making Enlarged Negatives and Prints.
7	Leeds Camera Club	*Birch and Bracken.* W. Thomas.
7	Photographic Club	*Exhibition of Method of Multi-colour Illumination for Microscopy.* Julius Rheinberg.
7	Society of Arts	*Egypt and the Soudan in 1897 and 1898.* W. T. Maud.
7	Southport	Velox Demonstration. J. R. Cave.
7	Southsea	Demonstration of the Velox Printing Process.
7	Woodford	Affiliation Slides. Set B, &c.
8	Darwen	Lecture: *Architectural Photography.*
8	Liverpool Amateur	Annual Meeting.—Exhibition of Prize Slides.
8	London and Provincial	Demonstration: *Experimental Work with the Lantern, including Colour.* E. J. Wall and T. E. Freshwater.
8	Oldham	*Venetian Pictures.* J. Shaw.
8	Woolwich Photo. Society	*Novitas Stripping Film.* F. W. Machen.
9	Bootle	Fifth Annual Exhibition of Competition Work.—Prize Slides.
9	Croydon Microscopical	Discussion and Suggestions for the New Year.
9	West London	*On Making Enlarging Negatives.* G. F. Blackmore.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 24,—Mr. A. L. Henderson in the chair.

The discussion turned upon Dr. Russell's experiments upon the action of various substances upon a photographic plate in the dark, and also the question of spiritualistic photography, a question which has recently again come before the Association.

The CHAIRMAN was of opinion that the action to which Dr. Russell had given his attention recently was analogous to that produced upon a plate by exudations from the material used for dark-slide hinges. Some ten years ago, he found that a certain batch of exposures was, when developed in the ordinary way, quite ruined by bands across the plate, presumably induced by something in the dark slide. He tried the experiment of soaking the others in a weak solution of alkali, carbonate of lithia, to wit, although any other, he imagined, would have equal effect, with the result that no further markings appeared. He was convinced that this exudation of moisture or essential oil would explain the bulk of Dr Russell's experiments, but not those where different metals had influenced the plate. As a practical means of avoiding a recurrence of these markings, he would suggest that dark slides be constructed of some suitable metal instead of wood.

Mr. A. HADDON remarked that Dr. Russell had shown an impression made by charcoal upon a photographic plate, the charcoal being placed upon the plate for some days. The speaker was informed, when asking whether lamp black would be likely to have the same effect, that absolutely pure lamp black would not; but that ordinary lamp black, containing as it did a large quantity of oil, would affect the sensitive film, and it was such oil which was the cause. Hence it would appear that the marks alluded to by the Chairman were traceable to the coating of lamp black and varnish, which by their emanations would influence the plate. He was also told that and it had not been found to be one of the metals which possessed the power of affecting plates; and this was interesting, because the dark slides of a certain camera were made of tinned iron.

Mr. T. E. FRESHWATER wished to know what conditions influenced the action of these emanations from dark-slide hinges, because, until quite recently, he had not experienced such a thing for a long time with the camera he had in use. This camera had been in service for nine or ten years without giving rise to trouble until just now, when a batch of plates were very distinctly marked where they faced the hinges of the slides. The plates were not in the slides for long, and the camera had not been exposed to damp atmosphere; but the effect was as stated.

Mr. W. D WELFORD, in thirty years' experience, had not personally been troubled with any such markings.

Mr. HADDON added that Dr. Russell had shown that the influence could be exerted through gelatine and celluloid.

The CHAIRMAN replied that these were of a somewhat porous nature. He suggested that Dr. Russell should place a piece of glass over a plate and effectually seal the edges to exclude moisture, &c., and, if he still got these marks, then the Chairman's theory would fall to the ground. He mentioned that, in his emulsion experiments of years ago, he had introduced camphor as an antiseptic, but the idea proved useless, as the camphor fogged the emulsion.

The CHAIRMAN stated, in reference to spirit photography, that Mr. Sterling, who was recently present at one of the meetings, had sent him the three negatives forming the continuous pictures of an unknown frieze which had been shown on that occasion. In the production of this it was stated that camera and lens played no part. The hand of the spiritualist was placed upon a box of plates, and that simply, development being answerable for the rest. This statement notwithstanding, the Chairman observed that the four corners of the plates bore evidence of having rested against cross wires with which some slides were provided, and which, to say the least, suggested that a camera had been used. He was very keen on getting to the bottom of the affair, and hoped to give some further particulars ere long.

Croydon Microscopical and Natural History Club.—This Club held its Twenty-ninth Annual *Soirée* on November 23, when, in spite of the very wretched weather, over four hundred members and their friends attended. Photography in its many and varied applications was, as usual, well represented. Seventeen members of the Photographic Section contributed among them no less than eighty pictures, of which we may mention some excellent 10×8 direct prints by Mr. Collyer of subjects chosen in Spain and elsewhere. Mr. P. Crawley showed a number of enlargements from 5×4 Frena snap-shots of scenes in Switzerland and Italy. Mr. Epps exhibited some very good flower subjects. Mr. A. P. Hoole showed some very fine carbon prints, for which he is justly noted. Mr. J. H. Baldock exhibited eight pictures, among them being three very good 15×12 enlargements on Eastman's Royal bromide paper. Mr. A. Roods showed eight prints, chiefly of subjects taken during the summer excursions. Mr. Platt exhibited ten pictures, including three 10×12 enlargements, two of these being flower studies and one a portrait with Rembrandt-lighting effects. Pictures were also shown by Messrs. Baker, East, Sower, Lincoln, Lock, and Weightman; also by Mrs. Groves, Miss Wills, and by the President, Dr. Hobson. A number of X-ray photographs were shown by Mr. C. J. L. Russell. One panel was reserved for the portfolio pictures which had secured the greater number of votes, and these comprised pictures by Messrs. Baldock, Epps, Gower, Hoole, Weightman and Miss Wills. Eight screens of transparencies were shown, numbering in all 400, contributed by Messrs. Baldock, Crowley, Dodd, Weightman, and Dr. Hobson. Mr. Saville Kent lent twelve frames, containing some 150 photographs, of his magnificent natural-history subjects; these, of course, as they always are, were greatly admired. Messrs. Watson & Sons gave four exhibitions of Ives's kromskop and the cinematograph, the room in which these were shown being packed each time. Mr. Mainbridge demonstrated the X rays and duplex telegraphy, and Messrs. Peto and Radford showed a number of electrical appliances worked by small storage batteries, and these were well patronised all through the evening. On the whole, the *Soirée* may justly be said to have been one of the most interesting and successful which the Club has ever held.

Lewisham Camera Club.—November 22.—Mr. F. R. Ball read a paper on

LANDSCAPE PHOTOGRAPHY,

briefly dealing first with purely topographical work, advising care in the selection of the point of view, and attention to the exposure and development. Coming to pictorial landscape, in which the object is not so much to make a copy of the scene itself as to reproduce the effect that the scene has on our minds and feelings, he first emphasised the importance of patience in selecting the point of view, and realising the leading sentiment expressed by the scene. The relative tones of the subject should also be borne in mind when developing, Mr. Ball considering isochromatic plates and the yellow screen a great help in obtaining a more correct rendering of them. With regard to the lens, he advised the use of a large aperture, as helping to give a broader effect and more idea of atmosphere, and emphasising the principal object by making one plane sharper than the rest. In conclusion, he laid great stress upon the importance of having a high ideal before one, as then progress, if slow, would yet be sure. To aid him in impressing upon his audience the importance of carefully considering these various points in pictorial work, Mr. Ball handed round several of his own productions, describing how he had been actuated in taking them, and by what means he strove to render the particular effect in each, thus making additionally instructive a paper which was listened to by all present with close attention.

Putney Photographic Society.—November 17, Mr. L. S. Zachariasen (Vice-President) in the chair.—Mr. W. Thomas, F.R.P.S., President of the Affiliated Societies' Committee, entertained the members with a chat on

METHODS OF WORKING.

He said the first thing was to settle on a class of subjects, such as landscape, figures, &c.; this each worker must select for himself according to his taste and temperament. Having done that he should persevere with it and study it thoroughly, go over the same ground time after time, and he would generally find that his latest result would be better than the previous ones. For landscape work, and, in fact, for nearly all subjects except architecture and micro work, spectacle lenses gave as good results, at least in a pictorial sense, as the most expensive; the spectacle lenses must, however, be of good quality. Mr. Thomas handed round his set of four, of foci, ranging from 12 to 22 inches, all fitting into one mount, and using one set of diaphragms, which, for the purpose of facilitating their use, had openings of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, &c. of an inch; it was therefore a very easy matter to find the $\frac{f}{a}$ for any particular diaphragm—for instance, using the 12″ focus lens and the the $\frac{1}{2}$ inch stop, $\frac{f}{a} = \frac{12}{\frac{1}{2}} = 24$, or with the $\frac{3}{4}$″ $= \frac{12 \times 4}{3} = 16$. For pictorial purposes it was not necessary to have much detail; a composition should have one dominant note all others being subsidiary, and the effect sought to be obtained by masses, without scattered lights. A series of rough charcoal sketches illustrating this in the simplest and more complicated compositions were handed round. As regards figure studies, the great difficulty was, of course, to avoid the appearance of posing; this could only be successfully met by infinite patience and tact on the part of the operator, assisted by a natural gift of falling into position and remaining there on the part of his victims. Mr. Thomas showed lantern slides on the screen where this rare combination must have been present in an unusual degree, as there was little or no appearance of self-consciousness on the part of any of the persons depicted. Several of the slides showed scenes from hospital wards, where there were not only many figures, but where also the lighting must have been most difficult; the results were most satisfactory, partly due, as Mr. Thomas explained, to the use of efficiently backed plates. The absence of halation from the windows through which the sun must have been shining strongly, was most noticeable. Mr. Thomas then proceeded to explain the principles underlying the art of composition, both in landscape and figure photography, and the difficulty of rendering the various planes of a scene with sufficiently truthful effect; he pointed out how the same scene differed under various conditions of lighting, from one standpoint to another, with lenses of different foci and working with large and small apertures, &c. Much could be done to modify results in development, and more still in the printing. This part of the lecture was fully illustrated with lantern slides and prints; in each case Mr. Thomas pointed out the quality, good or bad, which the slide or print was intended to illustrate. A long exposure was advocated; detail might easily be be kept under, but nothing could be added to an under-exposed plate. Full notes of exposure should be kept, accompanied if possible by a small sketch of the scene indicating the outline and form of the subject and the disposition of lights and shadows. Mr. Thomas also explained his methods of making large prints on a drawing board without the use of a printing frame; the printing in of clouds; sunning down and the use of white of egg and other materials to brighten the shadows, when required: the use of the actinometer in printing, &c. The clear, concise, and interesting remarks of Mr. Thomas were listened to with close attention throughout and acknowledged by a very hearty vote of thanks. Messrs. A. E. Smith and Hunt, members of Council of the Kingston Photographic Society, were present, and in this connexion it may be stated that the intercourse between the neighbouring societies is becoming more frequent and cordial, a happy result to a great extent owing to the work of the committee of the affiliated societies.

Richmond Camera Club.—November 21, Mr. Cembrano in the chair.—A discussion on Trimming, Mounting, and Framing Prints was opened by the CHAIRMAN, who had brought a number of specimens of his own work, varying in size from about one inch by three upwards, to illustrate the important bearing the size of the picture and the method in which it was mounted and framed had on the ultimate result. The Chairman's remarks were listened to with great interest, and the specimens he submitted to the meeting were much admired. Mr. Gibson had also brought some specimens of different methods of mounting and framing prints, which were passed round, and Mr. RICHARDSON advocated the use of a set square made of glass for trimming prints, the advantage being that the amount cut off could be easily seen. Several of the members present took part in the discussion which ensued, and the meeting closed with a vote of thanks to the Chairman for his valuable hints, and for the opportunity afforded of seeing the very interesting specimens of his work.

Blairgowrie and District Photographic Association.—At the monthly meeting of this Association on Tuesday, three signed enlargements of yachting subjects were presented to the permanent "gallery" of the Association by Mr. Charles Sweet, Rothesay. They are magnificent specimens of marine photography, and will form a decided adornment to the Association rooms. A paper on

PLATINOTYPE PRINTING,

by Mr. W. Grant Murray (Vice-President) was read in his absence by Mr. Maclachlan. The essayist was enthusiastic in his praise of platinotype and commended it to his fellow-members as an ideal printing process. He recommended a thin, clear negative full of detail, and was not in favour of actinometers, preferring to judge his printing by the appearance of the print, of course only experience would teach the photographer what was right in this matter. He also pointed out that in printing platinotype the worker had much control over the resulting image by various means especially developing it with the developer mixed with glycerine and applied by a brush. He did not favour the developer of the company exceedingly, and personally preferred to work with a developer of 130 grains of oxalate of potash to every ounce of water, this would keep for an indefinite period and could be used again and again.

On Thursday a lecture on

HAUNTS AND HABITS OF BRITISH BIRDS

was given in the Public Hall, by Mr. R. Kearton, F.Z.S., under the auspices of the Association. There was a fairly large audience who thoroughly enjoyed Mr. Kearton's racy and informative lecture, and were quite enthusiastic ovea the lantern slides with which the lecture was illustrated. A kinematograph exhibition was given at the close of the lecture by Mr. P. Feathers.

Bradford Photographic Society.—On Monday evening last, at the Church Institute, Mr. Godfrey Bingley exhibited and described his collection of some 230 slides, illustrating the principal places of interest in a journey from London to North Cornwall. The chair was taken by Mr. Percy Lund. The lecturer showed one or two views of London, and then travelled towards the coast. Among his slides, all of which were magnificent specimens of technique, perhaps the most interesting views were those of Stonehenge, of Exeter Cathedral, Linton, Lynmouth, Tintagel, and other remote and unsophisticated coast places in Devon and Cornwall. The majority of slides show that they had been taken during bright sunshine, yet no trace of hardness was evident in any one of them. As showing how interesting and valuable work can be done in the course of a comparatively brief holiday, the lecture afforded a very marked example. At the conclusion, many expressions of gratification were given by the audience.

Derby Photographic Society.—November 15, Mr. W. R. Bland (Vice-President) in the chair.—Mr. C. H. Eaton and Mr. C. D. Miller were elected members of the Society. Mr. Bland then read a lecture written by the Rev. A. H. Blake, M.A., entitled

PRACTICAL NOTES ON OUT-DOOR WORK WITH CAMERA.

The lecture was very instructive and interesting, and was illustrated by a number of excellent lantern slides. Mr. Bland interpolated a number of practical suggestions, the object of which was to emphasise the contention of the author of the lecture that the prettiest scenes are by no means always the best studies for photographer, and further to assist to educate the tyro in the best methods of searching for and composing artistic pictures. At the conclusion of the lecture Mr. Bland exhibited a number of beautiful prints made by some of the best amateur photographers in illustration of the hints on composition he had given. The attention of members is called to the fact that the annual supper in connexion with the Society will be held on December 7, at Smith's Restaurant, Victoria-street, and that tickets are obtainable feom Mr. E. Fearn, Richmond-road, the Hon. Secretary, and also from various members of the Society.

Leeds Photographic Society.—November 15, Mr. Bingley presiding—Mr. J. H. GASH gave a lecture and demonstration on the

RÖNTGEN RAYS.

In his opening remarks, Mr. Gash pointed out that, whilst the discovery of these rays was apparently due to chance, it was really more the result of many years of careful research and investigation. At the beginning of this century it was known that, whilst a spark of high potential electricity only passes a certain distance through the air, by passing it through a glass tube from which the air had been partially exhausted, the length of the spark could be enormously increased. As the degree of exhaustion was carried further, different effects were produced, and, subsequent investigation showed there were certain properties of this electrical discharge peculiar to the precise degree to which the exhaustion was carried, and the investigation of each particular stage led to the discovery of the properties of the next. Owing to the imperfect nature of the apparatus at their command, for many years the experiments could only be termed as being in a low vacua. The subject was carefully investigated by Faraday, Clerk-Maxwell, and other eminent scientists, and the theories they advanced to account for these phenomena laid the foundation of all subsequent experiments. The invention of the mercury air pump by Sprengel, together with the induction coil of Rhumkorff, gave a new impetus to the study, and enabled a vacuum far in excess of anything hitherto obtained from the ordinary air pump to be applied, leading the way to the investigation of the discharge in high vacua. Amongst the many who were investigating, Mr. William Crookes, President of the British Association) constructed various forms of tubes to demonstrate his results, which were of a surprising and, indeed, extraordinary nature. A new property of this electrical discharge now became manifest, with phenomena altogether previously un

known and unsuspected. To this the name of "radiant matter" was given, a something in itself as far removed from a gas as a gas is from a solid. This radiant matter, or cathode rays, he considered to be streams of rapid-moving particles coming from the cathode or negatively charged end of the tube. They are themselves invisible, but have the property of imparting phosphorescence to the substances they come in contact with giving many varied and beautiful results. It was while Professor Röntgen was experimenting with these cathode rays that another unexpected occurrence opened out a new field of inquiry. Some fluorescent material smeared on a piece of paper near to one of the tubes he was working with glowed visibly, even though the tube itself was covered with a light-tight covering. Here was a new property of the cathode rays. He did a great amount of work before making any public announcement, and found these rays would easily penetrate substances which no ray of light as we know it possibly could, and they would affect the photographic plate, and so he obtained for the first time photographs of the bony skeleton of a living being. Later experiments gave further proof of their penetrative qualities, and mention was made of the fact that, as wood is easily penetrated by them, we can obtain photographs through the dark slide as well as without it Their similarity to ordinary light as affecting a photographic plate is apparent; but with that the analogy may be said to end, for they cannot be deflected, refracted, or polarised, to any appreciable extent. Mr. Gash (assisted by Mr. Skilbeck) demonstrated the different exhaustions through a full series of tubes from that of the low vacua to the highly exhausted X-ray tube.

Scarborough and District Photographic Society.—November 23.—Mr. H. E. Watkin gave a demonstration on

Sepia Platinotype Printing.

For the benefit of those who were not at the previous lecture, he explained and showed the working of the three processes now generally in use, namely, the hot bath, cold bath, and sepia-toned platinotype. It was pointed out that the printing process commended itself more especially to amateurs, as very few appliances were necessary and only three chemicals required. The permanency of the finished prints was established beyond doubt, which was not the case with pictures made on the silver papers. After describing the different means of obtaining the best results by the process, such as lessening too deep shadows and giving prominence to high lights, &c., Mr. Watkin proceeded to develop and finish about sixty prints, which proved very interesting and instructive to his audience. Some pictures on fabric were also made, which it was shown were suitable for fancy-work purposes, such as making mats, d'oyleys, handkerchiefs, cases, &c., and it will probably be put to useful purposes on silk, satin, linen, &c. Mr. Watkin also exhibited finished specimens of his work in all processes, and these were greatly admired both for their artistic merit in lighting and posing and excellence of finish. During the demonstration questions were freely asked by members of the Society, and satisfactorily answered.

Southsea Amateur Photographic Society.—Wednesday 16, The President (Mr. G. Whitefield) in the chair.—The subject of the Annual Exhibition was discussed, and the hope was expressed that the introduction of open classes would prove a success. The programme for the winter season was also approved of. The company then adjourned to the lecture-room, and a very fine series of lantern slides by well-known workers (lent by the Royal Photographic Society), were projected on to the screen. They elicited warm encomiums and some comment. Subsequently a goodly number of other slides and specimens of the members' work were also shown and criticised.

On Saturday, November 19, at 2 o'clock, the Hon. Secretary (Mr. F. J. Mortimer) gave a practical demonstration of daylight enlarging with the Society's enlarging apparatus. There was a good attendance, and after carefully explaining the principles involved in making an enlargement, and by pointing out the correct method of using the instrument, including a device of his own, whereby, by placing the front and back of the camera on certain lines of a scale drawn on the baseboard, reference to a table would enable any one who had never previously made an enlargement to get the correct focus immediately for all sizes up to 18×16 inches, from ¼, ½, or whole-plate, Mr. Mortimer made two excellent enlargements one from a negative brought by the President, and the others by Dr. Newby. The developer used was metol hydroquinone in three solutions, the formula being Mr. Mortimer's own, and he said he preferred it to any other, as either soft or hard effects could be obtained, with the same exposure, at will. He also explained, during the demonstration, how to vignette an enlargement, and to mask and print in skies, and the subject of enlarged negatives for carbon and other processes was also gone into.

Tunbridge Wells Amateur Photographic Association. — Under the title of

Egypt and Elsewhere,

an exhibition of lantern slides of an unusually varied and interesting character was given by Mr. E. R. Ashton at the Club room, on Thursday, November 17, and attracted a large attendance; the slides being from negatives taken by him during a very varied experience of foreign travel. From the more remote parts of Australia were some scenes in a Government reserve of "black fellows" and views illustrative of life in the bush. Spain was under contribution for some fine architectural slides at the Alhambra, and several interesting scenes in the bull ring in Madrid; a view of the entry procession of bullfighters served to illustrate a detailed description of the opening ceremonies and a slide showing the delivery of the final *coup-de-grace* to the wounded bull by the celebrated matador, Guerilla, was quite unique. A series of Italian views, chiefly of Venice and the Italian lakes, were of a very pictorial character and were followed by some pictures of Morocco, in and round Tangier. Especially noticeable were a few slides of the Sandwich Islands; these were necessarily limited in number, as the islands at the time were in a state of active revolution and the town of Honolulu entirely in the power of the insurgents; the force occupying the quays and landing places being under the uneasy suspicion that the unoffending camera was possibly some new form of machine, gun or infernal machine, the practice of photography was rendered somewhat hazardous. Views of the Riviera, the United States, and Switzerland, as also the Jubilee procession and naval review, show the varied nature of the fare provided; whilst, in conclusion, was thrown on the screen a selection from the remarkable pictorial renderings of Eastern life and scenery, chiefly of Tunis and Egypt, for which he is so well known in the photographic world at home and abroad. The slides were accompanied by a number of entertaining anecdotes of travel which added greatly to the general interest.

FORTHCOMING EXHIBITIONS.

1898.
December 2–15 ..... Yorkshire Exhibition. Hon. Secretaries, 13, Chesham-street, Bradford.
,, 27–31 ..... Borough Polytechnic. Hon. Secretary, H. C. Philcox, 103, Borough-road, S.E.
1899.
February 4–25 ..... Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
March 4–11 ..... South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PHOTO-CERAMICS.

To the Editors.

Gentlemen,—Allow me to say how very pleased I am to see Mr. Forrest's letter in your last impression about the greatly neglected but beautiful ceramics. I can endorse nearly all he says regarding them. As an old friend of the late J. G. Tunny, of Edinburgh, I may mention that I never met a greater enthusiast in this branch. He was a pupil and licensee of mine, and worked my process successfully, and is succeeded by Mr. James Balmain, who still executes such work. I never heard of the strange compound of "enamel, flux, and sensitive collodion." I would like to hear more about it. It is incomprehensible why ceramics don't "catch on." There are several very easy methods by which they can be produced, viz., peppertype (simplicity itself), carbon process, dusting on, and, lastly, my own, and for all-round work I much prefer it. I think the present generation are too lazy to persevere and overcome little difficulties. I can remember one aspirant writing me "that he wanted to go in for enamels, and would I send him two plates?" Did he expect to become an expert after two experiments? At my age (sixty) I scarcely expect to live to see ceramics take first place in popularity, and all other fugitive processes abandoned, but that it must come is the prediction of yours truly,

A. L. Henderson.

To the Editors.

Gentlemen,—Referring to the letter of Mr. Jas. Alex. Forrest in your current issue, and the account of Mr. Eliff's lecture at the Leeds Camera Club in your previous issue, I shall be glad if you will kindly allow me the use of your valuable columns to point out that Mr. Eliff and Mr. Forrest have made an important omission. Neither of these gentlemen give any credit to Mr. W. Ethelbert Henry who really "dug up this old process," and found a workable formula by which it can be carried out. Many of your readers will remember the thirty-six demonstrations of photo-ceramics given by Mr. Henry at the Imperial Institute a few years ago, at the Royal Photographic Society, and in Leeds, as well as in many other provincial cities.

Mr. Henry's fish-glue formula was worked out by himself, and is the most satisfactory that I know of; but the formula of Mr. Eliff (The British Journal of Photography, page 741) is not markedly different from the old gum and honey formula given in the Almanacs.

Mr. Henry has incorporated his work in a book, entitled "Photo-Ceramics,' which was issued at the time of the Imperial Institute Photographic Exhibition in 1896.—I am, yours, &c., C. F. T.

STUDIO GLAZING.

To the Editors.

Gentlemen,—The correspondent whom you answered at the bottom of the last column in your Answers to Correspondents should know that the most important point for him to observe, if he uses ground glass in glazing a studio the light of which is obstructed by buildings and trees

is the *height of his side light*. He should know, as he will soon find out if he makes his side light too high, that the light which comes in through ground glass shadowed by buildings when fixed perpendicularly is of little use. He should therefore bring his top light well down, to six or seven feet from the floor; *then and only then* will he be able to make Chinese puzzles at the offending obstructions. Of course you knew all this, but it has evidently not occurred to you what a serious business building a studio is to a poor devil who hopes to make a living by portraiture. I expect H. W. Busbridge is one of the many, who would be happier with a millstone round his neck at the bottom of the sea, who take portraits for anything but pleasure. You do not seem to be able to sympathise with him as you should, or you would have answered his questions more fully.

The clear glass in the middle of his studio would be of no use; he should glaze entirely with Pilkington's white ground glass. The pitch he proposes is correct, all the new American studios are so. He need not be afraid of heavy shadows; if they are too strong, he can either put his camera nearer the light or his sitter further from it.—I am, yours, &c.,

THE NORTH WIND.

THE BENNETTO PROCESS.

To the EDITORS.

GENTLEMEN,—I have read in the last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY your remarks concerning my patent for an improved method of producing photographs in colour, I regret that the amount of work I have upon my hands prevents my replying as fully as I desire to the many queries you have put to me, and therefore I can only notice a few of the points raised. I shall, however, be quite ready and willing (if time and opportunity will allow) upon some future occasion to place before you and your readers the various methods by which I have obtained photographs in colour, and show you the results obtained.

The promise to demonstrate to you the process I have patented, and others I have not yet patented, I will fulfil at the earliest possible moment, and it would give me pleasure to do so, it is not my fault that this was not done some time ago. The method patented is not the one I described as a "jewel" in the letter to which you refer (November 6, 1896). An improved method of producing photographs in colour was worked out in principle some years before, and at that time I was unaware of any process of producing photographs in colour by the three-colour system. I abandoned my investigation for some time, and at the end of the year 1894 I found a practical way of overcoming the difficulties I had formerly experienced, and early in the following year produced successful results which I considered perfect, and still think so, and that is also the opinion of every one who saw them. In the mean time, however, I had become fascinated with some new principles which took complete possession of my mind, and to which I gave my whole time and attention, and the results obtained were those referred to in my letter as a "jewel," pictures produced by this and also the trichrome process were shown upon several occasions. I also produced some results upon chloride of silver, but they were not permanent. The final outcome of the whole of my investigations is now receiving my attention, and this with all my previous processes of colour photography will become the property of two gentlemen who are interested in my work.

Regarding the process patented, from the observations you make I gather you do not think it easy to work. If you refer to the specifications I think you will agree with me that this process is quite as easy as any known process of monochrome photography. The three negatives are taken with one exposure, and the print is obtained in one operation from the three negatives, the registering of the print I have several times completed myself in five seconds. The results speak for themselves. I regret I have not time to answer all your queries, but you ask by what process I photographed a painting blindfolded?

The painting was photographed and reproduced by the method patented, and was done solely in consequence of the lying and slanderous statements constantly made that I had painted them (the photographs). The artist who prepared the test subject painted it in impossible colours with a blue rock and blue tower, purple blue and green sea, striped the margin of the sketch with primary and mixed colours, and placed the date, day, month, year, in three different colours, and finally a pencil line and figures, the whole was correctly reproduced in my photograph, and the artist who is well known, with the two gentlemen who investigated that matter, gave a written statement that the colours were correctly reproduced, and I am not aware of any other process to-day that can do as much. Regarding the ability of the gentlemen to decide as to the correctness of the reproduction, you will not mind my saying that Cornish art *is sometimes* seen in London. If my process is old, where are the results obtained by others? and, if they have been obtained, why do the producers of them not show their results?

I will not trespass further upon your valuable space than to make these few remarks, which I more particularly address to your young readers; all my life, without assistance from others, has been devoted to study from the pure love of it without education in either art, science, or music, but with just the love of doing a thing well if possible. I have not sought fame or wealth; for ten years I have devoted my time to the problem of colour photography. I have succeeded in doing everything I ever attempted, I never tried to make enemies, and yet, even in the town in which I live, I have been slandered, libelled, and insulted because I have succeeded. "O tempora, O mores!"—I am, yours, &c.,

J. WALLACE BENNETTO.

The Studio, Newquay, Cornwall, November 22, 1898.

[The above letter reached us while absent from London, and too late to be published last week. We are obliged to Mr. Bennetto for replying to our remarks; but at the same time we very much regret he does not find it possible to answer the questions we put to him a fortnight ago regarding his patented process of colour photography, which is described in another part of the JOURNAL this week. If he had merely replied to one or two of our questions—those for example relating to the Young-Helmholtz colour vision theories and the Clerk-Maxwell and Kœnig colour-sensation curves—we should have had some clue as to the underlying principles which had guided Mr. Bennetto in his work; but, so far as we can discover, his process is not founded on any intelligible colour theory, and can only be described as a more or less hap-hazard way of producing photographs in coloured pigments by means of bichromated gelatine. Such a process we regard as being of very little theoretical or practical value. With respect to the other work which Mr. Bennetto has in hand, we wish him the utmost success; but, frankly, we entertain little hope that he will completely triumph where so many others have failed. A careful study of Mr. Bennetto's writings strongly inclines us to think that he is working on empirical lines—in other words, by trial and error—and that he is not at all guided in his experiments by theory. Now, it cannot be too emphatically stated and widely known that so far, practically, no results in colour photography have been forthcoming from empirics—men who have attacked the problem on grounds the reverse of strictly scientific. Ives, Joly, and Lippmann were masters of the theories they took in hand, and the results they have produced are the outcome of the scientific application of those theories to practice. The most elementary acquaintance with the phenomena of light and colour is sufficient to show that the chances of the problem of photography in natural colours being solved on any other than the most rigid scientific lines are extremely remote. It is almost impossible for accident to have anything to do with it. The spectrum must be at the bottom of it, and this we can hardly suppose has been the case with Mr. Bennetto. We, however, thank him for his promise to demonstrate his process to us, and shall be the first to congratulate him on any success he may achieve.—EDS.]

KEEPING QUALITIES OF FILMS.

To the EDITORS.

GENTLEMEN,—I read, in THE BRITISH JOURNAL OF PHOTOGRAPHY (November 11, 1828), a note on the "Keeping of Films." I can give my testimony to that of your correspondent. Lately I developed twenty films (Edwards's), exposed in a Frena camera, lantern size, in October 1893, five years ago. The negatives are excellent, and the yellow cardboard which had remained between the film has not injured in the least the emulsion. I had also some films bought in the same year, 1893 (Carbutt & Edwards's). They had been exposed, and I employed them for making some negatives of drawings. The films were a little veiled, but the negatives were very tolerable notwithstanding. Some paper sheets, also of the same date (negative paper of Morgan & Kidd), were as new. Last year, during a trip in Germany, I bought films made by the Actien Gesellschaft für Anilin Fabrikation (what a name!). Two of the films were unexposed, and I exposed them this summer, more than a year after the day when I bought them. They were perfect still.

You see that, with films as with plates, the emulsion is the great thing, and, when the brand is good, the films will keep.—I am, yours, &c.,

M. PELLECHET.

To the EDITORS.

GENTLEMEN,—Our attention has been called to Mr. T. Croft's letter in the JOURNAL on the 11th inst., and, incidentally, to Mr. Drage's article in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, with which, like your correspondent, we are "considerably surprised." Mr. Drage's experience is so entirely at variance with our own, and with that of so many users of our films, that it would seem desirable, in the interests of the ever-increasing army of tourists, if Mr. Drage would furnish further details of his experiments, especially as to his method of storing the films during the interval between exposure and development.

Mr. Croft describes the films which he found to keep perfectly for a period of seventeen months after exposure as "half-plate isochromatic." We may therefore assume that they were of our make, which we find do not deteriorate in the way described by Mr. Drage. We enclose for your inspection prints from hand-camera negatives on similar films ("snap-shot iso."), two of which were exposed in Venice in May 1896, and developed eighteen months afterwards; the remainder, including a couple of prints from negatives taken in Barcelona, at the time of the public funeral of

the victims of the anarchist bomb explosion, were exposed in June 1896, but were not developed until the 26th ult., nearly two and a half years after exposure. The negatives were developed in the ordinary way with pyro and soda, the only precaution taken in keeping being that both before and after exposure the films have been constantly kept sealed up in an air-tight tin, such as we use and recommend for export packing. —We are, yours, &c., B. J. EDWARDS & Co.

The Grove, Hackney, London.

[The prints which Messrs. Edwards & Co. have been kind enough to send us are of first-rate quality, and obviously from very good negatives. They depict street scenes in Venice, Barcelona, and Geneva, one of the latter views showing the very spot where the Empress Elizabeth of Austria was assassinated. We thank Messrs. Edwards for these interesting little snap-shots.—ED]

A SOCIETY FOR ASSISTANTS.

To the EDITORS.

GENTLEMEN,—In spite of the number of photographic societies, there is an opening for one which, if established properly, should be very successful, viz., a society consisting of professional photographers' assistants, and I should be glad if you will allow me to ask for the opinions of other assistants on the matter, through your columns; then, if this letter should be the means of arousing sufficient interest to justify it, a meeting will be called to establish such a society.—I am, yours, &c.,

A PHOTOGRAPHER'S ASSISTANT.

CHRISTMAS HOLIDAYS.

To the EDITORS.

GENTLEMEN,—Christmas Day falling on Sunday this year, several London photographers intend to close their studios on Monday, thus giving their assistants two clear days' holiday (if Sunday can be called a holiday). Could not something be done on behalf of those assistants who have to slave on all Bank holidays, including Good Friday, to enjoy this privilege? I was formerly in the employ of a firm who have a large business, and I am informed by one now in their employ that it is the intention of the firm to open all their studios on Monday following Christmas Day. Surely, after, say, a petition from their assistants, praying for the Monday, or the publication of a few letters on this subject in your valuable JOURNAL, the firm would say, "Yes, let them all go." Trusting you will find space for this letter on behalf of a large number of machines, who require a little relaxation at times but don't get it,—I am, yours, &c., JUSTICE.

London, November 26, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPH REGISTERED :—

The Worthing Portrait Company, 4, Railway-approach, Worthing.—*Photograph entitled "A Budding Genius."*

RECEIVED.—BLISTERS ; PROFESSIONAL, and others. In our next.

RALPH LANE.—Thanks ; the information may be serviceable.

C. S. ELLIS.—Too late for the ALMANAC, which is on the point of publication.

S. HERBERT.—Probably under-exposure and forced development ; but we cannot say definitely on the too few details given.

H. C. P. BELL (Ceylon).—We are obliged for your suggestion. The work is referred to in an article on "Colour Photography" in the ALMANAC.

HARRYSTOTYPE.—One is collodio-chloride, the other gelatino-chloride. There is no "best." Give both a good trial, working to the formulæ recommended by the makers, and decide for yourself.

W. H.—Send us a few specimens of your work, and we will tell you what we think of it. Of course we do not make a charge for such a thing ; we are always pleased to be of help to our readers.

AUGUSTUS WINTER.—The work is of a good commercial class. You should experience no difficulty in procuring a situation. As to the salary, two to three pounds a week might be obtained. You must enclose postage for the return of the specimens.

F. H. CARTER.—Thanks. Probably the same firm. It would be a good thing if all the photographic societies in the country could take notice of the swindle, as the publicity given to the matter in the local press would help to stop these knaves' little games.

MOUNTANT.—C. GORHAM asks : "Will you please tell me the proper way to stick a $3\frac{1}{2} \times 2\frac{5}{8}$ ins. photo print to bottom of a letter (glass) weight, for I have an idea of making such as Christmas presents, and oblige."—Simply clean the glass, and cement the photograph to it with starch paste.

ADDRESS WANTED.—D. G. VERA says : "Having read in a German journal copying from yours that Mr. David Salomons sells an apparatus or glass by means of which one can see the simple photographs stereoscopically, I should request you to tell me Mr. Salomons' address in order to write him direct."—In reply : Sir David Salomons' address is Broomhall, Tunbridge Wells.

K. S.—1. The picture in all probability would not be accepted at the Salon. Send it to some of the exhibitions referred to in our columns week by week. 2. You would probably make most money by selling the copyright to some large business house that advertises greatly—Pears', Beecham's, for example, or it would be useful for almanac purposes. 3. Yes ; a reasonable amount.

LEX —1. Use the normal formula, substituting sulphite for the metabisulphite. We have had no experience with it ; but a well-known worker recommends this mode of using it. 2. Sorry we can add nothing to the original paper ; but we will inquire of the author for an explanation. 3. Correct, if the half-tones be taken as they appear. 4. Probably, H. M. Ward, of Leicester. We cannot trace an advertisement of the name given.

PHOTOGRAVURE.—T. SIMPKINS writes : "Can you assist me at all? I am trying the process of photogravure, but I find the grinding and sifting of the bitumen a terrible nuisance. Reducing it to powder in a pestle and mortar is a laborious work, and the sifting of it makes such a dust that it smothers everything in the place. Is there any other way of getting the powder?"—Yes ; by purchasing it. Our correspondent is probably not aware that bitumen in fine powder is an article of commerce. It may be had from Mawson & Swan, Soho-square, and probably from Penrose & Co.

STUDIO.—C. YOUNG says : "I have just taken a studio, it is 20 × 12, shadow side covered in, can work with north light, which is all ground glass the whole length of studio. How much glass should be covered to shade backgrounds, and what colour material would be best, and what would be best to soften the light on sitter? If you will kindly answer this, I shall feel obliged."—Five feet at either end of the roof may be stopped out, and four feet at the sides. The colour used for the purpose is quite immaterial so long as it is opaque. Black is generally used. As the glass is ground glass, nothing is necessary to soften the light, a white-light reflector may be required to soften the shadows on the shadow side.

SPOTS AND STAINS.—WORRIED writes : "Can you assist me in explaining the cause of the minute yellow spots and stains on the enclosed collodio-chloride prints? It is the second time, with a considerable interval, that they have been apparent in the work passing through my hands. The spots, I think, are somewhat similar to those in albumen prints when air bells are allowed to settle on them, and the stains like hypo stains ; but, as I believe I work very carefully, I can scarcely think that this is so. I wrote the firm from whom I got the paper ; they blame the *Mantello* mounts. The benefit of your experience I will greatly appreciate, as this matter worries me much."—The spots may arise from many causes in the manipulating, all entirely different, and, as they only occur occasionally, they certainly should not be charged to the mounts or the paper. If either of them were the cause, the spots would be present at all times. The stains seem to proceed from a different source, and in one instance as if from streaks of the brush if a deleterious mountant had been used.

VARIOUS QUERIES.—ASSISTANT writes : "Would you kindly answer the following questions in the Query Column of THE BRITISH JOURNAL OF PHOTOGRAPHY? 1. Is a photographer's assistant (paid weekly) entitled to a week's notice, and compelled to give the same? 2. If pyro solutions of various strengths are used in development, they have an effect on the plate varying in proportion to their strengths. What is the greatest strength of pyro solution beyond which the solution has no varying (increasing) effect on the plate? 3. What would be the effect of using the strong solution as regards speed in development and character of resulting negative? 4. I presume the alkali used (soda or ammonia for instance) would have to be increased in the same proportion as the pyro? Thanking you in anticipation."—In reply : 1. Yes, unless there is a special agreement to the contrary. 2. No limit that we are aware of. 3. The speed of development depends more upon the amount of alkali present than upon the proportion of pyro. 4. Not necessary. The larger the proportion of pyro the greater the density given.

COLLODION NEGATIVES.—COLLODION writes : "I am troubled with a white scum on the plate, after fixing, but which is easily removed with a tuft of wool. It appears to arise from the bath. To remedy it, I divided the bath, filtered and made up the strength and acidified slightly and the first few negatives came good and clear, but the scum soon appeared as bad as ever. It slows the plate and needs longer exposure. I work at night, copying by gaslight. Can you give me any assistance in removing the cause of this defect?"—The defect shows a disordered state of the bath, and it was remedied by subsequent treatment, but only for a time ; it would seem that there is some disturbing element constantly at work. Possibly the collodion may be at fault. As our correspondent works at night, we rather infer that the negatives are required for mechanical work and possibly have to be made very intense. If they are intensified with the sulphide of ammonium, or similar methods, the fumes of that would have a tendency to disorder the bath unless the intensification is conducted quite away from the dark room.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
Ex Cathedrâ	785
Comfort in the Dark Room	787
Leaderettes:— Photography in Natural Colours—Three-colour Work—The Vapour of Iron—Suter's Competition—Aniline Lakes for Printing—The Inventor of the Camera	787
The Yorkshire Photographic Exhibition	788
At the Camera Club	789
Phosphorescence in Relation to Photography. By C. F. Townsend, F.I.C., F.C.S.	790
A New Camera Bag	791
Photography at Home by Artificial Light.—II. By John Warrack, jun.	791
National Photographic Record Association at the Imperial Institute	793
Exhibition of the North Middlesex Photographic Society	793
Ludlow Photographic Society's Exhibition	793
Affiliation of Photographic Societies	794
Our Editorial Table:— Panak—*Wild Life at Home: How to Study and Photograph it*—Catalogues Received	794
News and Notes	795
Patent News	796
Meetings of Societies:— London and Provincial Photographic Association—Photographic Club—Hackney Photographic Society—Kingston-on-Thames and District Photographic Society—North Middlesex Photographic Society—West Surrey Photographic Society—Hastings and St. Leonards Photographic Society—Leeds Camera Club—Oxford Camera Club—Plymouth Photographic Society—Carbon Portfolio Club, Edinburgh—Glasgow Photographic Society—Cape Town Photographic Club	796
Forthcoming Exhibitions	798
Correspondence:— The Photo-ceramic Process—The Kinematograph Panic—The Bennetto Process—The Carriage of Exhibits—Light of the Firefly	798
Answers to Correspondents	799

EX CATHEDRA.

We occasionally receive requests from our younger readers, who are engaged as operators, assistants, &c., to pass an opinion on specimens of work which they submit to us. This we are always pleased to do, and we here make mention of the fact in case there are others who may desire to take advantage of our services in this direction. All we stipulate for in exchange is that the return postage of the specimens be sent with them. In this manner readers at a distance, who are unable to inspect the great exhibitions, and are otherwise debarred from making themselves acquainted with the latest photographic work, may possibly derive a useful hint in their efforts at self-improvement.

* * *

Naturally photographs so submitted to us will be reviewed from the standpoint taken up in criticising work publicly exhibited, that is, from an honest desire to help in the improvement and progress of photographic productions. It will not be our aim to assist correspondents in their commercial aspirations—that is a matter entirely for themselves. One gentleman, at least, has no sympathy with this object, for he writes to ask for "something different to what people ask for" through our Correspondence columns. He says: "I have a large collection of large panel head photographs, which I have retouched for Messrs. ——. Having been head retoucher for them the last two seasons, and had the retouching of all the large work, and given the greatest satisfaction, and also the pleasure of having the vacancy left open for me if I will go back next season. But what I want is a permanency; so I wish to forward my work to you, with a lot more panel heads, for you to pass your critical opinion on them, and then, if they meet with your approval, *what would you charge me for a favourable press opinion in your* Journal?"

* * *

This is the first time such an insulting question as that which we have italicised in this person's letter has been addressed to us, and we trust it will be the last. It would have served the man right to have forwarded his letter to his employers, and it is only in the hope that he will resolve not to repeat his offence that we suppress his name and address.

* * *

A very old stereoscopic worker writes, with regard to our remarks in a leading article last week on the subject of size of plates, to remind us that in the old days, when stereoscopic pictures were in high favour with amateurs generally, although the $6\frac{3}{4} \times 3\frac{1}{4}$ was the standard size, there was also a shorter plate occasionally met with, and which he believes to have been the American size. It measured $6\frac{1}{2}$ inches in length, and was, in fact, the size of two lantern plates. Another size, which he believes to have been French, was still shorter, as far as he remembers between $5\frac{1}{2}$ and 6 inches, and slightly narrower than the English size—probably 14 or 15×8 centimetres; but this, although it gave pictures that were easily combined, showed too much margin on the ordinary-sized mount to have a pleasing appearance out of the stereoscope.

* * *

He goes on to point out that the size suggested—$6\frac{1}{2} \times 3\frac{1}{4}$—would be very little more "convenient" to the plate-makers, except in so far as it is a double-lantern plate, whereas the

"double quarter"—$6\frac{1}{2} \times 4\frac{1}{4}$—is not only equal to two quarter-plates, but it is the half of the whole-plate, and thus not only exceedingly convenient for the maker but also for the user, since there is no reason why the height of the picture need be curtailed. The full height need not be employed for general landscape work; but for architecture, and especially interiors, he claims the shape to be far superior to the ordinary square plate. The late Mr. W. Harding Warner some years ago tried to popularise the high shape of picture, using, he believes, a half-plate. Setting aside the question of extreme portability of apparatus, he considers the double quarter to be the best all-round size for stereo work.

* * *

GOING further, where portability is not in question, plates of much larger dimensions may be employed if the very ingenious stereoscope, patented by Sir Howard Grubb some twenty years ago, be used, and it is surprising that no manufacturer has had the enterprise to put this on the market. In this instrument the lenses are placed the usual distance apart, but by an ingenious arrangement of prisms, or, more economically, of mirrors, two pictures of any dimensions, placed one above the other, instead of side by side, are combined with the same ease as the two-and-three-quarter-inch pictures in the ordinary stereoscope. We remember seeing some very fine landscapes taken specially by this stereoscope by, we believe, Mr. Payne Jennings, measuring about 9×7 each; but, unfortunately, there was a "slump" in stereoscopic work at that time, and the idea never "took on." It will be evident that pictures of these dimensions, at least for close subjects, would have to be taken by separate exposures, with a camera on the Latimer Clark principle, otherwise the apparatus would be inconveniently bulky, and the stereoscopic effect greatly exaggerated.

* * *

MEMBERS of the Photographic Convention of the United Kingdom may be glad to know that the good folks of Gloucester are getting well forward with the arrangements for next year's meeting. On Friday evening last a special committee meeting was held at the house of Dr. Oscar Clarke (President of the Gloucester Photographic Society), at which Messrs. C. H. Bothamley, Harold Baker, and F. A. Bridge were present. Many excellent excursions were discussed, and it is anticipated that a very attractive programme will be presented for the consideration of the Council at its January meeting. On Saturday Messrs. Bothamley and Bridge, under the care of Dr. Hodges and Mr. Crump, paid a visit to the principal buildings in the city, including the Guildhall, where they were received most cordially by the Mayor (Mr. H. R. Braine), who informed them that the large room of the Guildhall, capable of seating about 700 persons, and a committee room had been granted free of cost for the week commencing July 10. He also kindly promised to open the Convention proceedings, and said the Corporation of Gloucester would do all in its power to promote the success of the meeting.

* * *

A SCOTCH correspondent writes: "I was much amused by reading the report of an action between photographers in Sydney in your, or should I say *our*, JOURNAL. One, however, does not require to go so far afield to find peculiar methods of pushing business. I enclose a circular which emanates from the studio of a neighbouring photographer which may amuse you. The paragraph on the back is particularly rich."

* * *

THE paragraph runs as follows: "I regret that circumstances compel me to take any notice of ——'s shameless advertising, but to justify myself I will state the truth. —— knows nothing about photography, never having taken a photograph in his life, and is entirely void of artistic taste. Necessarily, when in his employment, I did all the photographic work. For his rapacious injustice, and not paying me my wages according to agreement, I left him of my own accord. He advertises what he cannot perform, as I had to use *makeshifts* for all the improvements I introduced, and he makes it his boast 'how he can gull the public!' When I started with him the work was so bad that I gave him prints from my own negatives, and he keeps on exhibiting my work, with the exception of a few prints this time—presumably the so-advertised 'more skilful talent's' work. Well, I won't hurt his feelings, knowing what he has to suffer. All work intrusted to me has my personal attention, and I let no work leave the studio unless photographically good. This I *can* do, which —— *can not*, seeing he is totally ignorant of, and incapacitated for, the art. Puir man, it is only perverse stupidity that he is in the business. This we consider our incumbent duty (formerly innocent), as we live by and with the people *and our own labour*. 'People who live in glass houses should not throw stones.' 'Ingratitude is the crime of a monster.'"

* * *

THIS is one of the most remarkable specimens of the advertisers' art that we have met with; the more so, as the author in the same leaflet entreats his possible sitters not to be "misled by caluminous (*sic*) and deceptive advertising." Evidently the author and his former employer are not on the very best of terms. We put it to both parties that neither's business can profit by this uncommonly emphatic method of attracting attention, and we suggest that somewhat milder language would answer the purpose much better. Certainly such sentiments and the way in which they are expressed are not calculated to induce the public to look with the friendliest eyes on professional photography, the status of which so many earnest men are trying to raise.

* * *

ALLUDING to the French Exposition of 1900, the Paris correspondent of a morning contemporary says that plans and projects, as well as rules and regulations, are being drawn up for it. One of the first questions that came up for discussion was who would receive the sole right of photographing the interior of the Exhibition, and how much he would have to pay for it? The General Commissioner, M. Picard, has had numerous tenders from Parisian, provincial, and even foreign, photographers. One enterprising firm went so far as to offer 1,000,000f. for the monopoly. It has now, however, been decided not to restrict the right to any one, but to charge a uniform sum, on payment of which professional and amateur photographers will be permitted to transfer the artistic effects of the interior to films and paper. The sum has not yet been fixed.

COMFORT IN THE DARK ROOM.

To any one who has had the *entrée* to any large number of dark rooms of different ownerships, the vast difference exhibited in the possibilities for comfort and convenience with no differences in the initial outlays, must have been patent, though he were not a specially observant man. Here are order, cleanliness, and every convenience; there, disorder, untidiness, and dirt. In the old wet-collodion days a certain amount of cleanliness was observed by the most untidy, as otherwise dirty plates would have been perpetual; but, even then, there were great contrasts between dark room and dark room; but nowadays with gelatine plates, carefully and neatly packed by the maker, ready for use at any moment at one's elbow, good work would be possible if the dark room were a coal cellar. Yet, when it comes to a question of comfort, the pleasure of working in one of the well-ordered kind is by comparison incalculable. A few notes on various considerations in this connexion that we have from time to time jotted down may be of use to some, perhaps to many, of our readers. Among the very first subjects to be treated now the near advent of winter has already been foreshadowed is, naturally, that of heat and heating. This is to a certain extent a question of £ *s. d.* In the well-appointed photographic establishments, whether of the wealthy amateur or the successful professional, the heating of the room by hot water—high pressure or low pressure—reduces the matter almost to the simplicity of "pressing the button," the furnace man "does the rest." Before discussing this matter further it will be well to see what a well-heated dark room does for us. Without being a Sybarite, a man who spends much time in a dark room can thoroughly appreciate the comfort during cold weather of working in a well-warmed and ventilated, apartment; he can do more work, and better, in a given time than when his fingers are chilled to the bone with constant dabbling in ice-cold water, such as is too often the enforced experience of many an unfortunate operator. So far as to the more personal aspect of the subject, the actual work of the place is still more influenced by temperature. One of the most important points to be attended to in the production of a regular and even type of negative with a maximum of certainty in results, is the temperature of the developing solution. A difference, more or less, of five or six degrees materially affects the rate of development, and, if time development be adopted for exposures made under uniform conditions, it is absolutely necessary that the developer be always used at the same temperature within a very few degrees; but this is entirely impossible when the room is inefficiently heated. Even if the solution be mixed in large quantity, and by the use of warm water brought to an exact temperature, all such care is wasted if the cold sink, flooded with cold water, be the resting-place for cold dishes, filled from cold measures, with the atmosphere a few degrees above freezing point, for the solution will almost instantly part with its added heat, the process of development be retarded, and thus the expected certainty and evenness of result be banished.

There is a further direction in which a sufficient degree of heat is of great advantage. Many amateurs, and others living in the country, frequently put their negatives to dry in the open air; this plan, always risky, is quite impossible in smoky towns, and hence the only resource, failing the unusual means of a drying closet (and here heat is needed) is to place them in racks, or on the wall, to dry. Even in summer weather, except in the case of thinly coated negatives with their well-known corresponding disadvantages, a negative takes from twelve to twenty-four hours to dry; what it needs in winter, failing the application of artificial heat, it would be difficult to say. Let, however, the dark room, with a batch of negatives fresh from the washing tank put up to dry, be artificially heated to a temperature of 65° or 70°, and the way those plates will get rid of their moisture is a comfort which, once experienced, after a practical acquaintance with an opposite state of affairs, will not be readily forgotten.

In winter time the air is usually charged with moisture to an extent approaching far nearer the dew point than in summer, and this is the reason that evaporation proceeds so slowly. This condition it is also that brings about the well-known "sweating" of all cold objects, glass and vessels of glass containing liquids being especially subject to its evil effects. A cold day, we will say, is experienced; everything in the dark room becomes cold; then, possibly, a southern wind, bringing warm air laden with moisture almost to dew point, succeeds on the following day, with the result that moisture is precipitated on all these cold objects. Even dry plates would become damp if exposed to these fluctuations; labels of bottles will drop off; cameras, if by chance any are in this room, will work tight; and altogether discomfort will reign supreme. And this deposition of moisture will even be intensified, however hot the room may be, if the heat be produced, as is so often the case, through considerations of economy, by means of open gas or petroleum burners, with the products of combustion not carried away by suitable flues, the moral being that, if convenience, ease, and certainty of working, and, above all, comfort, be desired, the dark room should never, during winter weather, when work is proceeding, be permitted to get cool night or day. We trust, on a future occasion, to treat this question of "comfort" from other aspects.

Photography in Natural Colours.—The great interest exhibited in England in this subject seems to be rivalled on the Continent, for hardly a foreign journal reaches us but some reference is made to it. At one of the recent meetings of the Académie de Beaux Arts, the Secretary showed a series of superb photographs on material "reproduisant les unes et les autres, avec l'exactitude la plus scrupuleuse, les couleurs vives d'œuvres d'art, de toutes sortes de costumes," &c. All the proofs were obtained by M. Grenier-Villerd by purely photographic means by a process, details of which are shortly to be published. The inventor claims they are prepared without the addition of any colour whatever. Some of the prints were on silk, some on cotton, and linen. The colours appeared to be absolutely fixed, and, if M. Grenier-Villerd is to be believed, the cost of the same is considerably less than that of ordinary wall paper.

Three-colour Work.—M. Mathieu Dery has exhibited before the Gand section of the Association Belge a series of prints obtained by the superposition of three coloured films. The exposure for a portrait was said to vary between three and five seconds. If our memory does not play us false, examples of this process were shown in London in Pall Mall, and also at the Photographic Exhibition at the Imperial Institute, in 1895. Recently, also, Dr. Lamrois of Lyons has been using MM. Lumières' modification of this method to prepare stereoscopic transparencies of facial nævus. M. Dugardin has also been using the superposed films, using the carbon process, and it is stated that Monckhoven & Co., of Gand, are likely to put the tissues on the market.

The Vapour of Iron.—Mr. Pellat, in a recent communication to the Académie des Sciences, reported that he had found that

iron emitted some vapour which acted on silver bromide so that an image could be obtained on development. To prove that the emanations were not of the same order as the rays discovered by M. Becquerel to be emitted from uranium, a piece of iron separated from the sensitive surface by a thin piece of glass and coated with mastic and paraffin, did not affect the plate.

Suter's Competition.—The well-known optical house, Suter, of Basle, are offering prizes to the value of 3000 francs to commemorate the twentieth anniversary of the founding of the firm. The following are the classes and prizes :—

Class I. Portraits. Three prints must be sent in on albumenised, platinotype, or carbon paper. Size *carte-de-visite* to life size.

1st prize.—A lens to the value of			700	francs.
2nd	„	„	350	„
3rd	„	„	175	„
4th	„	„	100	„

Class II. Groups. Three prints, in or outdoor.

1st prize.—A lens to the value of			500	francs.
2nd	„	„	300	„
3rd	„	„	150	„
4th	„	„	100	„

Class III. Instantaneous, landscapes, architecture. Three prints.

1st prize.—A hand camera, 12×16½ cm., to the value of			250	francs.
2nd „	A casket or lens	„ „	200	„
3rd „	A lens	„ „	100	„
4th „		„ „	75	„

All prints must be mounted but not framed, and must have been taken with a Suter lens, and, as far as possible, should not have been previously exhibited, and must be sent to Basle on or before March 15, 1899. The Judges will be MM. Reutlinger, Paris; L. Schrank, Vienna; B. Dittmar, Munich; C. Ruf, Munich; G. H. Emmerich, Munich; F. Tersch, Munich; and E. Suter, Basle.

Aniline Lakes for Printing.—Herr Hazura recently described the preparation of printing inks from aniline dyes. To prepare the lakes from acid dyes, finely powdered kaolin was mixed with ten times its weight of water and a one per cent. solution of the dye mixed with caustic soda or potash. To this mixture, heated to boiling point by steam, was added slowly, with constant stirring, a dilute solution of alum, aluminium acetate, chrome alum, or tin chloride so that these were in excess. The lake was then filtered off, well washed, and dried at a temperature not exceeding 40° C. The basic dyes were precipitated by adding tartar emetic to the kaolin and dye, and then, on boiling, adding tannin solution. The after-treatment was as above. Stable colours were obtained from alizarine blue S., anthracene blue, alizarine green S., alizarine orange, gall of lavine, cœruline, purpurine, alizarine indigo blue, alizarine, alizarine yellow, voluidine blue, methylene blue, new methylene blue N., capri green, cresyl blue, cresyl violet, and brilliant metanim blue. In some instances the kaolin was replaced by gypsum or zinc oxide. For three-colour work suitable lakes could be prepared as follows: For blue, a lake precipitated from new methylene blue on kaolin; for red, a lake on alumina and tin; for yellow, an acridine lake precipitated on gypsum, which had to be mixed with chrome yellow A.

The Inventor of the Camera.—At one of the recent meetings of the Académie des Inscriptions et Belles Lettres M. Eug. Muntz stated that the invention of the camera was variously ascribed to Alberti, Don Paphnuzio, Cardan, and Tosta; but he pointed out that Leonardo da Vinci had minutely described the effect of using a sheet of paper pierced with a minute hole. Cardan, in his work, *De Subtilitate*, published in 1550, suggested the use of a lens, and Baptista Porta, later, devised the portable camera obscura.

THE YORKSHIRE PHOTOGRAPHIC EXHIBITION.

(Second Article.)

The representative nature of the Yorkshire Exhibition might possibly have been increased by the inclusion of some more recent photographs by the principal workers. For instance, Mr. Crooke's *Crusader*, and Mr. H. P. Robinson's *At Sunset Leaps the Lusty Trout*, to take two typical examples of these gentlemen's styles, are at least two years old; and Mr. Karl Greger's *Evening near Dordrecht*, among his other subjects, is reminiscent of a past Salon Exhibition. One or two of Mr. Robinson's combination photographs would have been welcome, but his contributions, notably his *Geese and Goslings*, will, doubtless, highly interest visitors. Mr. Ralph Robinson sends *A Sunny Window*, and his glowing *Golden Close of Evening*, and Messrs. J. H. Avery, Harry Selby, and A. J. Jeffreys are well represented by land and waterscape work. In Mr. Craig Annan's collection, the ever-popular *Little Princess* commands attention, but the ambitious *Church and the World* (?"or" *the World*), here somehow seems to arouse less interest than when it was originally shown. Most of Mr. Horsley Hinton's 1898 Salon exhibits are hung, and he also includes *Requiem*, the melancholy charm of which does not diminish on renewed acquaintance. In Viscount Maitland's collection, his beautiful reed and water study, *At Lillington*, stands out prominently, and Messrs. Percy Lund, Walter Thomas, and F. M. Sutcliffe uphold the credit of Yorkshire with interesting exhibits. In W. M. Warneuke's series we noted his successful Pall Mall picture—it seems many years since it was hung—*Kelp Gatherers*; his *Girl with Violin*, and *Portrait of a Lady* are also shown. These, it will be remembered, are sombre-toned studies, the vogue of which is probably not destined to last.

Mr. W. Gill's study of a dainty lady, engaged in *A Pleasant Occupation*, stands out well from his exhibit: its delicacy of style appears as marked as when we first saw it a year or more ago. And here we may remark that to habitual exhibition-goers like ourselves such a display as that at Bradford has the rare use of enabling one to compare impressions formed a year or two ago with others created after that lapse of time. To what cause it is to be attributed we cannot say, but at Bradford there are few, if any, photographs shown that provoked controversy when they were originally exhibited in London; the fittest only have apparently survived. There are no eccentricities, no photographic posters, no astigmatographs, no perplexing blurs. That these things have been swept into oblivion supplies cause for congratulation; and the fact that they no longer live is further emphasised by the total absence of such efforts from so representative an Exhibition as that at Bradford.

Mr. Charles Sweet has his Pall Mall portraits hung, and the very fine work of Baron A. de Meyer Watson, notably his daring effect of cross lighting, *Mrs. George Batten*, arrests attention. This is a splendid bit of portrait modelling. Miss Muriel Bell's pretty, rather than powerful, figure studies will doubtless please many, and to Mr. E. R. Ashton is due the credit of imparting diversity to the Exhibition by a series of his admired Eastern scenes. Mr. Calland sends half a dozen contributions, illustrating his peculiar manner of obtaining pictorial effect out of commonplace subjects, and the collection of Mr. N. S. Kay, one of our most promising photographers, has some delightful bits of portraiture and figure-study work. Of Mr. W. J. Warren's five, his *Man in Armour* and the pretty little child study, *Meadowsweet*, are the most noticeably good. We pass by Mr. R. W. Craigie's two portraits, and two summer landscape studies which vibrate with realism, to Mr. Baynton's clever architectural and other subjects, which well illustrate the wide range of this worker's powers. Mr. Keighley has a collection of ten; about his garden and similar scenes there is a rich but old-fashioned touch which will please those who like glowing effects. Harold Baker is seen at his best in his collection, his *Lily Hanbury* and *Lady Warwick* portraits commanding great admiration. He also sends, among others, *Andante Dolcemente* and *Grey Avon's Peace*. Among Mr. W. S. Aston's series is a truly delightful portrait of a beautiful girl, *Sweet Seventeen*. We see again Mr. John Stuart's *St. Leonard's Hospital, York*, and the *Cellararium, Fountains*. These massive bits of work will be specially welcome, as the Exhibition is not rich in first-rate architectural subjects. Mr. G. E. Thompson's admired Pall Mall medal picture, *Threshing by Steam* (a new title), is shown, and among the other exhibitors are Messrs. J. Cruwys Richards, H. V. Hyde, Gauntlett, J. Page Croft, Miss F. B. Johnston (portraits), Rev. F. C. Lambert, Messrs. Morley Brook, S. L. Coulthurst, Dr. Llewellyn Morgan, Messrs. J. Bushby, Wade, T. Lee Syms, &c.

A set of portraits by Mr. Fred Hollyer will enlighten Yorkshire visitors as to what is considered the very highest form of photographic portraiture, and Mr. Shapoor N. Bhedwar's characteristic work is illustrated by eight examples. Adam Diston's *genre* studies are sure to delight

those who like narrative pictures, and the French workers are very strongly in evidence, Bremard, Le Begue, Bergon, Bucquet, Puyo, Demarchy, and Darnis contributing a very choice collection of the peculiarly delicate yet daring work for which these photographers are noted. The contrast between these photographs and the much more heavily handled productions of the English photographers is very great—indeed the respective styles and methods of treatment are as distinct as they could be.

Nine of Rejlander's "early sixties" works are shown. There is a dramatic force and fibre in these compositions which is certainly not equalled, or at any rate not excelled, in modern photography, no matter where it comes from. Mr. and Mrs. Cadby send several examples of their very graceful work, and we are agreeably surprised at the wonderfully good portraits shown by Mr. and Mrs. Walter Gardiner, of Worthing. For the moment we cannot remember having seen their work at an exhibition before, but it is so strikingly good that we hope to have many future opportunities of inspecting it. Work by Lionel Bennett, W. T. Greatbach, and Fred Marsh (his Gas Works series) is also shown, while space is given to some of the principal local photographers, Mr. Appleton, Mr. H. Henry, and Mr. A. Sachs.

In the General Section the best specimens come from Mr. C. Thomas (wave study), Mr. Thomas Heap, Miss K. G. Spink (a capital study of a head), Godfrey Bingley, Percy Sheard, P. R. Salmon, Thomas Carter, W. A. Beevers, A. W. Cooper, J. H. Gash, C. R. Taunton, and R. J. Appleton (a very graceful portrait study, which is quite the best thing in the section). We cannot fairly say that anything in the section is of the very highest quality, but what is shown is very good, and interesting to us as giving promise of better things in future.

The Exhibition is not one that calls for a detailed notice, and we have not attempted it. On the whole, it illustrates modern pictorial photography in a thorough and representative manner, although, as we pointed out last week, there are some conspicuous absentees. We could have done with more photographs from American workers, especially the professionals, of whose fine productions the British public is almost entirely ignorant. This, however, is merely a reflection in passing, and is not at all conceived in a carping spirit. No such chance of studying the best work of the day has ever before been given the Yorkshire public, and we anticipate that the Exhibition will give a considerable impetus to the study and practice of this branch of photography in the county of broad acres.

We are pleased to learn that the sales of photographs are keeping up. The attendance up to Saturday evening last numbered 17,892. This was or the week.

AT THE CAMERA CLUB.

Judging by the large attendance of members on November 28 to hear Surgeon-Major Beevor's discourse upon the practical use of the X-rays on the field of battle, popular interest in Professor Röntgen's discovery has by no means abated. And it should be noted that the Camera Club has had so many papers on the X-rays that it might fairly have been anticipated that a scant attendance might be the result of venturing on the same subject again; but in this case the lecturer had fresh ground to cover, and, apart from the scientific interest of the question, the average Englishman is always glad to hear stories direct from those who have battled for the nation.

The lecturer's experience with the X-rays was gained during the last Afridi campaign on the north-western frontier of India, and certainly a more valuable experience could hardly have been found, for the Afridis are a brave and reckless race, skilled in the use of firearms; and as they will use anything for missiles, from bullets proper to stones and chopped-up telegraph wires, the wounds which they inflicted on our poor soldiers were, from a surgeon's point of view, of the most interesting description. As long as the Afridi can have a go at his enemy with something hard, he does not care a damson what that something is. The body of the British soldier will, for this reason, often become a veritable old curiosity shop; and it is in detecting the various bits of iron, brass, and other metals which the gay Afridi forces into his gun barrel that the X-ray tube does such splendid work.

The lecturer pointed out how difficult it was to get at any foreign body lodged, say, in the muscles of the back, in the stomach, or in the liver. To be able to localise and to note the actual size of such a body, so as to operate successfully, is an incalculable boon, both to patient and surgeon. The X rays have afforded the means of this being done, and their employment in this work represents the greatest surgical advance since the introduction of chloroform.

With such a preface, the lecturer proceeded to give particulars of various cases which had come under his notice during the Afridi campaign, modestly apologising for the roughness of some of the radiographs thrown on the screen. Some of these were taken, he explained, under circumstances of the greatest difficulty and in a climate, be it remembered, which varied from 22° of frost at night to 120° Fahr. in the shade the next day. Moreover, most of the pictures were taken in the greatest haste—one of them when sixty wounded men had to be attended to, and the bodies of more than twice that number of poor fellows awaited burial. In many instances there was no time for photographic operations, and the surgeons had to be content with a rough sketch of the position of a bullet taken from a fluorescent screen used in conjunction with the X-ray apparatus.

The first case demonstrated was that of a Gourka, who was shot at Dargai, the bullet entering the man's thigh, taking a course downwards, colliding with a bone, and finally lodging in a situation which could not have been discovered without the X rays. It was in contemplation to amputate the limb, so great was the inflammation set up, but the bullet was found, extracted, and the man made a good recovery without losing his leg. There is sometimes considerable difficulty found in cutting out a bullet which has been long in the body, for the reason that nature will encyst such a foreign body—wrap it up, so to speak, in a fibrous covering so as to render it almost harmless. Still its presence will prevent free use of a limb, and it has to come out before the patient can recover.

The next example was a bullet which had lodged in the bend of the arm—a Martini-Henry bullet, which was clearly defined by the X rays. Previous to the examination, which determined the presence of the bullet, the surgeons thought that the man was malingering, and it seems that native Indian soldiers are much given to that kind of thing. Eventually the bullet was extracted, but the operator took more than an hour, so encysted was it in tendonous material.

The radiograph of a foot showed how very small a piece of matter in the wrong place will prevent a soldier doing his duty. This man had received a charge of telegraph wire in his instep; the pieces were extracted, but still he hobbled about on crutches, and could not put the damaged foot to the ground. Three months passed away, but still, if his heel touched the ground, he felt an intense pain right up the leg. The X rays at length revealed the cause in a tiny fragment of metal, which had lodged just below the bone. It was extracted, and the man made a good recovery. A somewhat similar case was that of a soldier who was wounded in the knee. Several fragments of metal were extracted, but the limb continued to give trouble, and the X rays eventually revealed a fragment, which could have been detected no other way. Its extraction was followed by perfect use of the limb.

A bullet which lodged in the thigh bone of another soldier gave much trouble to the surgeons; it could be seen through the thickness of the bone by means of the fluorescent screen, but, owing to its situation, they did not dare to operate. The bone itself died where it had been struck by the bullet, and considerable suppuration followed, the man apparently slowly dying of blood-poisoning. The man was X-rayed and eventually sent home to Netley Hospital, carrying the picture with him. His health much improved with the sea voyage, and when he was again examined with the X-rays the bullet had altered its position by three inches. It had tumbled forward into an abscess due to its own presence; it was easily removed, and the patient got all right again.

Blood-poisoning often follows upon these wounds in spite of modern antiseptic dressing. Two cases were shown in which the bullet had carried with it, into the wound, a quantity of goat skin and hair from the coat the victim was wearing at the time. In one of these cases the elbow swelled up to a foot in diameter, and it was thought that the limb must be sacrificed to save the patient's life. However, the exact position of the foreign body was indicated by the Röntgen rays; it was extracted and the man recovered. In the other case a similarly happy termination was recorded. In the case of a shattered hand which was skilfully patched up by the surgeons, it was interesting to note how plainly the lead plaister dressing showed up on the radiograph which was taken of the injury, demonstrating that this metal, even in a finely divided state, can be recognised without difficulty in this new method of diagnosis.

A fair idea of the terrible risks of warfare was afforded by the radiograph of a general who received a bullet wound in the leg. He was taken to a tent and examined, and while the surgeons were at work no fewer than thirteen bullets were fired through that tent by the enemy. It is gratifying to learn that the new service bullet is far more merciful in its action than the missiles which it has superseded. It goes clean through the body as a rule, disabling its victim by shock to the system. A curious case was that of an officer who was struck in the chest at Dargai as he was in the act of turning round to give an order. The bullet had apparently made its exit at the other side of the chest; but lung difficulties supervened, and it was determined to make an examination with the Röntgen rays. It was ultimately found that the bullet had struck the edge of the sternum, or breast bone, and had been cut clean in half, one half escaping from the body and the other lodging in the pleural cavity. It is probable that the retained half of the bullet would never have been traced without the X-ray apparatus.

The discussion was opened by Mr. Cadett, who remarked upon the fact that, when Eastman's X-ray paper was used for the work, a dozen sheets piled one on the other could be impressed at one operation, showing that there must be a great amount of energy going to waste in taking a single picture on a plate. Mr. Campbell Swinton followed in the same vein, and remarked upon the inefficiency of modern dry plates for this employ-

ment. He hoped that plates would be introduced especially fitted for this work, and allowing the time of operation to be enormously reduced. Both gentlemen also expressed the thought that a portable dynamo would be far better to use in the field than any kind of battery. A clever suggestion came from practical Mr. Inwards, who proposed that surgeons should affix strips of tinfoil to the skin in the neighbourhood of a bullet wound, in order to detect, by aid of the radiograph, the exact position of the foreign body.

Mr. Wilson Noble, who occupied the chair, carefully summed up the various points which had arisen, and described a means of localising a bullet. He suggested the use of a Wimshurst machine for field use, thus doing away with induction coil and battery.

The lecturer, in his reply, described the apparatus which he employed. He had designed a dynamo with a bicycle movement, to be worked by hand or foot power. This had been sent out to the Soudan, but he had not yet heard how it behaved. In India he had employed a bichromate battery, the use of which he advocated for field work, because there was generally no difficulty in obtaining sulphuric acid from the field hospitals. Paper and films did not answer in such a climate; you might pack them in metal boxes, but they stuck together and became spotty. To get the best results, he believed, from experiments which he had made with a chemical friend, that a plate very rich in silver was the thing to use. Much of his work had been done at the front under fire, and many of his best radiographs had fallen into the hands of the enemy. The apparatus could not be trusted to mules, camels, or vehicles on rough roads, and he had found it best to have it slung on poles and carried on men's shoulders.

The proceedings, which did not close till a late hour, concluded with a hearty vote of thanks to the lecturer.

A very different subject was that discoursed upon on the following Thursday evening by Mr. Storey, whose text was "The Proposed New Bill with reference to Copyright so far as it relates to Photography." Mr. Storey said that his paper must not be looked upon as an exhaustive one, for his purpose was rather to induce a discussions from which he himself might learn a great deal. He wanted to know what photographers thought about this subject of copyright, and what amendments of the present law they would suggest in order to protect their own interests.

He went on to explain that the law of 1862, which gave a copyright in works of art for a period of thirty-six years, had not been altered, although several attempts had been made in that direction. The Royal Commission which sat in 1878 made several valuable suggestions, but there the matter stopped. In 1882 a new law was brought forward, and was ordered by the House of Commons to be printed. In doing this the House of Commons evidently thought that they had done what was required of them, and did no more.

For the past two years a Committee of Artists had been holding meetings with the view of getting the law altered. This Committee included himself, Messrs. Alma Tadema, Dicksee, Solomon, East, and other representatives of the brush. Sculpture, engraving, and architecture were also worthily represented on the same Committee, which had had the valuable and indispensable legal advice of Mr. Voysey. There was no photographer attached to the Committee; but, according to Act of Parliament, the photographer was as much of an artist as any one else, and that was one reason why he wished to hear their views about this proposed new Bill. They should all be united, if possible, so as to make heir joint voice heard.

The old Bill provides that the copyright in a work of art, be it a painting, drawing, or photograph, should last for the life of the artist and seven years after his death. In the case of an engraving the term is twenty years, and a sculpture forty, and fourteen more if the sculptor should be living at the end of the first-named term. Unless there be a written reservation of the copyright at the first sale of a work of art, the copyright lapses and is lost. The registration regulations are most unsatisfactory, as are those in force with regard to infringement of a copyright.

The new Bill, which is intended to amend the old law of copyright, provides that, in the case of original work, the term of protection should be the life of the artist and three years after his death. Works which are not original and photographs are to have a period of protection of thirty years. The copyright is to remain the property of the artist until disposed of by him in writing. With regard to registration, none is to be necessary as long as the work remains the property of the author of it; but, when he sees fit to dispose of it to another, registration becomes compulsory. In the case of photographs registration is necessary.

Such is a very brief account of the new and old Bills. The proposed Bill has the support of all the artistic societies in Great Britain; they have read its clauses and are in complete sympathy with its aims. As he said at the outset, he had not come to the Camera Club to speak himself so much as to hear others talk, and it was one charm of this Club that members were in the habit of getting up and carrying on a discussion in a delightful and entertaining manner. He trusted that members would not hold back now. There had been an immense improvement in the artistic qualities of photographs during the past few years, so much so that artists began to feel uncomfortable in the presence of such a formidable rival. He would not be false to his own craft, but he must say that he would always rather look at a good photograph than at a badly painted picture.

The Rev. F. C. Lambert opened the discussion with the remark that he did not see why a picture made with the brush should be placed in a different category to one taken with a camera. Although the question of copyright did not affect amateurs to any great extent, he could not help feeling that they should do what they could to help their professional brethren. Happily, the amateurs were so fortunate as to be able to treat photography as a hobby; but they should not be unmindful of the interests of those whose bread and butter depended upon it.

Mr. Gambier Bolton contended that photographs and pictures should all be put upon precisely the same footing, after which the discussion began to drift into a new direction, and patents and registered designs came in for review. There was also a fear at one time that the hoary old question of art *versus* photography would again crop up, and every one breathed a sigh of relief when it was discovered that none of the redoubtable champions in that everlasting bone of contention were present.

Mr. Austin, who occupied the chair, gave a careful summing up of the case in a most judicious and judicial spirit: after which those who had already spoken spoke again, the lecturer once more got upon his feet, and it looked as if no one intended to go home until daylight doth appear. But the proceedings at length came to a close with the suggestion from Mr. Storey that he would get a copy of the proposed Bill sent to the Club, so that those interested could read it and make upon its margin any suggestions which seemed good to them.

PHOSPHORESCENCE IN RELATION TO PHOTOGRAPHY.

[Read before the London and Provincial Photographic Association.]

Although a sound knowledge of higher mathematics and a siege train, composed of such battering engines as $\frac{dy}{dx}$, is required to tackle any of the problems connected with the theory of light seriously, yet, by the aid of one or two simple metaphors, it is easy to get a good idea of the main principles of the subject without any mathematics at all.

Phosphorescence must have been known from very early times, as several forms of animal life give off phosphorescent light, notably the glow-worm and the animalcules in the sea that render the water so beautiful on a dark night, especially in tropical climates. The sulphides of the alkaline earth metals are highly phosphorescent when prepared in a suitable manner. Bologna phosphorus is barium sulphide; Canton's phosphorus is calcium sulphide, and I believe that Balmain's luminous paint is composed of this material.

I have some examples here of Balmain's luminous paint, which continues to give out a bluish light for many hours after it has been withdrawn from the original source. To thoroughly exhaust the light stored up in this material takes a very long time, for the warmth of the hand is generally sufficient to cause the phosphorescence to recommence in a specimen that is apparently inert. Heat generally has the effect of increasing phosphorescence, and this is especially the case with fluor spar or "blue-john," as it is called in Derbyshire, which frequently shows a beautiful phosphorescence when hot.

Having shown some examples of phosphorescent bodies, it will be well to endeavour to explain the cause of this phenomenon. To do this it is necessary to make a slight digression, and say a few words about the wave theory of light. Apart from the mathematical side of it, this is a matter with which you are pretty familiar, but I will just touch upon it, so as to keep up the sequence of the argument.

When people first began to think about the cause of light and heat they came to the conclusion that light and heat were actual substances. According to this theory a luminous body was a kind of Maxim gun, continually firing off small particles of something. These particles, striking the eye of the spectator, produced the impression of light; so that the number of particles striking the eye in a given time, or the rate at which the metaphorical Maxim gun was working, was the measure of the luminosity of the body. Absurd as this theory seems in the light of our present knowledge, it held a very strong position at one time, and was strongly defended by the great Sir Isaac Newton. In those days people believed that there was such a thing as empty space; but now we are forced to conclude that all matter, from the star to the chemical atom, is floating in a medium of some kind, like ships do on the sea. Through this universal ocean, called "ether," heat and light travel as waves. In the terrestrial seas there are all kinds of waves, from the long ocean billow to the short choppy sea; similarly in the ether ocean there are long, slow waves, and short, quick ones. The longest waves of all are the dark rays that produce heating effect, whilst the shortest that we know of are the Röntgen rays. In every case the violence of the storm at sea, or the intensity of the light travelling across the ether sea, is in relation to the height of the waves.

To carry on the metaphor of the ships floating on the sea, suppose we compare the atoms of a chemical substance to vessels at anchor. If the waves that reach them are long, slow waves, the vessel will merely rise and fall, remaining motionless when the wave has passed. If, however,

the waves are short and choppy, the vessels will roll and tumble about, giving out waves of their own, much longer that the waves that set them in motion. Besides this, the ships will continue to roll after the original waves have stopped. This is what happens in the case of a phosphorescent body: the short, ultra-violet waves are converted into long ones, mostly blue-green, and the atoms of the body go on vibrating after the light has been cut off, giving rise to what is called phosphorescence. A ship could not roll until it had been exposed to the short waves, and a substance could not phosphoresce until it had been subjected to actinic light, such as daylight or the rays from burning magnesium or the electric arc.

To keep to our metaphor, let us see what would happen if our ships were moored by several anchors, so that they were more rigid. They would respond much less readily to the waves, and would have a greater tendency to convert short waves into long ones. If our theories are right, the colder a body becomes the more phosphorescent it should be. Professor Dewar has shown that many bodies become intensely phosphorescent at very low temperatures. Albumen, gelatine, and all such substances give a magnificent phosphorescence under these conditions.

Now comes the application of all this to photography. Gelatine, as I mentioned just now, is a phosphorescent body, and this fact must have an important bearing on the behaviour of a dry-plate emulsion towards the light that falls upon it. May not this fact play a leading part in the formation of the latent image? In a photographic dry plate we have a very complicated state of affairs. First of all there is the gelatine, of which we do not yet know the chemical composition, which must be the reverse of simple; then this is intermingled with bromide of silver formed in what chemists call the nascent condition in contact with the gelatine, and this again is treated to a process of stewing. At the beginning of the process we started with complicated substances, and at the end we probably have to deal with substances even more complicated and phosphorescent. The waves of light fall upon this, the exposure in some cases lasting for only one seven-hundredth of a second. If we imagine the action to be of a chemical nature and reducing the bromide to subbromide, it would be almost in the nature of an explosion; and the same may be said of a mechanical theory involving a different orientation of the atoms. When a bar of soft iron is suddenly magnetised by passing a current through a wire surrounding it, a metallic sound can be heard, corresponding to the change in the orientation of the atoms. If any such action took place in a dry plate, we should almost expect the emulsion to show signs of it. On the other hand, suppose we imagine—there is no harm in going through these mental exercises as we do not know what the action really is—that the action of the waves of light is to set the gelatine atoms phosphorescing or vibrating, and that these phosphorescent motions of the gelatine gradually produce the latent image (whatever it is), the problem seems to be much simplified.

Again, this phosphorescence of the gelatine must cause the action of the light to be slightly diffused, so that the image is less sharp than it would be otherwise.

It has often occurred to me that an interesting experiment would be to compare the phosphorescence of dry plates of different speeds, and see what relation they bore to one another.

A still more interesting point is relation to orthochromatism. Various dyes were tried to secure proper utilisation of the rays at the lower end of the spectrum; but it was not until eosine was tried that any satisfactory results were secured. Now eosine and, I believe, all the other dyes used for orthochromating plates are phosphorescent.

C. F. Townsend, F.I.C., F.C.S.

A NEW CAMERA BAG.

Mr. Percy Lund, editor of the *Practical Photographer*, describes in the last number of his journal a form of camera bag which should be decidedly useful to tourist photographers. We give an abridgement of Mr. Lund's own description, from which it will be seen that the bag is easily made and could be employed for carrying a number of small articles besides photographic apparatus. The bag is carried on the back:

The rücksack, as its name implies, is just a sack, and when it is empty it collapses completely, and may be laid perfectly flat upon a table, or rolled up and put in a capacious pocket. The most advantageous size for a half-plate camera is nineteen inches in height by seventeen inches wide.

Good, strong, dark-coloured waterproof tent cloth should be used, with an inner lining of thin waterproof cloth. At the top, eight holes are pierced, and large eyelets of brass, such as are used for tents, are driven into them. Through these holes, passing in and out alternately, a piece of stout cord is passed. The purpose of this cord is to draw up the bag tight when the contents are within, and it pulls together just in the same manner as a lady's workbag. After drawing tight a knot is tied, and the appearance of the bag then becomes as shown in fig. 1. The next matter to be explained is the carrying strap arrangement. This is very securely fastened at each side, to the base of the bag, and is of leather for several inches, this leather being attached to a broad web, the part which will come over the shoulders in carrying. These two shoulder straps measure from the central ring to where they are fastened to the the bag thirty-three and a half inches, when the buckle is at its greatest extent. Three or four holes for tightening up the buckle are quite

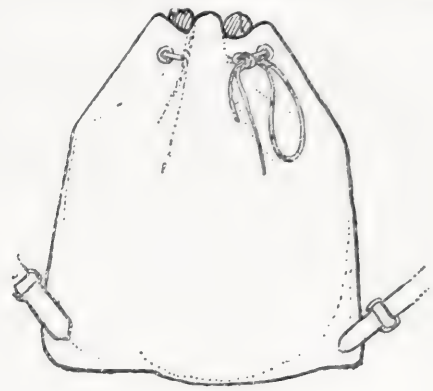


Fig. 1

sufficient to render the sack adjustable to the convenience of any size of person. These shoulderstraps are connected by a ring, and when preparing to put the bag on the shoulders the next step, after tying its

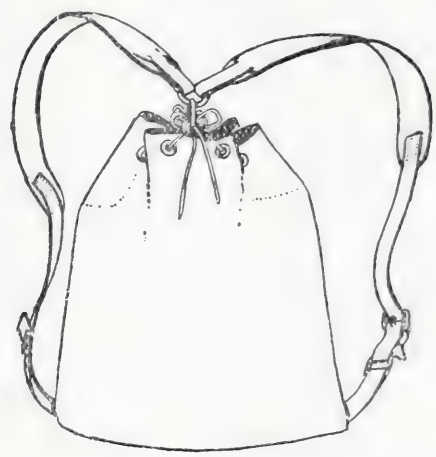


Fig. 2.

mouth up tightly, is to bring this ring midway between the two straps up to the cord at the top of the bag, and secure it firmly there by another knot or two. This is shown in fig. 2. The bag is now ready to be placed on the shoulders.

PHOTOGRAPHY AT HOME BY ARTIFICIAL LIGHT.*

II.

Posing.

It is time to say something about this question of posing, not, in such a paper as this, from the artistic standpoint, but in special connexion with artificial-light work. You will find in practice that, in most cases, and certainly in all cases where the effect of well-diffused illumination has to be got, you will require a principal and a secondary light. Now, if you are going to burn a length of magnesium wire in one part of the room, and then to run to another part to burn a second length, the duration of the exposure must be protracted. If you have an assistant—and this is of the greatest advantage—the thing can be more expeditiously managed. But even then it is safer to allow for the chance of your exposure running to eight or ten seconds. If, then, your sitter has to remain practically motionless for that time or longer, you must do your part by seeing that the pose is such that the body and the arms are comfortable and well supported. In a standing pose, without any support to steady the body, the act of breathing will cause such a swaying that your subject may appear on the negative as a "two-headed nightingale." You must remember, too, that the brilliancy of magnesium light may take the sitter by surprise. I should like to have shown you a photograph I once saw taken in a drawing-room of a young man in evening dress, who assumed a graceful and becoming attitude all the more easily that he had just risen from a good dinner and had a supporting faith in his own good looks. The exposure was made with gun-cotton and mag-

* Concluded from page 727.

nesium, and the instantaneous record so made showed a human being with his head thrown back, hands clenched, mouth open, and eyes starting from their sockets—a perfect picture of abject terror! When you burn a piece of magnesium ribbon there is no risk of such a result; but, if the sitter is new to the light, it is a good thing to burn an inch or so to let him know what he is to expect when the exposure is made.

Focussing and Exposure.

Let us suppose now you are going to make a portrait of some long-suffering friend. You use a half-plate lens, let us say; your plates are accordingly 5×4, or even quarter-plate, and, needless to say, you have attended to the backing of them. You are working in the largest and emptiest room that is at your disposal, so that you have as much choice of position and as little moving about of furniture as possible. You have determined where your subject is to sit, and you arrange your camera at the proper distance and approximately focus the lens before you ask your friend to take his place. This preliminary arrangement can be done by ordinary gaslight, which is enough to show you how much your plate will include. When the sitter is in position, you can give him a lighted candle or match to hold alongside of his face, or if he is in profile, in front of it. You can then focus on the flame without difficulty. Then you may take the candle, and after turning down the gas or other light, move the candle about till you find the point at which it lights the subject most satisfactorily. This point should generally be at least six feet from the sitter, and the greater the distance the pleasanter and more diffused will the lighting be. It must also be in such a position that it cannot send rays into the camera. And in the third place, except when you are working for special effects, it should be well above the level of the sitter's head. Having found the point, it is a good plan to leave the candle near it on any convenient support, so that you may light the magnesium wire at it when the time comes. Next, you must find a position for your secondary light, the purpose of which is to give a soft illumination to the shadows. It should be nearer the ground than the first, and had better be further from the subject—say ten feet distant. One rule that may be given is this, that lines from the two sources of light should meet at the sitter at right angles, though this is not a rule that need be rigidly adhered to. Generally the primary and secondary lights will be on different sides of the camera. And now, for the actual work of exposing, all the apparatus that is desirable is a pair of pincers and a shallow white basin, or a tin reflector, which you can have made for a few pence. The exposure is to be estimated in terms, not of time, but of inches of the ribbon. If you are working at f-8 on a plate of the rapidity I have indicated, and in a room not unusually sombre in colouring of walls and ceiling, you may cut off a length of about eight inches to burn at seven feet from your subject as principal light, and another piece of two to four inches to burn at ten feet as secondary light. Take the curl out of these pieces, and if the sitter is comfortable, and otherwise ready, the cap may be removed—from the lens, not from the sitter. Hold the eight-inch piece of ribbon by the pincers into the candle flame, and as soon as it begins to burn wave it gently about from side to side and up and down, holding the reflector behind it so as to concentrate the light on the sitter. The motion of the ribbon while burning is necessary if you are to avoid unpleasantly sharp shadows, and bar the effect of diffusing the light. When this is burnt out, or, if you have an assistant, while it is burning, the smaller piece must be lighted and waved about in the same way in the place you have chosen for it. Then it only remains to replace the cap and cover the plate; and the rest, if you know your work, goes on like clockwork.

Some Examples.

I will show you a picture where the waving of the ribbon was not kept out of the way of the lens and is recorded on the plate. The plate is a warning in many other respects; it was not backed, and shows the bad results. It was meant to show a young man ruined and disgraced after a night's play, but the story is insufficiently told. A pack of cards scattered on the floor would have helped it out. However, as you know, pictures resemble good little girls and boys in this respect, that they should not tell stories. The next illustration shows a fireside group. This, with the burning of the two lights and an accident in the middle, must have taken nearly half a minute in the exposure; but you see that the young child has been able to keep still for that time, thanks to good support and having her hands held. The next is a study of a degraded member of the criminal class (who is with us to-night). He appears to be in a reflective mood, which we may hope will result in permanent amendment. The next is a flower study, which has no artistic merit, and is shown to illustrate a danger in work with magnesium ribbon. You have to remember that any bright surface, such as the glass of a picture on the wall, or, as in this case, a shiny vase, will, unless you take care, reflect the wavings of the illuminant as a continuous twisting white line. Therefore, in arranging your lighting, look out for all polished surfaces. In this picture of a lady playing a guitar also, you see the necessity of a careful look to see that all is right before you light the magnesium. The full satin sleeve should not have been allowed to remain as shown; the straight line accidentally formed by it and the bow at the back spoils the picture. The next shows an old man reading something of a very blood-curdling nature. The costume which conceals the model's own commonplace raiment consists only of a velvet focussing cloth, which has been bunched up so as to make a rather good piece of outline behind the head. The lighting is supposed to be from a lamp near the head. Here is another lamp-light picture of a lady knitting in an easy-chair, the light being just overhead. The next four were done to show the effect of lamp-light with a lamp shown in the picture. In the first the young sitter laughed during the exposure, and she pays the penalty by being displayed with very swollen-looking cheeks. Of course, the magnesium is really held rather further off than the lighted lamp that appears to illuminate the scene, and you can see that the shadow of the piece of furniture on the left could not have been cast by the oil lamp, though the other shadows might pass muster. The second, of the same model, is interesting on account of the dark outline of the face. This seems to be the result of some motion in the interval between the first and second illumination. During the first illumination, from the direction of the lamp, the outline of the cheek was the light one you see, but before the shadows were lighted from the left of the picture the face must have moved forward, and the cheek, then in shadow, cut off so much of the lighted wall. This is just one of the risks that humble amateurs who cannot find an assistant to help them to give simultaneous illuminations have to run. The third of this lamp-light group shows a lady reading at a table under a lamp. You will notice that the effect is falsified by the soft shadow on the background, which is really the shadow of the lamp cast by the magnesium light. And in the fourth, showing a different pose in the same surroundings, the same fault occurs. However, with all their imperfections, some of which it would be easy to obviate at a second sitting, these slides will show that you can, at any rate, do good enough work to provide yourselves with interesting work with your cameras in the winter evenings, and that the results need not be worse than your daylight ones. They will show, too, that—thanks to the absolute control you have over the lighting—you can try many effects that could not otherwise be attempted.

Firelight and other Effects.

If you are not already wearied past endurance I will show you one or two firelight and other special effects. Here is a little girl in the costume of one of the Dutch fishing villages sitting with her work by the fireside. The plates on the wall are there because they are Delft ware, and to help the effect of a cottage interior; but they compete noisily with the head, in spite of its white cap, and if they were to be retained in the picture they should not have been so brightly lighted. It would have been easy to manage the lighting so that for two-thirds of the whole exposure the wall and plates were in shadow. The jug is placed where it is that its interesting outline may come black against the strong light, and so give it proper emphasis, while its shadow localises the source of illumination besides uniting the blackness of the jug to the darker parts of the picture. This pose was carefully arranged, but the next one, of the same subject, is a natural one observed and arrested, and you can see for yourselves how much more satisfactory the result is. The whole picture is better in feeling on account of the slight change. Another instance of how much better Nature, when you catch her in a pleasant mood, can manage things than the flurried photographer, is to be seen here. The ball of wool was on the little girl's knee, and the ugly basket, which you can see a bit of, was put on the floor to fill an empty place and give a support that the composition seemed to require; but before the exposure was made the ball of wool fell to the floor, and though the young sitter hastily picked it up again, it was carefully replaced on the floor, where it does the basket's work much more simply and effectively. The mistake was that the now superfluous basket was not removed. The next slide is the one that exemplifies the lighting of the face I wanted to warn you against, though you saw the same effect in the sketch by Rembrandt. It also shows what is, I think, a frequent fault in the work even of some of our artistic leaders. I mean the fact that the shadows are much too brightly lighted. In actual firelight the shadows are only lighted by reflection from surrounding objects, and there is no reason, except the ridiculous fear of "losing detail in the shadows," for any secondary illumination in this kind of work. Here is a picture with many faults, which, however, is a much truer representation of firelight, because there was only one illumination, and the shadows were left to take care of themselves.

In case any one does not understand how to produce these firelight pictures, I will explain that in this case there was no real fireplace at all. You can, of course, just as well work at an ordinary fireplace, but very often it is not conveniently placed in the room for getting your camera at a proper distance from it. This one is simply rigged up at the end of a room. The upright you see, which represents one side of the fireplace, is a loose leaf of a table. A fender and fireirons are placed in front, a screen of some kind is erected to hide the light from the camera, and can be arranged to represent the other side of the fireplace. Where the fire is supposed to be, you leave comfortable room for yourself and the manipulation of the light. The effect, as you see, is good enough to satisfy the eye without exciting any suspicion.

John Warrack, Jun.

NATIONAL PHOTOGRAPHIC RECORD ASSOCIATION AT THE IMPERIAL INSTITUTE.

At a meeting at the Imperial Institute on Monday evening, Captain Abney in the chair, Sir J. Benjamin Stone, M.P. (President), delivered an address upon the National Photographic Record Association before a large and influential audience.

He explained that the scheme of the Association is to obtain photographs of current events—local customs, as well as existing buildings, monuments, &c.—so as to keep a record of passing events that must be of use to the future historian and man of science; such records, as they are obtained, are deposited at the British Museum for public reference. Now the importance of the work is generally recognised, perhaps the Government may be induced to render some aid, if not to take up the work entirely. The scheme should have been started years ago, but it is only comparatively lately that it has been practicable, as, until the introduction of the carbon and platinum process, permanent prints could not be obtained. In order to illustrate the class of subjects to be included, a selection of slides were shown of Sir J. Benjamin Stone's photographs, he remarking, by way of introduction, that they were principally in and around Westminster, which formed the chief centre of attraction in the metropolis and was an area of most wonderful interest in our history, and that to no spot did more pilgrims resort than to the Abbey; and, although a modern building, yet the House of Commons also had its points of interest. The old portion of the House contained St. Stephen's Chapel and the Pyx Chapel, with its old chests once filled with papers and documents of State, including the Domesday Book, and from the time of Edward the Confessor this chapel was set apart as a strong room for the king's treasure; here, also, Sir J. Benjamin Stone found one chest still containing the tallies of the time of Henry II., being receipts for payments from the exchequer, and on another chest chalk marks still remain, "Inside here are preserved the Golden Deeds," but which are now in the Record Office. These deeds being the treaty exchanged between Henry VIII. and Francis on the Field of the Cloth of Gold and the Pope's Bull conferring on Henry the title Defender of the Faith; the acknowledgment of the latter is now in the Vatican library.

The slides shown comprised various views of Westminster Abbey, Houses of Parliament, portraits of some of the Members, including the Rt. Hon. J. Chamberlain and the Rt. Hon. A. J. Balfour; the Pyx Chapel and the chests before referred to, and the treasure chest which King Edward took with him on his various campaigns; sundry documents, including the warrant for the execution of King Charles I., showing where many erasures had been made; the distribution of the Maunday money; some general views of Westminster from the Clock Tower; concluding with views of the Tower, including the ceremony of Locking the Gates.

Captain Abney proposed a vote of thanks to Sir. J. Benjamin Stone, remarking that he had not only told them what should be taken for the Record collection, but had shown them how it should be done, the series of lantern slides exhibiting both technical and artistic skill. He was surprised that Sir Benjamin Stone had suggested that the Government might help, as, with such an enthusiastic and able amateur as President of the Record Association, he was sure the work would be done more quickly and ably, and the greater freedom from red tape the better.

EXHIBITION OF THE NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.

The Tenth Annual Exhibition of the work of the members of the North Middlesex Photographic Society was opened on Monday evening last, and remained open the following two days. The *Conversazione* which inaugurated the Exhibition was well attended by members and their friends, and on that occasion the opinion was generally expressed that the standard of excellence of the work shown was higher than at any former Exhibition of the Society. We have much pleasure in endorsing this opinion.

A fortnight ago we were able to speak with almost unqualified praise of the Exhibition of the Hackney Photographic Society, and we said then we expected the great improvement shown in this year's work would prove the keynote of our reports of the winter exhibitions. In the present instance our expectation has been fulfilled, and we find the improvement has been in the same direction, or, at least, it is in the same direction that the improvement is most marked, that is, in the work of the junior members. The best of the work at previous exhibitions has always been of a very high class—indeed, of so high a class that one does not expect to find any very great difference in it. Several of the members are regular exhibitors at Pall Mall, and two at least of them have received the Royal Photographic Society's medal, so that at this end the scope for improvement is limited; but, in common with most, if not all, local societies' exhibitions, there has been a proportion of the pictures that it was mistaken kindness to their authors to hang. We could hardly say this of the present Exhibition. Recognising the fact that, however rigid the selection might be, at any exhibition there must always be some worse than the average, and judging the progress of the Society by a mental comparison of the tail end of this year's Exhibition with the tail end of last year's—and it is a very reasonable way of judging it—there is not the slightest doubt that the North Middlesex Society has advanced at a far greater rate during the present year than in any previous year. The leaders in the Society have reason to be proud of the results of their example and precept. It is gratifying to note that the improvement is as much in technical photography as in the appreciation of those qualities which are requisite for pictorial success.

The Exhibition was admirably arranged. The Judges were Messrs. F. C. Tilney and E. J. Wall, F.R.P.S. The award was a certificate, and the Judges had the sole discretionary power as to the number awarded, thus following the lines of the Royal Photographic Society's Exhibition. There were no open classes.

The President of the Society, Mr. J. C. S. Mummery, as usual took a leading position. His exhibit included the pictures recently shown at Pall Mall, and were marked "not for competition." Mr. A. J. Golding had only three pictures, but quite up to his usual standard. His *An Essex Lane* showed a return to the sharp, steel-engraving type of photograph which is associated with the name of Colonel Gale. Such photographs now seem to give quite a pleasing relief in an exhibition. The Judges, in their report, commented upon the neglect of figure subjects by the Society; still, there were a few worthy of notice. We liked *Motherly Cares*, by A. H. Lisett, and, with a little more careful management in the printing, a really good thing might be made of it. *At Hammerfest*, by R. Child Bayley, evidently an enlargement from a snap-shot, was capital. *Meditation*, by H. Stuart, and *Washing Day*, by E. R. Mattocks, were good. Architectural subjects were not numerous, but there was some very fine work, including *North Choir Aisle, Canterbury*, by J. W. Marchant. *The Choir—Ely Cathedral*, and the *North Ambulatory, Ely*, by H. W. Bennett. Especially we noticed two little architectural studies by F. W. Cox, printed in gum bichromate, which were remarkable for the texture in the stone-work given by the process. Two capital flower studies by Ernest Spencer constituted the Society's efforts in this branch of photography. Among the landscape work we noted particularly *Hillside Pastures*, by R. R. Rawkins. *A Mountain Stream*, by C. Beadle, which possessed a peculiar wiry sharpness which would be very offensive generally, but somehow did not seem out of place in this. *When Shadows Lengthen*, by S. H. Fry; *Dunoon*, and *At the Edge of the Forest*, by L. Cope; *Land and Sea*, by H. Smith; *Tromso*, by R. Child Bayley; and *Winter's Solitude*, by S. E. Wall.

The entries of lantern slides were, we fancy, more numerous than usual. The quality of the slides was certainly improved.

The Awards.

The High Street, H. Smith; *A Mountain Stream*, C. Beadle; *Marshland after Rain*, A. J. Golding; *An Essex Farmhouse*, J. Angus; *Ramsgate Harbour*, S. H. Fry; *Winter Solitude*, S. E. Wall. Lantern slides: G. A. Barton, F. A. Bishop, A. T. Crane.

LUDLOW PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The Society was formed last year, and very shortly afterwards a small Exhibition was held, when an enjoyable evening, enlivened by lantern slides and music, was spent. This year, with the co-operation of Mr. H. P. Robinson, its President, it was decided to hold a second Exhibition, the prizes to be confined to members of the Society. The President, with his well-known good nature, exerted himself so heartily to make the Exhibition a success that the Society had a large number of pictures (sixty-four in all), by celebrated photographers, lent for the occasion. The walls of the room were, therefore, graced with such works of art as the President's *Dawn and Sunset, Morning Mist, Asking the Way*, &c.; Viscount Maitland's *May on the Teme, The Thames at Shepperton*, &c.; Mr. Percy Lancaster's *Day Dreams*, &c.; Mr. Ralph Robinson's *The New Pet*, &c.; Mr. Harold Baker's *Lily Hanbury*; Mr. George Davison's *Conway Mountain, Ring Horses*, &c.; so, altogether, Ludlow had the unique opportunity of inspecting many of the Salon pictures at its own door.

The Herefordshire Society also very kindly sent in its gold-medal competition pictures, numbering nearly 100, making a total number of the exhibits to something over 200.

Owing to the youthfulness of the Society, the local exhibits were small. Of these, Mr. W. H. Bessell's *Deer in Henley Park* was conspicuous, and easily gained the medal. The picture represented a herd of red deer, the grouping of which was particularly good, while the lighting and general treatment was excellent.

Mr. A. M. Poughe's set were of decided merit, and several of them, notably *Sympathy*—some school-girls condoling with a playmate on the upsetting of a basket of flowers and consequent damage to her pinafore—showed artistic feeling.

The other exhibits were *genre* studies, local views, and landscapes, which call for no particular comment. As many of the members were strong in lantern-slide work, it was hoped this would be a large class, but only four competed. Of these, Mr. J. E. Pughe and Mr. J. H. Williams gained medals.

The Society had recently purchased an optical lantern, which was tried in the evening for the first time, and gave great satisfaction. The

new fourteen-feet screen was easily covered, while the brilliancy and perfect definition of the picture secured the marked approval of the audience.

The lantern portion opened with four dozen slides by Dr. Hawksley, of Southport, who, while spending his summer vacation in Ludlow, had accompanied the Society and its President on some of their outings. These slides were of high-class quality and wide range, from sea pieces, landscapes, and *genre* subjects to some interesting snap-shots taken during an otter hunt on the Teme. Dr. Hawksley's set was followed by the competition slides, several of which were loudly applauded, and this part of the evening concluded with an exceptional fine set lent by Mr. Martin J. Harding, of the Shropshire Camera Club.

At intervals during the afternoon and evening a particularly fine selection of vocal and instrumental music was performed by ladies and gentlemen who kindly gave their services.

The following report by Mr. H. P. Robinson was read:—

"In consequence of the small number of competitors, which I much regret, and attribute to diffidence rather than want of talent in the members or indifference to the honour and glory of their Society, I do not feel I should be doing my duty by awarding all the medals and certificates offered. I prefer to consider, then, the photographs sent for my judgment as in an imaginary class rather than in what is left after those competitors I consider worthy of awards have been taken from the collection.

"For the best photograph, *Deer*, a bronze medal (this is a charming little picture, quite equal to, or better than, the average photographs of its kind) to Mr. Bessell.

"For a good collection of photographs, varied in subjects and equal in technical quality, a bronze medal to Mr. A. M. Pughe.

"In Lantern-slide classes there are two competitors, whose work is quite excellent and very equal—Mr. J. H. Williams and Mr. J. E. Pughe. To these exhibitors I award a bronze medal each. Their work would take a good place in any exhibition.

"This, I think, will be found to be substantial justice, if not judgment according to the strictest letter of the law."

And His Worship the Mayor, having heartily congratulated the Society on the great success of its Exhibition, presented the medals to the successful competitors.

Dr. King moved a cordial vote of thanks to those gentlemen who had so kindly lent their pictures and slides, and to those ladies and gentlemen who had assisted in the musical programme, which was carried by acclamation.

With such a beginning it is confidently hoped that the Society will not only go on and prosper, but that a brilliant future is in store for it, which will justify the throwing open of its classes.

It is a pleasing proof that there was a genuine appreciation of the photographic art by several of the pictures.

Mr. Belton, of Aberdeen, attended and explained the treatment of the well-known Velox paper, and his table was largely patronised.

AFFILIATION OF PHOTOGRAPHIC SOCIETIES.

A MEETING of delegates from the affiliated societies in Lancashire and Cheshire was held at Liverpool on Tuesday, November 29, in the rooms of the Liverpool Amateur Photographic Association, Mr. Paul Lange in the chair, at which fourteen delegates, representing eight societies, were present.

The Chairman stated that the meeting had been called to ascertain the views of the societies in that district upon the desirability or otherwise of carrying out what had already been done in the metropolitan and Yorkshire districts, namely, formulating some local organization binding together the affiliated societies. The idea had already proved successful in the districts mentioned, and he should be glad to learn the views of the delegates present.

Mr. Child Bayley (Secretary) gave an outline of what had already been effected in Yorkshire and in the metropolis, and stated that the Affiliation Committee had no desire to urge the matter upon the Lancashire societies, but wished that they should have an opportunity of deciding for themselves whether they would go on as they were going, or whether a local organization should be formed.

A long discussion took place upon the benefits which the societies had already received from the Affiliation. Several delegates stated that their societies had derived great benefit from the Affiliation lectures, which were highly spoken of, and from the loan collection of pictures.

It was proposed by Mr. Newall (Birkenhead Y.M.C.A.), seconded by Mr. Blackshaw (Altrincham), and carried unanimously, "That is is desirable to have an organization for Lancashire and Cheshire."

The discussion then turned upon the place to be selected as a local centre.

It was proposed by Mr. Parrott (Altrincham), seconded by Mr. Walker (Aintree), and carried unanimously, "That the first meeting be held in Liverpool to arrange matters, subsequent meetings to be held as the Committee should from time to time decide."

Mr. Parrott (Altrincham) of Ashfield-road, Altrincham, was unanimously elected Hon. Secretary *pro tem.*, and it was understood that the first meeting should be held in the rooms of the Liverpool Amateur Photographic Association on Tuesday, February 7.

Subsequently the meeting was thrown open to the delegates and representatives of non-affiliated societies.

The Chairman, in the name of the Liverpool Association, welcomed those present, and stated that the representatives of more than thirty societies in the neighbourhood of Liverpool and Manchester had been asked to meet to discuss the Affiliation question, and to hear from the Secretary what was being done in that direction. He pointed out that the delegates of the affiliated societies had that night determined to form for Lancashire and Cheshire a district organization similar to that already existing amongst the affiliated societies in Yorkshire and in the metropolis, and he thought that the movement would have every success. He expressed his own opinion very strongly that, for such a movement in that district to succeed, Manchester formed an obvious centre, and expressed the hope that the many societies in and round Manchester would support the efforts which were being made to bind the photographic societies together, and bring them more into touch with one another than they had been up to the present.

Mr. Child Bayley (Secretary) described the work of the Affiliation, and expressed his willingness to reply to any questions on the subject.

A long discussion took place upon the advantages offered, in which opinion was freely expressed on both sides, and the meeting, which was throughout of a conversational character, closed with a vote of thanks to Mr. Paul Lange for acting as Chairman, and to the Liverpool Photographic Association for its kindness in placing its room at the disposal of the meeting.

Our Editorial Table.

PANAK.

Marion & Co., Soho-square, W.

UNDER the name of "Panak," Messrs. Marion & Co. are sending out a solution which should have many uses in the hands of amateur photographers and others. It is a sensitive liquid "which can be applied with a brush to any suitable surface and which can be printed on from negatives in the ordinary way." The solution is brushed over the card or other surface selected; drying is allowed to proceed in a dark place; the sensitised surface is printed behind a negative to a bright light rather darker than the finished print is required to be, washed, fixed in hypo and dried. A specimen print produced in this manner lies before us; it has a most agreeable sepia tone and demonstrates that the process is capable of yielding excellent results. The special directions are: 1. A certain amount of moisture must be present to get the best results, *i.e.*, the part sensitised should not be bone dry. 2. Print in the strongest light possible. 3 Apply the solution evenly. 4. In finishing cards, more care must be used to keep them apart in fixing and washing than in finishing paper. 5. Wash the brush well before sensitising a second card. "Panak" is a distinctly novel and simple idea which will, doubtless, be largely welcomed.

WILD LIFE AT HOME: HOW TO STUDY AND PHOTOGRAPH IT.

By R. KEARTON. With Photographic Illustrations from Nature Subjects by C. Kearton. London: Cassell & Co., Limited.

THE enthusiasm which Messrs. Kearton bring to bear in their photographic studies of animated nature is of the Napoleonic kind, that is to say, paraphrasing a remark of the great Corsican about courage, it is four-o'clock-in-the-morning enthusiasm. No hour is too early at which to rise, no distance too great to travel, no discomfort too acute for these undaunted gentlemen if, by the self-denial, they can secure a photograph of some rare bird or other. The book before us is one of the most fascinating we have read; it teems with instances of remarkable ingenuity and cunning on the part of the authors exercised in pursuit of their prey. Messrs. Kearton are obviously very painstaking natural-history observers. Simple directions are given for the benefit of those photographers anxious to take up a branch of work in which the authors have been so conspicuously successful, and reproductions of over a hundred photographs of birds, insects, &c. are interspersed throughout the text, which is a sympathetically written account of how Messrs. Kearton go to work in photographing the wild life of these islands. Above all, the book is a splendid example of the wisdom of specialistic photography, for, unless the authors had vowed themselves to the one idea of photographing difficult nature subjects, they could have not have obtained the really wonderful results shown in the book. A combination of very rare qualities indeed must have been forced into service to secure, for example, a photograph of a lark feeding her young in the middle of a field; and this is only one of many equally remarkable results. We can cordially recommend the volume to all photographers. It would make a capital gift book for Christmas or the New Year.

CATALOGUES RECEIVED.

S. H. Fry, 12, South Villas, Camden-square, N.W.

THE feature of Mr. Fry's business is that he confines it to the trade—professional photographers and recognised photographic dealers.

According to his list, Mr. Fry undertakes the reproduction of photographs in carbon, bromide, and platinum; finishing; painting; lantern-slide making; negative work; and enlarging generally. Mr. Fry has built up a great reputation among the trade for rapidly turning out high-class results, and the specimens of his work which illustrate his list are in all respects admirable. Accompanying the list is a useful little almanac on card, embellished with a charming little bromide study of horses.

Morgan & Kidd, Richmond, Surrey, S.W.

In their new trade catalogue, which extends to over 40 pages, Messrs. Morgan & Kidd sectionise their specialities. No. 1 relates to bromide papers, opals, dry plates, &c. No. 2 to enlarging and printing in bromide, carbon, and platinum; finishing; painting; mounts and frames, &c. No. 3 to ceramic enamels, an important feature of Messrs. Morgan & Kidd's business; and Section 4 to half-tone and collotype. The catalogue should be in the possession of every professional photographer.

News and Notes.

Photographic Club.—Wednesday evening, December 14, at eight o'clock, Members' Open Night.

The wholesale agents of the Minisini Magnesium Lamp, which we noticed last week are, the London & Blackfriars Photographic Supply Co., 134, Borough, S.E.

We are informed that the Earl of Crawford (President of the Royal Photographic Society), who has left to spend the winter abroad, has taken with him one of Messrs. Adams & Co.'s Tella film cameras and a large supply of Tella films.

Royal Photographic Society.—Ordinary Meeting, Tuesday, December 13, at eight p.m., at 12, Hanover-square, W. "An Opacity Balance," by Chapman Jones; "On the Causes of Discrepancies in Opacity Measurements," by Chapman Jones.

The Warwick Dry Plate Company, Warwick, write: "Will you kindly note that we have been reluctantly compelled to withhold the first prize in our monthly competition, awarded to Miss Janet Reid, of Redhill, Surrey, in accordance with condition 5 on entry form, the negative having become broken in transit to us. We should like to call your readers' attention to this, that future prize-winners may be careful to pack the negatives securely."

Mr. Harry F. Phillips, of 19, St. Edward street, Leek, writes: "I enclose you a list of lenses stolen from my studio on Wednesday last, November 30, and should be pleased if you would kindly insert same in your next issue. Information respecting above would be gladly received by myself or Superintendent Pretoni, Leek: Voigtlander 5a portrait euryscope (one screw missing from rackwork); 15×12 Wray R.R. lens, No. 7313, iris diaphragms; three-inch Talbot and Eamer 'Mertal,' time and instantaneous shutter to fit above; 15×12 Ross orthographic lens; 5×4 Optimus R.R."

Employers' Liability.—At the Law Institute, Leeds, on the 1st inst., Mr. T. P. Perks, barrister, who has been appointed arbitrator under the Workmen's Compensation Act, had before him a claim for damages by Charles Whiteley, junr., a cabinet-maker's apprentice, the respondents being Messrs. Watkinson & Co., photographic-instrument makers of Carlton Works, Leeds. It appeared that the claim arose out of an accident that occurred on July 15 last. As Whiteley was passing close to a circular saw, his right hand was caught by the teeth, and he received injuries, which necessitated the amputation of all his fingers on that hand. The respondents admitted their liability, and offered to pay 14*s.* 3*d.* per week from July 29, a week after the accident. That having been accepted, the only question remaining was one of costs, to which the plaintiff claimed to be entitled. The first tangible offer having been received from the respondents was not made until September 3, and that was on the basis of 6*d.* per hour. The offer now accepted was reckoned on the basis of 6½*d.* per hour. Mr. Simpson, on behalf of the respondents, argued that the admission of liability on the part of the respondents did away with the necessity of coming into Court. The arbitrator was not satisfied with the declared admission of liability, and failed to see the non-necessity of the application, therefore he awarded costs to the plaintiff.

The Hastings Photographic Exhibition.—The President of the Hastings and St. Leonards Photographic Society (Dr. G. G. Gray) announced, at the last meeting of the Society, that a Photographic Exhibition would be held in February, and that the following classes had been arranged:—A, Champion, for photographs of any kind that have already gained an award; B, Landscape, with or without figure, or seascape; C, Figure Studies, general or portraits; D, Architecture; E, Hand-camera photographs; F, Lantern Slides (set of six slides); G, Scientific, Stereographs, &c.; H, Members' Class, confined to members of the Society. The Judges will have power to award the following medals in the above classes: Class A, one gold and one silver; in the other classes, one silver and one bronze in each class. Mr. Wilson Noble and Viscount Maitland have kindly consented to act as Judges. In connexion with the Exhibition, the Hastings and St. Leonards Borough Association are offering prizes of from five guineas downwards for (1) lantern slides in sets of twelve; and (2) photographs of art sketches. These are to be illustrative of the neighbourhood of Hastings and St. Leonards, and it is intended that the photographs and sketches shall be used for illustrating local post cards, by means of which the attractions of the borough and surrounding may be advertised. Prospectuses and full particulars may be obtained from Mr. A. Brooker, Exhibition Secretary, 21a, Wellington-place, Hastings.

Pirates in Art.—At Newcastle on December 1, a number of summonses were returned against Solomon Levene, who was charged with having infringed the copyright of several well-known pictures. The information was laid by Mr. Francis Euston Field on behalf of the Fine Art Society (Limited) and others. In the first summons it was alleged that the defendant, not being then the proprietor of the copyright in a picture entitled *First Words of Love*, and without the consent, unlawfully did copy and multiply for sale the copyright painting by means of photographic productions thereof. In other summonses he was accused of having similarly reproduced *Wedded*, *Peacemaker*, and *Forgiven*. According to the prosecution, Levene had for many years carried on this class of business, and had guilty knowledge of the class of trade he was engaged in. When a gentleman painted a picture which happened to be successful, it was unjust and unfair that this work should be pirated and produced at a tithe of its value, and that copyrights selling from one guinea up to ten guineas should be sold for two shillings. After hearing the evidence, part of which was that prisoner had told purchasers to be careful, as he printed these copyright pictures on the sly, Mr. Parsons, for the defence, submitted that in the four different summonses there was no reliable evidence that, on November 8, the defendant had copied and multiplied these pictures. Doubtless, Levene had dealt in these pictures; but, warned by prosecutions two years ago, he had given over that business altogether. All he was guilty of was the technical offence of dispo ing of the pictures. The magistrates dismissed the charges of multiplying the pictures, but convicted the defendant of having sold imitations of copyrights, and fined him 5*l* in cash in each of the four cases, with special costs of ten guineas, and the Court costs spread over the four cases. In default he was ordered fourteen days' imprisonment in each case.

Clergyman and Camera.—In the City of London Court, on Tuesday, before Mr. G. Pitt-Lewis, Q.C., Deputy Judge, an action was brought by the Rev. Thomae J. Price, 6 Brank-villas, Gravesend, against the City Sale and Exchange, photographic dealers, 6 Lime-street, E.C., who sought to recover from them the return of a quarter-plate camera or its value, 12*l*. The plaintiff said that on October 6 he took to the defendants a quarter-plate camera which he had only purchased of them five months before. He asked them what allowance they would make if he purchased a half-plate camera of the same quality. At first they were not willing to grant him what he thought was a fair price, seeing that they would be making a double profit out of the transaction; and he had not received from them the terms which he thought he was entitled to, seeing that he was an old customer of theirs (for there had been many previous transactions between them). As they could not come to terms, he asked to be allowed to leave his camera with the defendants until some subsequent period, when he would call for it. Later on, when he called for his camera, they would not let him have it.—The defendants' solicitor told the Court that they agreed to allow the plaintiff 7*l*. 10*s*. for his camera, and when he called he purchased a half-plate camera. They had not the goods in stock which he required, and they told him they would procure them. When the plaintiff called again, they told him they had obtained the goods which he had ordered; but then he said he had changed his mind, and he asked to have his quarter-plate camera returned. This, of course, the defendants would not do.—The plaintiff told the Judge that considering that he was an old customer he thought the defendants ought to have allowed him the full price of the camera, as he had only had it five months.—The Deputy Judge said that did not appear to him to be at all reasonable. The camera was second-hand, and the defendants could not be expected to take it back on the same terms as they sold it.—The plaintiff said he was quite sure that he had not ordered a half plate camera when he called. The defendants had not even a half-plate camera in the place; and he would not think of buying an article without seeing it.—The Deputy Judge said it seemed to him to be a case requiring a little concession on both sides.—The plaintiff replied that he would not concede anything. They had treated him badly, and the half-plate camera was of no use to him now. The defendants' manager and chief clerk were called, and they said they remembered the plaintiff calling and ordering a half-plate camera. There was no doubt that he gave a definite order, and afterwards changed his mind.—The plaintiff, in reply, said there was not a concluded bargain entered into.—The Deputy Judge said he was satisfied that there was an order given as deposed to by the defendants. The plaintiff should not have brought his action. There must, therefore, be judgment for the defendants, with costs.

A Photographer Non-suited.—At the Liverpool Assizes, on November 30, before Mr. Justice Bigham and a special jury, Charles Scholl, photographer, of Liverpool, sued the New Brighton Tower and Recreation Company to recover damages for alleged breach of contract. Mr. Pickford, Q.C., on behalf of the plaintiff, stated that the plaintiff had brought this action in consequence of the damage he had sustained, owing to a breach of contract on the part of the defendant company, in not giving him a properly fitted-up stall in the New Brighton Tower, as they had agreed to do, for the purpose of his photographic business, and in not giving him a continuous supply of electric light, which was necessary in his studio. The directors of the Company told plaintiff that the stall in the New Brighton Tower would be ready by Whit Monday last, otherwise he would not have taken it. He also expected to have a constant supply of electric light. The front part of the stall was to be used as a bazaar, and the back part as a studio. When Whit Monday arrived the workmen were still about the building, and the scaffolding had not been taken down, but the Tower grounds were open to the public. The plaintiff had fulfilled his part of the contract, by fitting up the stall and putting his goods there, but at first he got no electric light, and he did not get a continuous supply until August. The result was, that the money spent on the stock, &c., was practically thrown away. The plaintiff's takings, from the opening until August 9, only amounted to about 38*l*, whereas he had spent something like 223*l*. One hundred and seventy-three pounds were spent in photographic apparatus and fancy articles, and he paid 53*l*. in wages. He was about 180*l*. out of pocket by the transaction. If everything had been ready as promised, instead of his making a loss, he would have made a substantial profit. He estimated that in the photographic studio he would have taken 25*l*. per week,

of which fifty per cent. would have been profit, and in the bazaar about 12*l.* per week, of which some thirty per cent. would have been profit. His profit would have amounted to something like 292*l.*, and that, in addition to the 180*l.* he had lost by the transaction, constituted his present claim. After Emile Scholl, son of the plaintiff, had given evidence, his Lordship asked Mr. Pickford if he could not reduce his extraordinary claim. The plaintiff was claiming nearly 500*l.* damages, for a short time, and in a place the rental of which was 40*l.* per month. Mr. Pickford said the profit put down was an estimate, but the other items of the claim were all set out in figures. His Lordship: Then we will carefully inquire into them. His Lordship then proceeded to go through the items, and questioned the plaintiff's son closely upon the accuracy of them, and as to why allowances had not been made for the goods still in existence. His Lordship remarked that some of the items should not have been put into the list at all. Mr. Pickford agreed that one item should not have been inserted, and said he would yet do what he had intended to do, and ask the witness further questions. His Lordship: Oh yes; you shall re-examine him. I am cross-examining him. Mr. Pickford: And one question will be as to the allowance to be made for the goods still in plaintiff's possession. Witness was then questioned by Mr. Pickford, at some length, with a view to showing that plaintiff, in his Liverpool shop, could not dispose of the goods he still had, as they were bought specially for the stall at the Tower. Witness, in reply to Mr. Horridge, who appeared for the defendant company, stated that plaintiff wrote to the defendants, suggesting that they should let him the same stall for next season, at the same rent, and make him an allowance of 20*l.* for the loss alleged to have been sustained during the past season. The secretary to the Company wrote in reply, that if any inconvenience had been sustained, it was owing to plaintiff's defective lamps, and not to the want of electrical energy. Ernest Johnson, engineer to the Wallsall Electrical Company, said the lamps he erected at the plaintiff's stall were capable of receiving 110 volts, but the current supplied was too strong, the result being that the fuses burnt. The wires were afterwards strengthened, but they were not effective, owing to the dampness of the place. The plaintiff and his assistants gave evidence as to the dampness of the place and the unfinished state of the premises on Whit Monday. In reply to his Lordship, Mr. Pickford said he was relying not on the tenancy contract, but on a collateral agreement. Mr. Horridge, on behalf of the defendant company, submitted that this was a case in which the plaintiff had made as much as possible out of his stall at the Tower, and then brought an action against the company. He saw and knew that he was going into an uncompleted building, and it was at his own request that plaster was used at his stall, and that concrete was utilised. Naturally plastering would cause a certain amount of dampness at first. The truth was that he took an unsuitable place in which to carry on his business, and he was obliged to use as a studio a room that at other stalls was used as a store room. He contended that the plaintiff had no cause of action, that the claim was outside the written agreement, with the exception of the electric light. With regard to the electric light, the defendant company would prove that it was in, on Whit Monday, by four o'clock in the afternoon, when it was quite light. When first the arc lamps the plaintiff used were connected, the fuses burnt, because they were not suitable, being lamps for 110 volts; whereas the force at the Tower, to the knowledge of the plaintiff, was 220 volts. Counsel also submitted that the damages claimed by the plaintiff were excessive and over-estimated. John Ashley, clerk of works at the Tower, stated that on Whit Monday the place was completed sufficiently for the plaintiff to use his stall. The plastering of the stall was done at the plaintiff's own request. Ernest E. Bartlett, electrical engineer at the Tower, stated that the electric light was available at five o'clock on Whit Monday, and plaintiff made no complaint about the light until the end of that week. His Lordship having summed up, the jury returned a verdict for the defendants, and judgment was given accordingly. On the application of defendants' counsel, the Court made an order that the money paid into Court should be returned to the defendants.

Patent News.

THE following applications for Patents were made between November 21 and November 26, 1898:—

STANDS.—No. 24,517. "Improvements relating to Photographic Camera Stands." M. VAN PRAAGH.

CAMERAS.—No. 24,567. "Improvements in Photographic Cameras." Communicated by J. G. Siegrist, called G. Sigriste. Complete specification. J. C. FELL.

CAMERAS.—No. 24,715. "Improvements in and connected with Cameras." R. BALLANTINE and M. BALLANTINE.

LENSES.—No. 24,743. "Improvements in Bifocal Spectacles and Lenses." W. E. DEBENHAM.

NEGATIVES.—No. 24,750. "Improvements in and relating to the Production of Photographic Negatives." Complete specification. O. MOH and A. HESEKIEL.

CAMERAS.—No. 24,753. "Improvements in or relating to Magazine Cameras." Communicated by P. F. E. Laux. A. J. BOULT.

FILM-CHANGING.—No. 24,857. "Improvements in or relating to 'Daylight' or other Changing of Packages of Photographic Cut Films or other Sensitive Surfaces arranged as a Pack and Apparatus therefor." A. L. ADAMS.

OPTICAL PROJECTION.—No. 24,946. "Improvements in Optical Projection Apparatus." Communicated by H. O. Foersterling. J. G. LORRAIN.

VIEW-FINDERS.—No. 24,994. "Improvements in Optical Appliances Applicable as a View-finder or for Other Purposes." W. MALLET, W. WATSON, C. W. BELVOR, and A. L. ADAMS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

December.	Name of Society.	Subject.
12	Bradford Photo. Society	*Photographic Printing Processes, their Comparative Merits for Special Work.* A. Horsley Hinton.
12	Camera Club	Exhibition of Lantern Slides: *Hampshire.*
12	Croydon Camera Club	Extra Lantern Night.
12	North Middlesex	Technical and Nomination Meeting.
12	Oxford Camera Club	Exhibition of Members' Lantern Slides.
12	Society of Arts	*Acetylene.* Professor Vivian B. Lewes.
13	Hackney	*A Week with Cycle and Camera.* Dr. Roland Smith.
13	Isle of Thanet	*Practical Notes on Outdoor Work with the Camera.* Rev. A. H. Blake.
13	Royal Photographic Society	*An Opacity Balance* and *On the Causes of Discrepancies in Opacity Measurements.* Chapman Jones.
13	Shropshire	Prize Slides.
14	Bolton Mutual Photo. Society	*All about Animals.* Gambier Bolton.
14	Croydon Camera Club	Thirty-seventh Public Lantern Show: *A Trip to India.* H. Keatley Moore.
14	Kingston-on-Thames	Exhibition of Members' Lantern Slides.
14	Leeds Camera Club	Smoking Concert.
14	Photographic Club	Members' Open Night.
14	Society of Arts	*Commercial Education.* Sir Albert Rollit, LL.D., M.P.
15	Ashton-under-Lyne	Meeting for Conversation, &c.
15	Bolton Mutual Photo. Society	Lecture. Royal Photographic Society.
15	Camera Club	Sir Norman Lockyer, K.C.B., F.R.S., &c.
15	Leigh	Lecture: *Architectural Photography.*
15	Liverpool Amateur	*From Cornwall to Canterbury.* Dr. Llewn. Morgan.
15	London and Provincial	*Novitas Stripping Film.* Otto Schölzg.
15	Oldham	Annual Dinner.
15	Putney	Lantern Evening: Slides by Members.
16	Camera Club	Club House Dinner.
16	Croydon Microscopical	Discussion as to Issue of a Scientific Portfolio
16	Plymouth	Members' Lantern Night.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 1,—Mr. A. Haddon in the chair.

Mr. C. F. TOWNSND, F.I.C., F.C.S., read a paper on

PHOSPHORESCENCE IN RELATION TO PHOTOGRAPHY. [See p. 790.]

In the course of the paper the phosphorescence of different substances induced by exposure to the light of a magnesium-ribbon lamp was shown to the meeting. Phosphorescence, it was explained, was practically the same thing as fluorescence. The terms were used rather loosely, the latter at one time being applied to such bodies which were only phosphorescent for a very short space of time. Becquerel's phosphoroscope gave one the power to observe that very many bodies which did not appear phosphorescent in the ordinary way, owing to their short duration, produced this phenomenon. Dr. Russell, it was further stated, had noted a curious effect of uranium salts on a photographic plate, finding that, even after a two years' sojourn in the dark, the salts exercised an influence upon the sensitive compound. Mr. Townsend observed that it was remarkable whence the uranium could get the energy required to sustain phosphorescence for so long a time, although, of course, for all that, there would appear to be no reason why, if this action would continue for two or three months, it should not go on for two or more years.

Mr. PHILIP EVERITT believed that collodion was not a phosphorescent body. This fact might go to explain the greater rapidity of a gelatine plate (gelatine being phosphorescent) compared with a collodion plate. At any rate, such a possibility had been the subject of remark before. There was another point, looked at from an outside point of view, as he could only look from, namely, that if phosphorescence was due to the action of light and was really in proportion to the action of light, and was light given off by some body, the gelatine of the plate, for example, how was it that gelatine dry plates retained their developable power after a considerable number of years, and apparently without diminution of capacity?

Mr. TOWNSEND would explain that, by suggesting that the phosphorescence of the gelatine was gradually taken up by the silver bromide and converted into chemical action. Thus, instead of phosphorescence, a definite change of the silver bromide would occur, to which the latent image would be due. Assuming the correctness of this view, the plate should keep almost indefinitely.

Mr. EVERITT thought it would be interesting to ascertain whether a portion of gelatine, boiled to the same extent as for plate making, but without the admixture of silver bromide, would retain its fluorescence longer than gelatine similarly treated, but in the presence of silver bromide—in fact, a dry plate.

Mr. TOWNSEND further remarked that Professor Dewar had shown that the duration of the phosphorescent action of gelatine was at least as much as five or six minutes, following exposure to the light of the arc lamp.

Mr. R. BECKETT said it had come to this, that, accepting the theory propounded to them, it would be possible to develop a given exposure too soon and get the effects of under-exposure, whereas by keeping the plate for a longer time it would be reasonable to expect the maximum result of the exposure by continuing action.

The CHAIRMAN said there was yet another question, namely, that if the image owed its origin in part to phosphorescent influences of the gelatine, then one should get a quicker plate by increasing the volume of the gelatine upon the plate, seeing that the amount of phosphorescence would be increased in

the same proportion. It would be interesting to hear whether thick plates were quicker than thin plates. He also suggested an experiment to decide whether a sheet of gelatine exposed to light, and then placed in contact with a sensitive plate, gave a developable image as the result of phosphorescent action.

Mr. TOWNSEND had heard of an exposed plate which, enclosed with some unexposed plates in a box, had imparted its image to the other plates in varying degree.

Mr. BANKS considered it improbable, however, that, if phosphorescence affected bromide of silver, dry-plate makers would have remained ignorant of such an action; they would have seen the necessity of keeping the gelatine from the light, but no such precautions were taken. As the Chairman suggested, the high temperature of the cooking might get rid of the powers of phosphorescing, but then again, with the ammonia process of plate-making, it made no difference whether the gelatine were worked in the light or in the dark.

PHOTOGRAPHIC CLUB.

NOVEMBER 30,—Mr. Hans Müller in the chair.

Mr. W. R. STRETTON stated that, when recently sorting a lot of old negatives, he discovered that all those which had been developed with metol, three years ago, were crape-marked all over. The markings were similar to those which appear sometimes upon negatives treated with alum, but no alum was used in the case of the negatives referred to, and it looked very much like a contraction of the gelatine.

Mr. W. C. PLANK gave a lantern show of photographs in the district of Lynton and Lynmouth, accompanied by some short descriptive notes, in which he fear that the natural beauty of this part of England was in danger of desecration, at no distant date, at the hands of railway companies and builders of model dwellings, seemed to be a very serious one with the lecturer. The slides were much appreciated by the meeting, which afterwards had an opportunity of seeing a collection got together by Mr. Graystone Bird, likewise typical of North Devon scenery. A vote of thanks to Mr. Plank closed the business of the meeting.

Hackney Photographic Society.—November 29, Mr. William Rawlings presiding.—Matters relating to the Exhibition were dealt with, and the members were congratulated on the success of the show. Mr. Hudson drew attention to a developing formula in one of the photographic journals. It was recommended as very effective for getting detail in under-exposures, and consisted of a mixture of pyro and amidol. In reference to this, Mr. J. Beckett said that an amidol developer following one of pyro was very good for under-exposure. The plate should be well washed after removing from the pyro developer and before putting into the amidol solution. Mr. E. T. Coombes then gave an account of a cycling trip to the West of England, illustrated by a number of lantern slides from negatives taken during the tour.

Kingston-on-Thames and District Photographic Society.—November 30, Mr. W. Montagu Robertson (Vice-President) in the chair.—A lecture on

PRACTICAL POINTS IN EXPOSURE, DEVELOPMENT, AND PRINTING

was read. At the close of the lecture, Mr. East drew the attention of the meeting to a rather remarkable discovery he had made, quite accidentally, whereby he has been able to produce perfect slides and enlargements from negatives that have been inadvertently scratched—negatives which, in the ordinary course of procedure, would have been relegated to the dust-bin. Mr. East found that, by rubbing a little vaseline into the scratch before printing, no trace of the damage is discernible in the resulting positive. He showed examples on the screen made from a badly scratched negative before and after treatment. In the first the evil effects of the damaged film were only too apparent, but in the second slide there was absolutely nothing to suggest that anything had been amiss. This little dodge proved equally successful with paper enlargements. In a negative of a country view the film had been scratched right across a clump of trees in the middle distance, showing as a black line in the enlargement; but, by the use of vaseline, this mark was entirely absent in the subsequent picture, its place being taken, in some unaccountable manner, by the lost detail.

North Middlesex Photographic Society.—Technical Meeting, November 28, Mr. A. H. Lisett in the chair.—Mr. E. R. MATTOCKS read a letter from the leading German Photographic Society, inviting the North Middlesex to contribute to their Exhibition. Mr. Taylor passed round a bottle containing bromide of calcium for members to examine. Mr. A. G. Lawson showed a negative with a large dark patch with an opaque spot in the centre of it, light in the foreground. It was taken in a hand camera with a single lens, and pointed towards the sun, the image of which could be discerned in the sky. The opinion was that it was a case of flare spot; but how the apparent second image of the sun made its appearance in the view was not satisfactorily explained. A member called attention to an article by Mr. Drinkwater in THE BRITISH JOURNAL OF PHOTOGRAPHY a week or two back on developing partially printed P.O.P., and said one formula seemed to give good results, which was: Pyro, 3 grains, to 6 ounces of water, with 10 minims of 1 grain to once solution of bichromate of potash. The printing could be done by incandescent gaslight. He also said it had been suggested that, by adding some to the bichromate solution in sensitising carbon tissue, it enabled printing to be done in weak and yellow light; in fact, it orthochromatised the tissue. He then described a case in which he had wanted a print from a negative in carbon quickly. The negative was treated with methylated spirit and dried in a hot cupboard, and exposed with the tissue to incandescent gaslight for about two hours. On trying to develop, he found it impossible to make the tissue adhere properly to the support, and no image could be developed, even on boiling it. The tissue had given good prints only a little while previously.) Mr. MUMMERY said heat had an effect on carbon tissue, and perhaps that was the cause. Mr. Cox was asked how he got such excellent results in his prints by the gum-bichromate process. He said he followed the published formulæ: Vegetable black, forty per cent. gum arabic, and saturated solution of bichromate of potash, spread on the paper; that which he had used was of French make. He did not use an actinometer, and used simply water for developing. A brush was not recommended, although it might be useful occasionally if parts proved obstinate; but great care had to be used, as the image was extremely delicate. The voting on the prints sent in for the two special competitions resulted in Mr. A. H. Lisett scoring on *A Domestic Interior* and Mr. Rawlins on *River with Shipping*.

West Surrey Photographic Society.—November 30.—Mr. PAUL MARTIN gave a lecture and demonstration on the making of

LANTERN SLIDES BY THE CARBON PROCESS.

He said, while many processes might be better suited for making the majority of lantern slides, there were times when special results were wanted—pictures with all possible detail, even in the deepest shadows, and absence of violent contrasts, and perhaps only a hard negative to work from, and then it was the carbon process was to be relied on. The making of the slide was as the making of a print by that process, only that he recommended, to save possible trouble, that the glass should receive a gelatine coating first, making an emulsion of ¼ ounce gelatine to 4 ounces water, adding slowly 6 grains chrome alum dissolved in 1 ounce water, or, preferably, making the last a separate bath. He showed a simple whirling contrivance he used, and next passed through the lantern a great variety of slides made with various tissues, showing that, while many were dreamy-looking when on the screen, as if from weak negatives, there were four or five that were fairly satisfactory. The remainder had not, he considered, enough body colour for lantern purposes, engraving black, and portrait brown and purple were, with red chalk, perhaps the best. He also advised the members who could to prepare their own tissue.

Hastings and St. Leonards Photographic Society.—November 29.—In response to the invitation issued by the President of the Council of the Hastings and St. Leonards Photographic Society, there was a very large audience at a meeting of this Society, held at the Brassey Institute on Tuesday evening, when Mr. A. BROOKER exhibited and explained about one hundred photographic slides taken during a recent trip to Paris. The MAYOR presided, and in his opening remarks said Mr. Brooker's name was known pretty well all over England. The Society was largely indebted to Mr. Brooker, for he ventured to say that they might have aldermen, councillors, or even the mayor amongst its members, but they owed a great deal to the ability and energy of Mr. Brooker. Mr. A. Brooker's slides were exceedingly fine, and attracted the utmost attention. He had no written lecture, but briefly explained the slides as he went on.

Leeds Camera Club.—November 30.—The subject for the evening was

NORTHERN FRANCE,

by the President (Mr. W. J. Warren), with limelight illustrations and pastel sketches. Normandy and Brittany, bounded on the north by the river Seine, and on the south by the Loire, formed the country described. To get there, the best way, or the least objectionable way (for all ways are bad), is by Southampton, by steamer to Havre. While possessing several buildings of interest, perhaps the most noticeable feature of Havre is its green parrots. It swarms with them, cursing, screaming, and scratching—a perpetual din everywhere. Passing on through Caudelis to Rouen we find a busy and interesting city, a fine cathedral, and many fine churches. At St. Ouen is found one of the few churches built entirely from the designs of the original architect. The Courts of Justice are very beautiful, but not at all French in their character or style. Dreux, another noted town, is the burial place of the Bourbon family, and necessarily contains many fine tombs and buildings. Chartres, which was visited in turn, has a cathedral spire ranking, perhaps, as the finest in the world, and magnificent porches containing over nine hundred sculptured figures. The people are strongly characteristic and have many of our Yorkshire attributes, not readily making friends, but when they do they are good friends; and when they have a funeral—well, for show, a wedding is not in it. Wherever you go you see the widow's, the maiden's, and the married woman's cap, each distinctive, each pronounced. Mr. Warren, by pastel sketches, here illustrated these types, the effect in the simple coloured chalks being wonderfully effective. Mr. Homburg, during the sketching, spoke as to markets held at various intervals for the sale of the human hair. By reason of the style of caps worn, the hair of the female population becomes unnecessary, and perhaps a nuisance, so they cut it periodically, and it is recognised as the finest in the market. Continuing, Mr. Warren passed on to Falaise, noted for its water, which is so admirably adapted for tanning, that Falaise leather is famous. It was here that the Duke Robert, from one of the battlement towers, espied a village girl, Arlette, the daughter of a tanner, and so struck was he with her charms that he made her his wife; and she was the mother of William the Conqueror. Lisieux, an old-fashioned town, is remarkable for its knitting. All the women knit, and the men sit all day in the cafés smoking. Caen has two magnificent abbeys, one built by William the Conqueror, the other by his wife, to expiate their sin of having married each other, they being cousins. Coutances has a good hotel, a thing to be appreciated in Normandy. Bayeux, with its tapestries, and Avranches, were next visited, and finally a steamer was taken to Le Mont St. Michel, a highly interesting and descriptive account of which was given.

Oxford Camera Club.—November 28, the chair was occupied by Mr. Underhill.—The negatives which had been sent in for the

DEVELOPING COMPETITION

were thrown on the screen, and Mr. Cadett's report was read. The competitors had been supplied with Cadett ordinary plates which had been exposed on a transparency for eight seconds and sixty seconds respectively, and prizes were awarded for the best negatives made therefrom. The awards were as follows: (1) Mr. Hall: (2) Mr. Hornsey; (3) Miss Acland. There were eighteen competitors, and the negatives sent in varied but little; most of them appeared to suffer from over-development. Mr. Cadett in his report states that he felt great difficulty in doing justice to the competitors: the awards were based on a mere visual determination of the nearest results obtained with negatives of fair printing quality in comparing the under and over-exposed

plates, and these might not necessarily be the best printing negatives. He hardly approved of the competition; he was a believer in scientific measurement, and did not trust to the ordinary judgment of the eye; printing densities and visual densities were not necessarily the same: there was the question of colour to be considered, and also of the printing paper selected. In these days, when plates were correctly speeded and a shutter could be had which was accurately adjusted, exposure meters should be used, and we should strive for correct exposure. Hurter & Driffield's latest papers on development had been a revelation, especially with regard to the action of bromides, and the proper conditions of development would be to work with one constant and theoretically adjusted developer without bromide. We are always working in uncertainty when we attempt to dodge under or over-exposure, although by the use of restrainers it is possible to create wide differences in the apparent sentiveness of a plate, but this is variable with time of development. Plates also varied greatly in their capacity to give good results with a wide range of exposures; this depended on thickness of coating as well as character of the emulsion, slow plates having much more latitude than fast ones. We should above all things train ourselves to correct exposure; if exposure is not correct, it is only the lesser of two evils to try experiments with the developer. The negatives sent in had, of course, received a great variety of treatment, and all kinds of developers had been tried; but the best negatives were three sent by Mr. Cadett, which had been developed in a strong pyro-soda developer in the same dish and for the same time. The Secretary also showed two negatives which he had developed at the last Club meeting in the same way, and they were very equal and better than some of those in which dodging had been resorted to. The hearty thanks of the Club were given to Mr. Cadett for his kind assistance.

Plymouth Photographic Society.—December 2, The President (Mr. H. S. Hill) in the chair. The "A" set of Affiliation slides were shown, and drew a large attendance. The slides varied very much in quality, but a few of the architectural, one snow, two street, one moonlight, and one sea-breaking subjects, and two still-life studies, were certainly of very fine quality. Figure and animal subjects were not strong. The PRESIDENT thought that it was a matter of great interest to the Society to know what class of work members of other societies were doing. He thought that the Plymouth Society could produce work equal in merit to that shown that evening, and expressed the hope that, when an opportunity occurred, they would send a collection of representative work. Mr. W. C. JOHNS took exception to the size of the pictures on the screen, and thought that they would be improved if shown so that the size and shape of the mask could be distinctly seen. He also objected to figures appearing eight feet high, and bird's eggs such abnormal sizes, and considered that pictures from slides, instead of having an interminable margin of black around them, should be shown with a suitable frame, and with a mount if necessary. Mr. F. J. JOHNSON was glad to hear Mr. Johns make those remarks, he was also of the opinion that the size of some of the subjects was not at all pleasing to the eye, one, of some fruit and grapes, being very unsatisfactory. He also called attention to the bad perspective of some of the architectural slides, due probably to the use of hand cameras. Dr. WATERFIELD pointed to the developing difficulties in making slides that would give something near natural sizes on the screen. Mr. E. H. MICKLEWOOOD thought that the size of the disc was perfectly satisfactory, but was of the opinion that, if a little of the foregrounds, and perhaps some of the skies, had been cut off, in many of the slides there would have been improvement, but he could not see any advantage would be got from frames. As to size in particular subjects, the difficulty was, that during an exhibition the continual shifting of the lantern was not practicable; and, if there were other subjects in a picture, the proportions of figures, and fruits, and birds' nests were obtained. Mr. JOHNS quite agreed with Mr. Micklewood that the proportions were obtained, but still thought that the scale of the slides with figure and similar subjects was much too large.

Carbon Portfolio Club, Edinburgh.—The Annual Meeting of this Club was held at 22, St. Bernard's-crescent, on the evening of Wednesday, November 30, Mr. A. Eddington, F.S.I., in the chair. The Hon. Treasurer and Secretary, Dr. H. Scott Lauder, submitted a highly satisfactory financial report. He further intimated that there are at present no vacancies in the C.P.C., the full complement being now on the roll. The following gentlemen were elected officials for the current session, 1898-9:—*President:* Mr. James Hay.—*Council:* Messrs. William Allan Carter, C.E; Alex. Eddington, F.S.I.; W. I. Croall, C.A.; and J. Warrack, junr.—*Hon. Secretary and Treasurer:* Dr. H. Scott Lauder, R.N. The portfolio is circulated bi-monthly, and is primarily for the study and advancement of carbon work, although members have the option of contributing works, either in platinotype or gum bichromate, for the purpose of comparison and criticism.

Glasgow Photographic Society.—December 1, Mr. John Stuart (President) occupied the chair.—There was a fair attendance of members. The subjects discussed from the question box especially, were very interesting. One of them in particular was rather a "knotty" one, being purely optical. Mr. Lang read a paper on the Cyanotype process and kindred modes of printing. He also showed a book of very ancient date, produced by the Cyanotype process. After a very interesting discussion, he was heartily thanked for his paper. Mr. McKenzie broke new ground; it may be a source of talk for the Society on future occasions. He took up three communications from THE BRITISH JOURNAL OF PHOTOGRAPHY on three different and interesting points. The discussion was somewhat prolonged, one member taking the liberty of characterising most of the matter appearing in the photographic journals as "fads." He was not allowed off with this, however, without a good deal of talking to. Mr. McKenzie was very heartily thanked for his paper. A number of lantern slides were shown by Mr. Watson and Mr. Falconer. The Chairman intimated that Mr. Harold Baker, of Birmingham, would deliver a lecture at the February meeting on Artistic Photography. It is to be hoped that the members will bring pressure to bear on any absentees, so that they may be present at that meeting. Any members of the *Evening Times* Camera Club, or the West of Scotland Association, would be welcome to this meeting. A vote of thanks to the Chairman terminated the meeting.

Cape Town Photographic Club.—Mr. J. P. Edwards, in the unavoidable absence of Dr. Gill, presided at the Annual Meeting of this Club held at the Y.M.C.A. It appeared from the annual report, which was adopted, that the past year had been a prosperous one, although the balance sheet shows (omitting Mr. Rhodes's donation of 25*l.* towards the medals for the competition just closed) a small debit balance. The membership roll now stood at seventy-two ordinary and eight honorary members, as against seventy one and eight respectively last year. The following were unanimously elected office-bearers for the ensuing year:—*Hon. President:* Dr. Gill (Astronomer Royal).—*Vice-President:* Dr. Muir (Superintendent-General of Education).—*Hon. Secretary and Treasurer:* Mr. H. Bishop.—*Other Members of Council:* Messrs. J. P. Edwards, J. Denham, A. J. Fuller, G. Ainslie, A. Gracie, T. H. Watson, E. J. Steer, and A. McLeod. It was resolved to approach the Government with a view to the copyrighting of photographs; and, further, that a project originated some years ago of making a photographic survey of the streets of Cape Town should be so far revived that the Club should devote a Saturday afternoon to photographing the streets, with special reference to the older buildings. It was also decided to expend 30*l.* in the purchase of an enlarging apparatus.

FORTHCOMING EXHIBITIONS.

1898.

December 9–15 ..... Yorkshire Exhibition. Hon. Secretaries, 13, Cheham-street, Bradford.

„ 21–31 ..... Borough Polytechnic Society. H. C. Philco 255, South Lambeth-road, S.E.

1899.

January 25–31..... Perthshire Society of Natural Science. C. F. Burrows, Hon. Secretary, 16, Princes-stree Perth.

„ 30, 31..... Southsea Amateur. F. J. Mortimer, Cornw House, Ordnance-row, Portsea.

February 4–25..... Edinburgh Photographic Society. Hon. Secreta J. S. McCulloch, 2, George-street, Edinburgh.

„ 13–18..... Photographic Society of Ireland. Hon. Secreta 35, Dawson-street, Dublin.

„ 21–24..... Hastings and St. Leonards. Exhibition Secreta A. Brooker, 21A, Wellington-place, Hastings.

March 4–11 ..... South London. Hon. Secretary, A. E. All 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No no is taken of communications unless the names and addresses of the wri are given.*

*** *We do not undertake responsibility for the opinions expressed by correspondents.*

THE PHOTO-CERAMIC PROCESS.

To the EDITORS.

GENTLEMEN,—Having read the statements made by Mr. James Alexander Forrest, on the above subject, in your issue of November 2 I should be glad if some further information can be obtained concerning them. He states that twenty years ago, an enamel powder in packets, mixed with flux, and sensitive collodion, was sold in Paris. This was cleared and afterwards placed in a muffle to fuse with heat. Mr. Fo does not say so, but I conclude that this mixture was used for coating plates, and that they were exposed in the camera or in contact w negative. Now, it is the statement that "this was cleared" whi should especially like some information upon.

It seems to me quite impossible to clear the enamel from the film of collodion as required to form the image. After the plate is exposed, developed, and fixed, the film will still retain the enamel po throughout.

How is the enamel removed to form the image? I have worked the enamel and substitution processes successfully for some years, a should esteem this process by enamel-collodion mixture as quite an one for the production of photo-enamels.

I do not quite agree with the remarks by C. F. T. in your last i who considers that credit should be given to Mr. W. E. Henry, who "t up this old process." I do not believe it was ever buried. The nu of photo-enamels exhibited (a case of about fifteen of my own a them) at the Imperial Institute, is I think evidence of this. I am n wrong when I say, with the exception of two, or perhaps three, exhib they were all by the enamel dusting-on process. All this work w course, done before the lectures were delivered at the Imperial Inst or the book was studied which was sold there. For my own part, I s be sorry to give up my variation of the old process for the glue me I have tried the glue.

Mr. A. L. Henderson, of course, we are always pleased to hear, f reigns supreme over the subject of photo-enamels. I think he wil that the most frequent reason why ceramics don't "catch on," is b

he general public do not understand the exceptional qualities possessed by an enamel for its extra cost, as compared with an ordinary photograph.—I am, yours, &c., J. S. TEAPE.

THE KINEMATOGRAPH PANIC.

To the EDITORS.

GENTLEMEN,—Your notes in THE LANTERN RECORD on the vexatious restrictions by the London County Council on kinematograph exhibitions are most pertinent. The result of such regulations will be to practically prohibit the use of this most interesting photographic device, it will entirely place this branch out of reach of all but the very wealthy, for slender pockets cannot afford "fireproof huts." The regulations are to my mind most absurd, more worthy of China than England. Accidents have happened with the kinematograph, but what department of human life is free from risk. The London County Council will next prohibit the use of cabs in London because so many people get run over. It is to be hoped that the Council's example will not be followed by other local authorities; unless those interested make a vigorous protest against panic legislation of this kind, a rapidly growing industry and amusement is threatened with practical extinction. Similar vexatious restrictions have been imposed on the storage of calcium carbide. I quite believe in every care being taken, but the London County Council is acting absurdly. To my mind perfect safety would be secured without such restrictions, by the following regulations which no one could complain of:—

1. The machine to be so constructed that the light is shut off from the film when at rest.
2. That the light on reaching the film should be cool. This end can be obtained by various devices even at the risk of loss of light; better a little less light than a fireproof hut for the whole concern.
3. That no curtains or drapery should be within twenty feet of the machine.
4. That the operator be certified competent in *practical* knowledge of the apparatus that he uses. He should not be required to give more than proof of his fitness to manage his own apparatus.

It is to be hoped that some individuals of influence will take the question up and secure the removal of the present almost impossible and most vexing requirements. They are simply intolerable.—I am, yours, &c. DRAW THE LINE.

P.S.—It must be very pleasant to operate a lantern in a fireproof hut. What an absurdity!

THE BENNETTO PROCESS.

To the EDITORS.

GENTLEMEN,—*Apropos* to the "invention" of Mr. Bennetto, diagrams of which were given in last week's JOURNAL, may I point out that this device of a glass passing rays on to a red-sensitised plate and reflecting others up to a slide holding green and blue sensitive plates in the top of the camera is in no sense whatever an innovation, even assuming that it works" fairly well. A full description of an identical device will be found in Berthier's *Manuel de Photochromie*, pp. 52, 53, et seq. What, then, is novel in this much-discussed camera of the Newquay experimenter?—I am, yours, &c., E. D. F.

Torquay.

To the EDITORS.

GENTLEMEN,—I cannot pass over your remarks upon my work without some notice of them. You still seem to exhibit all the possible prejudice against myself and my work that you can, and this is done before you have seen a single result produced by my process. I spent years upon the science of light and colour before I ever made a single experiment upon photography in colours; and I have never made a single experiment in any work I have undertaken without first having thought out every detail beforehand. If it were so, as you say, that my work is merely the result of "trial and error," it would say very little for science when my results are taken into consideration. The pictures produced by my process do not show spectrums hanging upon trees, nor are they landscapes seen through park railings; science produces such things, I know, and with equally as much science I produce them otherwise.—I am, yours, &c., J. WALLACE BENNETTO.

The Studio, Newquay, Cornwall, December 6, 1898.

THE CARRIAGE OF EXHIBITS.

To the EDITORS.

GENTLEMEN,—We are living in an age of rapid locomotion, when all parts of the country are brought within easy access of any railway centre. With passenger or postal matters we, at Aintree, don't grumble; but the past week has proved to us that, on the dispatch of parcels, the railway companies are very remiss.

Our Exhibition opened on the 23rd ult., for four days. Competitive work was dispatched from the South London Club (some twenty frames) on the 15th inst., and delivered here on the 25th. Another case, containing about twenty-six frames, the work of the Leeds Camera Club, was dispatched on the 18th ult., and arrived on the 23rd, the adjudication taking place on the 22nd. All those forty or fifty admirable prints were too late for competition; while a case containing the London section of the loan collection, work by Messrs. Horsley Hinton, W. Thomas, Viscount Maitland, and T. H & O. Hofmeister was dispatched from them on the 15th, arriving on Friday evening, the 25th, the average distance covered each day being about fifteen miles per case. The cases were all marked "urgent;" but we fancy the railway companies could make better progress if they so desired. Exhibits marked too late for competition are extremely unsatisfactory to the Exhibition executive, more so the Judges, who, after their laborious duties, find on their next visit some picture they might have preferred; but most unsatisfactory to the competitor, who has, through the fault of his forwarding agent, missed the opportunity of gaining another laurel. We trust you will find space to give this matter publicity, as it is only fair to the members of the South London and Leeds Societies and to the Judges,—I am, yours faithfully, DARLEY TRAVIS, *Secretary.*

St. John's-road, Fazakerley, Liverpool, December 1, 1898.

LIGHT OF THE FIREFLY.

To the EDITORS.

GENTLEMEN,—There can be no question that the firefly contains the secret of producing light with small expenditure of energy. Having any number of these insects hovering round my garden at Calicut in 1888, I got a Pillischer's Microscope, and in an amateur way tried to attack the problem. Being at Calicut again last year, with a one-twelfth immersion lens this time, I renewed the investigation to arrive at substantially the same conclusion as before. The construction of the light-generating apparatus is very simple, there being nothing more externally viewed than the under surface of one of the abdominal rings; being of a transparent horny skin, below which streams of light flash with every pulsation of the firefly's breathing squashed under glass on the slide, the microscope discloses wonderfully few elements connected with the light production. There is the horny lantern film; pieces of tracheæ; the lung tubes of insects, what are apparently its blood-vessels, and a great number of transparent cells of half a dozen various sizes, some globular and others nummulitic; and a viscid fluid in which they are imbedded, having a granular crystalline composition.

It is quite clear that the light rays are a result of oxidation, produced in the same way as our own animal heat by cell decomposition. The only difference is, that, whether from any peculiar constituents—or this and the more minute size of the blood cells in the firefly—the wave-lengths are so short, that, instead of heat, light rays, including some of a very high order in the invisible spectrum, are produced. The blood cells may be supposed to have polarity of electric charge, and when oxidised and decomposed to yield the electricity up, but oscillating with the frequency to give rise to light waves. This action does not quite stop with the death of the insect, if the contents of the abdominal ring are exposed to the air so as to keep up the process, though short lasting, of oxidation.—I am, yours, &c., A. T. FRASER (*Col. R.E. Retired list.*)

Junior Athenæum Club, 116, *Piccadilly, W., December* 3, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

The Solotype Company, Lewes.—*Photograph of the Mayor of Lewes.*

W. Anderson, 364, Hamilton-place, Partick.—*Photograph of child, entitled "Ethel."*

RECEIVED.—H. HALL; "DOUBLE TONES;" SENLINS, and others. In our next.

BRITANNIA.—Yes.

G. PAULIN.—We can only suggest a threat of legal proceedings.

RICHARD.—Many thanks for your interesting note. We may possibly refer to it.

E. G. BRADLEY (Hon. Sec. Luton Camera Club).—Too late; the ALMANAC is published.

C. W. SINCLAIR.—Probably Marion & Co. or Houghton & Son can supply what you require. We cannot tell you of a maker of the goods. Most likely they are made on the Continent.

W. J. F.—You have quoted the London County Council regulation correctly. We fear there is little hope of getting it altered at present, as it was decided upon by the advice of experts.

COLOURED GELATINE.—R. SMITH says: "Will you kindly inform me where I can buy coloured gelatines in sheets about the thickness of enclosed sample?"—In reply, Cornellissen, Great Queen-street, W.C., sells coloured gelatines, but we are not sure whether of the thickness of the enclosed sample.

PROFESSIONAL.—1. *Photo-Ceramics*, by Mr. Ethelbert Henry, published by Dawbarn & Ward, 6, Farringdon-avenue, E.C. 2. No book that we are aware exclusively treats of the subject.

COLOURING BROMIDE PRINTS.—PAINTING asks: "Would you kindly tell me if the surface of bromide paper requires any preparation for painting in oils, and if so, what is necessary?"—No preparation is necessary.

CRACKED CONDENSER.—R. C. B. The diagram shows that, although the condenser is not of the most generally used one, the form is yet a commercial one, with some lanterns. Any optician who makes a speciality of lanterns will supply a new lens at a very moderate cost.

J. H. BALDOCK.—1. There is no book published on the subject that we are aware of. All that has been written on it has from time to time appeared in the JOURNAL. 2. Remove the objective. The more general way is to use a reflector with the light, and not a condenser.

DEFECT IN LENS.—C. H. W. The print shows that the lens has an unmistakable flare spot. This may probably be cured by a slight alteration in the distance apart of its components. We should advise you, however, to return the lens to the maker with a print from the same negative, like the one sent us.

JOHN DAY.—We have no knowledge of the person to whom you refer. It was unwise of you to part with your money without having obtained references. If you cannot get the goods, or the money returned, it appears to us to be a case for legal measures. Kindly note that it is against our rules to reply through the post.

BOOK ON PHOTO-CERAMICS.—P. CHAPMAN says: "Would you kindly inform me where I could obtain a book of instruction and materials required for making ceramic enamels?"—In reply: An excellent little book on the subject, by Mr. Ethelbert Henry, is published by Messrs. Dawbarn & Ward, 6, Farringdon-avenue, E.C.

REREDOS says: "I registered on November 3 last a photograph of a new reredos in a church. Can another person go afterwards and photograph the same subject for sale and reproduction legally, and are they liable?"—In reply: Yes; so long as your photograph is not copied the procedure is perfectly legal.

APPARATUS ON APPROVAL.—W. Y. X. As you sent the apparatus on approval, and cannot get its return, your remedy is in the County Court; but, as you cannot get any reply to your letters, the better way, in the first instance, will be to communicate with the Superintendent of Police for the district. The transaction almost looks like a fraud.

FINISHING BROMIDE ENLARGEMENTS.—T. BOWER. The surface of the paper may be roughened, to give it a tooth for crayons, by rubbing it over with an ink-eraser, or with fine cuttle-fish or punice powder rubbed on with the finger so as to slightly abrade the surface. Of course the powder must be very fine indeed, or it will make scratches.

SILVER IN BROMIDE AND CHLORIDE PAPERS.—T. WHALLEY. The simplest way to ascertain, approximately, the amount of silver there is in a sheet of paper is to fix it, without exposure to light, in hyposulphite of soda, making sure that all the bromide, or chloride, is dissolved out, then precipitating the silver as sulphide, and afterwards assay the sulphite obtained.

DISTILLING WATER (Wilts).—Yes; the information is quite right. A licence is required for a still, even if it is used only for distilling water. Even if you have the licence, which costs ten shillings a year only, you must not employ the still for purifying or rectifying methylated spirit, so as to get rid of the methyl and mineral spirit. You may, however, redraw the used spirit to get rid of the water, but that only.

E. W.—1. It is a slight improvement. 2. Theoretically, there is greater brilliancy, but in practice the screen is rarely used. 3. We cannot answer this query, because it is quite against our rule to express any opinion on the comparative merits of different makers' goods. 4. If the light be in the right position, the rays will be projected quite parallel, and a condenser is unnecessary. But why use a reflector? Why not adopt the ordinary arrangement as used in all lanterns?

COLLODION FILM.—B. MORRIS. If you want a thick film of collodion, pure and simple, and thicker than you can obtain with very thick collodion applied in the ordinary way, you can get it in the following way: Place a glass plate on a levelling stand, perfectly level, and pour on as much collodion as it will hold, and allow it to dry in that position. If a still thicker film is required, surround the glass with a paper border, so as to form a shallow dish, and then pour in the collodion and let dry as before.

BLISTERS ON C.C. PAPER.—BLISTERS says: "Kindly inform us if you can give us a remedy for blistering on C.C. paper; it is of German manufacture. We have tried everything we can think of, but still they come. Are others troubled with this?"—We have not heard of blisters with collodio-chloride paper for a long time now. A remedy has been suggested of immersing the prints, before toning, in a solution of alum; but we do not recommend such a remedy. Why not use another brand of paper that does not blister; there are others that do not?

ARC LAMP IN LANTERN.—H. G. M. CONYBEARE says: "I have failed to keep the light of my arc lamp in such a position as to illuminate the screen properly, although I have placed the carbons in all sorts of positions. I was advised to and am using a cored positive carbon; can this be the cause of the difficulty? The light is perfect for about five to ten seconds after striking the arc, but then becomes bad."—Is the lamp a focus-keeping one? If it is, the arc should keep always at the same point. If it is not a focus-keeping one, we can hardly understand its altering so soon as in five or ten seconds. It is possible, though scarcely probable, that the carbons are at fault, or it may be that the lamp is not adapted to the current. As the form of lamp is not given, or anything said as to the current, whether continuous or alternating, we can offer no further suggestion.

DEVELOPER FOR WET PLATES.—B. Wells writes: "An old friend of mine who used to work wet collodion, told me the other day that the common sulphate of iron (green copperas) was better for the development of wet-collodion plates than the pure protosulphate of iron, as it gave greater density, and that is what I want for process negatives. But surely it cannot be so energetic a developer? Your opinion will oblige."—Many of the old workers preferred the commercial sulphate, and liked the crystals, for the reason stated, and also that it gave cleaner negatives, *i.e.*, clearer shadows. It is not, weight for weight, quite so energetic in the developer, but that was compensated for by using a few grains more of the salt, per ounce, of the developer.

PAPIER-MÂCHÉ DISHES: ORDER FORM.—E. R. asks: "1. Will you kindly say if (from your own experience) it would be safe to wash, alum, and tone P.O.P. prints in papier-mâché dishes, as safe, in fact, as porcelain? I find the latter an expensive item, as assistants are not very careful with them. 2. Can you kindly favour me with a copy of an order form for customers to sign when they are giving orders through a canvasser? I have been awfully swindled during the last twelve months by canvassers bringing in bogus orders."—1. No. Not unless the surface and the material of the vessels are absolutely impervious—a very doubtful condition with the papier-mâché photographic dishes. 2. We know of no recognised order form. Surely you can draw out one that will embody the terms of your Club; we, of course, do not know upon what conditions you run your Club.

LIGHTING SITTER.—A. MARTIN asks: "Will you please give me your valuable advice on the following? My studio is twenty-five feet long, five feet each end, covered in on north side all ground glass, which is the best way to light a sitter? To put them under the light, or a little back from the light, and how much top and side light is sufficient to light a picture? An answer will greatly oblige."—The studio seems to be of good design and one easy to work. No set conditions can be given as to lighting the sitter, as each may require a different lighting, according to the features and the effect desired. The lighting best in one case may be the opposite in another. Place the sitter a little under the covered portion, and arrange the light, by means of the blinds, so as to get the effect desired. We would suggest that you get a few lessons in lighting from some professional photographer.

FEE FOR USING PHOTOGRAPH.—A. says: "A week or two ago we took two photographs of an interesting ceremony which took place here, and we sent copies of the same to two of the illustrated papers, stating our fee for publication of the same. One of the papers published them and sent the fee in due course. The second paper published them also, but, when applied to for payment, stated that they were not liable to us for payment, as they had obtained the photograph from another source. Now, as no other negative is in existence, is not this a direct piracy of our rights, and are we not justified to proceed against and recover by law? The photographs were not legally copyright; but does this make any difference, as we were not paid by any one for taking the photographs?"—Under the circumstances, as the fee for using was a condition, we should say you can recover, if you can prove that it was the print you sent that was used. You certainly should have made the photograph copyright, then there could have been no question.

RETOUCHING MEDIUM; SENSITISING BATH.—MEDIUM asks: "Will you please answer the following questions:—I made some retouching medium according to the formula in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1898—pale resin, 1 ounce; oil of turpentine, 1 ounce; oil of lavender, 2 ounces (page 1042). Although I did not obtain the very best oil of lavender, I obtained it from about the best chemist in the town. The ingredients were all placed in the bottle at the time of buying, and soon after placed by a fire; but, although the mixture has stood for about five days with frequent shaking, the resin does not appreciably dissolve. The liquid is now brown in colour. The top layer of sediment is darker than the rest. 1. How is it the resin will not dissolve? 2. Also, should a stronger or a weaker solution of silver nitrate be used for sensitising albumenised paper, to print from hard negatives? 3. What is ammonia nitrate of silver (for sensitising)?"—In reply: 1. The resin should have dissolved at once, and we cannot understand why it did not. No heat is required to get it in solution. Try again with material obtained from another source. Are you sure that you used resin? 2. Weak solution. 3. Oxide of silver dissolved in ammonia. Make a solution of nitrate of silver and add ammonia until the precipitated oxide of silver is redissolved.

VARIOUS.—R. MCCONCHIE writes: "1. A small box of iodine was laid down in too close proximity to two valuable prints, and they have been badly 'fumed,' they have gone purple on the back and yellow on the front; can I recover them? and by what means? 2. I wish to try bichromate printing. Can the operations be carried out by gaslight, as with ordinary printing-out paper? My dark room is very cold in winter, and if I could sensitise, dry and develop by gaslight in an ordinary room it would be a great comfort and convenience. 3. I read with interest the Australian 'Rococo' case in the JOURNAL. By the same week's mail I had photographs from my sister-in-law in Sydney, by, as she said, the new Rococo process. If you would like to see them, I will be glad to send them on for your inspection?"—In reply: 1. The iodine acting on the silver image was formed iodide of silver. That may be dissolved out by a solution of hyposulphite of soda; but we should expect that treatment would then leave the image much weaker than it was at first. If the prints were exposed to light, and then treated with gallic acid, with a drop or two of a solution of nitrate of silver, the iodide would be darkened, though we much doubt if by any means the prints can be restored to their original condition. 2. The bichromate printing operations may be conducted by gaslight; but the tissue must be dried away from the fumes of burning gas, or it will be rendered insoluble. 3. Thanks; we should like to see an example.

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Contents.

	PAGE
Ex Cathedrâ	801
Combined Baths *versus* Separate Toning and Fixing	802
Leaderettes:— Removing Marks from Matt Celluloid—Warm Tones in Collodion Transparencies—Coloured Positives—A Modified Gum-bichromate Process—The New Art Gallery for East London—Royal Academy Winter Exhibition	803
Development, Intensification, and Fixing in One Operation.—I. By W. B. Bolton	804
Foreign News and Notes:— Algraphia—Ferro-prussiate Paper—Coloured Prints on Fabrics—Parallelism of Camera and Object—Ammonium Persulphate—Amines in the Developer	805
At the Camera Club	806
The Dallmeyer Focometer. By Thomas R. Dallmeyer, F.R.A.S.	807
Toning Gelatino-chloride Prints	808
Colour Photography	808
The "Camera and the Wheel"	809
Notes from the West of Scotland	809
American Photographic Patents	810
An Italian Exhibition	810
Our Editorial Table	811
News and Notes	811
Meetings of Societies:— Royal Photographic Society—Photographic Club—Croydon Camera Club—Kingston-on-Thames and District Photographic Society—Richmond Camera Club—West London Photographic Society—Ludlow Photographic Society—Preston Scientific Society (Photographic Section)—Scarborough and District Photographic Society—Sheffield Photographic Society—Stafford Photographic Society—Edinburgh Photographic Society	812
Forthcoming Exhibitions	814
Patent News	814
Correspondence:— The Bennetto Process—Colour Photography—Home Portraiture—The Kinematograph Panic—Yorkshire Affiliated Photographic Societies—The Carriage of Exhibits—International Photographic Exhibition at Florence—Christmas Holidays	814
Answers to Correspondents	816

EX CATHEDRÂ.

The strong attacks recently made in the English press upon M. "Tanquerey," of free-portrait scheme notoriety, do not appear to have dismayed that indefatigable *chevalier d'industrie*, for his circulars are still being extensively distributed in this country through the post. The vigorous denunciations which have been directed to the nature of this man's business are surely sufficient to induce the Postmaster-General to refuse delivery of the circulars. It is to be hoped, when Parliament meets, that a question on the subject will be addressed to the responsible member of the Government. Could not Sir Benjamin Stone or some other photographic M.P. be induced to move in the matter? We again have to acknowledge receipt of several of the Tanquerey-Schneider circulars forwarded to us by readers, one of whom suggests we should have "something to say about it." What we have left unsaid on the subject of the various free-portrait swindles that have cropped up during the last seven or eight years is very little. We exposed the true nature of the scheme long before it attracted the notice of the outside press. This week we ourselves, at the offices of the Journal, are the recipients of a Tanquerey circular. The moving spirits of the concern are pronounced humourists.

Acetylene, like the cinematograph, seems in its early career to be accompanied by many misfortunes. On Friday last, the son of a jeweller at King's Lynn was making some experiments in an out-building in the manufacture of acetylene gas, when an explosion occurred, and the unfortunate experimentalist was instantly killed, while, at the same time, an assistant was rendered unconscious, and has become quite deaf from the accident. The details of the occurrence, as given in the daily press, are very meagre, as up to the time of writing an inquest has not been held; when it is, expert evidence will, no doubt, account for the mishap. It would seem, however, from the reports that the unfortunate victim instructed his assistant to apply a light to the burner, when immediately the explosion occurred. This would appear to indicate that there was a mixture of air with the gas, in explosive proportions, within the vessel. Acetylene, like the cinematograph, is perfectly safe in the hands of those who thoroughly understand what they are dealing with; but these constant accidents alarm the public, and County Councils as well.

* * *

At the monthly dinner of the Article Club, last week, the subject of "The Patent Law and the Community," was discussed. The Chairman was Mr. J. Fletcher Moulton, Q.C., M.P. In opening the debate Mr. Moulton alluded to the subject of English Patent Law and its abuses, and said that there were few cases brought into court in which there was not a fair chance of sustaining them. The real evil, he said, of the trading community was not the patents that went into the Courts, but the threats which were held out with regard to alleged infringements. He added that he thought that by a sensible arrangement the system of one patentee threatening another might be practically suppressed; but by this system of threatening we wonder how many of some photographic patents we have in our mind could have been, and are being, kept as a monopoly? Mr. Justice Vaughan Williams, in his remarks that there should be greater security for patents in England, added that in Germany patents were much more secure than in this country; but it might be mentioned that patents are not granted indiscriminately in Germany as they are in England to any one who likes to pay the fees.

* * *

A valued Derby correspondent is discontented with the praise we recently bestowed on the Bradford Corporation for

the excellent manner in which it aided the promotion of the Yorkshire Photographic Exhibition. He says: "On page 773 it says, referring to the Bradford Exhibition, 'We believe that this is the first time that the municipality of a great town has addressed itself to the duty of officially recognising the claims of photography to have, so to say, facilities for appealing to the understanding and the sympathies of the general public, as well as painting, sculpture, and other graphic arts.'" Our correspondent adds: "May I beg very respectfully to remind you that so recently as 1896, and also previously, the Corporation of Derby alternated their exhibitions of paintings with open photographic exhibitions, undertaking all the labour of organization and bearing all expenses. The exhibitions remained open about six weeks each, and were duly chronicled in the photographic journals." We gladly give publicity to the fact that the Derby Corporation preceded that of Bradford in its support of exhibition photography. Probably the principal features of each exhibition were not exactly parallel; but praise is distinctly due to the Midland municipality for the encouraging hand which it held out to a Photographic Exhibition. The question of priority in a matter of this kind is of less importance than the probable effect which these good examples will have in the future. We hope sincerely that what Bradford and Derby have done will stimulate other great municipalities to follow suit in so good a cause. That, after all, is the main point to keep in view.

* * *

On the subject of light filters and screens for orthochromatic plates, Messrs. Cadett & Neall, in the December number of *Dry Plates*, make the following announcement: "Our arrangements of apparatus for the measurement of colour luminosities are now nearly complete, and we trust to be able before very long to supply suitable screens for our quick spectrum plates. We may mention that we also have in view the still further improvement of our rapid spectrum plate, giving sensitiveness almost through the entire red, as well as the other portions of the spectrum. We ourselves would have no difficulty, theoretically, in making plates which are sensitive through the *whole* of the visible spectrum, but the difficulty of practical manufacture has stood in the way of making such plates. The very small portion we can give away in the extreme red, in order to be able to work these plates, is not of much consequence in practical work, and it enables us now to contemplate the manufacture of suitably prepared glasses for the dark room, as well as screens for use with the camera. Hitherto, in our directions, we have advised users to manipulate these plates in entire darkness, for the simple reason that we knew of the difficulty for the average individual to make his own light filters for the dark room; but, of course, as we use lights of a fairly safe character for the manufacture of these plates in our own works, it will be seen at once that we were quite aware that moderately safe lights could be made for these plates. We trust within a few days to be able to supply materials for dark-room illumination."

* * *

According to Anthony's *Bulletin* the importance of photography in the work of settling disputes and providing records for future generations has been taken up with active enthusiasm by the City of Boston (U.S.A.) in its official capacity, and a number of photographers are regularly employed by the different departments of the city government in making these records, filing them away or using them in the publication of the various city documents and department reports. The City Engineer and the Street Department employ a number of men upon this work, while the Police Department, under General Inspector William B. Watts, is preparing a large photographic studio, which will be fully equipped for the accommodation of those sitters who are forced to be candidates for the rogues' gallery. In addition to the regular photographers employed in this department, a great deal of work is done by professional men, who are hired specially for the work as occasion requires.

* * *

We read in an American contemporary that Misses Lilly and Emily Selby, two cultured young ladies from London, graduated from the Illinois College of Photography, at Effingham, Ill., recently. When they reached New York they made a tour of the city, visiting the various photographic studios, which resulted in their deciding to locate in that city. They began to look about for a location, and finally concluded to buy the Dana Gallery, one of the largest and best equipped studios in New York. The ladies are eminently qualified to do the very finest work. Their record in the college was the very best. Their specialities were lighting and retouching. We further learn that the Illinois College of Photography sends out men and women every month who are splendidly equipped for the work of their choice. This college now has the largest enrolment in its history.

COMBINED BATHS *VERSUS* SEPARATE TONING AND FIXING.

In concluding the article in our issue of November 18, wherein it was pointed out that any conclusions arrived at, either for or against the ancient methods of toning and fixing, may be quite misleading if applied to modern methods of working, we intimated that we should recur to the subject and bring more prominently into contrast the past and present conditions under which silver prints were, and are, produced, which may, or may not, have a marked influence on their stability.

In the previous article the negative of the past, which, by the way, is an important factor in the case, was referred to, and it was shown how widely different it was from that of to-day. It was so dense that it would take hours to print, or perhaps a whole day; so do some gelatine ones now, yet they may be, practically, very thin ones after all, inasmuch as the film itself is dense or stained, and the slowness of printing is solely due to the light being obstructed in the shadows; whereas in the collodion negatives of forty years ago, which took so long to print, the shadows were simply bare glass, yet the lights were as dense as those in the gelatine negatives just referred to. Therefore it is obvious that, whatever paper be used, whether albumen or gelatine, there must have been very much more silver reduced in forming the image in the former case than in the latter; consequently, there was, in the end, more actual metal present in the finished print to resist any after-influences. Here it will be seen that there is a very wide difference in the conditions to begin with.

We will now compare the albumen paper of the past with that of the present. The former had very little gloss on the surface, as the albumen was diluted with water before use; but,

as previously explained, it was heavily salted and highly sensitised; hence there was not only a large amount of chloride, but of free nitrate *in*, and on, the paper. The present-day paper, on the contrary, is very highly albumenised, but very lightly salted, not more than a third perhaps the extent it was formerly; while now it is but weakly sensitised, especially the ready-sensitised paper, and it contains but little free nitrate, the whole of the silver salts, both chloride and nitrate, being confined almost entirely to the albumen surface. Indeed, when printed, the albumen coating may be removed, leaving but a faint, if any, trace of the image on the paper; whereas in the prints of former days it was more *in* the paper than on its surface.

Of course, the more albumen there is on the surface of the paper the more "albuminate of silver" is formed, and that has always been quoted as one of the chief sources of the instability of albumen prints. This compound is said to be insoluble in the fixing bath, and it *is* very insoluble in hyposulphite of soda; yet by prolonged treatment in a strong solution some is dissolved. Doubtless, in the thin coating of the old papers, with several hours in the combined bath given in the previous article, very little remained in the finished print. With reference to the present-day albumen prints, let any one try the experiment of toning and fixing a print on it, made from a thin negative, in the old combined bath just referred to, and see the result. Such a simple experiment will at once demonstrate the difference between the conditions then and now.

Let us now consider the subject with reference to alkaline toning in connexion with the different conditions of negatives and paper then and now. Of course, the more silver that is reduced by the light the greater is the gold deposited upon it in the toning, and, as we have said, in the old prints the image was more in the paper than on its surface, it follows that more gold was deposited in toning, yet a large amount of silver was left unconverted in the paper; hence the deposited gold was always backed up with a considerable quantity of metallic silver to resist adverse influences. At present there is but little silver reduced, and little gold deposited upon it. Indeed, some makers make a feature of the small quantity of gold their papers require to tone or colour per sheet. Under such circumstances, the image may be looked upon more as a somewhat superficial stain, while the old ones were of a more robust, metallic nature.

In the matter of the fixing of the past and present alkaline-toned prints there is a difference. The former would stand a longer immersion and a stronger solution than the modern ones will do. In some cases now the prints have to be fixed in a weaker solution and in a shorter time, otherwise the tones and strength of the prints would suffer. Here it will be seen that with the modern method and alkaline toning, the conditions, by reason of the negatives and the paper, are vastly different from what they were when that method was first introduced.

Turning from albumen to gelatine papers, we find the same conditions prevailing, and probably in an enhanced degree, because the chloride is applied as an emulsion, and it contains but little free nitrate of silver, and that is confined entirely to the gelatinous film. When this paper is printed with the modern type of weak negatives, little metal is reduced in forming the image, and that only in the gelatine.

With regard to the ancient and modern combined toning and fixing bath—the former was given in the previous article—though weaker in hypo than many used it will be seen that it contained nothing but gold, and, sometimes a little silver as well, and hyposulphite of soda, and that in the proportion of ten ounces to the pint of water. In some of the "combined" of the present day the proportion of hypo to water, after the decomposition brought about by the alum, acid, lead, &c., is allowed for, is reduced to little more than an ounce to the pint, or a tenth of that formerly employed.

In the old bath the toning was a slow operation, but the fixing preceded the while, so there was no question that, however lightly the prints were toned, they were perfectly fixed. In the present method the prints must be removed as soon as the desired tint is obtained or they will be over-toned, whether they are toned or not.

In this and the preceding article the sole object has been to point out that any deductions drawn, either *pro* or *con* as to the stability of prints made by the past and present methods of silver printing may be quite fallacious, as the conditions obtaining then and now are so widely different.

Removing Marks from Matt Celluloid.—We have been asked how to remove the marks caused by friction from matt celluloid, in order to fit it for use as a focussing screen, as described a week or two back. In the first place, we should not think of applying to such a purpose a sheet of damaged material, when it is quite easy to have it in a fit state by using a new sheet or a freshly stripped waste negative. If an ordinary film negative be immersed for a short time in a solution of alum, formalin, or any of the usual acid clearing baths, the gelatine film will readily peel off, and the celluloid, after rinsing in clean water and drying with a soft cloth, will be as perfect, as regards surface, as when new. Cold water must be used or the celluloid will warp and "cockle." If it is compulsory to use a piece that shows bright markings, these may be removed by means of "Monkey" brand soap applied with a moderate amount of pressure, with a pad of flannel, or better, perhaps, finely powdered pumice; even better still, the two combined. The celluloid should be laid upon a sheet of wet glass or a perfectly smooth board, and the abrasive applied with considerable pressure until, on rinsing, the marks are found to have disappeared. Should the celluloid from any reason become warped, it may be restored to perfect flatness by heating the two glasses between which it is mounted as hot as the hand will bear, and pressing it between them while still hot.

Warm Tones in Collodion Transparencies.—Collodion plates, especially emulsion or those developed with alkaline pyro, are well known for the facility with which they enable warm tones to be obtained; but we have recently seen a series produced, we believe, by a Continental amateur, which show the widest range of colour we remember to have seen. These had been purposely prepared to show what could be done in the way of tone from the same emulsion, and the colours vary from deep blood red, through all shades of brown, to purple brown, purple black, blue, and neutral black. The method adopted appears to be essentially one of toning; the emulsion employed is an ordinary one, and the developer only differs from that commonly used in being strongly restrained, in order to allow sufficient exposure to be given to produce a red colour to start with. From that point the treatment is virtually the same as the toning of a paper print, both gold and platinum being used. The action of the toning solution can be arrested at any stage in precisely the same manner as with a print on paper, the gold giving a blue shade to the image, platinum a brown, while the neutral blacks and greys are obtained by shortening the exposure or by using a hydroquinone or similar developer. The

specimens submitted to us were all from the same negative, showing that the variation in colour is in no way due to the character of the image, and the tones exhibit as much variety as it is possible to imagine.

Coloured Positives.—The method quoted in a recent issue from the *Bolletino della Società fotografica Italiana*, for the production of coloured positives, appears to have given rise to some misapprehension as to its *rationale*, as one at least of our readers appears to imagine that the picture is produced in the same manner as an ordinary carbon print, viz., by dissolving away portions of the gelatine film after exposure, and wants to know how this can occur with a negative film which has been hardened with alum as well as by development. If he will read the description again more carefully, he will see this is not the case. Such a film is certainly sufficiently hardened to preclude its use in the manner he suggests, but not sufficiently so to prevent its being rendered still harder, or, in fact, perfectly impervious to aqueous solutions. He will observe that, after sensitising with bichromate of potash, it is printed under a *transparency*. By this means the *high lights* are hardened and rendered non-absorbent, while the shadows retain the power of taking up the solutions to be afterwards applied, and the picture is formed by the precipitation of various coloured pigments in the more or less absorbent portions of the film.

A Modified Gum-bichromate Process.—In the same column of Foreign News and Notes a "Black Printing Process" is described which might engage some of the attention of the devotees of gum bichromate. A gum-bichromate solution, without colouring matter, is applied to paper and dried, and after exposure washed and again dried. It is then evenly coated with shellac varnish containing lamp black, or, we presume, any other colouring matter, and finally immersed in dilute hydrochloric acid "until the whites are clear." It is stated to give results like copper engravings, but whether from "black and white" or half-tone negatives is not stated; at any rate, it would seem to offer as fair a chance of rendering gradation as the ordinary gum bichromate.

The New Art Gallery for East London.—On many occasions, during the past few years, we have referred to the way that Art Exhibitions are appreciated at the East End of London. Hitherto they have been held in more or less improvised buildings. A few weeks back we mentioned that it was proposed to have a permanent building for the purpose. This is now practically *un fait accompli*, for last Friday the foundation stone of the building was laid by Viscount Peel, in presence of a large number of the promoters of the idea. At a meeting held afterwards, at the Toynbee Hall, the Chairman, the Rev. Canon Barnett, who has been the principal promoter of the loan exhibitions, said that the cost of the site of the New Gallery was 6000*l.*, and that that sum was raised in a fortnight; also that the Charity Commissioners had devised a scheme by which an endowment of 500*l* a year was secured from the Parochial Charities; furthermore, that the cost of the new building was secured by contributions, which included the builder's charges, so that only about a thousand pounds had now to be raised for furniture and the like.

It seems a little hard on the residents of the East of London that if they wish to see any of our National Art Treasures they should have to make a pilgrimage to the far West, Trafalgar-square, or still farther West to South Kensington. If part of our National Art Treasures were located at the East End, they would be equally comeatable to residents of the North or South of London as those located at the West and extreme West of the City. Moreover, the whole of them, or even a small portion, cannot be inspected in a single visit. London, and so are our National Collections, is growing fast, day by day, and there seems no reason why some of the latter should not be located at the East End as well as at the West and extreme West.

Royal Academy Winter Exhibition.—There is to be another Winter Exhibition this year at the Royal Academy, confined to works of the Old Masters this time, specially to those of Rembrandt. We learn that the owners of many of the pictures that figured in the great Amsterdam Exhibition of this master's work have expressed their willingness to lend their treasures to this Royal Academy Show. Foreign owners of Rembrandts have also signified their willingness to lend their pictures for the occasion. Such an opportunity will probably never occur again in this country. This famous artist was celebrated for the lighting of his subjects, and photographers would do well to visit the Exhibition in order to study that—the most important thing to them. For years past photographers have been producing so-called "Rembrandt portraits," but a sight of this great master's works will show what a travesty of Rembrandt are the majority of the so-called Rembrandt photographs.

The exhibition of Rembrandt's work will not however be confined to the Royal Academy Exhibition alone, for we learn that the keeper of the Prints and Drawings at the British Museum is organizing, from the wonderful resources of the Museum, an exhibition of Rembrandt etchings. These are to be arranged, as far as possible, according to chronological order—or at least the most recent view of it. In addition to the etchings there will be an exhibition of drawings of the great master. It is doubtful if any museum or collection, even the famous one at Amsterdam, contains so many of the great Dutchman's etchings and drawings as is possessed by our own British Museum.

DEVELOPMENT, INTENSIFICATION, AND FIXING, IN ONE OPERATION.

I.

It is a common expression that "there is nothing new under the sun," and, while there may be much truth in it, it is undeniable that many known facts remain a very long time before they are applied to any useful purpose. Take, for instance, Mr. Howard Farmer's "physical" intensifier for gelatine plates, consisting, in its original form, if I remember rightly, of a solution of hypo, saturated with bromide of silver, small quantities of which were added to the ordinary alkaline developer after the necessary detail had been obtained. This, undoubtedly, was the first idea of the system of physical intensification that has come into notice again during the last year or two, though in itself it never attained to any position of practical utility. About ten years ago, however, the original method was modified by Mr. J. B. B. Wellington, and his formula remains practically the basis of the modern process, though it again has not acquired a very general adoption, owing, no doubt, to its comparative expense, which has deterred all but a few experimentalists from attacking it in a serious manner.

But, setting on one side the question of expense, it has been, I think, recognised by those who have really tried it as one of the best, if not *the* best intensification method applicable to gelatine plates, by reason of its effect being proportionate to the original gradation of the negative, and almost unlimited in the extent to which it can be carried without any danger of stains or fog, its only limitation being the possible softening action of the sulphocyanide upon the gelatine film. For collodion plates this danger does not exist, and Mr. Wellington has described it as a perfect intensifier for that purpose—a recommendation which, after some months of nearly constant use and experiment, I am disposed to fully concur in. In fact, as I hope to show, it possesses capabilities that, properly worked out, promise in a great measure to revolutionise our present system of development.

To explain what I mean by the latter remark, I may say that for several months past I have been using the ordinary pyro-ammonia developer, by means of which I bring out the picture to a certain stage, and, when that is reached, a few drops of a separate solution are added to the same developer to effect intensification; and, if the conditions of exposure are correct or within certain bounds, the auxiliary solution may be added in sufficient quantity to perform the fixing operation as well. But, further than this, the solution of sulphocyanide and silver acts not only as an intensifier, but it may

serve also as a restrainer, and, by suitable handling, the character of the image may be modified to almost any extent, from the utmost delicacy and softness to the clear glass and opacity of the old pyro-developed wet plate. It is true the bulk of my experiments have been made, or perhaps I should say my regular work has been done, with collodion emulsion plates; but I have seen enough of its action with gelatine films to feel at least sanguine that by suitable modification of the solution its application to gelatine can be reduced to the same degree of certainty as with collodion.

Going back for a moment to the title of this article, I may say at once that I do not attach a great deal of importance to the matter of development and fixing in one operation, and only avail myself of that power when it happens to be the easiest way of performing development, that is, of getting the requisite gradation and density. It may be that the gradual intensification may have to be continued with too small a quantity of the sulphocyanide solution to have a proper fixing effect; or, on the other hand, it may be necessary to fix at an early stage of intensification, or even before commencing it, which is, I believe, the plan hitherto invariably followed. But, when the action of the solution is studied, it will be quite clear that its developing and intensifying functions may proceed simultaneously.

It is upwards of twenty years since I first experimentally combined fixing and development, and mentioned the possibility of doing so at the time in these pages, but pointed out the uselessness of the power from a practical point of view. It was in connexion with Sammann's hydrosulphite developer (mentioned a week or two back) that I found our old friend hypo, treated with metallic zinc in the same manner as the neutral or acid sulphite of soda, had the power of developing an image; but its fixing power predominated to such an extent that, even when the picture "flashed up" instantaneously, it had not time to acquire any useful strength before the plate was fixed. However, by mixing sulphite and hypo in graduated proportions, pictures were developed and fixed in a single operation, but merely as a curious experiment.

Before speaking of formulæ let me say a few words upon the theory of the action of the compound solution. I have already stated that the separate functions of development and intensification may proceed concurrently, but perhaps that statement requires some modification, since I am not sure to precisely what extent the addition of the sulphocyanide arrests the *chemical* development. That it does arrest it is abundantly proved by the case of a much over-exposed plate by adding a few drops of the intensifying solution as soon as the image begins to appear, when, instead of "rushing up," as it would otherwise do, the visible portions of the picture only gain density, and the shadows (if a negative) or the lights of a transparency are practically altogether arrested, except, as I shall point out, when the over-exposure is very considerable. I am inclined to think, however, from close observation, that, when but a small proportion of the intensifying solution is added, the "chemical" action of the solution continues to assert itself to some extent as well as the physical—that, in fact, chemical and physical development proceed side by side.

But it must be borne in mind that any fresh detail that may make its appearance after the addition of the sulphocyanide and silver may be attributed to either of two causes, to the "chemical" action of the alkaline pyro alone, or to the "physical" action of the combined solutions, and where to draw the division line between these two actions is the difficult point. It must also be taken into consideration that the exposure necessary to impress an image that is susceptible of physical (is very much greater than what will suffice for chemical) development. With collodion dry plates prepared with the bath the advantage in favour of the alkaline method over pyro and silver used to be reckoned as about four to one, but with emulsion plates it is undoubtedly much greater. And this is why I am inclined to think that where, in the case of a normal or faulty exposure, fresh detail is brought out by the intensifying solution, it is due to its "chemical" action, because, to bring it within the scope of the physical development, not only would the exposure have to be greatly increased, but even then a very protracted application of the developer would be necessary.

But, given a sufficiently extended exposure, the developing, as distinguished from the intensifying, action of the solution does undoubtedly come in. This can be proved by stopping the development at a very early stage, as already described, by the addition of a small quantity of the sulphocyanide silver solution so as to leave the least exposed portions of the plate blank. In this state they will remain for a long time, though the rest of the image will go on increasing in density until, if the exposures have been sufficiently long to bring the least-exposed parts within the range of the physical action, a stage will be reached at which development begins afresh and new detail makes its appearance. A plate exposed by contact under a negative of ordinary density to the light of an inch or two of magnesium wire will show this double development.

I was going to cite as another proof the fact of the possibility of developing an image on a fixed plate, but I doubt very much whether the result then produced is due to any remaining effect of light as such. At any rate, it is quite possible, nay, quite easy, with a little patience, to develop an image of printable strength when the plate is fixed directly after exposure. In this case, as in the last, it is necessary to give a much longer exposure than for alkaline pyro, but, if this be done and the plate thoroughly fixed and well washed, a perfectly clean image is gradually developed, which, with patience, can be brought to fair printing density. Indeed, there seems no reason why, with freshly mixed developing solutions, unlimited density should not be attainable. I have repeatedly, with one solution, suitably reinforced from time to time, developed lantern slides to full density and with very little stain.

It will thus be seen that the use of the silver sulphocyanide solution not only provides the means of intensification, but also of very materially modifying the gradations of the image, and this, let it be said, without any contradiction of the Messrs. Hurter & Driffield's principle, since they specially mention the "building-up" system of intensification as the only method of altering gradation. Thus, by adding the intensifying solution at an early stage as I have suggested, not only does the building-up process commence, but a check is put upon development by reduction, if it is not altogether arrested. The check is at any rate far greater and entirely different in character to that produced by bromide or any of the other retarding agents in ordinary use. The intensification, too, may be placed under two distinct heads, for, while the reduced silver forming the image acts as a nucleus upon which the added metal is deposited, the influence of exposure is more strongly exerted—physical development, in fact, takes place—on the better-lighted portions of the image, and contrast is promoted.

Thus, in practice, with a normal exposure, the development is commenced with the ordinary pyro ammonia and bromide, and may or may not be completed in this manner. If a slight further intensification be deemed desirable, a very small quantity of the intensifying solution is added, and the process carried on without fixing until the proper density is reached. If the image appear in all its detail, but much lacking in density, two courses are open: it may be fixed and then intensified, or continued additions of the silver solution added until gradual fixation takes place; but the former plan is the more certain in its results and less liable to irregularity of action. In case of under-exposure, chemical development alone is carried on until all possible details are out, while over-exposure is met by either fixing as soon as the requisite detail is visible, however faintly, or by adding the sulphocyanide in quantity sufficient to fix, which amounts to the same thing.

I have described the mode of working with collodion plates, but it will be easy to understand that the thicker films and slower fixing of gelatine necessitate a considerable modification of the formulæ, while the principle involved remains pretty well the same. I shall therefore next proceed to describe the solutions used for collodion, and the directions in which they may be usefully modified to suit gelatine.

W. B. Bolton.

FOREIGN NEWS AND NOTES.

Algraphia.—Kampmann, who in 1896 was one of the first to report on the use of aluminium as a substitute for the lithographic stone, now reports that Bohn & Herber, of Würzburg, have invented a rotary machine with which aluminium plates can be used

with excellent results. As aluminium has proved successful as a support for collotype, it is hoped that this machine may also be used for collotype printing.

Ferro-prussiate Paper.—M. Chambon, of Dijon, has been experimenting with the ferro-prussiate process, and recommends the following as an improved formula, which gives a paper much better than any commercial make:—

Gum arabic	2 grammes.
Ammonio-citrate of iron	3 „
Tartaric acid	2 „
Distilled water	20 c. c.

Dissolve thoroughly and place in a bottle capable of holding 50 to 60 c. c., and add—

Liquid ammonia	4 c. c.,

and shake well. Then dissolve—

Potassium-ferridcyanide	2·5 grammes, in
Distilled water	10 c. c.,

and add to the other mixture, shake well, and allow to stand for a quarter of an hour, and it is then ready for use. After printing place face downwards on water for ten seconds, then remove and expose to the air for a short time, and then wash thoroughly in water. The colour is somewhat pale, but is made much richer by immersion in—

Eau de javelle	50 c. c.
Water	1000 „

and then wash thoroughly and dry.

Coloured Prints on Fabrics.—Stewart F. Carter lately recommended, before the Society of Chemical Industry of New York, the following process of obtaining coloured prints. The fabric is sensitised with the well-known ferro-prussiate mixture:—

Ammonio-citrate of iron	75 grammes.
Potassium ferridcyanide	75 „
Water	400 c. c.

After exposure the print is thoroughly washed in water, and then immersed in a 0 1 per cent. solution of caustic soda till the blue colour is discharged, then thoroughly washed in hot water, and then in a hot solution of sodium phosphate (at 77° C.). It should then be dipped in cold water, again in hot, about 71° C., and again in cold water. The fabric is then immersed in the following solution:—

Resorcin	3 to 5 grammes.
Gelatine	5 „
Water	1000 c. c.

The gelatine is dissolved in the water at 71° C., the fabric immersed for two or three minutes, and then removed, and the colour added, and, when dissolved, the solution is heated to 82° C. When sufficiently coloured, it is removed and dipped into boiling water, and then cleared in a soap bath at 71° C., and then washed in hot and cold water, and dried. Gallocyanine may be used, and gives violet and blue; alizarine gives red; and alizarine brown, brown. Natural dyes, such as logwood, may also be used. Kopp suggested, in the *Bull. Soc. Ind.*, Mulhouse, the following process: Soak the fabric in the following:—

Kalle's indigo salt	15 grammes.
Sodium bisulphite lye (40° B.)	20 c. c.
Sodium carbonate	8 „
Wax	50 grammes.
Gum water	600 c. c.

Dry in the dark, and expose from an hour to a day in the sun, when the image will appear of a yellow or dark brown colour, and then wash in warm caustic soda solution, and then in water.

Parallelism of Camera and Object.—Herr Gerstenbrandt, of Graz, suggests that the quickest way to place the camera back parallel to a flat object which has to be copied is, first of all, to level the camera with a level and then to place against the copy a compass set in a square block of wood, and, noting the point to which the needle points, to place the compass against the ground glass and shift the legs till the needle points to the same point.

Ammonium Persulphate.—Professor Namias, in the *Boll. della Società Fotografica Italiana*, states that if an over-exposed carbon print be soaked for half an hour or longer in a one per cent. solution of sulphuric acid, to which five per cent. of ammonium persulphate is added, it may be easily developed with warm water. The action is the conversion of the chromic oxide, which makes the gelatine insoluble, into chromic acid, and the gelatine is thus free to dissolve. He also states that possibly the above mixture might be useful for etching, as it dissolves zinc and aluminium without the evolution of hydrogen, and, further, that an ammoniacal solution of ammonium persulphate will dissolve copper without the evolution of gas.

Amines in the Developer.—MM. Lumière and Seyewitz last month communicated to the Société Française the results of their researches on the use of the amines as substitutes for alkalies in the developer. They have found that monoethylamine, monomethylamine, dimethylamine, and trimethylamine may be used; the two former produce dichroic fog, but the latter acts well and gives a more energetic developer than the caustic alkalies, and with pyro the developer does not discolour. The particular formulæ recommended are:—

Hydroquinone Developer.

Hydroquinone	8 grammes.
Sodium sulphite anhydrous	35 „
Solution of trimethylamine (thirty-three per cent.)	100 c. c.
Water	1000 „

Pyro Developer.

Pyrogallol	10 grammes.
Sodium sulphite (anhydrous)	30 „
Solution of trimethylamine (thirty-three per cent.)	60 „
Water	1000 c. c.

Paramidophenol Developer.

Paramidophenol	10 grammes.
Solution of trimethylamine (thirty-three per cent.)	150 c. c.
Saturated solution of sodium sulphite	1000 „

Propylamine, butylamine, amylamine also act in a less degree, as does also ethylene diamine, and benzylamine gives a very faint image. The aromatic amines have no developing power. The amines haves an intensely disagreeable smell, which may militate against their general use, but they may be useful in special cases.

[The use of trimethylamine is not new; it was suggested as an accelerator in the pyro developer in 1890.—Ed.]

AT THE CAMERA CLUB.

Members had retained a pleasant recollection of the paper read at the Club some months ago by Captain Wilson Barker, of H.M.S. *Worcester*, on "Photography at Sea," and the same lecturer therefore received a cordial welcome on the 5th inst., when he was set down for another subject, viz., "Photographic Notes on Natural History."

Captain Barker has devoted much time to meteorology, as every seaman should, seeing that so much of their well-being must always depend upon the vagaries of the weather, and he seeks to inoculate other amateur photographers with some of his own enthusiasm, and tells them that the study of this part of natural history is both amusing and of high scientific value. But they must not be content with making occasional pictures of cloudland; they must make careful notes, and be also careful in the arrangement and classification of their pictures. Natural History covers far more ground than was understood by the term in the past. It has been separated into a huge number of branches, and each of these requires a lifetime for its adequate study.

Captain Barker's first pictures (and many of them were pictures in the highest sense) comprised studies of cloud formation, cirrus, stratus, and cumulus, both alone and in combination. Many of these pictures evoked much applause from those who knew the difficulty of securing detail of feathery forms upon such a bright background. Next came a series of pictures illustrative of the evolution of a storm. First, a tiny cloudlet dimly seen on the horizon, "like a man's hand," growing in subsequent pictures until the storm is at its height; then the pause which comes so often in the middle of such a disturbance, the sky still all unsettled, with patches of blue sky seen between masses of scud. Once again the sky is clouded o'er, and the series of pictures closes with one of a waterspout.

In February 1896 King Frost held sway over the metropolis, and studded the Thames with ice floes, which stopped all navigation on the

river. Such stubborn frosts are, happily, not common in the metropolitan area, and it is well that photography should be enlisted in the service of recording the unusual effects presented by such a state of things. Captain Barker's pictures of the view from his own ship, lying at Greenhithe, together with those of the *Worcester* itself, with small icebergs attacking it as they float down stream, were most interesting, because they represented the Thames under unusual conditions.

The next pictures were illustrative of physical geography, and perhaps the most interesting were those which showed the life history of a river from its birth in a glacier to its end in a lake. The particular glacier was that of Grindelwald, and several pictures were shown which gave a good idea of the solid masses of ice which were being slowly pushed down towards the valley below. Then the glacier abruptly ends, and a small stream of water flows from beneath its projecting edge, a stream which quickly grows to the proportions of a river and broadens out into a beautiful lake. All this is somewhat more interesting than the manner in which geographical facts were impressed upon the minds of most of us at school, and we are fain to admit that the pains of learning were altogether out of proportion to its pleasures. Happily, observers and recorders like Captain Barker are laying up in store better times for scholars to come.

From alpine snows we are transported to Brazil, where, at Pernambuco, there is a curious reef piled up of sand and mud, and owing its origin to the trade winds which blow on that coast with persistency. We as yet only observe that coast from a ship, the reef being marked by a line of surf, but, when we get nearer, we find that the reef forms a natural breakwater within which is a snug harbour. As to the surface of the reef itself, it is full of pools, containing objects which would cause the heart of a naturalist to rejoice.

The next pictures were devoted to geology, the first being of the temple of Jupiter Serapis in the Bay of Naples, which has so often afforded geologists an illustration of subsidence and after elevation in comparatively recent times. For the pillars of this temple are pierced by some of those boring molluscs which make such havoc with stone when they get the chance, clearly showing that for some lengthened period those pillars must have been submerged beneath the sea, although they are now high and dry.

Captain Barker's zoological series comprised a photograph of the water spider in its nest—that curious creature which may be looked upon as the inventor of the diving bell, for its nest is below water, and it carries down with it bubbles of air for breathing purposes. Another picture was of a spider of the trap-door variety, which Captain Barker found at Bahia (Brazil), its home being in the bark of the palm-tree. Protective mimicry in animals was illustrated by the well-known dead-leaf insect, which counterfeits so closely the foliage upon which it rests.

Going from small things to great, we were shown pictures of some of the sacred crocodiles of Kurrachee, which are worshipped by the Hindoos. Formerly these creatures were allowed to roam the country at their own sweet will, but they gobbled up the children at such a rate that the Government intervened, and they were enclosed, so that their liberty was curtailed. They are so well fed that they take no notice of visitors, and show not the slightest objection to being photographed.

The lecturer here showed a picture of certain fish which he had caught, as a useful method of recording not only appearance but size as well. The fish were each hung horizontally by two threads, and immediately beneath them was a scale of feet and inches. The plan may be recommended not only to naturalists, but to fishermen generally, whose tall stories as to their catches are apt to raise a derisive smile unless corroborative evidence be at hand. Our only fear in recommending this procedure is that certain fishermen might be induced to make diminutive scales for their own particular use.

Captain Barker brought his remarks to a close with several capital pictures illustrating the flight of gulls and other birds. He said that he believed photography was destined to add much to our knowledge concerning flight. All present theories were unsatisfactory, and he regarded none of them as being right. He had watched a bird soaring for ten minutes at a time without any apparent movement of the wings, and under such conditions it would keep pace with a steamer doing thirteen or more knots.

The camera used by the lecturer stood on the table near him. It was of quarter-plate size, and was held to the stand by a readily adjusted ball-and-socket movement. Dr. Charters White, who occupied the chair, initiated a short discussion, and the proceedings closed with a vote of thanks to Captain Wilson Barker for his interesting paper.

On the following Thursday Mr. Cadett gave his promised paper on "Photometers for Colour Photography" which, it may be remembered, was postponed from a previous date owing to the absence of the President Captain Abney, who is well known to take a great interest in this subject. He, of course, occupied the chair for Mr. Cadett's lecture.

Mr. Cadett commenced his remarks by reminding his hearers how a sportsman delights in bagging big game, and he himself felt a thrill of satisfaction in having "drawn" Captain Abney on the present occasion. They all knew how much photography was indebted to Captain Abney, and everything which he stated or wrote was entitled to grave consideration, even if in some cases one might not be able to endorse the conclusions at which he arrived. He hoped that evening that he (Mr. Cadett) would say nothing to raise the Chairman's ire, it was certainly not his intention so to do, for he acknowledged Captain Abney as the only real authority on the measurement of colour. On one point they certainly agreed, and that was in their estimate of the Rumford photometer as the best at present procurable.

The subject of colour measurement had really not been tackled in earnest save by Captain Abney himself—others had worked on the trial and error principle, and, although if plenty of time were available that method might lead to satisfactory results, it had no commercial value. You must knock the sentiment out of a thing when you strive to give it a commercial value. Captain Abney, he was aware, looked at a problem from a different standpoint, he established principles. In commerce one must be more exact, and, taking this view, he might perhaps question some of the President's figures.

The photometer which he had to show this evening was based upon the instrument described by Captain Abney in one of his books, but he had altered the position of the mirror. He used an arc light as the luminant, a speculum mirror, and the box in which the apparatus was contained was partitioned in two places in order to get rid of scattered light. The necessary shadows of the coloured rays which had to be compared were cast by a brass rod blackened in a gas flame. Members would presently have the opportunity of examining the apparatus and could take readings for themselves.

The discussion was opened by Mr. Sanger Shepherd, who said that he had made, with Mr. Cadett, a number of measurements with the apparatus, and was much struck with the uniformity of the results obtained. The coloured glasses used have been chosen with the greatest care, and he believed that the apparatus generally was almost as perfect as it could be. The Chairman then said that he thought he might usefully join in the discussion instead of leaving his remarks to a later stage. It was a satisfaction to him to find that the principles which he had enunciated had been taken up in a commercial spirit; but he must certainly object to the dictum that commercial accuracy is better than scientific accuracy, for he believed that the reverse was the case. Mr. Cadett believed in his (Captain Abney's) principles, but not in his figures.

Captain Abney then showed on the blackboard how the lecturer had fallen into error in his criticism of one form of photometer by assuming that the luminant was an arc instead of an argand burner, the latter giving an equal light all round, while the arc has its greatest intensity in one direction only. He also showed how the difference in the figures quoted by Mr. Cadett had probably arisen.

He quite endorsed Mr. Cadett's estimate of the future importance of colour photography, and said that he himself had been engaged for months in making experiments which were just finished, and he believed that, when his results were published, they would be found of value to those who were working at the problem. Mr. Cadett always trails his coat on the ground to be trodden on by an opponent, but in the end he always tucked it up again and they parted good friends.

After a few words from Mr. Cadett, the proceedings, which had been listened to with the greatest attention by the members present, closed with the usual vote of thanks.

We hope that we shall have an early opportunity of publishing an illustrated discription of Mr. Cadett's new apparatus, which cannot be adequately described without diagrams.

THE DALLMEYER FOCOMETER.

It is obvious that the use of this focometer is not limited to the application of the theoretical considerations involved in the formula which was deemed most convenient for a tele-photographic system. Many other well-known methods of focometry may be carried out by its use, particularly in the determination of the focal length of an ordinary positive system.

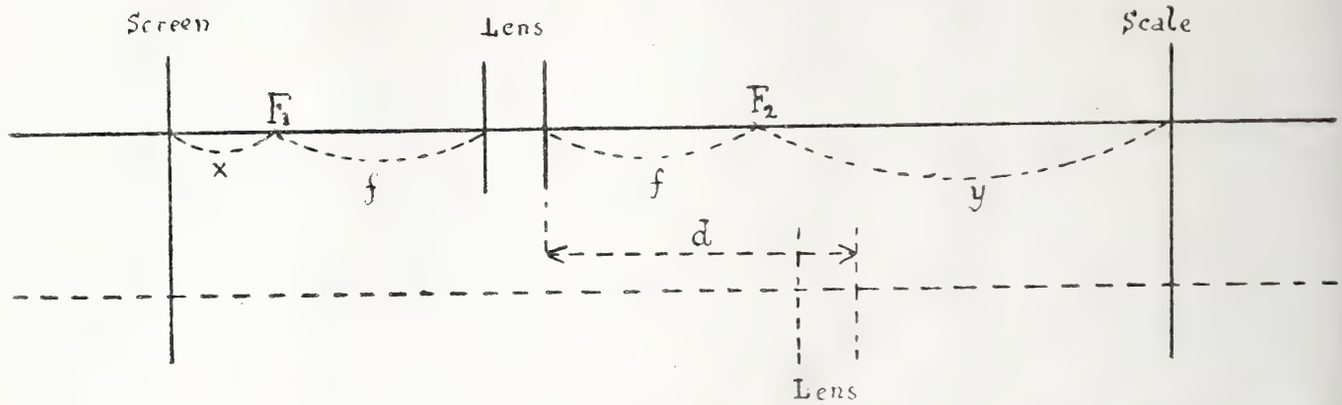
One "method of magnification" has already been referred to in a footnote (page 760); the following method has been found very satisfactory

and involving little trouble when applied to ordinary positive systems, and is therefore given:—

Scale and screen are clamped at a distance of about five to six times the approximate focal length of the lens apart (see figure).

There are two positions of the lens in which the scale focusses upon the screen. Let the distance moved through by the lens be called d; also let a well-defined mark or length, l, upon the screen give images, h and k, in the two positions of the lens respectively ($h > k$); then the focal length of the lens—

$$F = \frac{d}{\sqrt{\frac{h}{k}} - \sqrt{\frac{k}{h}}}$$



$$y - x = d; \quad xy = f^2$$

$$\frac{h}{l} = \frac{y}{f}; \quad \frac{k}{l} = \frac{x}{f} \therefore \frac{h}{k} = \frac{y}{x};$$

and $$\therefore \frac{d}{f} = \frac{y - x}{\sqrt{xy}} = \sqrt{\frac{y}{x}} - \sqrt{\frac{x}{y}} = \sqrt{\frac{h}{k}} - \sqrt{\frac{k}{h}}$$

$$\therefore F = \frac{d}{\sqrt{\frac{h}{k}} - \sqrt{\frac{k}{h}}}$$

Example: A lens supposed to be about $8\frac{3}{4}''$ focal length.

$$d = 14{\cdot}60; \; h = \frac{70}{100}; \; k = \frac{15{\cdot}4}{100};$$

$$F = 8\,78''$$

THOS. R. DALLMEYER, F.R.A.S.

TONING GELATINO-CHLORIDE PRINTS.

WE take the following interesting notes from *Photographic Scraps* for November: Some revival of the subject of toning P.O.P. has been met with in the discussions raised at some of the Society meetings recently. We welcome the spirit of investigation which has prompted the discussions. In these days of ready-made plates, ready-sensitised paper, ready-made (and often injurious) developers, &c., &c., the *independent* investigator is too rare compared with former times, when every step gained was the result of careful thought and experiment, even if not made on altogether scientific lines.

We always follow, with the utmost interest all suggestions or opinions as to the better working of photographic plates and papers, and we carefully and methodically test all ideas put forward, if they do not condemn themselves.

As regards toning, which is the subject under consideration, we have to report that the recent suggestions made for different methods of working do not offer any advantage over our prescribed formulæ, and in some cases they even carry with them grave risks and disabilities. We need not particularise, but would say with authority, that not one of the toning methods recently spoken or written of is worthy of adoption.

The Ilford toning bath, given with Ilford P.O.P. in 1891, remains (after seven years' experience) the best, simplest and surest formula that can be used, and this test of time amply confirms the careful and scientific research which we expended before we ventured to put the paper on the market, or decided on the best formula to give.

A little note on the subject of the quantity of paper that a given volume of the bath will tone may be of interest.

The Ilford usual toning bath is:—

Sulphocyanide of ammonium	20 grains.
Water	20 ozs.
Gold chloride	2 grains.

The above bath will tone a $24\frac{1}{2} \times 17$ sheet of paper to a cold tone in about ten minutes. For medium and warm tones the best results are obtained by diluting the bath with water, until the desired tone is reached, in from eight to ten minutes. The proportions of gold and sulphocyanide to each other must never be altered.

For medium tones the added water may be made up to about 30 ounces, and for warm tones up to 80 ounces.

The number of prints in the bath must always be proportionate to the quantity of solution used—that is, a 20 ounce bath will tone 16 pieces $6 \times 4\frac{1}{4}$ inches (= a sheet $24\frac{1}{2} \times 17$ in) to a cold purple tone, and if the bath is diluted, the number of prints should be increased in exact proportion to the water added.

The salt and alum bath should always be used before toning, followed by washing, as recommended.

One who had tried other methods of toning recently wrote us as follows:—

"After hearing from you I followed your instructions carefully, and am well repaid by the results. Not one of the many batches of prints which I have toned since has turned out other than successful, and I realise to the utmost your view that the manufacturers' formulæ must be the best and simplest if we workers would only be content to follow them."

As a contrast to this level-headed correspondent, we quote from another letter recently to hand. The writer claims to be a professional photographer of fifteen years' experience, and yet he has the hardihood to suggest to us the following plan of working P.O.P.:—

"Put prints in water for one minute, tone; put *direct* into alum; then *direct* into hypo, and then wash."

The photographer who proposes this undoubted plan of obtaining sulphur toning and all its risks must have been oblivious to all that has been written on the evils of the combined bath, and is fatally ignorant of his subject.

For the Ilford "Special" P.O.P. the formula to be used is:—

Sulphocyanide of ammonium	20 grains.
Water	20 ozs.
Sodium sulphite	2 grains.
Gold chloride	2 ,,

Allied to this subject of toning, and arising to some extent from the foregoing suggestion, is the question of preliminary washing of prints.

Those that are only *slightly* washed will apparently tone more readily, but will lose tone much more in the fixing bath. This is a trouble that many workers appear to meet with, and we can only enforce our recommendations to wash thoroughly as per instructions, and the trouble will not be met with.

COLOUR PHOTOGRAPHY.

BEFORE the London and Provincial Photographic Association on December 8 Mr. E. J. Wall and Mr. T. E. Freshwater performed some experimental work with the lantern, including the subject of colour, the former gentleman describing the various experiments undertaken. The particular lantern in use possessed an advantage over ordinary types in that it could be employed for projection in the usual way, as well as for microscopic projection and spectroscopic work. In front of the condenser system, and supported upon the base of the lantern, is carried an arrangement, sliding at right angles to the axis of the lens, upon which is placed the ordinary objective at one end, while at the other end rests either the microscope or spectroscope, whichever may be in use. Such a lantern becomes very convenient when it may be desired to show an ordinary photograph of an object and a photo-micrograph of the same, as the one may be quickly substituted upon the screen for the other by sliding the moving front along.

Several slides having been projected by this means, Mr. Wall proceeded to show the action of a large number of glass colour filters in cutting out certain parts of the spectrum. This was the more readily demonstrated by throwing upon the screen, by the side of the spectrum, a small patch of the colour filter being tested, showing at once the depth of tint and

the extent of its influence upon certain parts of the spectrum. This portion of Mr. Wall's remarks and demonstrations was particularly instructive in showing in a manner which could be appreciated exactly what was of use in colour work as also for dark-room illuminations.

Passing on to three-colour work, Mr. Wall reviewed the Clerk-Maxwell theory of colour, and said that the Clerk-Maxwell curve of primary colour sensations was the proper basis for this work. And here he emphasised the fact that there were absolutely no primary colours, as was commonly supposed, but only sensations. In speaking of a primary colour one inferred a colour which could not be split up, but there was none which could be truthfully said to be monochromatic and not to be split up. Monochromatic light could only be obtained from one single line of the spectrum. Clerk-Maxwell discovered that it was not necessary to use more than three colours to get every tint in nature, and it was upon such a foundation that the three-colour process was built up. The three negatives necessary for the process require to have a ratio of gradations conforming to the Clerk-Maxwell curves, and photographs taken in such a way by means of Mr. F. E. Ives's invention, the photochromoscope, were shown upon the screen. First of all, the three discs—red, green, and violet—were brought together upon the sheet, the combination approximating to white light, which is more or less perfect according to the illuminant used. On the present occasion a blow-through oxy-hydrogen limelight was employed, but the effect would have been nearer the truth with a mixed jet, and more so had the electric arc been available. However, it was sufficient to show that the three lights blended together gave a white disc, and consequently when three positive slides were placed in position in their respective lanterns, according as they represented the red, green, and violet sensation, each allowing only the necessary quantity of light to pass, the result was a very good picture, with very little to suggest the crude colours of which it was composed, and a delicacy of tints little short of that in the original of the photograph.

Another application of the three-colour process was described, namely the Joly method. In this a screen, ruled very finely in red, green, and violet, is placed in contact with the sensitive plate. Exposure and development result in a negative built up of lines of equal width with those of the colour screen, but, of course, in monochrome. Thus it may be said that, starting from any given line, every third line represents the red of the original, from the next line every third line represents the green, and from the next every third represents the violet. It amounts to this, that, although the principle is the same involved in the Ives process, Joly combines his three-colour filters in one, and works with a single plate instead of three. From the negative obtained in this fashion a positive is made, and to import to the slide the colour which this positive only represents in varying gradations and lines, a "viewing screen," ruled in orange, green, and blue-violet, is mounted in contact with it, with very nice adjustment, and taking care that the orange lines occur opposite the lines in the positive representing the red, and so on. A few slides, lent by Mr. Child Bayley, were shown upon the screen, one being a sectional slide to make clear the principle of the process.

In answer to questions upon the subject, Mr. Wall explained that the standard required in the colour filters was practically that they should give a rendering of the spectrum in gradations equivalent to Clerk-Maxwell's colour-sensation curves. They were actually tested beforehand photographically with the spectroscope. As regards the weakness of the green in some of the examples, this defect was difficult to cure. Slight errors in exposure and wrong use of the developer were patent causes of bad rendering. He found metol was the best developer for this work, and for Joly's process Lumière's Panchromatic plate, and Cadett's Spectrum for Ives's process, were the most suitable plates. He did not think, by any form of retouching whatever, that it would be possible to strengthen or bring down any part of the picture which was abnormally coloured. All this rested with the original taking of the photograph, unless, as in the present case, any defective colouring might be laid at the door of unsuitable illumination for the lantern.

THE "CAMERA AND THE WHEEL."

Lecturing last week on this subject at the Thornton Heath Polytechnic, Mr. Bynoe said there were probably no other two pastimes which could be taken up that could be worked together better than photography and cycling; for the individual that cycles and does not photograph would find the pleasure of his trips greatly enhanced if he took photographs of the places he visited, and the photographer that does not cycle would be amply repaid if he were to purchase a cycle, as he would then be able to reach places perhaps far prettier and more suitable for his particular class of work than he had thought of previously.

He then went on to explain, for the benefit of those that did not know anything of photography, the way in which a photograph is taken, and, following this, he made quite clear the difference between single and rapid rectilinear lenses, and mentioned that if one could not afford a R.R. lens, a single lens would do most excellent work, especially if carefully made and corrected, so that the distortion was brought to a minimum; in fact, by diagrams which were put on the screen, he showed that single lenses were now made in such a way that the amount of distortion was scarcely perceptible, and could only be detected by the experienced eye. Following this, the definition of the fixed-focus lens was explained, and also the way in which magnifiers work.

In drawing the attention of his audience to this, Mr. Bynoe pointed out that, if a very long-focus spectacle lens is placed in front of an ordinary photographic lens, it causes the cone of rays collected to become parallel rays, and thus near objects can be brought to a focus in the same plane as objects at a long distance from the camera. This method of focussing as used on some fixed focus cameras he claimed is superior to the focussing scale and pointer of other hand cameras, as, with magnifiers, one knows exactly what distances are in focus, while, with the other method, a point at a certain number of feet away is known to be in focus, but the number of feet nearer and farther away than that particular point is an unknown quantity.

The lecturer then passed on to the question of the most suitable support for the sensitive surface, and he said that cut flat films were undoubtedly much more convenient than glass plates for cyclo-photographers, globe-trotters, and for all hand-camera work, as they are unbreakable, flexible, and extremely light.

When using films it is desirable to have a camera in which a large number can be placed and changed automatically, as it is not always convenient to resort to a dark room after making every few exposures, and, after mentioning several devices which have been tried and have failed, Mr. Bynoe explained that the one method which was good was the gravity system, and with the aid of a cleverly worked-out mechanical slide he showed the "Frena" system, and the way in which it discharges is forty-cut flat films, one by one.

The way in which a cycle could be used as a tripod was then demonstrated, and with a large and varied series of slides from negatives taken at home and abroad on flat-cut films, the lecturer neared the close of his lecture.

At the conclusion Mr. Bynoe drew the attention of his hearers to the fact that at present Thornton Heath was without a photographic society, and as there were a very large number of amateur photographers in the neighbourhood, and most polytechnics were the home of a photographic society, he thought it would be a good thing if this Polytechnic could see its way to forming such a society, and if a Society were formed and he could be of any service to it, his services would be theirs as far as his engagements would permit.

The proposition that a photographic society should be formed at the Polytechnic was seconded by Dr. Fowler, who also proposed a vote of thanks to the lecturer and to the Mayor of Croydon, who occupied the chair.

NOTES FROM THE WEST OF SCOTLAND.

A case of considerable importance to photographers and photographic societies has recently arisen in connexion with a public entertainment given under the auspices of the Shettleston Camera Club, and which will likely at an early date come before one of the Glasgow law courts. It would appear that some time during the summer season a member of the Shettleston Camera Club was engaged photographing a few points of interest in the district, and amongst other views taken was one of a celebrated tavern about a hundred years old. When exposing the plate, there happened to be passing at the time on his cart a well-known native of the village, who, it would appear, has a strong prejudice against being photographed, or having his picture shown in public.

On a recent occasion a lantern entertainment was given by the Shettleston Camera Club, and among other views thrown upon the screen was the one of the old tavern, in which this party appears in a somewhat prominent manner in the foreground. On this picture being shown without the consent of the party being had, exception was taken on the grounds that the exhibiting of such tended to hold the man on his vehicle up to public ridicule, and that, primarily, the view complained of is in reality a picture of the man and his cart, and not that of the Old Drum Tavern.

The case is now in the hands of the solicitors, and will, no doubt, be followed with much interest by all interested in photography, raising as it does a very important question as to the legality of certain pictures being taken and exposed to public view without the consent of parties interested

We understand this is the first occasion upon which the legality of a certain questionable form of snap-shot working has been brought under the observation of our law courts. In many instances, no doubt, what is really an impertinent intrusion by camera men has been committed, but generally such conduct has been resented without appealing to the judicial bench for damages.

With the approach of Christmas the various photographic societies are holding their annual exhibitions, and this year one or two new fixtures fail to be noted in addition to those of previous years. The Eastern Photographic Association has for the first time brought together a goodly show of work by its members in Bridgeton Public Halls. This is a new Society formed in the East end of Glasgow, and hitherto has had a very successful career under the able guidance of its Secretary, Mr. Thomas Hughes.

During the year that has passed at least two new societies have been formed in and around Glasgow, and one noticeable feature lies in the

popularity photography is acquiring among what may be termed the artisan class of workers. Several of our large manufacturing establishments and factories are contemplating forming photographic societies in connexion with their works. Certainly, in the West of Scotland there is no falling off in the popularity of the camera, and this, no doubt, is partly due to the moderate-priced but excellent apparatus now obtainable by the working classes.

The Glasgow and West of Scotland (Glasgow's premier amateur society) will hold their annual Exhibition at an early date. This is becoming quite an important function in photographic circles in Glasgow. Another very long list of additional members has been added to the roll again this year, and everything in connexion with the Society is flourishing.

The Glasgow Photographic Society, which is largely composed of professional workers, is striving to regain some of its popularity enjoyed in former years, and strenuous efforts are being made to not only increase its membership, but to bring about a better attendance at their monthly meetings. After a long spell of leisure, Mr. Wm. Lang, F.C.S., who for many years acted as President of the Society, has been prevailed upon to again take an interest in the Society's welfare, and, no doubt, in the near future, under the pilotage of Mr. John Stuart and Mr. George Mason, brighter days are in store for Glasgow's Parent Photographic Society.

Some strong comments are being made in local photographic circles regarding the composition of the Committee formed in connexion with the Photographic Section of Glasgow's next International Exhibition, which is to be a big thing in Kelvingrove during 1901.

As matters now stand, it may be said that all our local societies have been left out in the cold, and are virtually unrepresented in this important function.

Our local opticians are having a very busy time of it with lantern and cinematographic work. During the winter season Glasgow is always inundated with bazaar schemes and sales of work, and the cinematograph has become quite as much a feature in bazaar programmes as the time-honoured raffle. This, no doubt, has advertised well several of our local opticians, and has led to important engagements elsewhere among nobility and royalty, and anyone desirous of securing a good display of the cinematograph has to book the order many weeks beforehand.

In lantern work the electric arc light has never been popular in Glasgow, and it is marvellous what can now be achieved in cinematographic projection by means of several of the newer forms of high-pressure jets. At least, two of our best exhibitors dispense entirely with regulators in the use of these jets, and work direct from the cylinders by means of fine adjustment valves, by which means they claim to get more out of their jets than by the use of regulators, which more or less limit the pressure to from twelve to fifteen pounds per square inch.

What must be termed a somewhat new departure in photographic competition continues to be highly popular with the members of the Glasgow and West of Scotland Amateur Society, who now regularly introduce lecturette competitions in connexion with their annual Christmas show. This year there will again be an interesting competition in this respect. As an outcome of which several good amateur lecturers have been brought forward who otherwise might never have had an opportunity of showing their ability in such a *rôle*.

AMERICAN PHOTOGRAPHIC PATENTS.

As the result of a visit to the United States Patent Office, Mr. James E. Price, in an American contemporary, supplies the following interesting details relating to American photographic patents :—

From the time the first patent concerning photography was issued (on May 8, 1840), there have been granted for all purposes in this connexion 1841 patents. Of these there are 29 in the Daguerreotype class. The others—the figures for which may be of benefit to the inventor—are, in alphabetical order, as follows: Actinometers, 8; bath, 8; burnishing, 63; cameras, 178; the latter being added to by 27 kinetographic, 123 magazine, 43 multiplying attachment and 20 panoramic. Camera stands number 56; colouring processes, 48; dark rooms, 44; embossing, 46; finders, 12; focussing devices, 21; heaters and driers, 5; mechanical printing, 90; mounting, 23; photo-sculpture, 3; pictures, 22; plate holders, 175; printing and vignetting, 174; processes, 60; retouching, 36; roll holders, 88; shutters, curtain, diaphragm, pivoted and sliding, 194; studios and accessories, 62; sensitive surfaces, 79; trays and tanks, 98.

The first American patent in the photographic class was, in the language of the old specification writer, for "a method of taking likenesses by means of concave reflectors and plates so prepared as that luminous or other rays will act thereon." In describing his apparatus and manner of operating same, the inventor says in part :—

When the camera—that is, the box with the reflector, &c.—is to be used, the person whose likeness is to be taken should be placed in a chair, to which some suitable support for the head should be attached to enable him to be perfectly still. The camera should then be placed with the open end immediately opposite the person. A trial plate is then to be placed or put against the frame and the focus adjusted. The trial plate is then to be removed, and the plate, paper, or other material prepared for being acted on by luminous rays, put into its place and allowed to remain as long as required to form the image. A convenient size for such camera would be as follows: box, inside, 15 inches long, 8½ inches high and 8 inches wide; reflector, 7 inches clear diameter and 12 inches in focus. The plate or other material on which the picture is to be formed should be 2½ inches long by 2 inches wide."

This improvement in "ancient" photography was invented by Alexander S. Walcott, of New York, N.Y.

The next oldest photographic patent issued in this country was given to Benjamin R. Stevens and Lemuel Morse of Lowell, Mass. This was for an improvement in the mode of fixing Daguerreotype impressions so as to allow colours to be applied to them. The patent is dated March 28, 1842. The inventors' claim is as follows :—

"A mode of preparing Daguerreotype impressions so as to fix them on the plate, and adapting them to the reception of paints and colours, by coating the same with varnish or solutions of gum, using for the purpose of coating said plates any kind of varnish or gum, and any preparation of varnish or gums which will produce the intended effect."

These old pioneer patents form interesting links between the far and slow-going past and the rapid and progressive present. In the old time one who sat for a picture had to be quiet and patient until the slow work of likeness transfer was accomplished. Now the camera is exceedingly more rapid in its work than the individual is in motion. Every movement can be caught, and even the speedy bullet, invisible to the human eye, can be pictured in its aerial flight.

It is unfortunate that there is no model of the first invention in the photographic class patented in the United States. There are many models in this class in the collection of the Patent Office (now kept on the second and third floors of the Union Building in Washington), but few, if any, date further back than the year 1851. The exhibit has in it 348 models of photographic apparatus. Of these a large number are cameras, although not a few of them appear at first glance to have been made for almost any purpose other than that of taking pictures. One is round, with a conical front portion, having at the tapering end the brass tube and object-glass; another, made of tin, is in shape of an old-fashioned circular lantern, while a more modern, though unique specimen, is in shape of a trunk, having an oval top and protecting lengthwise strips of wood. The exhibit contains also a number of old photographs, some of them being finely coloured; and near these is a wooden model of a photographic room. This is oval-oblong in shape, and resembles a soldier's helmet with the spike left off.

AN ITALIAN EXHIBITION.

The Società Fotografica Italiana have decided to hold during April and May, 1899, an international Exhibition to celebrate its tenth birthday. The following are the classes, &c. :—

Class I.—Historical, including apparatus and results prior to the introduction of gelatine plates. Each exhibitor will receive a special diploma.

Class II.—Artistic Photography. This will include studies of head, half and full-length figures, groups, landscapes, seascapes, mountain work, instantaneous, flower and animal studies, and architecture. Exhibits will have to pass before a jury of artists and photographers for acceptation.

Class III.—Mechanical Photography, which will include negatives illustrating special processes, negatives illustrating retouching, reducing, intensifying, prints representing new processes, cyanotype and kindred processes, positives on metal or other support, transparencies of all kinds, ceramic enamels, prints coloured by substitution processes, enlargements, objects in natural size illustrating the use of the telephoto and spectacle lenses, examples of orthochromatic photography, artificial light work. If possible, laboratories will be fitted up to illustrate each process.

Class IV.—Photographic materials of all kinds (not lenses), cameras, plates, sensitising solutions of all kinds, &c.

Class V.—Photo-mechanical Processes, which includes photo-mechanical work of all kinds, as well as machines, materials, &c.

Class VI.—Photographic Optics and Apparatus of Precision, including lenses, spectroscopes, cells, prisms, condensers, lens grinding apparatus and photo-grammetric instruments, tele-photographic, aeronautic, micro-photographic, X-ray, and all physical, astronomical, meteorological instruments, &c.

Class VII.—Scientific Photography and Photographic Books. This includes examples of photo-topography, cartography, tele photography, micro-photography, skiagraphs, medical, ethnological, anthropometric, astro, spectro, and meteorological photography, study of explosives, and movement, exploration, colour, and pinhole work, also all photographic books.

Class VIII.—All Industrial Applications of Photography.

Class IX.—Society Exhibitions. A diploma will be granted to all societies competing.

Prizes will be given for the best scientific or technical essay, for a novel or story illustrated by photographs, for negatives showing good

technical and artistic treatment, for half-tone illustrations, and for scientific work.

During the Exhibition a conference will be held which will deal with artistic photography, the unification of photographic nomenclature, and the copyright of photographs.

Full particulars may be obtained from lo Segretario dell'Esposizione, Società di Belle Arti, Via del Campidoglio, Firenze. The jury will be divided into three sections, artistic, industrial, and scientific, and they will award as a maximum twenty marks to any exhibit. Exhibits receiving eighteen or more will be awarded a gold medal, from seventeen to fourteen marks a silver medal, from thirteen to ten marks a bronze medal, and from nine to six an honourable mention.

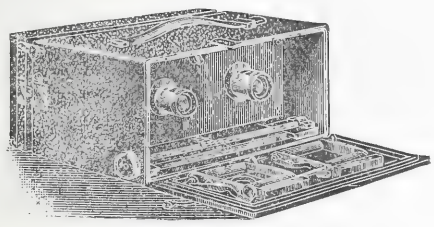
Our Editorial Table.

The Optimus Stereoscopic Hand Camera.

Perken, Son, & Rayment, Hatton-garden, E.C.

Appropriately enough at a time when the subject of stereoscopic photography is receiving renewed attention in our columns, and there is a prospect of binocular work again growing largely in favour among photographers, Messrs. Perken, Son, & Rayment have brought to our notice a very serviceable form of stereoscopic hand camera which they are introducing. The size of plate required for this camera is $6\frac{1}{2} \times 3\frac{1}{4}$, that is, the double-lantern plate. Double dark slides and focussing screens of both sizes are provided, so that not only may the camera be employed for binocular work, but also for single $3\frac{1}{4}$-in. pictures, the unutilised half of the camera thus being available as a full sized finder. This is an exceedingly convenient and common-sense arrangement, by which the valuable opportunity of using the instrument either as a binocular or ordinary hand camera is obtainable at will.

The camera is fitted with the usual collapsible septum for stereo work



and focussed by means of a rack and pinion. Lenses of $3\frac{1}{2}$ to 4 inches focus are fitted to the camera. We cannot too strongly advise the use of comparatively short-focus lenses for this kind of work, for the trimming down of the resultant pictures very greatly diminishes the field of view, and obviously the longer the foci of the lenses used the narrower becomes the included angle of the finished stereograph, which, of course, means the sacrifice of a considerable amount of the effect of relief in the picture.

The shutters of this camera are constructed on the blind principle, and by a simple arrangement controlling the releases either a binocular or monocular exposure can be given at will. The camera is well and neatly made, and we can strongly recommend it to those who contemplate taking up that most delightful branch of work, hand-camera stereography. Of course, the instrument can also be used on a stand as occasion demands.

The "Elge" Sensitiser.

L. Gaumont & Co., 25, Cecil-court, Charing Cross-road, W.C.

This is a sensitive solution for application to letter paper, post cards, and other suitable surfaces or supports. The instructions for use are as follows: "Spread the sensitiser evenly with the brush; this operation should be done in a weak light. Dry your paper in the dark. Expose it under a negative until an image is obtained slightly fainter than the final results should be. Wash for two minutes, changing the water twice; fix for ten minutes in ordinary hypo. Then wash it for ten minutes in running water. Press between two sheets of white blotting-paper; then dry. To obtain further variations of tone, any known fixer can be used." It is obvious that, by the employment of ready-prepared sensitising solutions, the skilful photographer can obtain a great variety of effects, and thus for special purposes the Elge solution should find many applications.

Messrs. Gaumont are also the agents for Artigue paper, supplied in red, black, sepia, or blue, and make a speciality of retailing the whole of the materials for this interesting process.

Messrs. W. Butcher & Son, of Blackheath, have sent us a sample box of their new Flexible Hymn slides. They are now putting these up in boxes of one dozen. They have also added thirty new hymns, which now makes five complete sets. There is a great advantage in these hymns being printed on to a flexible material, as they can be carried about in the pocket. Messrs. Butcher are also now printing them on a material that does not cockle when being shown in the lantern; one of these hymns can be left for quite twenty minutes with a high-power jet behind it without being affected by the heat in any way.

News and Notes.

Photographic Club.—Wednesday evening, December 21, at eight o'clock, Beginners' Night. "Preparation of Negatives for Printing," by Mr. E. Dunmore.

This (Friday) evening, December 16, Mr. T. C. Hepworth, F.C.S., lectures on "Photography Up to Date" at the Bishopsgate Institute, Bishopsgate-street Without, E.C.

Royal Photographic Society.—Photo-mechanical Meeting, Tuesday, December 20, at 12, Hanover-square, at eight p.m. "On some Colloid Printing Methods," by E. Sanger Shepherd.

We are sorry to learn of the death of Mr. Lessey Beard, photographer, of Clevedon. The deceased gentleman, who was only twenty-five years old, was a Fellow of the Royal Photographic Society and a frequent exhibitor.

Professor Vivian B. Lewes is of opinion that acetylene will play an important part in the railway lighting of the near future, as twenty per cent. of it added to oil gas doubles the illuminating value and enables the gas cylinders to run for double the time at less than double the cost. If improvements in the method of manufacture lead to the cheapening of the calcic carbide, an unbounded future is opened to this interesting hydro-carbon.

Atbara and Omdurman.—A lecture on the battles of Atbara and Omdurman, illustrated by limelight views from photographs taken on the field of battle, will be delivered at St. James's Hall, at eight p.m., on Tuesday evening, December 20, by Mr. René Bull, special war artist and correspondent of *Black and White*. Mr. René Bull, we understand, has already shown his marvellous pictures with great success in Dublin, when a large and fashionable audience was assembled, including the Lord Lieutenant of Ireland, Lord and Lady Roberts of Candahar, Mr. Gerald Balfour, and Lady Betty Balfour.

Cook's Ten guinea Tour.—We have received from Messrs. Thomas Cook & Son their illustrated programme of popular tours for the winter and spring season. It contains a large number of attractive excursions for the inclusive sum of ten guineas. Not only may tours, ranging from ten to seventeen days, be made to Rome, or to Nice, Cannes, and Mentone; or, again, to the Swiss Riviera on the sheltered shores of the Lake of Geneva, to Davos Platz, and other similar places, but even yachting cruises in the Mediterranean of thirteen days' duration, visiting Algiers, the Balearic Islands, Tunis, Palermo, Naples, and other interesting places by the steam yacht *Midnight Sun*.

Edinburgh Photographic Society.—The Annual Exhibition of Photographs will be held in the rooms of the Edinburgh Photographic Society, 38, Castle-street, Edinburgh, from Saturday, February 4, 1899, to Saturday, February 25, 1899. The entries close on Wednesday, January 25, 1899. The reception of pictures closes on Saturday, January 28, 1899, at 10 p.m. A special gold medal has been offered by the President of the Society for the best picture in the Exhibition, the work of an amateur member. The following classes are open to all (gold, silver, and bronze medals in each class): Class 1. Landscape, Seascape, and Architecture. Class 2. Portraiture, Figure and Animal Studies. The Judges are Messrs. John Smart, R.S.A., Edinburgh, J. Craig Annan, Glasgow, and W. M. Warneuke, Glasgow. All communications should be addressed to the Secretary, Mr. J. S. M'Culloch, W.S., at 2, George-street, Edinburgh.

Who Invented Spectacles?—Who first invented spectacles? These aids to vision appear to have come into use about the fourteenth century. The earliest reference to them is in the work of Bernard Gordon, Professor at Montpellier, who speaks of a collyrium, devised by him, which allowed a person to read without spectacles. In 1360 Guy de Chauliac, in his treatise on Surgery, refers to the use of the lenses. The invention of spectacles is sometimes attributed to Roger Bacon, who died in 1225. Further research, however, has shown that in 1215 Savino degli Armati, a Florentine, was the first who worked glass into the form of a lens. For him, therefore, may justly be claimed the honour of having invented spectacles. He died in Florence in 1317, and was buried in the Church of Santa Maria Maggiore. On his stone is a Latin inscription, of which the following is a translation: "Here lies Savigno degli Armati, of Florence, inventor of spectacles. May God forgive his sins."—*British Medical Journal*.

Photographing the Zodiacal Light.—What is known as the zodiacal light has been more studied among the Moslems than among the Christians, because the former regulate the beginning and end of their Ramadan by it, and nothing tends so much to observation as religious fervour or the prospects of a good meal; however, this reproach is in process of removal, and it was reported to the last meeting of the Astronomical Society that Captain P. Molesworth had succeeded in out-distancing the Mohammedans by obtaining a photograph of this peculiar celestial light, which is seen immediately before sunrise or after sunset, marking the spot where the orb is to appear or just sunk from view. This is believed to be the first time such a feat has been accomplished. Many theories have been propounded to account for this cone of nebulous light, but, now that it has submitted to the camera, it may reasonably be hoped that the true explanation of its existence may soon be found. Mr. Backhouse reported that the morning zodiacal glow was at present visible in the north of England. On clear mornings it should also be discernible in the south, although it is now rather late in the year for it. The great point is that it has been photographed.

PHOTOGRAPHY IN COLOURS.—On Tuesday evening, the 6th inst., Mr. R. Child Bayley (Assistant Secretary of the Royal Photographic Society) lectured on "Photography in Colours" at the Royal Victoria Hall, Waterloo-road, now the People's Palace for South London, but perhaps better known as the "Vic," the once-famous music hall dear to the denizens of the classic region called the New Cut. The lecturer treated the subject in a popular manner, giving a brief but lucid outline of the theory of colour vision, explaining the methods of Messrs. Lippmann, Joly, and Ives, and illustrating his remarks by some very beautiful experiments, which were received by the frequent applause of a large audience. Some slides, lent by Professor Lippmann, were shown, as also several by Dr. Joly's process, and the illustrations of the Ives three-colour method included many very successful pictures by Mr. Saville Kent. The lecture was listened to with the greatest interest, and was evidently very highly appreciated.

ROYAL INSTITUTION.—The following are the lecture arrangements at the Royal Institution before Easter:—Sir Robert Ball, six lectures (adapted to young people) on Astronomy; Professor E. Ray Lankester, ten lectures on the Morphology of the Mollusca; Mr. A. Henry Savage Landor, three lectures on Tibet and the Tibetans; Dr. Allen Macfadyen, four lectures on Toxins and Anti-toxins; Mr. William Poel, three lectures on English Playhouses in the Fifteenth, Sixteenth, and Seventeenth Centuries; Sir Alexander Mackenzie, three lectures on Liszt, Tschaikowsky, Brahms (with musical illustrations); the Right Hon. Lord Rayleigh, seven lectures on the Mechanical Properties of Bodies. The Friday evening meetings will begin on January 20, when a discourse will be delivered by Professor Dewar on Liquid Hydrogen; succeeding discourses will probably be given by the Right Hon. Sir Mountstuart E. Grant Duff, Mr. Victor Horsley, Professor H. S. Hele-Shaw, Mr. Richard R. Holmes, Sir Frederick Pollock, Bart., Professor H. L. Callendar, the Right Hon. Lord Rayleigh, and other gentlemen. The year 1899 is the centenary year of the Royal Institution, and arrangements are being made with a view to its celebration in a fitting manner. Details will be announced at a later period.

THE Fifth Annual Exhibition of the Bootle Photographic Society took place at the Masonic Hall, Merton-road, Bootle, on Friday, December 9. His Worship the Mayor of Bootle (Vice President of the Society) kindly opened the Exhibition, and spoke at some length on the humble origin of the Society, and followed its existence down to the present time. The President of the Society (Mr. E. T. Cockerham) then presented his Worship with a framed enlargement of the Mayoress, Mrs. Brewster. His Worship, on behalf of the Mayoress, kindly accepted same. Captain Sibthorpe moved a vote of thanks to his Worship, and was ably seconded by Mr. W. T. Wright (Hon. Treasurer). The motion was carried unanimously. About 400 photographs, oil paintings, and water colours were on view from 6.30 p.m. till 8.30 p.m., when the Society's prize-slides were passed through the lantern by Mr. T. A. Lancaster. The results of the Society's competitions are as follows:—Champion Class, T. Farrelly, silver medal. Class I., silver medal, T. A. Lancaster; bronze, C. C. Trewavas. Class II., silver medal, L. D. Wood; bronze, T. A. Lancaster. Class III., Miss M. E. Wright; bronze, T. A. Lancaster. Class IV., bronze medal, Miss S. I. Wright. Class V., silver medal, Miss M. E. Wright; bronze, Dr. Owen. Classes VI. and VII., and Junior Class, no awards on account of insufficient entries. The Judges were Messrs. W. Prior Christian, John H. Welch, and T. F. Lloyd, of the Liverpool Amateur Photographic Association.

THE ESSEX CYCLING UNION.—The Fifth Annual Photographic Competition of the Essex Cycling Union was held at Clerkenwell Town Hall on the 2nd inst., and this year the whole five classes were thrown open to amateurs, whereas in previous years the four classes have been confined to members, and only one thrown open. Taking the Exhibition as a whole, some good work was shown, particularly in the Hand-camera Class; the cycling subjects, however, are exceptionally poor, which rather points to the fact that the wedding of the cycle and camera has not been productive of much good up to the present. The following are the awards made by the Judges, Messrs. John H. Gear and E. J. Wall.—Class A, Portraiture and Figure Studies: first prize, gold medal, W. McLean, No. 33, *The First Lesson;* second, gold-centre medal, Harry Wade, No. 1, *Secrets;* third, silver medal, J. B. Maclachlan, No. 23, *Jeems.* Class B, Landscape and Seascape: first prize, gold medal, Charles F. Inston, No. 111, *Storm Breaking;* second, gold-centre medal, G. H. Lamb, No. 85, *Morning Mists;* third, silver medal, Harry Wade, No. 117, *Two Lug Peaks;* fourth, diploma, G. J. T. Walford, No. 49, *Silver Birches.* Class C, Cycling subjects (sets of four): first prize, gold-centre medal, withheld; second, silver medal, W. McLean, No. 131, *Racing in Ireland.* Class D, Hand-camera subjects (sets of six): first prize, gold-centre medal, Charles F. Inston, No. 139; second, silver medal, J. Kearney, junr., No. 142; extra silver medal, W. D. Welford, No. 144; diploma, W. J. Croal No. 170. Class E, Beginners, any subject: first prize, J. F. Haden, No. 50, *Pont-y-Pair.* Class F (Members'): silver medal, Ben Freeman, junr., No. 14, *Dorothy;* diploma, S. H. Capper, No. 118, *Outward Bound.*

ONE MONTH'S IMPRISONMENT FOR INDECENT PHOTOS.—Nathaniel Barton, of 12, Canning-street Sheffield, was charged before the Sheffield stipendiary, on the 2nd inst., with having exhibited indecent pictures at the Trades Exhibition, at the Drill-hall, on November 24 last. It appeared that, on the day in question, Detective Dyson visited the Exhibition and paid one penny to see the defendant's show, which was inside a small square tent. Two pictures of an indecent character were being shown through a stereoscope, and at the time the detective was there a boy and girl were looking at them. Police Constable Coggin also spoke to visiting the defendant's tent with Detective Dyson, and a boy who saw one of the pictures also gave evidence. Mr. Wing, on behalf of the prisoner, contended that the evidence was not sufficient to convict in such a serious case. The stipendiary said it was a serious matter, and should have been treated more seriously by the prosecution. There did not appear to have been as much evidence as there should have been. Mr. Wing said the defendant had exhibited pictures before in Sheffield, by means of the kaloscope and other contrivances to give living pictures, and he had also exhibited in other towns, but no complaints had ever been made against him. It might be advisable for him to discontinue exhibiting the pictures in question, but he submitted that only one of them was indecent. In addition to that, there was no evidence of publication. The stipendiary said both pictures were indecent, and, if the case had been properly proved, he should have sent defendant to gaol for three months, but under the circumstances he would let him off with one month's imprisonment. Mr. Wing asked that a fine might be inflicted, but the stipendiary said it was a serious matter, and fines did not stop such exhibitions. If people chose to run risks, they must be punished personally, and he declined to alter his decision.

PHOTOGRAPHING THE POLICE.—At the last sitting of the Reigate Town Council, a discussion arose as to photographing the police in the local police force. Mr. Gillham said he wished to know how many of the force were to be photographed. At the previous council meeting, it looked as if they had a dozen police present in order to see one honest man home. The Mayor stated that when the force was full there would be thirty-three constables. At present there was a vacancy caused by the resignation of Inspector King. He did not know what the price of the photographs would be, but a Councillor, who was a member of the Watch Committee, said that when he met a constable he should like to know what his name was, and he could find out by referring to the photograph. It had been ordered that they should have thirty-three photographs. Alderman Budgen said it appeared as if it was merely for the gratification of one Councillor, and he should move as an amendment that the resolution should be struck out. Alderman Pain seconded, and Mr. Brackley supported the amendment. Mr. Viall said he was the member referred to, and he should take the whole responsibility upon his shoulders. He was a member of the Watch Committee, and he did not wish to be a dummy member. At present he did not know the members of the force, and he did not want to vote upon the appointment of an officer, or an increase in his salary, without knowing something about him. That was why he suggested the photographs. The cost would be small. Mr. Seex characterised the proposal as absurd. He could not for the life of him understand why the gentleman in question should want to know the constables. He did not want to, and he could not conceive why any one else should. Mr. Viall: The Watch Committee have to deal with them. Mr. Seex: When they come before them. He could appreciate the photographing of prisoners so that they might be known, but why the police should be photographed was beyond his comprehension. The amendment that the proposal should be struck out was carried by nine votes against six.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

December.	Name of Society.	Subject.
19	Barnet and District	Juvenile Evening.
19	Bradford Photo. Society	*Composition, Light and Shade and Tone Value.* E. Tindall, R.B.A.
19	North Middlesex	*Platinotype Printing.* J. W. Marchant
19	South London	Social Evening.
20	Bootle	Annual General Meeting.
20	Gospel Oak	Debate: *Experience* versus *Exposure Meters* Messrs. Rayner and Billingsley.
20	Hackney	*Enlargements, by Projection on Bromide or Silver Paper.* J. H. Gear.
20	Leeds Photo. Society	*Lantern-slide Making: Dry Collodion, Wet Collodion, and Dry Plate.* W. J. Wilkinson.
20	Royal Photographic Society	*On some Colloid Printing Methods.* E. Wanger Shepherd.
21	Ashton-under-Lyne	1898 Prize Slides. Reader, J. Turnbull.
21	Brentford	*Development.* H. Grundy.
21	Croydon Camera Club	Beginners' Night: *The Development of Dry Plates.* H. E. Holland and L. G. Kough.
21	Leeds Camera Club	*Yorkshire Coast.* P. Robinson.
21	Photographic Club	Beginners' Night: *Preparation of Negatives for Printing.* E. Dunmore.
21	Rotherham	Prize Slides (1898 Series).
21	Southsea	*Examples of Architecture near Portsmouth.* A. Fisher, A.R.A.
21	Woodford	*Bromide Enlarging.* Mr. Malby, F.R.P.S.
22	Ashton-under-Lyne	Meeting for Conversation, &c.
22	Darwen	Demonstration on Velox Paper. W. J. Belton.
22	London and Provincial	On the Copying of an Oil Painting.
22	Oldham	*Holiday Slides.* J. A. Newton.
22	Woolwich Photo. Society	Members' Lantern Evening.

ROYAL PHOTOGRAPHIC SOCIETY.

DECEMBER 13,—Ordinary Meeting,—Captain W. de W. Abney, C.B., D.C.L., &c. (Vice-President) in the chair.

BUSINESS ITEMS.

Fifteen new members were elected, and about thirty candidates for membership were nominated.

It was announced that the Dover and West Surrey Photographic Societies and the Whitby Camera Club had been admitted to affiliation.

The CHAIRMAN announced that the Council had passed a resolution expressing their thanks to Mr. R. Child Bayley, the retiring Assistant Secretary, for the valuable services rendered by him to the Society during his tenure of office, a proceeding which was endorsed by the hearty applause of the meeting.

ELECTION OF AUDITORS.

Upon the motion of Mr. T. E. FRESHWATER, Messrs. Fry & Vezey were appointed Auditors of the accounts of the Society for the current year.

THE SOCIETY'S NEW PREMISES.

The CHAIRMAN announced that the Council had authorised the sealing of the lease of the Society's new premises in Russell-square, and that the amount guaranteed in respect of the additional expense involved by the change of *locale* was now 1180*l*.

AN OPACITY BALANCE.

Mr. CHAPMAN JONES, F.I.C , F.C.S., read a paper describing an instrument which he had devised, and to which he had given the name of an "opacity balance." He explained that, although experience had confirmed his confidence for general purposes in his apparatus, described before the Society three years ago, for measuring the densities of photographic plates, he had not found it so convenient as he had hoped for certain special purposes which he had in view, and he had therefore constructed the instrument now brought forward. The former apparatus he now called an "opacity meter," a name which appeared to him to be much preferable to the term "photometer," for, although photometry in its widest meaning, no doubt, included the use of all such instruments, there was a radical difference between photometry as commonly understood and the measurement of opacities such as photographers required. In the one case the light itself was measured, the zero being the absence of light; in the latter the light was rarely measured, its intensity, except as a matter of convenience, being of small moment, and the zero was the full intensity of the transmitted light. The ingenious contrivance of a translucent patch and an opaque patch in juxtaposition, the invention of Captain Abney, he proposed to call an "Abney screen," and his modification of it consisted in the use of opal glass instead of a fine white paper. The instrument now described was what was commonly understood as a balance, an opacity being measured by it, not in the absolute manner of the meter, but by comparing it with a known opacity. Only one source of light was used, generally a Welsbach incandescent gas-burner, and two mirrors reflected pencils from this, through apertures in a velvet-lined box, to a prism of small angle (one pencil falling on each face of the prism), which reflected the pencils and rendered them parallel. They then fell upon the object-glass of a telescope, which gave sharp images of the apertures in the field of the eyepiece. The details of the construction of the apparatus and the manner of using it were very fully explained, but they are obviously impossible of reproduction in a brief and condensed report, and without the use of di grams. The application of the instrument was subject to one very important restriction, the light scattered by the deposit on the plate being measured was lost, and, as the proportion of transmitted light that was scattered could be made to vary very much by varying the character of the deposit, it did not at all follow that opacities of different kinds, if apparently equal when observed by the balance, transmitted equal proportions of light. This possible discrepancy applied to all methods of measurement in which the plates examined were not close up to the testing surface, or Abney screen, but it was no drawback to the principal use of the opacity balance, which was to compare similar densities on the same plate together.

DISCREPANCIES IN OPACITY MEASUREMENTS.

Mr. CHAPMAN JONES followed the above paper by another, "On the Chief Causes of Discrepancies in Opacity Measurements." He pointed out that by the use of the opacity balance it was possible to get at least an approximate idea of the loss of light due to scattering when the plate to be measured was at a distance from the testing surface, and he said he had endeavoured to get some idea of the amount of light lost in this case, or gained by reflection when the plate was brought close to the testing surface. The paper detailed the results of many experiments carried out for the purpose of determining the extent of these discrepancies under various conditions.

The reading of the papers was followed by remarks by the Chairman and Messrs. Sanger Shepherd, Krohne, and the Rev. F. C. Lambert, and, a vote of thanks having been given to Mr. Chapman Jones, the members proceeded to inspect the apparatus which had been described, and which was the object of much favourable comment.

PHOTOGRAPHIC CLUB.

DECEMBER 7,—Mr. Lewis Medland in the chair.

Mr. NAHUM LUBOSCHEZ demonstrated the

VELOX PAPER

of the Nepera Chemical Company, as also a new paper from the States, which he had that day seen for the first time. The sensitiveness of the latter was similar to that of Velox paper, and it is amenable to the same treatment in development, &c. The new paper, which resembles bromide in many ways, has one advantage over ordinary bromide paper, by reason of its price, which is only about a third that of the other paper. There is a remarkable apparent absence of emulsion upon the paper, and it is difficult to decide at first sight which is the coated side. It is a paper which lends itself particularly to working up, and should serve well for enlargements, tending also to what are generally known as "artistic" effects. Velox has many peculiarities. Unlike bromide paper, its image is a surface image, and the gelatine of the emulsion does not swell. Strength of image is regulated by the amount of exposure, and development is carried on to the extreme for good colours and permanent prints. The developer is some four or five times the strength of that for plates, and what is known as M.Q. (metol quinone) is the agent recommended, combining two opposite characteristics, delicacy and want of contrast of the first, and the reverse of this in the quinone. The strength of the developer tends to keep the image upon the surface of the paper, helped by the non-absorbing powers of the gelatine, and the aim throughout is to insure that the image shall not go right through the emulsion, as in bromide paper. The speaker was not in favour of restraining the developer to more than a very limited extent. Chloride of sodium acted very well. To avoid interfering with the proportions and constitution of the mixed developer, developing is effected preferably with a sponge or cotton wool, economy also being the better observed in such a way. There was no fear of streakiness, for the reason that the full effect of exposure is developed, and the truth of this was shown by passing the sponge over a portion of the paper, and waiting a few seconds before wetting the remaining portion, notwithstanding which the image levelled up at the end. Some claim was made that Velox was better able to render negatives of every characteristic than any other paper on the market, but this view was not altogether accepted.

Croydon Camera Club.—November 7.—Mr. BOXALL demonstrated

ENLARGING BY MEANS OF THE GAS LANTERN.

In order to illustrate the perfection of his procedure, he used three quarter-plate negatives, which the Hon. Secretary handed to him, and which he had until then never seen. Although the negatives were in several respects not the best possible for the purpose, and, notwithstanding that Mr. Boxall had not tried the Club lantern until he began his demonstration, he was able to produce three 12 × 10 enlargements on bromide paper which were on all hands considered admirable examples of what a good enlargement should be. How he obtained these excellent results he explained and illustrated as he went on with the work. The prints were developed by means of metol. Mr. Boxall also exhibited a number of charmingly toned bromides, in which the various hues were obtained by either alum and hypo or uranium nitrate. One of these was particularly notable, inasmuch as, by the skilful application of various toning agents, a variety of colours was applied to the print. In this a boat with brown sails, blue distance and sky, and green water, exhibited in a remarkable manner the possibilities of the toning in Mr. Boxall's hands.

Kingston-on-Thames and District Photographic Society.—December 7.—Mr. J. E. EAST gave a demonstration of

ENLARGING UPON BROMIDE PAPER BY ARTIFICIAL LIGHT.

For enlarging purposes, he pointed out that the negative should be rather thin, the hard, dense variety being of little use, and resulting only in soot and whitewash effects. Although it was his intention to make his example with the aid of an enlarging lantern, using artificial light, such apparatus was, he said, not absolutely indispensable. A more economical plan is to use daylight as the illuminant, in conjunction with an ordinary camera, in which case it is only necessary to block out a window, preferably facing north, leaving a small space through which to point the camera to the sky, and then carefully stop out all light except that passing through the lens to the paper, which should be pinned to a drawing board held upon an easel; or, instead of pointing the camera directly to the sky, a mirror may be placed at such an angle as to reflect the light through the camera, the same precautions being observed to exclude extraneous light. For those whose engagements preclude their working by daylight, or to whom the expense of a lantern is a consideration, he recommended the use of magnesium ribbon. In this way, also, it is possible to make use of the ordinary camera, a piece of ground glass being placed behind the negative to diffuse the light and secure even illumination. It is, however, necessary to use a screen of some sort, such, for instance, as an old soap box, while burning the ribbon, to prevent the light striking the paper from other sources than through the lens. Mr. East then proceeded to make some enlargements by limelight upon paper kindly supplied by Messrs. Wellington & Ward. The image was projected on to paper held in a special adjustable easel of the lecturer's construction, in appearance not unlike the deadly guillotine, but which he assured his audience was quite harmless. Several exposures were made, the methods of vignetting being fully explained. The enlargements were subsequently developed, for which purpose a preference was given to iron, though amidol was mentioned as being capable of yielding results of great excellence, and as having one advantage over the former in that the acid bath was not required.

Richmond Camera Club.—The meeting on Dec. 5, when Mr. Purcell occupied the chair, was devoted to a show of lantern slides by members of the Club. A large number of slides, many of which were of good quality, were passed through the lantern. They were the work of Messrs. Cheese, Davis, Emery, Etherington, Gibson, Neville, Oetzman, Purcell, Wilson, and Woods, and included a series of Indian and Ceylon slides by Mr. Gibson, which were very interesting. Among them were portraits of natives belonging to various castes, landscapes, views of houses, &c., &c., and some very successful snapshots of cobras and of the hamadryad, the most deadly snake in India.

West London Photographic Society.—December 9, Mr. H. Selby (President) in the chair. Mr. G. F. BLACKMORE read a paper on

ENLARGED NEGATIVES,

in the course of which he stated that the procedure he usually adopted was to make a reduced transparency in the camera on a bromide lantern plate three and a quarter inches square, and from this transparency to make the final enlarged negative on Eastman's smooth thin bromide paper or on Wellington & Ward's negative paper. This method admitted of the ordinary optical lantern being used instead of a special enlarging apparatus, and has much to recommend it. The paper negative was much less costly than one on glass, and the quality of image was not at all inferior. There was, of course, a certain amount of grain, but it was less than might be expected, and completely disappeared if a rough-surfaced paper was used for the final print. The kind of transparency he recommended was one which would be described as a good lantern slide, of not too steep a range of tones, and not of the brilliant type. He passed round a collection of negatives and prints, which fully bore out his remarks.

Ludlow Photographic Society.—December 9, Mr. E. E. Davis in the chair. —It was unanimously resolved that Mr. H. P. Robinson be reappointed President; that Mr. J. H. Williams be reappointed Secretary; that Mr. G. E. Davis be appointed Treasurer; that the following gentlemen be appointed the Committee: Messrs. J. E. Pughe, Tilsley Price, J. H. Scuttle, and W. H. Bessell, with the President, Secretary, and Treasurer. That the best thanks

of the Society be especially given to Mr. H. P. Robinson for what he had done in making the recent Exhibition such a success, and to those ladies and gentlemen who had worked so hard in the same direction. The Society now numbers forty-two members.

Preston Scientific Society (Photographic Section)—Dec. 9.—Mr. J. H. Tonge was elected Chairman, Mr. A. W. Cooper Hon. Secretary, and Messrs. J. Asherton, J. D. Marsden, J. C. Isles, and W. Phillips, Committee. After the meeting a demonstration on bromide printing and developing was given by Messrs. Asherton, Busby, and Tonge. Mr. Asherton demonstrated hydroquinone as the ideal developer for this printing process. The only disadvantage he found in its use was its liability to deteriorate if kept too long. Mr. Busby, who followed, took ferrous oxalate, and spoke very highly of its general advantages over the other developers. In spite of its supposed messiness, and the necessity for an acid clearing bath, he said that its equal was not yet discovered. He pointed out that, as this developer would keep indefinitely, a much larger quantity could be prepared at once than would be advisable for the newer developers, and to the occasional worker this would be a great advantage. He also explained how prints could have their contrasts altered by the addition of bromide of potassium. Mr. Tonge, in speaking on amidol, said that, while he admitted the superiority of ferrous oxalate over this developer, yet the omission of the clearing bath, and the absolute freedom from stains, were greatly in its favour.

Scarborough and District Photographic Society.—December 10.—Mr. Albert Strange (Head Master, School of Art) gave a lecture on

Photography from an Artist's Standpoint.

He went thoroughly into the subject, frequently supporting his remarks by quoting the opinion of some of the greatest artists of the day. Photographers, he said, should learn as much about art as possible, and not merely rules. They should imbibe the artistic view of things, so that they might be able to perceive that there is an artistic and an inartistic view; to find out, in short, what are the essentials in a subject. Portraiture was, in his opinion, especially difficult, and he advised photographers to avoid retouching as much as possible. Above all, simplicity of treatment and subject was the main cause of excellence, as in the works of Mrs. Cameron, Mr. Craig Annan, and others. Both in landscape and figure, the best photographic art was that which most closely approximated to the best pictorial art in the main essentials of dignity, simplicity of treatment, and individual view. Mr. Strange regretted that the almost universal popularity of photography, on account of its supposed easiness, led in many cases to its abuse, and urged the members to carefully think out each subject before exposing, and not to snap off plate after plate on anything which met the eye. Alluding to the advantages of photography, he remarked on its value in making records, both scientific and historic, such as the coming photographic survey of the old town, which would be quite as valuable as all the pencil sketches or paintings that could ever be made of this part.

Sheffield Photographic Society.—December 6, the President (Mr. G. Tomlinson) in the chair.—The prints for the annual competition were on view, and the Judges' awards were made known. Mr. A. W. Hill took the first prize, viz., gold medal in the Championship Class, with very artistic prints made on "Velox" paper. In Class II. Mr. Harold Hill took the Society's silver medal with fine prints made on platinotype paper. Mr. A. W. Hill took second prize in this class. In Class III. Mr. Harold Hill took the first prize, and Mr. W. J. Rayner took the second prize. Mr. A. Horsley Hinton judged the pictures, and his efforts were decidedly successful. Afterwards Mr. J. H. Lygo manipulated the Society's lantern, and a large number of members' slides were shown, and very much enjoyed by the members present.

Stafford Photographic Society.—December 5.—Mr. W. J. Belton, of Messrs. Griffin & Sons, gave a demonstration in the working of

Velox Paper

before the members of this Society. Having described fully the peculiar properties of Velox paper, Mr Belton proceeded to make exposures on negatives of varying density, and produced excellent results in each case. The lecturer then asked for negatives taken by the members, and made several very successful prints from those supplied. The development was done by brushing on the developer with a camel's-hair mop, there being much greater control over results by using this process. A means of producing a red print by development and of producing sepia tones by the hot alum and hypo toning bath were described.

Edinburgh Photographic Society.—December 7, Mr. A. Eddington, F.S.I. (President), in the chair Mr. P. W. Adams, R.S.A., delivered a lecture on

Character and Expression,

illustrating his subject by a number of limelight views of works by the old masters. In the course of a short discussion which followed, Mr. Lennie drew attention to the fact that, in contrast to most of the other art galleries of the world, a visitor to the National Gallery or Portrait Gallery of Edinburgh was unable to carry away a copy of any picture which caught his fancy. The special winter Exhibition was formally opened during the evening. The following are the prize-takers:—Beginners' Section for Landscapes: Adam Cranston, Penicuik. Lantern Slides: E. L. Brown. Class for Pictures taken at the Society's Rambles: E. L Brown; highly commended, J. L. Whyte. Already sixty new members have joined the Society this session, bringing up the membership to over 500. The electric light was used in the rooms for the first time, and proved a distinct success.

FORTHCOMING EXHIBITIONS.

1898.

December 21–31 ..... Borough Polytechnic Society. H. C. Philcox, 255, South Lambeth-road, S.E.

1899.

January 25–31..... Perthshire Society of Natural Science. C. F. S. Burrows, Hon. Secretary, 16, Princes-street, Perth.

,, 30, 31..... Southsea Amateur. F. J. Mortimer, Cornwall House, Ordnance-row, Portsea.

February 4–25..... Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.

,, 13–18..... Photographic Society of Ireland. Hon. Secretary, 35, Dawson-street, Dublin.

,, 21–24..... Hastings and St. Leonards. Exhibition Secretary, A. Brooker, 21A, Wellington-place, Hastings.

March 4–11 ..... South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Patent News.

The following applications for Patents were made between November 28 and December 3, 1898:—

Automatic Photography.—No. 25,108. "Improvements in Automatic Apparatus for the Taking, Sale, and Delivery of Photographs." E. J. Ball.

Changing Boxes.—No. 25,191. "Improvements in or relating to Magazine Cameras or Changing Boxes." H. Hill, E. G. Price, and Photo, Ltd.

Radiographic Apparatus.—No. 25,205. "A Radioscopic and Radiographic Apparatus for the Examination of the Human Body." J. Wertheimer.

Changing Boxes.—No. 25,261. "Improvements in or relating to Cut-film Changing Cameras or Changing Boxes." H. Hill, E. G. Price, and Photo, Ltd.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE BENNETTO PROCESS.

To the Editors.

Gentlemen,—After an absence from England for nearly twelve months I return and find—with what disappointment!—the publication of Mr. Wallace Bennetto's patent specification for producing his much-talked-of results.

As pointed out by your correspondent, "E. D. F.," in your last issue, the essential feature of Mr. Bennetto's patent camera was described by Berthier in 1895, but the camera there described was a stereoscopic camera, in one chamber of which was placed the green and blue screens, and in the other the red screen. Mr. Bennetto's improvement seems to be the placing of two plates film to film at the top of the camera, and thus doing away with the second chamber.

As regards the printing of the positives, I would point out that there is absolutely nothing new in the superposition of three films, this having been done by Ives about 1889, and certainly shown by him in London in 1892. It is true that Mr. Ives used bichromated gelatine, and subsequently stained the films with transparent dies. But we may go back still further, for in 1868 Cros took out a French patent for the same thing.

Further, in 1874, Ducos du Hauron writes to the Société Française de Photographie a letter, in which he says: "À obtenir, par les procédés de la photographie *au charbon ou par les procédés similaires*, tels que la chromo-lithographie, la photoglyptie (procédé Woodbury), &c., une image positive rouge en faisant usage du premier négatif, une image positive jaune en faisant usage du second négatif, et une image positive bleue en faisant usage du troisième négatif, ces trois images incorporées l'une et l'autre et constituant par leur unification l'image définitive ou représentation polychrome de la nature."

In the following year (1875) M. Du Hauron, however, actually described a process of obtaining transparencies, using carmine in gelatine on paper, chrome yellow in gelatine on paper, and Prussian blue in gelatine on paper, sensitising with bichromate, printing, and stripping, and superposing. Where, then, comes in the novelty? Certainly not in the use of opaque pigments, such as scarlet or vermilion, *chrome yellow* or cobalt; neither is it in the use of "bands of suitable widths," nor in separating the films from the paper, nor in developing the positives, nor in superposing them.

If Mr. Bennetto will turn to your issue for April 16, 1897, p. 248, he will there find a patent by Mr. Walter White, in which the reflection from coloured glass to form the second and third images for three-colour work, and the use of red glass at an angle of 45°, is specifically mentioned.

Mr. Bennetto states that he "spent years upon the science of light and colour. I never made a single experiment upon photography in colours, and I have never made a single experiment in any work I have undertaken without first having thought out every detail beforehand." And yet so careful a man totally neglects what others have done.

Possibly it would be as well for Mr. Bennetto to read now what others have done, or else his "jewel," which takes so long to polish, may, after all, turn out to be merely a recutting of an old stone.

There are, of course, many points in the letter of your issue of the 2nd inst. which one might ask questions on, or answer, even without referring to spectrums on trees and park railings, but there is one point which puzzles me sorely in Mr. Bennetto's process, and that is how he equalises the exposures for the red, the blue, and the green rays. I have experimented a little, but at present I fail to see how equality of exposure is to be obtained, and when this is obtained how equal gradation is to be obtained on three different plates.—I am, yours, &c.,

A. D. PRETZL.

[We are much obliged to Herr Pretzl for his interesting letter, which makes it clear that Mr. Bennetto's patented colour process (see page 776) has been anticipated in every single essential detail, and therefore, regarded solely as an "invention," is quite inadmissible. Moreover, to the drawback of antiquity the process, as it is described, adds the major disadvantage of not being of much practical use, and it is therefore best relegated to obscurity. Mr. Bennetto in his letter which we published last week accuses us of being prejudiced against him and his work—the carefully guarded "jewel" that is one day to be shown to a waiting world. This, of course, is a misapprehension. We cherish feelings of the highest esteem for Mr. Bennetto personally, and are only pained that he will not give us the opportunity of bestowing a like degree of admiration upon his precious "jewel." It is two and a half years since Mr. Bennetto was announced to have "discovered the long-sought for philosopher's stone of photography." Where *is* that elusive and alchemical rarity? Lost? Mr. Bennetto tells us (page 781) that the final outcome of the whole of his investigations is receiving his attention, so, to quote the familiar line, "Now we *shan't* be long." He objects to our theory that he is working empirically, and says that his process "does not show spectrums hanging upon trees." The spectrum doesn't usually "hang" anywhere. Finally, he claims that his results are produced by "science." To judge his work by the curious process above referred to, it is science of a kind with which no other experimenter in colour photography is familiar. —EDS.]

COLOUR PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I am much indebted to you for the ALMANAC. I am especially pleased to see that you credit Clerk-Maxwell with the first indication of indirect heliochromy; so far as I remember, Dr. Joly has been the only one to recognise and acknowledge Maxwell's priority. You will find another reference in the *Transactions of the Royal Society of Edinburgh*, vol. xxi.

One point I should have liked to have seen brought out were the "prophecies" of Zenker and Lord Rayleigh. Zenker's book (which I have got with much trouble) was published in 1868, as you say, and Lord Rayleigh's papers, so he tells me, in the *Phil. Mag.* of August 1888, and August or September 1889. Wiener's paper was published in *Wied. Ann.* of 1890 (Band xl.) Cornu described this in the *Comptes Rendus* of January 26, 1891, and mentioned that Zenker had suggested the same photographic method for determining the direction of vibration in polarised light (C. R., lxvi. 932, 1255; lxvii. 115).

This last has not been well brought out in connexion with photography in colours. You will find a short account of the question in Mascart's *Tra té d'Optique*, vol. iii.

Perhaps you are right in leaving out fuller references. Lord Rayleigh's paper is by no means popular, but there is a slip in the dates on p. 679 which I have tried to show.—I am, yours, &c., P. E. B. JOURDAIN.

63, *Chesterton-road, Cambridge, December* 8, 1898.

HOME PORTRAITURE.

To the EDITORS.

GENTLEMEN,—In your JOURNAL of November 4, p. 720, a correspondent inquires concerning "Home Portraiture by Reflection." In a small handbook, written by J. Traill Taylor, and published by the Scovill Company, of New York, about 1881, the above subject is treated in one of the chapters. The writer of this has since seen references concerning this booklet, which was called "The Photographic Amateur," stating it was based on articles previously appearing in your JOURNAL. This may give a clue to further successful search. My own files only date back to 1885.—I am, yours, &c. OTTOMAR JARECKI.

Erie, Pa., November 30, 1898.

THE KINEMATOGRAPH PANIC.

To the EDITORS.

GENTLEMEN,—If the repeal of the present vexatious and over-stringent London County Council regulations cannot be obtained, it will be well worth inventors' while to turn their attention to the production of a film that will not be "combustible." Such ought to be quite within the resources of present-day science; therefore, while using every effort to get that ridiculous "fireproof hut" abolished, it is even more desirable that a non-combustible film, if possible more transparent than the present, should be produced, otherwise the regulations referred to will, if extended elsewhere, practically kill the living-picture device. Those who think of investing money in such will do well to reconsider their prospects, whether as manufacturers or exhibitors. I am neither, but I consider the present regulations very unfair and un-English, and needlessly severe. The kinematograph is, perhaps, the most interesting and instructive invention of the century, capable of enormous development, and deserves more sympathetic treatment than the London County Council have extended to it. We should make its popularity easy of attainment, rather than difficult, removing all needless obstacles from its progress and development. That iron hut *must* be got rid of. Of course, if a non-combustible film be invented, it will be all the better. Hoping you will not consider this further letter an imposition on your space, the matter is of great importance to those who like seeing the pictures, as well as to those who manufacture and exhibit.

By the way, that word "kinematograph" is much too troublesome for British tongues. May I suggest a much simpler and more graphic term? Why not "vigraph!" I mean to use that term in future.

The London County Council regulations apply only to combustible films. Two alternatives exist. Repeal the regulations or invent non-combustible films; otherwise the vigraph is practically prohibited in London, and possibly everywhere. It is very lucky that the London County Council has no power in Yorkshire, otherwise football would be prohibited, as it causes a lot of broken bones.—I am, yours, &c.,

DRAW THE LINE.

P.S.—I notice the Council prohibits the use of acetylene in conjunction with vigraphs. I have been informed that the acetylene light is the coolest of the lot, and that, with a proper generator, is as safe a light as can be used. Is there not much "panic" *re* these new introductions?

YORKSHIRE AFFILIATED PHOTOGRAPHIC SOCIETIES.

To the EDITORS.

GENTLEMEN,—With reference to your report of the affiliated societies' meeting, held at Liverpool, in this week's issue, it appears that the Yorkshire affiliated societies were held up at that meeting as an example of the advantages to be derived from association with the parent Society in London. It will be readily acknowledged, *à priori*, that the writer has had better opportunities for gauging the feeling of the said societies than probably, any other individual.

It is generally admitted that the Affiliation scheme in Yorkshire is very unsatisfactory. Everywhere disapproval is expressed of the manner in which the affairs of the organization are managed. The Yorkshire Exhibition Committee, which is an amalgamation of affiliated and non-affiliated societies, has repudiated, practically from the commencement of its labours, that it was exploited by the Affiliation authorities.

The Committee at the very outset refused to work the Exhibition on purely Affiliation lines. Whatever the merits of the scheme of Affiliation may be, from a theoretical point of view, in practice centralisation and its consequent officialism have proved it a failure. My experience officially of the organization is that it hindered rather than helped us in our object. —I am, yours, &c., EZRA CLOUGH.

13, *Ch sham-street, Bradford.*

THE CARRIAGE OF EXHIBITS.

To the EDITORS.

GENTLEMEN,—On behalf of the exhibitors from the South London Photographic Exhibition, I should like to say I dispatched a box to the Aintree Exhibition on Tuesday, November 15, four days before receiving day, containing forty-one exhibits (thirty-six frames and five sets of lantern slides) by the following members: Messrs. Walford, Bull, Speechley, Price, Lamb, Payne, Farmer, Oakden, Page, French, Ayling, and myself. It appears that the box laid at Aintree Station for several days, and was not delivered till Friday, November 25, and this being after I had complained to carriers this end. We have therefore sent a claim to the carriers. WILLIAM F. SLATER.

169, *Southampton-street, Camberwell, S.E.*

INTERNATIONAL PHOTOGRAPHIC EXHIBITION AT FLORENCE.

To the EDITORS.

GENTLEMEN,—In March and April, 1899, the Italian Photographic Society, of which the Prince of Naples is Honorary President, intends to celebrate the tenth anniversary of its foundation by holding an Exhibition at Florence.

On the invitation of Colonel Pizzighelli, the President of the Society, and the committee appointed for the purpose, the Marquis Torrigiani Syndie, of Florence, has promised the support of the local authorities, and has accepted the office of Honorary President of the Exhibition Committee.

The Society is desirous of obtaining foreign exhibits, and especially of a representative collection of English work, which desire will, I hope, meet with an adequate support from our leading exponents of artistic photography.

The conditions are not yet definitely fixed, but I anticipate the form altimately arrived at will be that of special invitation.

Later I hope to have the pleasure of furnishing further particulars.—I am, yours, &c., HENRY E. DAVIS.

Camera Club, Charing Cross-road, December 9, 1898.

CHRISTMAS HOLIDAYS.

To the EDITORS.

GENTLEMEN,—May I be allowed space to inform you, and also "Justice," whose letter you published in your issue of December 2, that since the publication of "Justice's" letter a firm of photographers, with many branches, have consented to close their studios on Saturday, December 24, instead of Monday; but, you will be surprised to hear, to make up for this holiday they intend to keep open all studios on Friday, December 23, until 8 p.m., although, for years, they have had posted up that they "close on Fridays at 5 p.m." It would be interesting to know why Christmas Eve was chosen instead of Boxing Day. Thanking you for giving publicity to this matter,—I am, yours, &c., A LADY ASSISTANT.

London, December 12, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post. Questions are not answered unless the names and addresses of the writers are given.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED:—

Bulley & Flower, Victoria-road, Dartmouth.—*Photograph of carved oak screen in St. Saviour's Parish Church, Dartmouth.*

H. L. Morel, 126, Welbeck-terrace, Mansfield-road, Nottingham.—*Seven photographs of different parts of the city of Nottingham, forming a panoramic view.*

CARET.—The subject is thoroughly taught at the Bolt court Technical School. See reply to "H. Short."

R. STEWART (Melbourne, Australia).—We are much obliged to you for your interesting letter and enclosures, of which we may make personal use at a future date.

H. SHORT.—Better address Mr. C. W. Gamble, at the School, Bolt-court, Fleet-street, E.C., for a copy of the prospectus. We do not answer questions through the post.

P. R. S.—1. We shall probably give increased prominence to the subject next year. 2. We believe he is flourishing. 3. Thanks for the note about the lamp. 4. Better write him again.

IRON DEPOSIT ON GLASS VESSELS.—E. BENNET. If the deposit is oxide of iron, a little diluted hydrochloric acid—one part of acid to one of water—will quickly remove it. Sulphuric acid may be used for the same purpose.

MARION.—1. There are about a dozen photographers in the town. 2. No lady photographer that we can discover. 3 and 4. Probably a fairly good place, but for a lady we should think the West-end of London preferable.

CARROD.—The statement was made in a paper read before the Camera Club, and is, we believe, quite correct. The present copyright law is in a very unsatisfactory state. The Act itself, in full, is given on pp. 644 *et seq* of the ALMANAC for 1898, which will give you all information as to the law.

SCRATCHED BURNISHER.—S. S. asks: "Will you kindly inform me, through your valuable paper, the best way to restore a bar burnisher which slightly scratches prints?"—The only way is to get rid of the scratches on the burnisher. This may be done by working the bar longitudinally on an oil stone until they are removed.

CHANGED CARBON PICTURE.—C. Y. The carbon image shows no sign whatever of fading, nor is it likely to do so; but it is clear that the paper it is upon has turned somewhat yellow by the exposure in the window. Most papers change in colour when exposed for a long period to a strong light. The picture is returned as directed.

PHOTO-LITHO.—W. SAYER. The transfer seems to have been fairly right, but the fault appears to have been in the "inking-up." We should advise you either to get a lesson in this from some lithographer in your town or to get him to ink up a transfer for you; but for the applying of the ink we should say you were all right. You are not so far behind as you think.

ALBUMEN PROCESS.—E. OSMAN. The formula as given in the ALMANAC is quite correct; but in essaying this process you must not expect success with the first trial, or, indeed, with many, as it is one that requires considerable skill in working, and that is only acquired by long practice. When learnt it is not a difficult one to work, though it is a somewhat troublesome one.

CARAMEL BACKING.—HALATION says: "I shall be obliged if you would kindly inform me what is the best method of applying caramel as a backing for plates to prevent halation."—Simply apply it with a brush, or it may be dabbed on with a piece of sponge. We presume you know the formula for the caramel backing. If you do not, it will be found on page 980 of the ALMANAC for 1897.

POTASSIO-CHLORO-PLATINATE.—DOUBLE TONES says: "I have a solution of chloro-platinite potass, one grain per ounce. 1. Please say what is the cause of solution becoming very dark in colour. 2. And, as I use a small quantity of gold to my bath to prevent double tones, should it affect bath in any way? 3. Is it difficult to keep in condition while in solution? Your opinion will much oblige."—In reply: 1. Probably the solution is made with impure water. 2. No. 3. No; not if it is made with pure water, particularly if it is made *very* slightly acid with hydrochloric acid.

ROLLING PRESS.—H. HALL writes: "Your advice *re* the following will be gratefully received: I have a very heavy rolling press (for prints) with steel plate 24 × 10. At some time this has been allowed to get rusty, having eaten somewhat into the plate, causing dull, granular markings on prints. I have spent some hours upon it with emery cloth, emery powder, and paraffin, but with very slight result. Can you recommend anything?"—If the rust has eaten deeply into the bed of the press, the better way will be to send it to the maker to be replaned. If not deeply in, it may be worked out with snakestone and water, working always longitudinarily and the entire length of the plate. This is a very tedious, not to say laborious, work. After the rust is worked out with the snakestone, the plate is polished with charcoal and oil.

BURNISHING.—J. J. DAWSON writes: "I shall be greatly obliged to you if you will help me out of the following difficulty: I have lately started using P.O.P. I use the Paget paper, and stick closely to their formula, but fail in burnishing with my bar-burnisher. I have tried the bar all heats and pressures. I lubricate with Castile soap in spirit. The mounted prints will not pass through, they stick about a third through and will go no further. I shall be obliged to you if you will answer me in your Friday's issue, as I have a lot of work to finish for Christmas?"—The cause of the prints sticking is, doubtless, due to their containing too much moisture. They must be made quite dry. Albumen prints may be burnished while they contain a certain degree of moisture; not so, however, with gelatine ones, they must be made thorougly dry or trouble may be expected.

TONING BATH.—F. SMART asks: "Could you oblige me by letting me know the cause of my toning bath turning a bright yellow after it has been made up ready for use a day? It is Ilford formula. The water here, I hear, contains a lot of iron. I have tried rain water filtered through a charcoal filter. The distilled water answers all right, but is so expensive. Can you tell me of anything to use in filtering water? The bath tones all right, but takes so much gold."—The behaviour of the bath quite coincides with the water containing iron, which there is no ready means of getting rid of. We should recommend the use of distilled water for making the toning bath, as it answers all right. Our correspondent complains of the expense of distilled water, but it is not so expensive, after all—fourpence or sixpence a gallon—considering the saving there is in the gold. The cost of a gallon of the water is but equivalent to about a couple of grains of gold saved.

DAGUERREOTYPE-RESTORING.—SENLIM asks: "Will you kindly say the best method of restoring an old Daguerreotype? I think I have seen this question answered before, but so long since that I forget the method. Is there a possibility of destroying the image, as the one I wish to restore is almost faded away, and, being rather valuable to my client, I could not afford to run much risk? Better to do what I can with what I have at present."—The Daguerreotype may be cleaned—"restored" by treating it with a diluted solution of cyanide of potassium until the tarnish is removed, then thoroughly washed with distilled water. There is a great risk of injury to the picture in the hands of a novice in the work. We should advise our correspondent to place the picture in the hands of one familiar with the Daguerreotype process instead of attempting the work himself. Many valuable Daguerreotypes have been irretrievably ruined by novices.

*** Several Answers left over.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

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Contents.

	PAGE
ATHEDRÂ	817
LOPMENT AFTER FIXING	818
ERETTES:—	
to-microscopy for Winter evenings—Steadiness in Apparatus Supports—Photographing Mirage—Rön gen-ray Investigations—Camera Work for the topics—Old Masters in the antern—Alleged Portrait of arist—Spurious Masterpieces.	820
GN NEWS AND NOTES:— onomical Photography—iero-photographic Objectives—rbon *versus* Silver—The Consumption of Silver—Platinum inting—Formate of Soda—notographs on Ivory	821
EE-COLOUR PRINTING PROCESS	822
HAND CAMERA: ITS CAPABILITIES AND LIMITATIONS. By E. H. klewood	822
V SYSTEM OF VIGNETTING	824
VER PHOTOGRAPHY"	825
GRAPHIC DEVELOPERS AND ELOPMENT. By C. H. namley	825
THE NOVITAS STRIPPING FILM P.O.P.	827
SPECTROSCOPY	827
GLASGOW AND WEST OF SCOTLAND'S ANNUAL EXHIBITION	827
EXHIBITION OF THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION	828
DEATH OF DR. H. W. VOGEL	829
OUR EDITORIAL TABLE:— *Photographic Mosaics for 1899*—The Cooke Portrait Lens—*Anleitung und Tabellen zur Auswahl unsere Photographische Objective*	829
NEWS AND NOTES	830
PATENT NEWS	830
MEETINGS OF SOCIETIES:— Photographic Club—Croydon Camera Club—Hackney Photographic Society—Preston Scientific Society (Photographic Section)	830
FORTHCOMING EXHIBITIONS	831
CORRESPONDENCE:— Colour Photography—A Wife's Complaint—Christmas Holidays	831
ANSWERS TO CORRESPONDENTS	832

EX CATHEDRÂ.

he time this number of the JOURNAL reaches the hands of aders, the Christmas festivities will have commenced, and year 1898 will have glided into the last hours of its exist-

Let us, then, take this opportunity of wishing all friends ie JOURNAL, both near and far, "a Merry Christmas and ppy and Prosperous New Year." At this season we are ys the fortunate recipients of a great number of pretty , agreeable wishes, congratulations on the appearance of LMANAC, and other gratifying manifestations of good-will rds us, the individual acknowledgment of which would sitate a task of no small magnitude. Hence to those ls who so remember us, as well as to our thousands of rs all the world over, we are forced to send our best s in this manner—at once simple and public, it is true, but n that account lacking anything of the utmost sincerity heartiness. May 1899 be a great year for photography photographers!

* * *

E are pleased to feel that the year 1898 will have run ourse without war breaking out between Great Britain and the United States, in consequence of a temporary misunderstanding which arose between that important section of the press of both countries which looks after the interests of photography. For a time we were inclined to think that the disease known on the other side as "yellow journalism" had attacked some of our esteemed contemporaries in the States, so angry with us were they over a piece of well-meant criticism we felt it our duty to make, in reference to the *risqué* character of some of the illustrations occasionally appearing in certain transatlantic photographic papers. Our innocent contemporaries quite needlessly denied sympathy with these productions, and rebuked us for not naming names. Now, in matters of this kind, it is not at all essential to be painfully precise, and the sequel has demonstrated the wisdom of our reticence, for we have observed with pleasure that the class of illustration to which we took exception no longer appears. All that was required was a judiciously worded hint, and, this having been taken, no more need be said on the subject.

* * *

IT is pardonable, we trust, to give way to feelings of amusement at beholding how very thin-skinned our American brethren unfortunately allow themselves to be at times. It is patriotism carried to excess, we suppose. Not only did we get into hot water for objecting to the unsuitable character of some of the very many reproductions of photographs that are printed in our contemporaries, but one of the latter has been betrayed into a very bad fit of anger because some time ago we good-humouredly criticised the free-and-easy nature of the American Convention. In passing, we may say that we have been far more severe on the shortcomings of the British Convention. Our contemporary, the *Photo-Beacon*, edited by a shrewd Scotchman, Mr. F. Dundas Todd, permits the following outburst to appear in the pages of his otherwise excellent little paper: "Our British contemporaries, full of that self-satisfaction that is the inherent birthright of every Cockney—most English photographic journals are published in London—amused their readers annually with not too complimentary comments about our National Convention, and one editor in particular, for some good reason best known to himself—possibly he may have partaken too freely of American sour grapes—used to round out a year of spiteful remarks by one grand outburst in August, due possibly to the muggy heat of London having developed acute ptomaine poisoning

among the said grapes that still burdened his digestive apparatus." There is more in the same style, of which the most charitable estimate we can give is, that in all probability it was penned under a misapprehension. Neither the American nor the British Convention is perfect, and it is therefore manifestly the duty of those who have command of publicity on both sides of the Atlantic to use their best efforts to make these Conventions of the greatest possible use and benefit to those in whose behalf they are held. Properly directed criticism, if at the time unpalatable, cannot fail to do good in the long run, and we have no doubt that the recent history of both Conventions would prove that those institutions are all the better conducted for the attention they have received on both sides of the Atlantic. But we are sorry our *confrère*, Mr. Dundas Todd, should take up an attitude of such determined antagonism towards the British Convention, which, if not "such great shakes" as its American cousin, would cordially welcome the presence of Mr. Dundas Todd, or any of his friends from the other side, and would not be averse to learning from them how best to conduct a meeting of photographers in Convention assembled.

* * *

Messrs. Perken, Son, & Rayment, of 99, Hatton-garden, London, who for many years have manufactured clinical thermometers, have submitted to us an example of the accuracy of their instruments. A batch of forty-eight clinicals was sent by this firm to Kew to be tested. The certificates showed that forty-five of the number were absolutely free from error (standards), while the remaining three possessed the smallest error recognised, viz., one-tenth of a degree, which existed at one point only, whilst the rest of the scales were entirely free from error.

* * *

A fortnight ago we referred to a letter from an old stereoscopic worker with reference to the standard size of the stereoscopic plate of the future, in which he advocates the double quarter-plate, namely, $6\frac{1}{2} \times 4\frac{1}{4}$, for the amateur stereoscopist. Since then we have conversed with many friends on the subject, some maintaining that the smaller would be the more portable size, the plates less costly, and less weighty to carry, a consideration when a dozen or more plates are taken in the field, as in hand-camera work, when only stereoscopic and lantern negatives are desired. On the other hand, others express the opinion that the larger size will be the better of the two, inasmuch as the camera can then be adapted to take single pictures the full size of the plate, the proportions of which correspond almost exactly with that old favourite size with amateurs, namely, $7\frac{1}{2} \times 5$, half as long again as the width.

* * *

Although opinions differed with regard to the width of the plate, all were unanimous with reference to its length, that of $6\frac{1}{2}$ inches, and condemned the old $6\frac{3}{4}$ as being inconvenient alike to the makers and the users, particularly as the extra quarter of an inch must always be waste glass, as there could be no margin in trimming the subject, as the centres can only be $2\frac{3}{4}$ inches apart, though there might be in trimming the picture in the vertical direction. It would rather seem that there may be two standard sizes for the stereoscopic plate of the future, namely, the $6\frac{1}{2} \times 3\frac{1}{4}$ and the $6\frac{1}{2} \times 4\frac{1}{4}$, and why should there not be? We are not confined to one size for other pictures. We are calling special attention to this matter, as there is the prospect of stereoscopic photography next year receiving as much attention in this country by amateurs as it has done during the past year or two on the Continent and in America; and it would be exceedingly inconvenient for apparatus-makers to put cameras of different sizes on the market if there were no plates stocked by dealers that would fit them. It will be seen from the review of the Optimus stereoscopic camera, in our last issue, that Messrs. Perken, Son, & Rayment have adopted $6\frac{1}{2}$ inches as the longest dimension, and we hope that this will be the size adopted in all future stereoscopic cameras, whether the other dimension be $3\frac{1}{4}$ or $4\frac{1}{4}$ inches.

* * *

One often hears and reads of the "hand-camera fiend" who "snap-shots" ladies as they emerge from their morning dip at the seaside, or loving couples quietly reading under a shady rock, or surreptitiously photographs private picnicing parties and then shows the results at lantern entertainments; also that, when they have been caught in the act, their cameras have been forcibly emptied, and themselves unceremoniously treated. With that class of hand camerists few will have much sympathy. In the "Notes from the West of Scotland" in last week's issue there is an instance quoted where a question arises that is, or may be, of importance to every hand-camera worker. It appears that one of the members of the Shettleston Camera Club, while photographing points of interest in the district, photographed a celebrated ancient tavern; at the time a well-known resident in the neighbourhood happened to pass in his trap, and was secured in the picture. This resident, it appears, had a strong objection to being photographed or his portrait being exhibited in public. The picture, however, was shown upon the screen at a lantern entertainment under the auspices of the Shettleston Camera Club, and legal proceedings are likely to result therefrom in the Glasgow law courts, as the matter is said now to be in the hands of the solicitors.

* * *

The result of this case, if it comes to an issue, will be looked forward to by every photographer who takes instantaneous views, as it is, in the majority of cases, next to impossible to exclude individuals. For instance, how is it possible for any one to secure instantaneous street scenes, say, in such places as Cheapside, the Strand, Regent-street, &c., without including the pedestrians and vehicles passing at the time, and by the score, too? In a good photograph the persons will be perfectly recognisable. Now, can any one, or all, of these persons so depicted prohibit the pictures being publicly shown? This may possibly, some day be a knotty and profitable point for gentlemen of the "long robe" to settle. By law a portrait may not be publicly exhibited without the permission of its prototype. Under the Copyright Act it is not an infringement to take a photograph of, say, a room, on the walls of which may be a number of copyright pictures which may be clearly depicted in the picture, provided they only form a portion, a subordinate portion, of the main subject of the work.

DEVELOPMENT AFTER FIXING.

Although the subject of development after fixing has latterly been attracting a good deal of attention, there is absolutely nothing new in the fact that, by suitable means, an image can be developed or reproduced after apparently all trace of it has been removed. Nor have recent discussions elicited any new

ormation on the subject. But, although the knowledge y not, so far, have been applied to any useful purpose, it by means follows that further research may not open up prac- l applications of the principle which at the present time do ahow themselves.

The question we propose to discuss in the present article is v far, if at all, the production of an image under such umstances can in the strictest sense be attributed to the ion of light. Do not let us be misunderstood. Obviously, the case of a plate exposed in the camera or under a ative, the image subsequently developed must owe its in at least indirectly to the action of light; but, when the te is fixed and washed, *i.e.*, deprived of all sensitive or arently developable material before the developing solution pplied, we are forced back upon the purely physical theory the action of light in order to account for any remaining ion. Taking this view of the case, we are further compelled accept another, viz., that this physical or vibratory action e set up continues for all time, since it matters not how old egative image may be, it can be removed and redeveloped hout any difficulty.

f we reject the physical and adopt the chemical theory, it till difficult to see how the direct action of light comes in, ugh its indirect influence is easily and, it seems to us, urately indicated by Neuhauss, who attributes the effect to minute trace of metallic silver remaining from the decom- ition of the sub-bromide by the fixing solution. Accepting s view, we see clearly how to explain the various phenomena hout in any way attributing to light a persistence of action t it would be in the highest degree difficult to maintain. The ge is originated by the action of light, and sub-bromide of er is formed, and there, so far as light is concerned, the tter ends. If a developer be applied, we know what occurs n image is formed at the expense of the bromide of silver he film; but, if that bromide of silver be itself removed, it ot very obvious at first sight what basis remains upon ich even to *build up* an image in the physical way. The lanation, however, is offered above. We can easily under- nd how, in clearing the film, a small proportion of Ag is left ind from the Ag_2Br, which is decomposed by the fixing ution into bromide of silver and metal, and this then forms nucleus upon which the physical image is subsequently lt up by purely chemical means.

The case of the undeveloped image differs to some extent n that of the image removed after development and repro- ed, but the differences such as they are can be easily onciled. It has been often pointed out in these columns t, under the latter conditions, the reproduced image takes somewhat of the character of a *silver stain*, caused by deposition of fresh metallic silver on the portions of the n that have suffered contact with the old image in the act solution; in fact, with metallic silver in the soluble and cent condition. How very little of that kind of inducement required to bring about abnormal deposition of silver in sical development collodion-workers are only too well aware, l it is to the cause named we have always attributed the scitation of a dissolved image.

But this explanation does not apply to the undeveloped te, or, if applied in the same manner, is not borne out by s. Thus, metallic silver is not dissolved, while, if merely er in a state of solution is required to set up the necessary ion, then the undeveloped plate should fog all over, since the whole of it has suffered contact with the bromide of silver removed in fixing. But there is just where the difference exists; the unexposed silver bromide in solution is no more liable to set up a reducing action than when *in situ* on the film. What is required, we take it, is either a metallic silver or a compound capable of reduction itself, or of forming a nucleus upon which fresh silver can be deposited. The latter is the more usual form, though the former is not unknown, as shown by the dirty plate marks often brought out by the ordinary alkaline or chemical developer.

If an undeveloped but fixed plate, or one that has had the image removed after fixing, be treated with dilute hydrobromic or hydrochloric acid, and again fixed and washed, we shall have the means of corroborating the above theory. Whereas, in the first instance, both plates are in a condition to form a developable image under physical treatment, the application of the halogen acid changes the character of the "latent" image each contains, and, in fact, destroys its capability of attracting silver from the developer. The result under those conditions will be no image at all.

Exactly similar phenomena can be produced by purely chemical means and without any recourse to the action of light at all. We have before us a number of examples produced in the following manner. In order to imitate as nearly as possible a photographic image on glass, but without any agency of light, a ten-grain solution of silver nitrate was slightly thickened with gum water, and with this "ink" characters were written with a quill pen upon carefully cleaned glass in the dark room. When the characters were dry, the plates were coated with plain collodion. We then have an image consisting of nitrate of silver and organic matter between the glass and the collodion film, and the application of a plain pyro solution, or almost any of the ordinary developers, will convert it into a visible image without any action of light at all. But if one of these plates, without exposure to light, be washed in distilled water, frequently changed, until the free nitrate of silver may be supposed to be thoroughly removed, it will still give a developable image under physical treatment, though it may or may not yield one to pyro and alkali. Similarly, if treated first of all with a reducing agent, plain pyro answers as well as any, and the visible image removed with nitric acid, iron alum, or persulphate of ammonia, the capability of development still remains; but, if treated with dilute hydrochloric acid, fixed and washed, no image occurs.

But the use of hydrochloric or hydrobromic acid without fixation does not suffice to arrest the formation of the image, and this entirely agrees with what we should have expected from previous experience. For instance, if a negative made by reversal with nitric acid be intensified with silver, *i.e.*, by the physical method—it will, as is well known, be blackened all over. If treated with hydrochloric acid or similar clearing solution, the blackening will be retarded and perhaps reduced in intensity, but it takes place. If, however, the bleaching or clearing solution be supplemented, and a certain proportion of bichromate of potass, persulphate of ammonia or permanganate of potash, applied for some time, a clean intensification will be possible, as by that means the whole of the silver compound remaining in the film is converted into haloid and so placed beyond the range of the developer.

If space permitted, we should like to speak of other experiments that go to prove that the immediate cause of the developable image after fixation is purely chemical, but

sufficient has been said to indicate the lines upon which we found that belief. We may say that most of our experiments have been made with the "Wellington" intensifier, which is more to be relied upon than any other form of physical developer.

Photo-microscopy for Winter Evenings.—Amateur photographers—enthusiastic amateurs—find little work during the winter months, beyond making lantern slides and enlargements from negatives taken during the summer, to occupy their time, and hobby, photographic. But why should that be the case—when there is a wide field open for winter-evening work, namely, when once entered upon, the seductive one of photo-micrography? Many are deterred from entering this field from the imaginary idea that costly appliances and great skill are required; nothing of the kind, at least for dealing with the most popular class of subjects. Of course, when one comes to deal with bacteria, microbes, and the like, the case is different; but with such interesting objects as small insects, the flea, wing of the fly or its proboscis, wing of the moth, butterfly, &c., nothing more than what the ordinary amateur already possesses is necessary, because it is only a matter of "enlarging," working from the original object instead of from a negative. For working from such a class of subjects as those alluded to, an ordinary photographic lens, say a rectilinear of short focus, is all that is necessary. Indeed it is really better for this class of object than a costly microscopic object and microscopic fittings, if it is of really good quality. With such a lens it is simply necessary to treat the object as if it were a small negative to be enlarged.

Steadiness in Apparatus Supports. — There are probably more really faulty negatives through what might be termed mechanical causes, produced by unsteady supports, than any other means. In photo-micrography, in copying prints for process work, in enlarging, and in ways too numerous to mention, the passing of a vehicle or of a distant train, for example, is quite enough to produce sufficient vibration to mar the perfection of definition, sometimes indeed to destroy it. Much—not necessarily all—of this is eliminated by doing the work in the basement or a cellar; but, unfortunately, this means of avoiding a difficulty may be impossible, and is usually inconvenient. Still, whenever fixing up an apparatus of the kind, it should always be remembered that the higher the apartment the greater the liability to tremor. The best way to get rid of these tremors is to place the camera and object to be operated upon on a thoroughly well-made substantial table or other special support, and to place under each leg of the table a block of solid indiarubber. Strange to say, if, as is not probable in photographic work, the instrument is one possessing regular movements of its own, a pendulum for instance, the use of the rubber blocks may, according to the *Journal de Physique* for last month, actually increase the effect of tremors, this being the case when the periods of vibration happen to be in unison with the tremor periods.

Photographing a Mirage. — It appears that the mirage photograph which we recently described as having been taken in San Francisco cannot be looked upon as a novelty. A writer in the *English Mechanic* points out that so long ago as May 5, 1869, Mr. Robert Symons, of Julian-street, Tenby, took a photograph of a church spire in that town, and when it came to be scrutinised an abnormal effect was noticed half way up the spire, which upon examination was discovered to be a view of the *Gadfly*, a vessel then being launched at Pembroke, a dozen miles away. The immediate object of the photograph appears to have been to secure a negative of a steeplejack's work, his ladder being shown and the church clock pointing to about eighteen minutes past six.

Röntgen-ray Investigations. — Considering the short time that has elapsed since the discovery of Röntgen rays, an immense amount of work has been done by many investigators in its various phases. At a recent meeting of the Royal Society, Mr. C. J. B Wilson, M.A., read a paper showing the results of his experiment in the comparison of these rays with the rays from uranium, wit ultra-violet rays, sunlight, metals in contact with the gas unde examination, and further with the modifications brought about b electricity. The net result of Mr. Wilson's work, which lay in th effect upon the condensation of aqueous vapour into fog or visibl drops of these various radiations, conclusively showed that thes radiations were all distinct and different, and not to be confounde with one another, there having been at one time, as our readers ma remember, a strong tendency to show a similarity of constitutio through similarity of effect.

Camera Work for the Tropics.—One of the great evil to be contended with by those whom business or pleasure takes t India or other hot countries is the evil wrought by various insec pests. Of course, many of them are kept away by enclosing th camera in a tightly fitting tin case, but that is not a very practica way for a man, for example, out on a long journey. A large manu facturer of hand cameras once informed us that he found the bes security from the attacks of the white ants (which will eat almost any thing) was to make the covering of Russia leather. This he con sidered a perfect safeguard for a certain length of time. As th essential oil to which this leather owes its peculiarities become gradually dissipated, the preservative effect all is lost; but a write in *Nature* last week, dealing with the effect of insect pests, mor especially bookworms, describes a method of treatment which, o the face of it, suggests that it is the true remedy. It is simply a solution in alcohol of corrosive sublimate and thymol. Fo cameras where alcohol might injure the surface of the leather i might be better to dilute the alcohol with water until the solven action of the spirit ceased to be evident, so long as the thymol re mained in solution, or as an emulsion.

Old Masters in the Lantern.—We notice that, at th last meeting of the Edinburgh Photographic Society, a lecture wa illustrated by a number of slides of the works of the old master It has always been a matter of surprise to us that series of goo slides of such subjects are not on the market, particularly as two o three of the largest Continental art-reproducing firms have been a great expense in photographing the pictures in our National col lections, and also in the Royal collections, and the excellent result they have published make us wonder that they have not issued som of them as lantern slides. On mentioning the subject to the Londo representative of one of these houses, we were told that the reaso was that their works were so largely pirated in this country, thoug badly, from paper prints, that they would not risk issuing them o glass, from the fear that they would be still more largely pirated, b reason of the better results obtainable from glass than from pape also that the public would be less likely to discern the fraud.

Alleged Portrait of Christ.—If one compares the por traits of Christ, as depicted by the different old masters, and moder ones too, it will be seen what a wide discrepancy there is in the idea of the painters of what kind of features he had, as they are all s widely different from each other. Take, for example, the Christ o Velasquez and compare it with that of Rembrandt, and see the wid difference there is between them and the portraits by other artists Of course they are all ideal depictions. Now, according to th *Standard's* Paris corespondent, a Frenchman has discovered, amongs a number of old coins for sale at a curiosity shop at Rome, a curiou bronze medal, which he bought for ten centimes, because he foun on it Hebrew characters dating back to the primitive times of th Christian era. On closer examination, it has been declared that i bears the effigy of Jesus. The Hebrew inscription it bears on th reverse, translated into English, is "The Messiah, the King, wil come in peace. He is the light of men, incarnate and living." It i further stated that replicas of the medal are being struck, both i bronze and silver. If that be the case, they will, if properly "boomed," prove a profitable investment of the ten centimes by th

lucky discoverer. No doubt photographs of the medal will also be forthcoming, and they too will doubtless under the conditions alluded to command a ready sale and be a further source of profit.

Spurious Masterpieces.—According to the *Morning Post*, the Belgian police have discovered, in the suburbs of Brussels, a workshop where masterpieces by some of the leading modern artists are, or have been, turned out. Amongst the fraudulent productions found and seized were some clever imitations of paintings by Millet, Puvis de Chavannes, Baudry, and Jean Paul Laurens. From the report it would seem that the forgers must have done a considerable business, for they are said to have netted over 1,000,000 francs in the time they have been at work. It is said that the work found a ready sale in the United States, and that specimens of their skill are to be found in some of the most important private collections in America. Not a very satisfactory thing for the owners, or altogether for the owners of genuine productions by the same artists. American collectors have always been anxious for European pictures, and pay high prices to obtain them, and many of the best works of *our* leading artists have left this country for the States. We have long since heard that America possesses a goodly number of pictures of old masters, for which high prices have been paid.

FOREIGN NEWS AND NOTES.

Astronomical Photography.—An article by P. Zschokke, in the *Photographische Correspondenz*, draws attention to this branch of photography as offering considerable scope to the layman for interesting work which may prove of considerable scientific value. A fairly good telescope may be easily adapted to the purpose by fitting it with a small camera and a suitable positive or negative lens. The latter is more convenient, and a tele-negative lens will answer excellently well. In 1874 and 1882, the transit of Venus was photographed by the German expedition with a 4-inch telescope combined with a positive enlarging system, and the aerial image was magnified from ¾ to 4 inches in diameter. At the present time a similar arrangement with objective of 6 inches diameter is used by Dr. O. Lohse at the Astrophysical Observatory, Potsdam, and photographs of the sun 50 cm. in diameter have been taken. A positive enlarging lens requires greater length of tube, but it is used when observations are taken by cross lines. Negative lenses have come into more use from the convenience of a shorter telescope tube, and observations may be made by adjusting the middle line of the plate definitely to the meridian. Astronomical photographs are principally used for ascertaining changes in the surface phenomena of heavenly bodies, and for obtaining series of pictures of the occultation of stars, eclipses, &c. For this purpose photo-telescopes are eminently suitable, as the images obtained are of large dimensions and great sharpness. At the same time they may be mounted on small stands or affixed to the tubes of larger telescopes used visually. The following table will give some idea of the dimensions of photo-telescopes, and the size of image obtained.

Aperture.	Focus of Objective.	Focus of Tele-photo-Combination.	Entire length of Telescope.	Diameter of Image of Sun or Moon.
mm.	mm.	mm.	mm.	mm.
61	730	5370	980	50
81	1218	8060	1350	75
108	1624	11370	1960	108
135	1949	16115	2365	150
135	1353	16115	1800	150
162	2599	32230	3510	300
162	2599	24170	3155	225

The focus of the actinic rays must be ascertained by trial, but, once found, the lenses may be permanently fixed in position for subsequent use.

Micro-photographic Objectives.—Ernst Leitz, of Wetzlar, has introduced a new series of lenses for photo-micrography. The series comprises two types, illustrations of which are given in the *Photographische Correspondenz*. The three largest of the series are triplets. The two external lenses of the combination are each composed of a double concave cemented to a double convex, and the middle lens is composed of a double concave cemented between two convex. The four biconvex elements are of crown (?) and the three biconcave of light flint glass. The smallest lens of the series is a doublet composed of a pair of biconvex elements, each cemented to a biconcave.

Carbon *versus* Silver.—Dr. H. W. Vogel, writes in the *Photographische Mitteilungen* concerning the difference between carbon and silver prints, and attributes it to the difference in colour sensitiveness of the two printing processes. For comparison a very fine portrait negative was taken, representing a lady dressed in white silk damask, with a design of white flowers upon a white ground. The design could be seen in the negative, but the deposit was rather dense. The silver print did not show a trace of the design, unless the well-rendered portions of the negative were masked, whilst the silk dress was given further exposure in printing. A normal print could be made in carbon without masking the negative, and the details were fully rendered. It is said that carbon gives more detail in the high lights and renders two or three gradations more than silver. But Dr. H. W. Vogel thinks this is seldom the case, as the light transmitted by the negative is the same in both cases, and, according to general opinion, should give the same gradations whether silver or carbon be used. But practice teaches us that such is not the case. Dr. H. W. Vogel holds that that difference is dependent upon the colour sensitiveness. The bichromate of the carbon paper absorbs the violet rays and the blue to green, but the silver paper only the violet and ultra-violet. The light is further affected by the negative through which it has to pass, which is generally somewhat yellow, and absorbs violet and ultra-violet. Consequently the rays which are most effective in silver printing suffer most, and the detail in the densest parts of the negative is lost. It is otherwise in the carbon process, as the pale blue and green are absorbed by the paper and affect it. These rays are transmitted by the negative more freely and assist in printing the high lights of the carbon picture, but they are lost in silver printing. Dr. Andresen's interesting communication concerning optical sensitisation of silver printing papers indicates the means by which these defects may be overcome, viz., sensitising for other colours than spectrum violet.

The Consumption of Silver.—The *Saale Zeitung* refers to the use of silver for commercial, manufacturing, and other purposes, and points out that, whilst in most cases the metal is recovered and used again for other purposes, there are some industries in which it completely disappears. As a notable instance, it points to the manufacture of photographic dry plates. One German firm alone, in the course of ten years, has used 7500 kilogrammes of silver nitrate in the manufacture of plates. This represents about five tons of pure silver. If we add the consumption of silver by other manufacturers of dry plates—and it must be remembered that there are larger factories in this country than in Germany—photography must have some influence on the production of silver.

Platinum Printing.—The addition of bichromate of potash to the developer has been recommended for prints made from flat negatives; but this method has been found unsuitable in some cases, and this species of intensification seems to be dependent for its success upon the character of the negative. Paul von Jankó writes, in the *Atelier des Photographen*, that he finds persulphate of potash, or anthion, much better for the purpose, as it acts equally throughout the scale of gradation. Taking as a normal developer—

Distilled water ..... 8 parts,
Saturated solution of potassium oxalate (33 per cent. ..... 4 „

he substitutes, for one part of distilled water, one part of a 5 per cent. solution of potassium or ammonium persulphate. If more contrast is wanted, further quantities of persulphate solution may be substituted for water, but it is not desirable to go beyond the following proportions:—

5 per cent. persulphate solution ..... 4 parts.
Distilled water ..... 4 „
33 per cent. oxalate solution ..... 4 „

Formate of Soda.—Mr. A. L. Henderson's toning bath with formate of soda, as recently recommended at the London and Provincial Photographic Association, is mentioned in the *Photographische Mitteilungen*. The editor, Dr. E. Vogel, offers the

following explanation of its action. The formates act as reducers, that is to say, they slowly precipitate the metal from solutions of gold and platinum. The toning baths in which they are used therefore act differently from those to which we are accustomed. In the latter the toning action depends upon the chloride of gold combining with a portion of the silver image and forming chloride of silver and metallic gold, which latter gives the picture its tone. On the other hand, toning with the formates is brought about rather by deposition of the gold or platinum in the nascent state upon the silver image. These baths consequently act as physical intensifiers.

Photographs on Ivory.—The *Deutsche Photographen Zeitung* gives the following details of a printing process for ivory. A positive of a line subject or a positive from a process negative is used, and the ivory is prepared for printing with bichromated albumen. After exposure, development is effected in precisely the same manner as in preparing a plate for the first etching in photo-zincography. The margin is then prepared with modelling wax to protect it from the etching fluid, which consists of one part of sulphuric acid to six parts of water. The etching fluid turns the exposed surface of the ivory black. After etching, the surface is washed with a weak solution of ammonia and the bichromated albumen removed.

A THREE-COLOUR PRINTING PROCESS.

Dr. Noack, of Giessen, suggests in the current number of the *Photographische Correspondenz* the following process for trichromatic printing, and, whilst it strikes one as being somewhat complicated and difficult to successfully carry out, it may contain the germ of an idea for other experimenters on the same lines.

Dr. Noack states that three negatives are to be obtained, and that he prefers a fairly dense negative full of detail for the red printing; the yellow printing negative must be fairly full of contrast and hard; the blue printing plate must be rather flat. For the first, the red, he used an Isolar ortho plate;* for the yellow, an ordinary plate; and for the blue a Lumière's red sensitive plate. The requisite value of exposures he found to be 60 : 1 : 150.

Dry filters were used made according to Hübl's formulæ †

Whatman's drawing-paper was cut to the required size, allowing plenty of margin; thus, for a 13 × 18 cm. plate, sheets 16 × 22 cm. were used. A piece of plate glass of the same size was used, and glass and paper placed in a dish filled with water at 70° C.; when the glass was warmed through, and the paper softened, both were lifted out together, and the paper damped off with blotting-paper, and whilst still warm placed on a levelling stand and coated with 30 c. c. of 6 per cent. solution of gelatine, at 30° C. by means of a brush and when set hung up to dry. When dry the gelatine was hardened by soaking in a 5 per cent. solution of formalin. In this condition the paper can be kept for any length of time.

The red impression is made first. The paper is laid between damping sheets under pressure until the film has become slimy, and then sensitised by floating on the following solution for from four to six minutes. The solution must be made fresh each time:—

Phenol Solution.

β-naphthol	1 gramme.
Sodium hydrate	0·35 grammes.
Water	40 c. c.

Dissolve and filter and add the

Diazotising Solution.

Sodium tetrazoditolyl sulphonate	1 gramme.
Water	40 c. c.

Dissolve and add two drops of a saturated solution of sodium sulphite, shake, and filter.

The sensitised sheets are damped off with blotting-paper and hung up to dry. All these manipulations must be done by weak artificial light, as the paper is considerably more sensitive than gelatino-chloride printing-out paper. The prepared paper will keep, in a calcium tube, in a cool place for a long time.

* These plates are anti-halo, or double-coated plates, and sensitised for yellow and green, and made by the Actien-Gesellschaf für Anilin Fabrikation, Berlin.—*Trans.*

† *Die Dreifarbenphotographie*, pp. 134-136.

The orange filter for the blue-printing negative is made by coating one glass with 0·3 per cent. chrysoidine collodion, and another with 0·25 per cent. saffranine collodion. That for the yellow plate with Victoria-blue collodion, and that for the red plate by one screen of brilliant green collodion, and another of picric acid collodion.—*Trans.*

The print must be made on fairly damp paper, and the sheets may be damped as suggested above, then covered with thin waxed paper and placed in contact with the red negative, which should be varnished with zapon varnish,* and exposed in the shade till the print has the desired depth. The print must be examined in artificial light. Fixation is effected in three baths of 0·5 caustic soda solution at 60° C., first in artificial and afterwards in weak daylight. The image becomes pale and the tone is altered, and to bring it back it is bathed in a 10 per cent. solution of glacial acetic acid, and then washed in running water and hung up to dry.

The yellow print is made next, and the red print is damped as before stated, and then floated for about five minutes in lamp light on the following solution:—

A.

Glacial acetic acid	25 c. c.
Water	250 „
Lead nitrate	20 grammes.

Dissolve in the above order and filter.

B.

Potassium ferridcyanide	30 grammes.
Water	250 c. c.

Dissolve and filter.

Both solutions will keep, and should be mixed in equal parts just before use. After sensitising, the paper is blotted off and hung up to dry, and then the yellow negative is, by looking through it, made to correspond with the outlines of the red print. As the paper will have probably stretched whilst damped for the red, it is advisable also to damp it for the yellow printing in the same way.

Printing must be judged by an actinometer, as the image of ferrocyanide of lead is not visible. Unfortunately the paper is about 1000 times less sensitive than collodio-chloride, and a normal negative requires about five hours' exposure in the shade when the sun is shining brightly.

The printed sheet is fixed by immersion for some hours in water, acidulated with from 0·5 to 1 per cent. of nitric acid, which must be repeatedly changed and finally well washed in running water. After thorough washing the prints are toned in a bichromate solution (20 c. c. of saturated solution of potassium bichromate to 100 c. c. of water), and then the excess of bichromate washed out. If the yellow parts show a greenish tinge, this is due to the formation of small quantities of Berlin blue, and a clearing bath of weak ammonia water followed by a 10 per cent. solution of acetic acid and subsequent washing is desirable.

The blue print is made by recoating the red and yellow print with the above-mentioned gelatine solution, and this is sensitised by floating on a mixture of equal parts of the following solutions:—

A.

Green ammonio-citrate of iron	50 grammes.
Water	200 c. c.

Dissolve and filter.

B.

Potassium ferridcyanide	18 grammes.
Water	200 c. c.

Dissolve and filter.

To every 40 c. c. of the mixture—and this quantity is about enough for six sheets—add 10 c. c. of a 2 per cent solution of citric acid. The sheets, which should be sensitised by lamp-light, should be blotted off and hung up to dry in the dark. The sheet must be adjusted to blue negative as suggested above for the yellow. The progress of printing is readily seen, and it must be carried rather further than required as in the washing some of the vigour is lost. The final washing must be thorough.

Dr. Noack points out that there is considerable room for improvement in the process, particularly in the substitution of another solution for the lead intensifier, which is extremely difficult to remove from the paper. The red print, which is founded on the Feerotype process, is also not absolutely stable. The author hopes to make further experiments and will report results.

THE HAND CAMERA: ITS CAPABILITIES AND LIMITATIONS.

[Paper read before the Plymouth Photographic Society.]

Since the advent of the gelatine dry plate with its extraordinary sensitiveness to light, requiring, as it does, with suitable lenses passing a large quantity of light, exposure measured by fractions of a second, the hand camera has grown upon the amateur photographic public to an enormous extent. By a hand camera I, of course, mean a camera which is held in the hands during exposure, and is provided with a suitable shutter enabling the exposure to be made in a sufficiently short period of time.

* Celluloid or pyroxyline in amyl-acetate varnish.—*Trans.*

I need hardly say that a hand camera ceases to be such when it is used upon a tripod or stand, and the exposure made from such fixed support.

Now, you will not expect me to do more to-night than review the salient points of the hand camera, to briefly suggest what is best to have and what to avoid, for I take it that some of you will have some questions to ask to further elucidate some points left obscure or not sufficiently ventilated.

It is not my intention, in this paper, to consider cost at all, but to suggest what is best in my opinion, and I shall base my idea of what the hand camera is capable of doing on the assumption that you have as good gear as is procurable, because it is not fair to put any limitations on the capacity of the hand camera if we start with any but the best procurable.

Now, the hand camera differs very materially, far more so than is generally understood, from one worked on the stand; to get good results you must have a better optical system and far more perfect mechanism, because so much depends upon both of these factors. I will explain. A lens capable of giving very good results, when stopped down and used for a time exposure, may easily be practically worthless if used with sufficiently open aperture to pass the necessary amount of light to impress your plate in the fraction of a second, which its use as a hand-camera lens entails. The lens is, in any case, the main and central pivot on which photography rests, and, as I have stated, it is doubly important to have it good for hand-camera work. The lens should be one capable of giving even illumination all over the plate for which it is employed; further, it must do this with a large diaphragm, say not less than *f*·8; it must further give good definition at this large aperture all over the plate; that is to say, it must give even illumination with a flat field. Now, this is equivalent to saying that you must have great depth of focus with a large aperture, a condition of things always aimed at by opticians but very difficult to attain, but a consummation more nearly arrived at since the introduction of the Jena glass than ever before; and there are several prominent examples of such lenses now available—to wit, the Goerz, the Zeiss, the Cooke, the Stigmatic, the Platystigmat, and possibly one or two others.

The next element of the hand camera in order of importance is the exposure shutter, upon which, and the position in which it is placed with reference to the lens, more depends than is often realised.

It should be as light as possible, because, moving as it does at a high speed, a heavy shutter is apt to cause vibration; for the same reason the release should be as light as is consistent with safety, and the style of release should ensure that action and reaction are equal, or vibration is almost certain to ensue; again, the path of the moving shutter should be in a plane vertical to the plate, as then no tendency to vibration from the shifting of the centre of gravity is set up; but I have left the most important consideration to the last, viz., the position of the shutter with regard to the lens and plate. Now, I hold very strong and definite views on this matter, and I consider that the vast majority of shutters are in the worst possible place, viz., close up to the lens, either just before the front combination or just behind the back. Now, as this is a vital matter, I hope you will allow me to examine the question more fully, it may be news to some of you, but you can easily try the experiment with a piece of gummed paper. If you cover any part of the lens with any shaped obstruction, and examine the image it then throws on the ground glass, you will find that the whole of the view, or what not, is depicted; but it is less brilliantly illuminated in proportion to the amount of surface blocked out. You will further find, if you have blocked out, say the centre of the lens, so that the marginal portions are doing all the work, that the quality of the image is very inferior as to sharpness, or, and which is the fairest test, you cover a definite portion much as it would be in some position of the moving shutter. You will, in every case, except at full aperture, find the image is not either the brightest or the best the said lens is capable of giving.

Now, no great amount of imagination is required to see that only for the briefest portion of the exposure is the position of greatest effectiveness present; during a very large fraction of the exposure the marginal or worst portion of the lens is doing the work, and you will readily realise that, where the whole exposure is so brief, to have only a minute fraction of this at its best is a fatal mistake. Three other positions are available, all better than the one examined, the usual one; these are that the shutter shall be near the diaphragm of the lens, or against the plate, or a similar distance in front of the lens—this latter entails such an increase of bulk as never to be adopted. I will therefore examine the other two, first as to a shutter working near the diaphragm; this at its best takes the form of an aperture opening from and closing to the centre, and it has much to recommend it; but in this form, although the lens works at its best so far as quality and definition are concerned, it passes much less light than it should do, or, shall I say, much less light than in the last position I shall examine, and that is when the shutter takes the form of a more or less narrow slit passing rapidly across and close to the face of the plate.

This will be recognised as what is known as the focal plane shutter. The action of this shutter, in my opinion, may be best described as allowing the whole of the lens to do the whole of the work the whole of the time. I am quite aware that theoretically, for the taking of moving objects, this shutter is condemned as not giving scientifically correct results. I am not, in this paper, however, dealing with any scientific branch of photography in which extremely rapid action is a necessity, but I am dealing with the hand camera in its every-day aspect. Having arrived at this opinion theoretically, I had, early in the year, a hand camera made to this design, and I can only say that it has fully realised my expectations. You will also note another very important point, viz., that, as this shutter passes all the light the whole of the time, a smaller diaphragm can be used in the lens.

The next item of practical importance for use with the hand camera is the plate or film, and here arises subject-matter sufficient for a lecture in itself; so many considerations arise before deciding what plate to use, as to subject, time of year, state of the light, and other minor considerations. As a general rule, we should use as slow a plate as all these considerations admit of, and the reason for this is that such plates are more readily developed into vigorous negatives. It must have been an experience of several of you who have attempted to develop a plate which had never been exposed, that after some little time in the developer it has greyed all over, although light had never acted upon it. Now, what is the meaning of this, seeing that, had the same plate received an exposure, the darkening of the film would have been in proportion to the action of light? I take it, that in the development of a plate on which light has acted the developer has a legitimate work to do; in other words, where light has acted the most, a deposit of silver readily takes place. This having once started, further action has a tendency to continue along the same lines, and during this action there is little doubt that bromine is set free, and acts as a preservative of the shadows of the negative. Now, with a plate which has had a minimum exposure in a hand camera, the action of light has been so short that this has to be supplemented by the action of the developer, which acts for so long a time that the greying first alluded to has a tendency to start, and so produce flat and unsatisfactory results. There can be no doubt that, under usual conditions, the fractional exposure we are able to give is so short that satisfactory results can only be hoped for on suitable plates, that is, on plates highly sensitive, or which will stand a long development without fogging; and medium rapidity plates will stand, as a rule, more of this than the very rapid.

In the course of my experience with these short hand-camera exposures, I have discovered what at any rate to me appears to be a new principle, or one which I have never seen enunciated, and that is, that the developer should be made to fit the exposure—a fixed principle underlying this, which I can best describe by saying that the shorter the exposure the weaker should be the developer with which to commence developing. You have all, no doubt, heard of stand development, and the application of this to hand-camera exposures seems to solve the problem of getting the very utmost out of any such exposure made. You will find that by this method you get vastly more detail without blocking up of the high lights, and in every way a more satisfactory and harmonious negative.

Now, as to plates or films. We can use the thin roller film, the cut thick film, or the ordinary plate. With reference to the first, personally, while recognising its immense advantages in the field, the subsequent trouble so far counterbalances this that I do not care to use them. For a "you touch-the-button" amateur, they undoubtedly present advantages of lightness and facility of change, which have much to recommend them, and the quality of the film is almost invariably good. Further than that, the new daylight spools give a very extended range of capacity.

With regard to thick cut films, these are somewhat more expensive than plates, and far more troublesome to change, except in one variety of camera, to which one does not care to be tied down. Still, given an efficient means of changing, they, to my mind, constitute the best means an amateur has of making a large number of exposures without unduly burdening himself.

Now, as to plates. These have many points to recommend them. For instance, with plates one has great choice of make, of sensitiveness, and several ready means of changing. Their great drawbacks are weight and fragility, but outside those they appear to have nearly every advantage.

Immense ingenuity has been expended on changing mechanism for plates, as apart from the use of double backs. Many of these work with tolerable accuracy, while others have an exasperating trick of going wrong at a critical moment.

A great deal depends on what one's idea is in going out with the hand camera, because, for varied subjects and at different times of the day, different degrees of sensitiveness in the plate used may be desirable, and to attain this end readily the use of double backs is almost a necessity, as no changing mechanism with which I am acquainted admits of the use of any special plate to the exclusion of the next in order. For my own use, I have a Pullman changing box, which has really worked very well. It is difficult, if not impossible, to give any direct recommendation or condemnation of any of the several mechanisms at present before the photographic public, because, without personal acquaintance with them, such would have no value.

We will now consider the question of how we shall know what we have on our sensitive film at the moment of exposure. There are a variety of ways of getting at this information, some far more definite and cor-

rect than others. Probably the most accurate is to have a second lens of the same focal length as the one actually doing the work, but which lens is simply employed through the interposition of a mirror inclined at an angle of 45° to throw on a ground-glass screen the same image which the other lens will throw on the sensitive plate. This method, however, introduces two undesirable factors, one of weight and bulk, and the other of expense, and is not therefore generally employed. Another very good method is to employ the single lens to throw a similar image by the same means, the mirror being moved out of the way by suitable means when the exposure is made.

Then, there is the long army of finders, whose name is "multitude," and whose attributes are various. Of these the most efficient, but, as usual, by far the most expensive, is the optically ground prism, which gives a beautifully bright image under the most unfavourable circumstances without shading.

After this, and a long way behind, come the other finder devices, all of which are actually substitutes for the prism. The great defect with finders is the fact that they may easily not agree with the focal length of the lens used, and can only be regarded as correct when they have been fitted or selected to agree with the focal strength of the lens used.

Another form of finder consists of a concave lens, in which, when held in the correct position and plane, a bright miniature representation of the view as thrown by the lens will be seen in it. These, however, like the prism, need to be selected to agree with the focal length of the lens used.

A last variety of finder is one in which a small rectangular opening proportional to the plate being used is looked at through a small hole at a correct distance from it. This is not an optical system at all, but is a mechanical means of framing the view about to be taken, and has much to recommend it, the only defect it possesses really being that it necessitates the holding of the camera on a level with the face.

Some hand cameras are fitted with circular or cross spirit levels, but this, to my mind, is a very undesirable complication, as the proper use of an efficient finder entirely obviates the necessity for it, and it introduces complications which must take the attention off the main subject, and as often as not cause the loss of something especially desired of some moving object.

With reference to size of plate used in hand-camera work, the quarter-plate is probably far most frequent. A very good size, however, and one which I myself use, is the 5×4, which as you will see, for enlarging from is a multiple of 10×8, $12\frac{1}{2} \times 10$, and 15×12, all of these being regular sizes in which bromide paper can be had for enlarging on. To my way of thinking, 5×4 is large enough for hand-camera work, as, apart from other reasons, all lenses give better results when only the central portion of the rays they pass are used, and they are more readily adapted in the usual focal lengths suitable for hand cameras for about this size.

We will now leave the practical details of the hand camera, and consider its use for photographic purposes. There can be no question whatever that the hand camera, as such, fills a place in the photographic world, as one can often effectively use a hand camera to secure some momentary effect which the setting up of the stand camera would inevitably lose. So easy is it to understand this, and such numbers of cases will suggest themselves to you all, that it would be a work of supererogation on my part to attempt to go into detail. All this simply proves, as I have said before, that the hand camera has a place; but, just as a carpenter does not attempt to do all his work with a gouge, so let me advise any amateur photographer not to attempt to do all his with a hand camera. Its limitations are numerous and serious. The hand camera, as such, can only efficiently be used on open and well-lighted views, is unsuitable, generally speaking, for architectural subjects, is no good for the taking of interiors, and is certainly a long way behind a stand camera for portrait work. Further than this, it is not usable for copying work, and I would strongly advise, in the taking of any subject intended for enlargement, that wherever possible the stand should be used and the lens stopped down to, say, *f*-22.

There is, however, a charm about hand-camera work, or its results all its own. There is a life and breeziness about many of the results quite unobtainable with small stops and long exposures, but it will be noted that these results only present these features when viewed in the size in which it was originally taken. I would appeal to my hearers if, in their experience, they have not found that on the whole the results of, say, their summer hand-camera work has not been more or less disappointing.

There is a very general but a very mistaken idea that the hand camera is at any rate the camera for the beginner, as later on he will be able to get a larger size and work it on a stand for more serious work. In my opinion this is beginning at the wrong end, for I look upon the production of really good work by the hand camera as at least three to four times as difficult as stand work. My advice, therefore, would be to start with a camera which is both hand and stand, that is, of course, one which can be used either way. Then, if the novice, or, for the matter of that, the accomplished photographer, will use it whenever possible on the stand, and only as a hand camera when the necessities of the case demand it, he will get as near making the best possible use of his apparatus which he possibly can.

E. H. Micklewood.

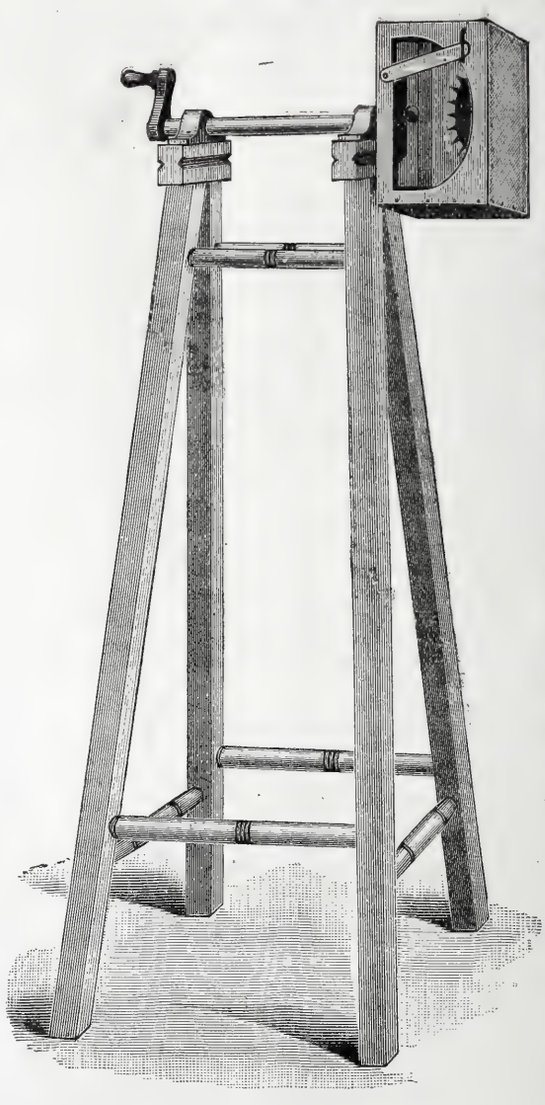
A NEW SYSTEM OF VIGNETTING.

A short time ago we were enabled to inform our readers that a Glasgow photographer had invented a somewhat novel system of producing a delightfully soft and evenly blended vignette appearance to prints on bromide or other rapid printing papers, when such were printed by means of artifical light. The inventor, Mr. Willie Anderson, of Partick, Glasgow, delayed giving full particulars of his method of working until such time as he had acquired patent rights for his invention, both in this country and on the Continent. The latter having been secured, Mr. Anderson has quite recently shown his apparatus to a few prominent photographers, and in a very few cases has kindly invited some of these to witness the working of his invention in his studio at Partick. The difficulty of securing a perfectly graduated vignette when printing negatives by artifical light has been well known to all practical workers for a long time, but it is not saying too much when we state that this difficulty has been entirely overcome by Mr. Anderson in an exceedingly simple manner.

In response to an invitation, we quite recently visited Mr. Anderson's printing room, and were shown the apparatus working, a brief description of which will, no doubt, be read with interest by all practical photographers.

The apparatus is so extremely simple, and the mode of using it so easy, that on anyone seeing it in operation for the first time they are forcibly impressed with its utility.

A negative is taken and placed in an ordinary printing frame, to which is attached the usual vignette mask, and up to this stage there is absolutely no difference in the treatment to that in regular practice for years upon years back; but, after the negative has been set in the printing frame, with the sensitive paper in contact, the frame carrying the negative is inserted in an outer envelope or box, and, by means of guides and a spring clip, the same is held immovable in its outer case. To the back of the wooden envelope is attached a wooden spindle which is set in bushes upon a short platform, the end of the spindle having a handle for the purpose of easily rotating the apparatus to right or left at any desired speed.



The front of the wooden box or envelope has a cut-out, over which is stretched a covering of coarse, transparent muslin. In using his vignettes, Mr. Anderson utilised his charging room, at the end of which an aperture is cut out in the partition, one side of the aperture being glazed with deep canary, and on the outer side of the partition another sheet of coarse ground glass. The room in which the apparatus is situated immediately opposite and about nine inches from the canary window is, of course, glazed with the latter medium, but a full illumination of such does not injure the bromide papers when charging the frames. Just in front of the ground glass in the daylight room is fitted a sixteen-candle power gas jet, and Mr. Anderson invariably uses this in his working, although any other lamp or radiant is equally well adapted for the purpose.

To make the exposure, the box or envelope is pushed up to a distance of nine inches from the canary glass, a small gauge of wood being used to measure the distance, and so ensure all exposures being of exactly the

same duration, &c. As soon as the box is in position (and the simple means employed enables such being accomplished with the utmost rapidity), the canary glass is run back in its grooves, thus exposing the negative to the diffused white light coming through the ground glass on one side of the partition and the coarse muslin on the envelope. Simultaneously with the removal of the canary glass the spindle is rotated by means of the handle, first, for four turns to the right, then for four turns to the left, and then the canary medium is made to shield the light and close the exposure. There can be no question regarding the beauty of the results obtained by this simple method of working, and one very important factor lies in the absolute certainty of an operator being able to produce any number of prints of exactly the same appearance. Hitherto, in rapid contact printing followed by development, this has not been easy of accomplishment; but, by means of Mr. Anderson's invention, it is possible to give exactly the same time in exposure to every print, and when such are developed in a batch at one time they all come as nearly as possible exactly the same in appearance.

This invention is likely to mark a fresh departure in bromide work in connexion with portraiture, the rapidity with which any number of copies can be supplied, all being exactly similar in appearance, is a very important consideration.

"FLOWER PHOTOGRAPHY."

At the meeting of the Leeds Camera Club, December 14 "Flower Photography and its Adaptability for Lantern-slide Making," by Mr. W. Emmott, was the subject for the evening. The lecturer, dealing in the first place with the arrangement of flowers for photography, said they must not be overcrowded, and the vase or receptacle holding them should be in harmony with the flowers, and each flower, or grass, or fern, should show its own individuality. Too great contrasts of colour should be avoided, or development becomes very difficult, the delicate tones of the light colours being lost before those of the darker are brought out. For light, a room with window facing north is the best, and by means of a mirror light up the dark side of the subject. This lighting is found to be a very important factor, and experience only will teach how to get the best results, for the lighting of every group should balance the particular flowers used, and the light should be so shaded, subdued, or increased, as to best show the relative tones of colours in the flowers. Exposure was another matter depending on experience. No hard-and-fast rule could be laid down, for on a September day, at noon, with a fair light, 30 seconds at *f*-11 might be right; yet at four p.m. the same day as much as 4 minutes might be required. Every exposure should be carefully tabulated, and a note made of the apparent value of light, together with the day of the month and the particular time of the day. Results so obtained were invaluable for future reference. In developing use the medium you are most familiar with. Pyro soda he found the best, beginning with a diluted developer. As soon as the high lights appear, rinse in water, and bring up the undeveloped portion with a soft camel's-hair brush and a stronger developer. Regarding the use of isochromatic plates, screens, and coloured backgrounds, Mr. Emmott said he had found no apparent advantage. He used a dark background and ordinary plates, the results being most pleasing, but always taking care to study well the position of the flowers, near or from the light, and the relative value of the reflected light. Flower subjects are not so well adapted for prints as for lantern slides. A brilliancy is obtained in the latter which no print can give. Slides made by contact or reduction seem equally good, providing the negative is one full of gradation, without harsh contrasts. The varying density of the negatives when making lantern slides can be overcome by varying the time of exposure, or the distance of the negative from the light employed, and using gaslight, a No. 5 burner, at a distance of about 16 inches. An exposure of 5 to 12 seconds would be found ample. Note should be taken of the light, for it would be found that 5 seconds at ten p.m. would be equal to 7 or 8 seconds at six p.m., although it was always better to err on the side of over-exposure, and then diluting the developer. Mr. Emmott recommended the use of three different strengths in developing, one normal, one well restrained, and one with increased accelerator. First immerse the plate in water for a minute, taking then the first-named (normal). Apply it until the image appears faintly; then rinse and place it in water for a minute or two. Development will be found to have continued somewhat, and with a very soft brush locally apply No. 2 or No. 3 as is required. Rinse well, fix well, and wash thoroughly.

PHOTOGRAPHIC DEVELOPERS AND DEVELOPMENT.

[Read before the Society of Arts and printed in its *Journal*.]

Photographic developers are many, and the phenomen of development are complex and often obscure. It is impossible in the time at my disposal to deal with more than a comparatively small part of such a wide subject, and I propose, therefore, to consider developers rather than the operation of development, though the matter must naturally be dealt with incidentally.

It is a noteworthy fact that, with the exception of ferrous oxalate and ferrous citro-oxalate, all the substances that have been found to be of any practical value as developers for gelatino-bromide plates are carbon compounds, and, with one exception, are derivatives, and comparatively simple derivatives, of one and the same parent substance, the hydrocarbon benzine.

For some time pyrogallic acid or pyrogallol, which has been used as a developer in the collodion process, was the only carbon compound applied as a developer for gelatino-bromide plates. In 1880, however, Captain Abney, to whom photography owes so much, showed that hydroquinone, or, to use its systematic name, quinol, not only may be used as a developer, but has properties that distinguish it from pyrogallol and make it especially useful for particular purposes. In the same year Eder and Toth recognised that pyrocatechin, or, again, to be systematic, catechol, which is very closely related, and in many ways very similar to quinol, likewise has strongly marked developing power. Up to the present time, however, this compound has been but little used, partly because, until quite recently, it has been comparatively costly. Some years later an α-amido-β-naphthol-β-sulphonic acid, which was described by Meldola in 1881, was recognised by Dr. Andresen as a photographic developer of considerable power, and its sodium salt was placed on the market under the trade name of eikonogen. For a time it was distinctly popular, but it is doubtful whether it is used to any large extent now, not because of any special demerits, but because photography, and especially amateur photography, is peculiarly subject to fashions, for a time at least eikonogen seems to have been displaced by later novelties, such as paramidophenol, amidol, and metol.

Since 1890 new developers have appeared in even greater numbers than minor planets, and to-day there are at least twelve distinct developing agents in the market: pyrogallol, catechol, quinol, eikonogen, metol, paramidophenol, amidol, glycin, ortol, diamidoresorcin, diaphenal, and diogen. Perhaps to these may be added reducin, and, if we were to include all the substances that have been patented as developers, the total number would not fall far short of a hundred. This embarrassment of riches, for such the average photographer finds it to be, is mainly due to two German chemists, Dr. J. Hauff, of Feuerbach, and Dr. M. Andresen, of Berlin, who have inquired into the developing properties of a very large number of benzine and naphthalene derivatives. Their investigations have not only resulted in a number of patents, but, what is very much more important, have paved the way for the recognition of certain relations between the constitution of benzine derivatives and their power of acting as photographic developers. The establishment of these relations is valuable, not only because they reduce chaos to at least a semblance of order, but also because they indicate the directions in which further investigations may be made with the greatest promise of useful results.

The broad general principles were first definitely enunciated independently by Dr. Andresen and by Messrs. M. A. and L. Lumière, of Lyons, in July 1891, and a summary of the position to which they have brought the matter will probably be of interest, premising at the outset that in some points of detail they are not quite in agreement even as to matter of fact.

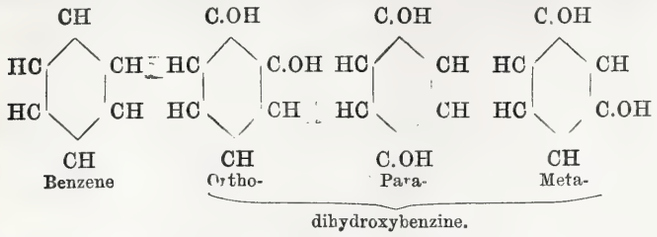
All the benzine derivatives that are known to act as photographic developers, with one or two partial exceptions, to be referred to hereafter, contain hydroxyl groups (OH) or amido groups (NH_2) that have been substituted for hydrogen, and, moreover, contain at least two such groups, which may be either both hydroxyls, or both amido groups, or one hydroxyl and one amido group. Phenol and aniline and their homologues are not developers.

Chemists are familiar with the fact that the bisubstitution derivatives of benzine, in which two out of the six atoms of hydrogen originally in the hydrocarbon have been displaced by either elementary or compound radicles, are capable of existing in three distinct modifications or isomerides, which have the same composition, but differ from one another in physical properties, such as crystalline form, melting point, and solubility, and also in chemical behaviour, more especially as regards their aptitude to enter into chemical reactions, the character of the reactions in which they will take part, and the nature of the products that they yield under similar conditions, and notably when treated with oxidising agents. The three modifications are known respectively as the ortho derivatives, para derivatives, and meta derivatives, and the differences between are believed to be due to differences in the arrangement of the atoms within the molcule, and in particular to the relative positions of the elements or groups that have been substituted for hydrogen. Adopting the usual plan of representing benzine by means of a hexagon with a carbon atom and a hydrogen atom at each of the six angles, the three dihydroxy derivatives of benzine, in which two hydrogen atoms have been displaced by two hydrogen groups (OH), are represented by the formulæ given elsewhere.

A similar plan is adopted for all other bisubstitution derivatives. In the ortho derivatives the two substituted radicles are supposed to be adjacent; in the para derivatives they are directly opposite; in the meta derivatives they are neither adjacent nor directly opposite, or, in other words, they cannot be represented as lying at the opposite extremities of any side or diagonal of the hexagon.

Now, it is found that, whilst the ortho and para derivatives are de-

velopers, the meta derivative has no developing power. Orthodihydroxybenzine is catechol, or pyrocatechin, to which reference has



already been made, whilst paradihydroxybenzine is quinol, or hydroquinone, which is well known and widely used as a developer.

The metadihydroxybenzine is also well known under the name of resorcin, or resorcinol, and is of great practical importance from other points of view, but it has no power of developing the latent image on an exposed gelatino-bromide plate.

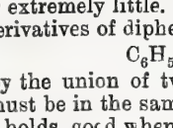
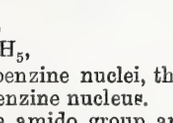
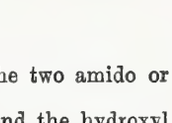
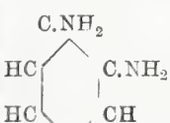
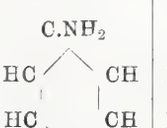
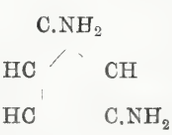
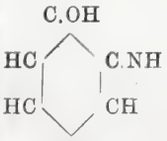
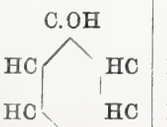
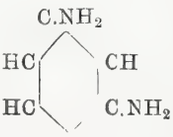
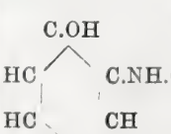
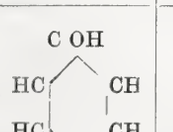
Similarly, the ortho and paradiamidobenzines (phenylene diamines) have developing power, but metadiamidobenzine (metaphenylene diamine) has none or extremely little.

In the case of derivatives of diphenyl,

$$C_6H_5,\ C_6H_5,$$

which is formed by the union of two benzine nuclei, the two amido or hydroxyl groups must be in the same benzine nucleus.

The same law holds good when the amido group and the hydroxyl group occur together; orthoamidophenol and paramidophenol are developers, but metamidophenol is not. One of these, paramidophenol, is now tolerably well known, and is sufficiently in vogue as a developer to be included amongst those put up by Burroughs & Welcome in the convenient form of tabloids; it is also the active constituent of the developing solution sold as rodinal. The constitution of these three groups is shown in the following table:—

	Developers.		Non-developers
	Ortho.	*Para.*	*Meta.*
Dihydroxybenzines.....	 *Catechol.*	 *Quinol.*	 *Resorcinol.*
Diamidobenzines..... (*Phenylene diamines.*)			
Amidohydroxybenzines..... (*Amidophenols.*)		 *Paramidophenol.*	
Methamidohydroxybenzines.....	 *Ortol.*	 *Metol (Andresen).*	

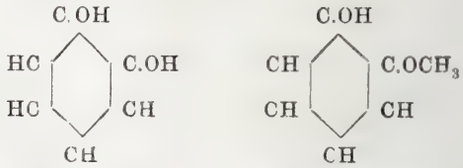
Benzidine, or diamidodiphenyl, $NH_2C_6H_4$, $C_6H_4NH_2$, is not a developer, because the two amido groups are in different benzine nuclei, but hydroxydiamidodiphenyl,

$$NH_2C_6H_4C_6H_3(OH)(NH)_2,$$

is a developer, because one amido group and one hydroxyl group are associated in the same benzine nucleus in the para position. Hydroxydiamidodiphenyl is the active constituent of the developer diphenal.

Naphthalene derivatives, to be developers, must also contain at least two hydroxyl groups, or two amido groups, or one hydroxyl and one amido group, but it would seem that in this case the two groups need not both be in the same benzine nucleus, and it is not quite definitely ascertained whether the rule with regard to meta derivatives holds good. The association of two benzine nuclei to form a naphthalene molecule is of a very intimate character, different from that which obtains in the case of diphenyl, and the various derivatives show certain relations and differences that are not observed in the case of benzine derivatives. As illustrations of the main general law, however, it may be stated that the naphthols and the naphthylamines are not developers, but most of the dihydroxynaphthalenes and the amidonaphthols are developers in a greater or less degree.

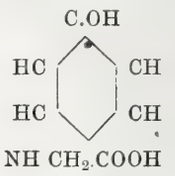
Returning to the benzine derivatives, it is well known that the hydrogen of the hydroxyl group, or the amido group, can be displaced by alkyl radicles such as *methyl* CH_3 or *ethyl* C_2H_5, and also by other radicles, and the results are of some practical importance. In the case of a developing compound that contains two hydroxyl groups or one hydroxyl and one amido group, the substitution of a radicle for the hydrogen of an hydroxyl group destroys the developing power; for example, methyl catechol, commonly known as guaiacol, has no developing power when quite pure (Lumière).



On the other hand, when a similar substitution takes place in the amido group the results are quite different, and some of the products are already important developers.

Methylorthoamidophenol is the chief constituent of the valuable developer ortol; whilst methylparamidophenol is Andresen's metol and its homologue, methylparamidometacresol, is Hauff's metol. The constitution of the first two compounds is shown in the Table already given. Both metols act practically in the same way, and this seems to be true also of the parent substances, paramidophenol and paramidocresol so far as the behaviour of the latter has been examined.

The chief advantages gained by the introduction of an alkyl group in place of the hydrogen in the amido group are increased solubility in water and a slight increase in developing power. An apparent exception to the latter statement, however, is glycin,



which is parahydroxyphenylglycin, or is paramidophenol, in which one of the hydrogen atoms of the amido group has been displaced by the group $CH_2.COOH$. It is, however, more properly regarded as glycin, $NH_2.CH_2.COOH$, in which an atom of hydrogen has been displaced by the hydroxyphenyl group, $C_6H_4.OH$.

It may be convenient to state here the broad general distinction between developers which owe their power to hydroxyl groups and those which owe it to amido groups. Dr. Eder has pointed out that all the developers in use may be broadly divided into two groups, according to the manner of their action on those parts of the sensitive film that have received different exposures. The members of the first group develop the image gradually and step by step, the high lights of the subject first making their appearance, and being followed by the other parts of the image in the order of their relative brightness. The members of the second group act differently; all the details of the image appear almost simultaneously, whether they represent dark parts or bright parts of the object, and afterwards the various parts gradually acquire opacities that represent their relative brightness. In the first group Eder places pyrogallol, catechol, and quinol; and in the second group amidol, eikonogen, metol, and paramidophenol. The first group contains developers that are suitable for normal exposures and over-exposures; the second contains those that are suitable for normal exposures and under-exposures, such as are frequently given in hand-camera work. It is clear that with one and the same exposure the two groups of developers would give negatives of very different characters, especially if development were not pushed to its limit; and this is well shown by the example thrown on the screen. One half of the plate was developed with pyro soda, and the other half with metol soda, and it is evident that the gradations of the two halves are markedly different.

C. H. Bothamley.

(*To be continued.*)

THE NOVITAS STRIPPING FILM P.O.P.

the London and Provincial Photographic Association, on December 15, Otto Scholzig gave a demonstration of the Novitas stripping-film ting-out paper, and of a new method of toning silver prints. The itas paper consists of a collodio-chloride printing-out emulsion, ted upon paper previously treated with a substratum of gelatine. At bsequent stage the solution of this gelatine in warm water releases collodion film, which is then ready for transfer as desired. The antages claimed for Novitas paper over developing or printing-out es, for transparency work, consist of the possibility of examining the gress of the printing, as in the ordinary way, a thing not possible h plates; the superiority of a print-out collodio-chloride image over hard results usually obtained by development; and its adaptability to bination printing, clouds, &c., the making of vignetted negatives, and on. The prints are made in the usual way, except that, when intended transparencies, the image is allowed to become completely bronzed. transfer to opaque substances—ivory, opal, glass, porcelain, and hlike substances — the depth of printing need be only that for inary P.O.P. prints. Toning and fixation may be done by any mulæ suited to this class of paper; but, the paper being apt to curl very liable to finger marks, care is more than usually necessary ing this operation. A brushing-on process of toning, very suitable for itas, was detailed, one advantage being that curling and finger stains e largely obviated. Whichever the method used, after finally washing print it is placed face downwards upon a piece of transfer paper, the two introduced into warm water at a temperature of about 120°. pointed out before, the substratum goes into solution and the original port becomes easily removable from the collodion film, which is then ported upon the transfer paper. Any particles of gelatine remaining wiped away, and the film is ready to be transferred to its final sup-t, which is best prepared for its reception by a thin coating of gum-bic solution, forty grains of gum per ounce of water. With a roller eegee the surplus gum, the air bubbles, and all crinkles are carefully oved, and the film, after it has become dry, for its better protection, arnished in the usual way. The new toning method was that worked by Mr. Starnes. It is a brushing-on method and of a rapid character, , of course, one print only can be done at a time. The end sought o deposit the gold without risk of the colour being caused by hur toning, to avoid waste of gold, and any interference with qualities of the bath by the immersion of the prints in the e, as also the production of double tones. The solution is pared in the following manner: To 70 minims of ten per cent. monium sulphocyanide solution water up to 5 drachms is added, then achm of chloride of gold solution (1 grain per drachm), 50 minims of a per cent. phosphate of soda solution, and 80 minims of a saturated tion of borax. For quarter-plate prints from 35 to 40 minims of such ath would be required, and a camel's-hair mop, capable of carrying quantity should be employed. The brush must not be dipped into stock solution, but a definite quantity for the print to be toned ed out into a vessel from which the mop may be charged. Fixing is e in hypo of four ounces to the pint, seven minutes being ample, the print is then washed in the ordinary way. Prints already fixed be toned in this manner quite successfully.

SPECTROSCOPY.

members of the Camera Club met on Thursday the 15th inst. for last time previous to the Christmas holidays, to hear Sir Norman yer give an account of his twenty-eight years of scientific labour. yone knows that it is to the difficult study of spectrum analysis that lorman Lockyer has given his life's work, and that so far as the ap-tion of the spectroscope to the telescope is concerned he is a pioneer. ssor Armstrong, who took the chair and introduced the lecturer, ded his hearers of that fact, and otherwise spoke of the work he accomplished in complimentary terms.

Norman said that, as he had the pleasure of addressing a photo-ic audience, he thought it would possibly interest them most if in rst place he brought before them the way in which photography had ed the place of eye observation in astronomical research, while at ame time he would glance at the history of the application of graphy to this class of work.

er alluding to the great work of Becquerel, who as early as the year photographed the entire solar spectrum, the lecturer spoke of the rs of Professor Stokes, who by means of fluorescence and a quartz of prisms extended the spectrum to such a degree that he thought here must be a mistake somewhere. In a paper brought before the Society in 1862, Professor Stokes said, "I tried different methods ut being able to satisfy myself as to the accuracy of the observations, requently thought of restoring photography." While Professor s was thinking of doing so, Dr. Miller, of King's College, did resort otography and succeeded in getting photographs of the so-called in-part of the spectrum, and of the spectra of many of the elements. orman Lockyer himself took up the work seven years later—and he ly saw that photography as a recorder for spectrum work, was far d anything that could be achieved by eye observation.

By means of a lantern picture the nature of laboratory arrangements then in vogue was clearly shown, the spectroscope being mounted near a window outside which was a heliostat, for throwing a beam of sunlight towards the instrument. This is focussed by means of a double convex lens just between the poles of an electric arc lamp, while a second lens casts the sun's image or that of the arc upon the slit plate of the spectroscope. By this means the spectrum of iron, for example, by associating with the carbons of the lamps a fragment of that metal, can be photographed on the same plate for the sake of comparison.

By use of what is known as a compound slit– that is a slit which can be divided into several parts, each being controlled by a shutter which cuts off the light from any one part at will—and by employing a dropping plate, several different spectra can be photographed on that plate, the lines of which will coincide or may be non-coincident; at any rate, the various spectra can in this way be compared with the greatest precision.

Some of the early photographs of spectra taken in this manner about the year 1870 were very good indeed, and several examples of terrestrial substances compared with the solar spectrum were thrown upon the screen. Photography not only made these records with a certainty which could never be attained by the most skilful eye and hand, but it did the work in one-hundredth part of the time. By such observations he had been able to announce that carbon existed in the atmosphere of the sun. Some people had attributed the appearances to the presence of cyanogen, but he himself held to the belief that they were due to carbon.

Then came the introduction of photographic dry plates, by which the labours of the spectroscopist were enormously extended. He could now make as many comparisons as he wished, and it became possible to photograph the spectra of various gases at variations of temperature and pressure. Photography soon became of such enormous importance in laboratory work that it was but the truth to affirm that a student only wasted his time by using his eyes. The photographic method accumulated millions of facts for subsequent study, and these were actual facts which were not in any way biassed by the personality of the observer.

Lantern pictures were then shown of the aluminium spectroscope attached to the reflecting telescope at South Kensington. Another very beautiful result shown was the photographed spectrum of the nebula in Orion, which the lecturer described as one of the most successful results of the marriage of photography with the spectroscope, for this nebula was one of tha least luminous bodies in the heavens, the photograph having necessitated an exposure of no less than four hours.

An interesting table was then exhibited showing the length of photographic exposure necessary for stars of different magnitude. Thus a star of the first magnitude required 40 minutes; one of 1·5, 66 minutes; one of 2·0, 100 minutes; of 2·5, 165 minutes; and of 3·0, 250 minutes. Progress of late years has been so rapid that it is now possible to get as good a spectrum of a star of the third magnitude as twenty years ago it was possible to get of the sun itself. And all this advance was due solely and simply to photography. "Take away photography and you destroy astronomy as we know it now."

Six star spectra were next thrown upon the screen for comparison, the difference between them being very great, these differences being very clearly shown by means of photography. "With very little skill and very little brains," said the lecturer, "the classification of the stars is thus aided, and photography is at the bottom of it all."

Sir Norman Lockyer then described the prismatic camera, and explained by means of photographs its employment during the last Eclipse expedition, when he had a number of willing workers in the shape of blue-jackets from H.M.S. *Melpomene*. He then took ten photographs at intervals of ten seconds at the beginning of totality, and the same number at the same interval of time at the end of totality. On such an occasion it was ridiculous to waste time by looking at anything, save that one must see that the instruments were properly tended. In the case of one observation which had received some years ago a certain interpretation, photography had since proved that that interpretation was erroneous. But it was far better to record wrong views than no views at all, for in earnest hands wrong views were speedily turned into right ones. He would say to all, Make as few eye observations as possible, and rely altogether upon photography.

The Chairman complimented the lecturer upon the singular clearness and charm of his discourse, and the way in which he had conveyed to the Club some idea of his twenty-eight years' work, and invited discussion upon the subject.

Sir Trueman Wood thought that discussion was inadmissible. He congratulated the Club upon having had such a clear exposition of a very difficult line of research. He himself had seen the apparatus at South Kensington, and was quite surprised at the perfection to which the photographic appliances had been carried. He trusted that on another occasion of an eclipse Sir Norman Lockyer would utilise the cinematograph method of securing quick successive exposures.

GLASGOW AND WEST OF SCOTLAND'S ANNUAL EXHIBITION.

In Glasgow, the fortnight preceding Christmas is always looked forward to with interest and pleasure by a great many amateur workers as well as professionals. The cause for this is found in the double circumstance —first, The British Journal Photographic Almanac puts in its appear-

ance; and, secondly, a large number of local workers are keenly alive to the importance of the West of Scotland's fixture, which is always held the week before Christmas.

The affairs of this Association continue to flourish in a a most gratifying manner. Not only has the year that is just passing away brought a further large increase to its membership, but, from a financial point of view (judging from the Treasurer's statement, recently published), there certainly is no kindred association in the country that can in any way compare with the satisfactory bank account and other assets possessed by the West of Scotland Association.

Their Exhibition this year is chiefly noticeable for the success attained by quite a number of new workers. and it would appear that in the future there is going to spring up a somewhat novel feature in exhibitions. The Judges this year were well chosen and there was an entire absence of any special leaning to a particular class of work, which we regret to say was not entirely absent in former years. Some amusing incidents mark the Exhibition. In one instance a gentleman was persuaded against his inclination to frame and exhibit a picture he had consigned to his waste-paper basket. A friend happening to see the photograph in that situation at once discerned the merit of the picture and was instrumental in having it exhibited. This photograph has been recognised by the Judges and awarded a leading prize. There was a very large turn-out in the Philosophical Rooms on Monday night at the West's popular night, when Mr. John Trotter gave a fine display with his cinematograph. The Judges were Messrs. John Stuart and Brinkley, photographers; Mr. Andrew Black, R.S.W.; with Messrs. George Chalmers and Stuart Smith, members of the Association. Silver and bronze medals have been given in all but two classes. Their awards are as follows :—

Lands ape above half-plate size.—First prize, Mr. W. Louis Primrose; second priz , Mr. J. Imbrie Fraser.

Landscape, Half-plate and under.—First prize, Mr. R. Sim; second prize, Mr. J. C. Oliver.

Portraiture.—First prize, Mr. A. Lindsay Miller; second prize, Mr. Robert Macmillan.

Instantaneous.—First prize, Mr. A. J. Kay; second prize, Mr. W. G. Buchanan.

Hand-camera Work.—First prize, Mr. A. Lindsay Miller; second prize, Mr. John Reid.

Bromide Enlargements, Portraits, &c., 10 × 8.—Professor Finlay, M.D., Aberdeen.

Bromide Enlargements, any other subject.—First prize, Mr. J. C. Oliver; second prize, Mr. Edwin Gorsman.

Best Outing Picture.—First prize, Mr. A. J. Kay; second prize, Mr. J. Imbrie Fraser.

Novices.—Landscapes.—First prize, Mr. Hugh Campbell; second prize, Mr. R. G. Kemp.

Novices.—Any other subject.—Mr. Thomas Morrison.

The Exhibition will be open til January 2.

EXHIBITION OF THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

Following upon the adjudication of medals on Wednesday, the 7th inst., the Annual Exhibition was opened on the following day. The Judges (Messrs. Seymour Aston, Huson, and Watmough Webster) awarded the Challenge Trophy Gold Medal to Mr. C. F. Inston, three silver medals to Dr. Llewellyn Morgan, Mr. John Appleby, and Dr. Thurston Holland, and in the competition open to those who had never previously received an award Miss Mabel H. Stead and Messrs. John Smith and C. M. Robertson were the recipients of three of the possible four bronze medals. In the class open to ladies only the special silver medal given by the President for the best four studies of child life went to Mrs. Charles Bell.

The class for stereoscopic views had eight sets, of which six sets were by one contributor, the Rev. W. Smith, who was successful in obtaining the silver medal.

The lantern-slide competition is usually very keen, and on the present occasion over thirty sets of six were thrown on the screen for the Judges' verdict. The two silver medals went to Messrs. H. J. Ampton and H. Holt respectively, while the two bronze, for those who had never received an award, were gained by Messrs. W. Mallinson and C. E. Hancox.

As many of our readers are aware, the competitors in this Society are required to send in four photographs to be eligible for an award, a plan which virtually prevents an accidental fluke such as is perpetrated occasionally by a worker of mediocre ability receiving an award of merit.

The system has been the cause of discussion carried almost to the point of acrimony, but we cannot but think it has much to recommend it. Naturally the most potent argument in its disfavour is that, if three pictures of extreme merit, accompanied by one of indifferent execution or design, are to be medalled, that one photograph can be exhibited as a medalled picture, and so throw discredit upon the Judges; yet to give a medal to four, even in their comparative mediocrity, would seem very hard upon the exhibitor capable of producing three pictures of excelling merit. It appears to us that the simplest way of avoiding this very real difficulty would be to reduce the number of photographs in each set. Thus if three only were required to qualify, the Judges need experience no compunction in ruthlessly throwing out a trio if it contained a single print that did not pass mediocrity.

The exhibits themselves reached a high standard, and we shall be surprised if we do not see some of them on a future occasion in Pall Mall. Following them in the order they were placed on the screen, we first noticed the silver medallists and the challenge trophy. Mr. Inston, in *Wanderers from the Path*, gives us a pathetic study of a worn-out mother clasping her babe to her breast, asleep on a stone doorstep; a seascape recently shown at Pall Mall with boat bright and sparkling, the suggestion of waves in motion being most striking. His picture of sheep and landscape is delicate yet broad. Mr. Joseph Appleby has two fine studies of huge breaking waves, and two equally good of sand dunes with peeps of sea beyond. Dr. Llewellyn Morgan in his photograph of broad, flat seashore shows clever selection of standpoint and appreciation of effect in the introduction in the middle distance of a stranded vessel, which gives value to the picture and a fine effect of breadth and distance.

Dr. Thurston Holland, *facile princeps* in Röntgen ray work, was deservedly rewarded for his four pathological studies. One large sciograph of the whole of the lower part of the trunk, showing the bones of the pelvis, and a distinct impression of a surgical adjunct imbedded in the intestines—a Murphy's button—is of very exceptional merit. His print by Röntgen rays of a profile view of a portion of the skull, including the eye, in which is distinctly seen the shadow of a minute metallic spicule, is of almost unique interest. Mr. C. M. Robertson has three excellent photographs of sea and powerful skies, but his view of Liverpool Custom-house, technically good, offends by the inharmonious arrangement of lines. Mr. John Smith has two appreciative views of woodland beauty, while in a third he introduces, with some success, two figures wandering through tall grass, with a noble stretch of water beyond. Miss M. H. Stead gains her medal for four tiny carbon pictures printed in green, quiet moonlight effects—true pictures out of scant materials. Possibly the gem of the Exhibition is Mr. Sinnett's print, in deep green tone, of a mysterious vessel looming through the misty darkness, excellent in design and in composition, and, notwithstanding its colour—perhaps even because of it—producing an effect almost weird. Mr Ellerton Thorp's has from Kilpeck Church a grand Norman arched doorway, and Mr. H. L. Burgh's quiet river view, with overhanging trees, shows careful selection with a view to pictorial quality. Mr. E Carney Wilson, without working in a well-known groove, shows how a picture can be made of sedgy spits of land and stretches of river. A view of river with trees has a sky beautiful as a sky piece, but by its too great brightness at one point hindering the balance of the composition. Mr. Joseph Appleby has four figure studies, excellent photographs, but deficient in *motif*, except in one ambitious and fairly successful low-toned composition of a mother with her two children at her knee, saying their good-night prayers. Why should these prints be varnished? Mr Spencer shows us prettily how Hoylake sands look when the tide is out, with an unending array of stranded boats and wide stretches of sand, broken by glistening lines of pools. Dr. Ellis also shows how a true picture can be made with such simple elements as broad stretches of flat banks of sand divided by meandering streamlets running to the distant open water. Mr. Parkinson has four exquisite bits—river banks, river and sky, with well-chosen sky effects, showing clouds through which the sun is struggling to shine. Mr. F. B. Sutton's exhibits show mastery over the introduction of figures, though in one of them the woman walking out of the picture seems to offend against accepted canons of composition.

In the ladies' competition the Judges must have experienced the difficulty as regards the presence of defective pictures in more than one instance; even the medalled picture set by Mrs. Bell there is one photograph to which no one would think of giving a medal on its own merit, on account of the terrible kite, but it is accompanied by three others, capital child pictures. Mrs. Hitchmough's set includes a successful and pretty portrait of a child with a dog: one would have preferred to see the white hat removed from the dark corner. Miss M. H. Stead's set also has a pretty study of a child helping its dad to mend his net. Mr. F. J. Glazebrook's contribution contains pictures of very high merit; but *The Labourer*, a woman sharpening her scythe, will attract attention in any exhibition. Mr. J. Bushby's lake fringed with tall trees merging in heavy shadows to one side and another picture with foreground of stones and sedges with bank of trees, beyond show sympathetic study of such elements as go to make a picture. One cannot but be attracted by the reposeful effect of Mr. Morgan's picture of misty foreground with river and low bank of trees beyond, as also by his set of four platinotypes which not many years ago, before critics became so *exigeant*, would certainly have been medalled.

Mr. Dibdin—whose masterly portrait of Mr. Finney, splendidly done into photogravure by Mr. Huson, one of the Judges on the present occasion is one of the ornaments of the permanent collection of the Society—exhibits four portrait studies of great excellence; but why did he send a print from a cracked negative so badly doctored—a print otherwise by far the best portrait in the competition? Mr. R. Sloper's *Ebb Tide*—river bank and shipping; and *Storm Swept*—a stormy sky threateningly overhanging an expanse of tall grass and deep pool of water—will receive high commendation. Dr. Morgan is here again with a third set, and we will

much attracted by his flock of sheep on a dusty road with presumably a shepherd following in their wake; it needed but little more to make it a great success. Miss Hardy's four pictures are four little gems. We note in one the same sheet of water, the same grass, the same two little children as in Mr. Jas. Smith's medalled set; Miss Hardy's does not suffer by comparison. Of Mrs. C. Bell's four figure studies, one is an exceedingly telling picture—we have a girl very well placed in the near foreground with winding road and hill beyond.

Coming now to the lantern slides, for which Liverpool photographers possess an enviable celebrity, it is not possible to criticise them in detail. Enough to say that two silver medalled sets were perfect examples of what slides should be. Mr. C. J. Houghton's snow pictures were superior to any lantern slides of such subjects we have ever seen. The bronze medallists, Mr. Hancox and Mr. Mallison, well deserve their reward. The competition was so close that one single indifferent slide at once condemned the set.

DEATH OF DR. H. W. VOGEL.

We regret to have to announce the death, at Berlin, on Monday last, in the sixty-fifth year of his age, of Dr. Hermann Wilhelm Vogel, Ph.D., the well-known photographic writer and experimentalist. The deceased gentleman had long filled a prominent place in the literature of photography, and it is not too much to say to him the black art is greatly indebted for many important contributions to our knowledge of the subject.

In his earlier years he studied chemistry, physics, and mineralogy under Professors Rammelsberg and Dove, to whom he became assistant in 1858. About this time he was induced to take up photography in his studies of mineralogy, he having been struck with the value and importance of being able to procure photographic enlargements of sections of meteorites. In 1863 he founded the Photographische Verein at Berlin, and in 1869 the Verein zur Forderung der Photographie, of which he was President at his death. In 1864 he started the *Photographische Mitteilungen*, of which he remained Editor until quite recently, when he resigned in favour of his son, Dr. E. Vogel.

The school which is now the well-known Imperial Technical High School of Photography at Berlin, owes its foundation to his efforts, and he was an Imperial Commissioner for the International Exhibitions at Paris in 1867, Vienna in 1873, Philadelphia in 1876, and Chicago in 1893. The varied nature of the work he engaged in may be understood from the fact that he took part in almost every Eclipse expedition since 1868. He will be chiefly remembered by photographers from the circumstance that he is generally credited with the discovery, in 1873, of the use of dyes for imparting orthochromatic qualities to sensitive surfaces, one of the most important discoveries that have been made in photography, and the true value of which it is difficult to over-estimate.

In 1876 he founded a school for the study of spectrum analysis, colour, and illumination. He was an Honorary Fellow of the Royal Photographic Society, and, besides his many contributions to periodical literature, published during the last twenty-five years a number of books dealing with the chemistry and physics of photography.

Our Editorial Table.

Photographic Mosaics for 1899.

New York: Edward L. Wilson.

The thirty-fifth issue of Mr. Wilson's popular little annual comes to us in the aspect that has been so long familiar to us. Very nearly three hundred pages are filled with well-selected articles on practical photographic subjects which supply a wealth of useful information. To us the chief charm of the book lies in the illustrations, of which there are between sixty and seventy well reproduced in half-tone. Most of them are portraits of strikingly good quality, which in themselves afford a vivid idea of the undoubted excellence of American professional portraiture. About this work across the Atlantic there is such a distinct and progressively improving beauty that we can recommend *Mosaics* to our readers as offering quite a liberal education in the posing, lighting, and treatment of portrait subjects. We wish that more American professional portraiture were shown in Great Britain. The examples given in Mr. Wilson's book are uncommonly fine.

The bound volume of the *Practical Photographer* for 1898, edited by Mr. Percy Lund, and published by Percy Lund, Humphries, & Co., Bradford and London, has also reached us. This, too, makes a charming gift-book. Mr. Lund steadfastly devotes himself to the exploitation of the pictorial possibilities of photography, and in this branch of work quietly accomplishes a great deal. Not only are some of the best modern productions of the camera illustrated in this pretty volume, but also many of the noted photographs of bygone years, and thus the *Practical Photographer for* 1898 has a double value. Once again we make acquaintance with the masterpieces of Robinson, Blanchard, and others, and we fall to wondering whether, after all, the cleverest photographers of the time have in any essential respect "gone one better" than those old-time giants who accomplished so much with difficulties to contend of which latter-day workers are blissfully ignorant.

The Cooke Portrait Lens.

Taylor, Taylor, & Hobson, Slate-street Works, Leicester.

Series II. of the Cooke lenses has been designed for portrait use. The full aperture of the lens is *f*-4·5, and it is stated to combine the advantages of the anastigmat—flatness of field and freedom from astigmatism at full aperture—with an adjustment enabling the photographer to introduce at



will spherical aberration evenly over the whole plate. The maximum of fine definition is said to be obtained when the back lens has been unscrewed exactly three turns.

The following are further particulars relating to the series:—

Approximate Equivalent Focus in Inches.	With large Aperture to cover Plates. Inches.	When stopped down, to cover Plates up to Inches.	Diameter of Standard Screw.	Diameter of Standard Hood.
8	$4\frac{1}{4} \times 3\frac{1}{4}$	$6\frac{1}{2} \times 4\frac{3}{4}$	3 in.	3 in.
13	$6\frac{1}{2} \times 4\frac{3}{4}$	$8\frac{1}{2} \times 6\frac{1}{2}$	4 in.	4 in.

Anleitung und Tabellen zur Auswahl unsere Photographische Objective.

Carl Zeiss, Optische Werkstaette, Jena.

The Carl Zeiss Optical Works have set out in this pamphlet the principal factors that should be considered in the selection of a lens for optical or general purposes. The professional or amateur photographer will not only find the information of practical value in the selection of suitable lenses from Messrs. Zeiss' well-known series, but also of general application, and therefore of more than transitory interest.

The tables refer to the calculation of angle of view, exposure, and the classification of lenses for various sized plates and classes of photographic work. The pamphlet will be found very useful in the selection of an optical outfit.

The 1899 issue of Fallowfield's Annual, published at 146, Charing Cross-road, W.C., price 1*s.* 6*d*, has reached a total of 852 pages. It is quite the largest and completest production of its kind, the illustrations alone numbering over 1500. There are many half-tone prints and several excellent examples of bromide printing. It would be difficult to name a photographic requisite which is not particularised in this book, which both professional and amateur photographers should find of the greatest service for reference.

THE bound volume of our contemporary, the *Photogram* (published by Dawbarn & Ward, 6, Farringdon-avenue, E.C.), makes a book of such varied beauty and interest that it is well adapted for presentation as a Christmas or New-year's gift, not only to photographers but also to those who are still outside the ranks of camera-workers. Most of the articles have been well selected with a view to their being of permanent value, and the illustrations, which are always good in the *Photogram*, depict the latest applications of photography. The frontispiece is a reproduction of what purports to be a representation of the Holy Shroud.

News and Notes.

PHOTOGRAPHIC CLUB.—Wednesday evening, December 28. Travellers Night. "Jerusalem and the Holy Land," by I. Abrahams, Esq.

THE Birmingham Photographic Company have recently removed to Criterion Works, Stechford, near Birmingham. Their new telegraphic address is "Criterion," Stechford.

SOUTHSEA AMATEUR PHOTOGRAPHIC SOCIETY'S EXHIBITION.—The Judges will be Messrs. H. Snowden Ward, H. Symonds, and G. W. Lord. The latest date for receiving exhibits is January 26, 1899.

THE AUSTIN-EDWARDS MONTHLY FILM NEGATIVE COMPETITION. — The prize camera for the current month has been awarded to Mr. John Jackson, 21, Ryan-street, Bradford, for his negative, *Waterfall, Ingleton, Yorks.*

THE names of the winners in the Warwick Monthly Competition for December are:—1st prize, 20*l.*, Mr. C. E. Wanless, 31, Westborough, Scarborough; 2nd prize, 10*l.*, Mr. Ralph W. Robinson, 147, High-street, Guildford; 3rd prize, 5*l.*, Mr. G. Campbell Dickson, Lily Bank, Pitlochry, Scotland.

BOROUGH POLYTECHNIC PHOTOGRAPHIC SOCIETY.—The Fourth Annual Exhibition of this Society will be opened simultaneously with the Institute Christmas *Conversazione*, at 103, Borough-road, S.E., from Tuesday to Saturday, December 27 to 31, 1898. As in former years, there will be many counter attractions such as lantern entertainments, cinematograph, Röntgen rays, mutoscopes, &c.

REFERRING to next year's meeting of the British and French Associations the Paris correspondent of the *Times* remarks: Science, happily, has no politics, and the French Association for the Advancement of Science, with the view of fraternising with the British Association, has fixed its next Congress for September 14 to 22, at Boulogne. The office-bearers of the two Associations have agreed on a joint gathering at Dover during the two Congresses. Although the younger Association will thus cross the Channel to show its deference for seniority, it is understood that there will be a return visit. The French Association having thus, so to speak, broken the ice, it may be hoped that, just as it has already held a congress across the Spanish frontier, it will before long receive and accept an invitation from some English town. The distance can evidently be no objection, for it has held two congresses in Algeria, and a third in Tunis.

THE Worshipful Company of Spectacle-makers' Diploma, copies of which will be received by successful candidates at the Company's examinations, is printed from an etched and engraved copper plate on straw-coloured paper in brown ink, and framed in a moulded oak and gold frame, surmounted with the arms of the Company in gold. The border is of bold ornamental scroll work with the City arms and supporters at the top and the arms of the Company at the bottom. The top corners of the design encompass two scrolls on each side. That on the left illustrates the microscope, past and present; for the past a Hook's minocular (date 1665), and the present by a Powell and Leyland binocular. On the right the scrolls illustrate physics by J. Browning's spectroscope, Crookes' radiometer, and a Röntgen rays tube; and navigation by Captain Cook's sextant, and a Davis quadrant. Astronomy, past and present, is represented by quaint shields right and left, bearing the Great Pyramid and Oxford University Observatory. Medallions are introduced left and right of the Company's arms, at the bottom with a view of a Huyghen's aërial telescope, seventeenth century, in a field with Ursa Major pictorially represented in the heavens, whilst the opposite corner shows the great strides made in the telescope—a modern equatorial telescope, and showing the interior of an observatory of modern date. The diploma has been designed and carried out by James B. Sly, engraver, of 9, Rathbone-place, London. Should a copy of this be required, application should be made to the above graver.

THE ACCOMMODATION OF THE EYE.—I have been perusing some recent observations made by a Continental scientist (writes Dr. Gordon Stables) on the power of accommodation of the eyes of lower animals. His observations are singularly interesting, and the more so as they refer to a matter to which attention has not been specially directed by naturalists. The power of accommodation in us is due to alteration in the shape of the wonderful crystalline lens of the eye. A slight change in the shape of this structure accomplishes in us what we effect in a telescope by altering the length of the tube, or in an opera glass by turning the wheel. We can read a book at one moment, and the next we can accommodate the eye at once to enable us to see an object afar off. This is not the least wondrous of the arrangements of that wonderful camera the eye. The eyes of insects, which are of the compound nature—each eye consisting of a mass of simple eyes—appear to require no special means of accommodating them to distance. They perceive objects at different distances, as it were, by eyes which are specially adapted for the varying focuses; but it is, of course, impossible that in such rigid eyes there should be any far sight of a kind comparable to that which we are able to exercise. But when we come to animals such as ordinary fishes, or to the cuttlefishes, which possess eyes constructed on a type resembling our own more or less closely, the power of accommodation is found to be well represented. Fishes, we are told, have the eyes habitually focussed for near sight, and this rule applies to aquatic animals at large. When they require to alter the eye in order to see at a distance, it is not by alteration of the shape of the lens that this end is attained, but by bringing the lens actually nearer to the retina, this last being the nervous network of the eye, whereon the images of things seen are received.

THE POPE AND THE BIOGRAPH.—An interesting exhibition was given before Cardinal Vaughan and a few of his invited guests on Monday last at the Archbishop's Palace, Carlisle-street, Westminster. This was a series of animated pictures representing the results of five sittings granted by his Holiness the Pope, at the Vatican, to Mr. W. K. L. Dickson, the Technician of the Mutoscope and Biograph Syndicate. The views showed the Pope in his daily walks about the Vatican gardens and other scenes in which he appears. Comparatively few of those who visit Rome have the opportunity afforded to them of seeing the Pope, but by means of these sittings granted by him it will be possible for people in all countries to view what has been seen only by the few who obtain admission to the Vatican. The pictures include a carefully planned picture of his Holiness driving through the Vatican gardens. The closed carriage was opened purposely. Four other views were taken in the Vatican gardens some weeks later. In the mean time his Holiness graciously granted several interviews, and expressed himself as much interested in the development of this art, as well as being greatly pleased with the result of the previous sittings. Of all the views taken of the Pope for the biograph that entitled *The Apostolic Blessing* is the most important. It was suggested to his Holiness that he might confer a great privilege on the millions of his people who are unable to visit Rome and receive his blessing by making it possible for them to behold him in the act of giving his blessing. The Pope very heartily gave his consent to the propriety of thus sending a blessing to his followers, and knew that a likeness of his every movement would, by means of the biograph and mutoscope, be preserved and reproduced and carried to all parts of the world, so that Catholics in every clime might behold him performing this solemn function.

Patent News.

THE following applications for Patents were made between December 5 and December 10, 1898:—

PHOTOGRAPHS IN NATURAL COLOURS.—No. 25,718. "The Chromo-stereoscope an Instrument for showing Photographs in their Natural Colours." C. S. LUMLEY.

COLOURED PHOTOGRAPHS.—No. 25,760. "Improved Process for Producing Coloured Photographs." E. MERTON.

STANDS.—No. 25,773. "Improvements in Camera Stands." T. WHILES & T. THORNTON.

PORTABLE STUDIO.—No. 25,806. "A New or Improved Construction of Portable Photographic Studio." A. E. LEVI.

ACETYLENE BURNER.—No. 25,922. "'L.B.S. Sunray Burner' to be Used for Acetylene Gas and Other Gases for Photographic Purposes or Other Uses." G. M. LANDER.

PHOTOGRAPHING MOVING OBJECTS.—No. 25,924. "Improvements in Optical Apparatus for Photographing and Projecting Moving Objects. T. W. BARBER.

CAMERAS.—No. 26,140. "Improvements in Photographic Cameras." T. E. MEADOWCROFT.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

December.	Name of Society.	Subject.
27	Hackney	Members' Lantern Night.
28	Leeds Camera Club	*Printing Processes.* John H. Gash.
28	Photographic Club	Travellers' Night: *Jerusalem and the Holy Land.* I. Abrahams.
29	Ashton-under-Lyne	Quarterly Sale of Papers and Meeting for Conversation, &c.
29	Isle of Thanet	Social Evening.
29	London and Provincial	Lantern Night.
30	Croydon Microscopical	Conversational Meeting.
31	Ashton-under-Lyne	Last Day for Receiving the Competition Pictures taken on the 1898 Rambles.

PHOTOGRAPHIC CLUB.

DECEMBER 14,—Open Night,—Mr. Frank Haes in the chair.

There was a display of members, slides, Mr. Welford, Mr. Medland and Mr. Haes contributing to the show. The Edinburgh Convention, Belgium, snow and frost, zoological and landscape subjects were chief amongst the pictures shown, those by Mr. Haes depicting some interesting old houses and scenes in Lincoln, Aaron of Lincoln's house, the High-street, and some nice sunset effects at Oban.

Croydon Camera Club.—Lantern Show.—It is remarkable how wide-awake the public is in finding out a good thing. Hence it is hardly surprising that a large number of people—perhaps four hundred—flocked to the Small Public Hall on Wednesday evening, December 14, on the occasion of the Croydon Camera Club's thirty-seventh public lantern show; and they were well rewarded for their attendance. Mr. Keatley Moore was in his best form, and kept up a most engaging stream of traveller's talk, which vastly entertained and much amused an audience which followed every word with the utmost attention. It is impossible to give even a *résumé* of the lecture. We can only say that whether telling funny stories of Baboo English, of Indian cookery and an extraordinary menu of life on shipboard, and of sundry customs and habits of the mild Hindoo, or whether descanting upon the amazingly gruesome rites and observances which he saw, Mr. Moore did full justice to his engrossing narrative. Time—and the President—unfortunately applied the closure all too soon, hence the lecturer had to mutilate his recital that it might cram into an inadequate forty-five minutes. However, he managed to tell us a good deal of acceptable information respecting the solar eclipse, one of the parties detailed to observe which the lecturer was attached to—of which the most noteworthy item was the photographic achievement of Mrs. Maunder, who succeeded in obtaining a valuable and unique photograph of the corona and the far-reaching streamers. This was made possible by availing herself of the abnormal "latitude" inherent in the triple-filmed Sandell plate, which has, seemingly, placed in the hand of the astronomer a new and most valuable means of research.

THE ONE-MINUTE COMEDIES.

The Club has often displayed moving photographs on similar occasions, but the general and unmistakable verdict was that never were the films better shown, or of more intrinsic attraction than on the present occasion, the credit of which is due to Mr. J, Williamson, of Western-road, Hove, who not only took and developed all the subjects himself, but very kindly travelled up from Hove expressly to show the twenty films to the Club's members and friends. If he sought his reward in appreciation, he must have been supremely satisfied, for, after the first film or two, the audience fairly let itself go, and thundered out applause, or fell into fits of laughter in a very unrestrained fashion, and when the last film had passed through the gathering gave Mr. Williamson a round of acclamation which was both loud and long. Certainly those of our readers who require a lively and interesting display of moving photographs would do well to obtain some of these films. Especially "funny without vulgarity" are the "Naughty Boy" series. "The Clown Barber," "Winning the Gloves," and "Sloper at Brighton." Amongst the other scenes "Lady Cyclists' Military Ride" and "The Smack Race" obtained great favour. We should add one word of appreciation, due to Miss Grimes, who whiled away the intervals very pleasantly with her pianoforte selections.

Hackney Photographic Society.—December 13, Mr. W. L. Barker presiding.—Mr. BIRT ACRES showed and explained

THE BIRTAC,

an instrument for taking and projecting animated pictures. In a most interesting discourse he gave a general history of animated photography and of his own connexion therewith. He described his early experiments with glass plates and collodion films, using a battery of lenses. One difficulty with this arrangement was that of parallax. Owing to several pictures being taken at one time, and from slightly different points of view, the backgrounds would not coincide. When celluloid films had been first introduced, he had had great trouble with frilling in development, but he had got over that difficulty by making and coating his own films. As regards the position of animated photography, he said that hitherto it had been made the instrument of the showman, and as such had, in many cases, been used objectionably; but he believed that it would in time return to its proper place, that of a branch of photography. To make the cinematograph popular, it must be reasonable in price and be capable of producing results cheaply. To fulfil these requirements he had introduced the Birtac. Its cost, complete with incandescent lantern for projection, was 10*l.* 10*s.* Films giving about 640 pictures were 2*s.* 6*d.* each, so that the cost of a picture for projection would amount to 5*s.*, plus cost of developer. The instrument shown by Mr. Acres was much admired for its neatness and portability, it being no larger than a quarter-plate hand camera. He showed the method of working it for taking the negatives, and afterwards projecting the positive images on the screen. The light used was from a special incandescent gas mantle contained in a metal lantern. With proper gas pressure this was capable of giving a well-lighted six-foot picture. The development of the negatives was not difficult, the film being wound round a flat frame in such a way as to make the latter appear, when the whole of the film was on it, like a dry plate coated on both sides. This was placed in a suitable bath and completely immersed in the developer.

Preston Scientific Society (Photographic Section).—December 15, Mr. E. H. Turner, A.C.A., lectured on

"NEGATIVE-MAKING FOR BEGINNERS."

In introducing his subject, Mr. Turner explained the action of light on the dry plate, and subsequently that of the developer. He strongly advocated the use of an exposure meter for calculating the exposure, and said that uniform work was nearly impossible without such an aid. He also urged beginners to use a plate of medium speed and of a given speed number, for then, in conjunction with the exposure meter, failures in exposure would not be so frequent. In spite of the advantages claimed for the new developers, Mr. Turner pins his faith on the old timeworn pyro ammonia which he uses in ten per cent. solutions. In answer to a question put by one of the members, the lecturer said that he did not believe in backed plates as a preventive of halation and so he did not use them. He gave an instance of photographing the interior of a church with a window in the centre of the view chosen. Using an aperture of *f*-7 and 20 minutes' exposure, he found no more halation would be desirable to indicate that the window shown was a source of light, and at the close developed the plates which had been exposed previous to the meeting.

FORTHCOMING EXHIBITIONS.

1898.		
December 23–31	.....	Borough Polytechnic Society. H. C. Philcox, 255, South Lambeth-road, S.E.
1899.		
January 25–31	.....	Perthshire Society of Natural Science. C. F. S. Burrows, Hon. Secretary, 16, Princes-street, Perth.
,, 30, 31	.....	Southsea Amateur. F. J. Mortimer, Cornwall House, Ordnance-row, Portsea.
February 4–25	.....	Edinburgh Photographic Society. Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
,, 13–18	.....	Photographic Society of Ireland. Hon. Secretary, 35, Dawson-street, Dublin.
,, 21–24	.....	Hastings and St. Leonards. Exhibition Secretary, A. Brooker, 21a, Wellington-place, Hastings.
March 4–11	.....	South London. Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

COLOUR PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—With reference to the letter of last week (page 815) from Mr. P. E. Jourdain, will you allow me to point out that the rediscovery of Clerk-Maxwell's suggestion was made in a private letter to Dr. J. M. Eder by Herr Kampman, and this was published by the former in the *Jahrbuch*, 1895, page 329?

Clerk-Maxwell's original paper appears on page 270 of THE BRITISH JOURNAL OF PHOTOGRAPHY, 1861.—I am, yours, &c., A. D. PRETZL.

A WIFE'S COMPLAINT.

To the EDITORS.

GENTLEMEN,—Why are editors so thoughtless? It appears to me that, no matter who rushes into print with his paralysing ideas, the editors in their urbanity give him his devastating opportunity. In your issue of November 4, a Mr. William Peek (he lives in France, thank goodness) invites the whole tribe of photographic dabblers to stick their nasty prints on the mirrors in their houses. There was no need to look at the name to know the writer is a man; no woman, however bad, would be guilty of such an enormity. Is he married? I doubt it. If he is, his wife must be a poor, down-trodden creature. I should probably never have known of Mr. William Peek's odious suggestion had not a man in my house tried to disgrace himself by disfiguring my cheval glass. I don't fancy, however, it will ever occur again. If it should, the perpetrator will again be brought to book by his indignant WIFE.

CHRISTMAS HOLIDAYS.

To the EDITORS.

GENTLEMEN,—I am glad to see, from "A Lady Assistant's" letter, published in your last issue, that my appeal, which you so kindly printed on December 2, has not been made in vain; but I am sorry they did not see their way clear to close on Boxing Day. If the firm in question, who employ a large number of assistants, only knew what giving this holiday (Boxing Day) meant, how many families torn asunder by the awful rush and grind of modern life manage to meet on this yearly occasion, well, they would change their views and close all their studios every Boxing Day. Their works close on that day, why not extend this privilege to the studios? As it is, considerable dissatisfaction exists amongst the assistants with regard to closing on Christmas Eve, instead of Boxing Day, and several with whom I have spoken feel very strongly on this subject. With regard to Friday, December 23, I don't think the firm will gain much by keeping open their studios till 8 p.m., instead of closing at the usual hour, 5 p.m.

Trusting you will find space for this letter, in conclusion, I am desired by several assistants to thank you, Gentlemen, for opening your columns for the discussion of this matter, and to take this opportunity to wish you a happy Christmas and a bright New Year.—I am, yours, &c.,

London, December 19, 1898. JUSTICE.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

E. Edwards, 20, New-street, Worthing, Sussex.—*Photo raph of a Roman Catholic church in the Crescent-road, Worthing. Photograph of a reredos in the abo e church.*

F. Sargent, 372, Uxbridge-road, London, W.—*Photograph of the captain of Richmond Associatin Football Club. Photograph of the Richmond Association Football Club team.*

OSMAR.—Address Mr. L. Nievsky, Gransden-road, Shepherd's Bush, W.

W. B.—Better advertise, stating your qualifications very fully. This is the only suggestion we can make. There is a demand for really good operators.

M. A. MEYER-BURKLY (Zürich).—Address the Photo-chromoscope Syndicate, 119, Shaftesbury-avenue, London, W.C., or Messrs. Cadett & Neall, Ashtead, Surrey.

E. EDWARDS.—It is not necessary for you to register enlargements or reductions of the original photographs in order to protect them from infringements.

H. HALL and J. J. DAWSON.—Will these correspondents kindly send us their addresses? letters lie at our office for them. We do not keep the addresses of inquirers.

E. SHIVAS.—The addition of a solution of ferrous sulphate to the solution will precipitate the platinum in the metallic state. The platinum thus obtained may be converted into platinic chloride by dissolution in aqua regia.

TONING P.O.P.—T. DORMAN. You cannot do better than use the formula supplied with the paper. The manufacturers usually know what suits their paper best. Your using another formula, different from that given, is probably the source of your trouble.

ALEXANDER TEEGENS.—As you are quite a novice in dry-plate making, and ask us to recommend you a treatise on the subject, we should advise you to get Abney's work on emulsion photography, published by Messrs. Sampson Low & Co., Fetter-lane, E C. Thanks for seasonable greetings.

ELECTROTYPING GELATINE RELIEFS.—C. FERRIS. The most convenient battery for the purpose is the Smee battery, with the platinised silver and zinc plates. It will be found more convenient and cleanly in use than the Daniel battery, though the latter was largely used for electrotyping years ago.

COLLODION NEGATIVE.—R. NEVILL. The "streaky silvery" appearance seen on the back of the piece of negative forwarded is due to the glass not having been perfectly clean; in fact, we may say that the negative was taken on a *very* dirty piece of glass. The remedy is obvious, namely, more care in cleaning the plates.

BLOOD ALBUMEN.—H. PARKER. Blood albumen is an article of commerce, but it is somewhat difficult to get in small quantities, as it is not kept by ordinary chemists. We find it, however, in the list of Hopkin & Williams, Cross-street, Hatton Garden, from whom you can obtain it. Caseine may also be had from the same house.

RESIDUE RETURNS.—C. R. W. The firm is a very respectable one, and we do not doubt that it has made a fair return. The weight of residue sent is no criterion as to its value, *i.e.*, the metal it contained; without knowing that it would be quite impossible to even approximate its value, or give any idea as to whether the return is fair or otherwise.

RUSHEN.—1. Yes; Swan was practically the originator of the modern method of carbon printing. 2, 3, and 4. The *Autotype Manual*, published at 74, New Oxford-street, price, we believe, 2*s.* 6*d.* 5. None. 6. One. 7. None that we are aware of, but there are generally openings for first-rate men. 8. You must advertise. 9. South Africa is as good as any, we should think.

ELECTRIC LIGHT.—G. & J. HALL write: "Being desirous of introducing the electric lamp for portraiture in my studio, I have an offer to supply what is described as 'a Gwynne arc lamp with two resistances and switchboard.' Being entirely inexperienced in this branch, and the price asked being 25*l.* (second-hand), may I ask your kind advice as to whether the lamp is a practical one and the price fair? Thanking you in anticipation."—The Gwynne electric light for portraiture is one of the best in the market, and is largely used in some of the best studios. We do not value apparatus, but the price seems fair if the apparatus is in good condition.

LANTERN SLIDES.—COLONIAL says: "I was pleased to see an article in the JOURNAL of the 2nd inst. on 'Wet-plate Lantern Slides,' by Mr. Pike. He writes about the beauty of wet-plate work, and the various colours to be got by it, but does not give any formulæ except for dry plates. Would you be kind enough to give me a formula for getting a warm tone in a wet-plate slide? I can get beautiful blacks, but not sepia. Is it possible to get a warm tone for an ordinary bromide paper print, same as can be got in a silver print?"—Possibly Mr. Pike will kindly inform our correspondent his method of producing sepia tones on wet-collodion plates. Warm tones up to Bartolozzi red may be obtained by the uranium toning process on bromide paper.

ENGAGEMENT.—SADIR asks: "1. Does an employer in engaging an *emp'oyé* pay half or full fare from a distance, or has it to be arranged so before going? 2. What notice should an operator give engaged at a weekly salary? I have heard it is a month on both sides."—In reply: 1. Quite a matter of arrangement. 2. A weekly servant is only entitled to a week's notice, nor need he give more, unless there is a stipulation that a longer one is to be given.

PHOTOGRAVURE.—J. H. MICHELE writes: "I have been making a number of experiments in that fascinating process, photogravure, and have succeeded in spoiling a goodly number of copper plates, which are costly. Is there any simple way of removing the etched image so that the plates can be used again?"—Yes; the method is very simple, but it is somewhat tedious and takes time. Take a piece of snakestone, moisten with water, and with it grind off the image, working *always in one direction*. When the image is removed, polish the plate with a stick of charcoal and oil, working that also in one direction, the same as that of the snakestone. Unless the plates are large, or time is of no value, "the game is scarcely worth the candle." But there is the way, and the one usually followed by practical workers.

LENS.—A. W. ELB says: "I have for several years used a half-plate camera, but am now thinking of getting a larger one—12 × 10. I would like to know one thing, as I am a bit in doubt. If I have a 12 × 10 camera and a lens to take groups that size, shall I be able to take cabinet or *carte* size photographs with the same lens in the same camera? Or would it be necessary to get a long distance away in order to do so, as my studio is only about twenty feet? The groups I should take out of doors, but the portraits in the studio. You see my query. Would one lens and one camera suffice for both purposes?"—The 12 × 10 lens and camera will do quite well for taking cabinet portraits, but not in a studio only twenty feet long. Better keep to the half-plate camera for cabinet portraits in the studio, and use the larger as occasion may require.

CELLULOID.—CHROMO writes: "I want to make some slides from three-colour negatives by the carbon process. Can you tell me where to obtain some thin, clear celluloid to develop the prints upon? The enclosed sample is the best I can get, and is too muddy and discoloured, especially when the three thicknesses are superposed. Surely better than this can be had. If not, can you tell me of some other suitable material? Am thinking of trying sheet gelatine soaked in formalin if I can't get celluloid."—Unless the celluloid can be obtained from Guiterman, 35, Aldermanbury, E.C., we doubt if it can be obtained anywhere better than the sample enclosed. Failing to get clearer celluloid, we can suggest nothing better than gelatine. Talc in thin plates is sometimes almost colourless, and that would not contract with the heat of the light, which gelatine is liable to.

HYDROMETER-LENS.—A. FULLAM writes: "Will you kindly tell me how to use Sikes' hydrometer for obtaining the specific gravities of solutions? I mean the use of the scale on stem, and weights; also the present market value of a Dallmeyer wide-angle landscape lens, glass one and a half inches in diameter, as I am offered one, slightly chipped, at a very low price."—The hydrometer in question is specially constructed for testing the strength of spirits, and is used by publicans for the purpose, in connexion with a book issued with it. Usually the instrument is constructed of brass, and that would render it useless for taking the sp. gr. of most photographic chemicals, by reason of the corrosive action they would have on the metal. Hydrometers of glass are very cheap, and they should be used for all photographic purposes. We do not value second-hand apparatus, and, even if we did, could not do so on the mere size of the glass.

DEVELOPED P.O.P.—MAJOR says: "1. I should be much obliged if you would kindly let me know your opinion regarding the permanence of developed P.O.P. I have read through the article in the ALMANAC, and think it will be a great save during the dull weather, as it will be such a great advantage to economise the light. I may say I have some very good developed results. Thanking you in anticipation of a reply in your JOURNAL. 2. I would also like to have your esteemed opinion regarding blinds in studios. I have just taken one built on H. P. Robinson's sloping-roof principle, facing north-east, glass about twenty feet by nine feet. What colour blinds or curtains would be most suitable to get perfect modelling and lighting? Would unbleached calico be suitable for all purposes, or must I have a more non-actinic material?"—1. The prints will be as permanent as those printed out, possibly more so. 2. We should prefer dark blue or a light green in preference to the unbleached calico, and either will give the studio a better appearance.

EXPOSURE.—S. THOMPSON asks: "Would you kindly answer me the following questions:—I have enclosed two photos for you to see, and should like to know if they are over-exposed. The flowers were taken in an oak-panelled room with one window facing east. It was fairly sunny; *f*-32, 20 minutes with a Thornton-Pickard rapid rectilinear lens. Instantaneous plate, Wratten Wainright. The sheep, *f*-8, 1½ seconds. Both developed with Ilford hydroquinone developer. The flowers appeared very slowly, the flowers themselves being very dense before the background was dense enough. I should also be obliged if you would tell me if snow scenes required more exposure than landscapes at this time of year without snow; also, if there is any amateur society that I could join where the photos sent in are criticised and sent round for other members to see? Thanking you in anticipation."—The flower subject is considerably under-exposed and has been forced in the development. The exposure for the sheep has been about right. The exposure for snow subjects will depend upon the actinic quality of the light at the time. The snow, of course, reflects and diffuses light, so that, all things being equal, less exposure will suffice. The addresses of two postal Photographic Clubs are given in the ALMANAC for 1899.

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Contents.

	PAGE
Ex Cathedrâ	833
Comfort in the Dark Room	834
Leaderettes:— Acetylene Items — New Electric Light—Grease Spots on Prints	835
On Things in General. By Free Lance	836
Preparing Negatives for Printing. By Edward Dunmore	837
Photographic Bas-reliefs	838
Photographic Developers and Development. By C. H. Bothamley, F.I.C., F.C.S.	839
Errors to be Corrected in Photographic Lenses	842
Royal Photographic Society	843
Butler's Single, or Stereoscopic, Colour Camera	843
Selke's Process and Apparatus for the Plastic Representation of Solid Bodies by the Aid of Photography	844
Our Editorial Table:— *The American Annual of Photography for* 1899—The Birtac	845
News and Notes	845
Patent News	846
Meetings of Societies:— Royal Photographic Society—London and Provincial Photographic Association—Photographic Club—Croydon Camera Club—North Middlesex Photographic Society—Plymouth Photographic Society	846
Forthcoming Exhibitions	848
Correspondence:— "Deleterious Action of Developers"	848
Answers to Correspondents	848

EX CATHEDRÂ.

Our contemporary, the *Times*, has recently issued a reprint of the ninth edition of that monumental work, the *Encyclopædia Britannica*, to which some of the most able scientific authorities of the time have made contributions. Photographers may have some interest in knowing that among the names of the contributors are to be found those of Thomas Bolas, Raphael Meldola, H. Trueman Wood, James Glaisher, and W. de W. Abney. The last-named is responsible for the article on photography, which bears evidence of having been written fourteen or fifteen years ago. In photography, as well as in most other branches of science, a great many important advances have been made in that time, which is equivalent to saying that a new edition of the *Encyclopædia Britannica* is desirable. Nevertheless, the work as it stands is of infinite value, and the *Times* deserves credit for its endeavours to popularise it.

* * *

With the number of the Royal Photographic Society's *Journal* that was issued last week, the balloting paper for the election of members of Council, which takes place within the next few weeks, was also sent out. We call special attention to this matter for two reasons: In the first place, the publication of the *Journal* during the Christmas holidays may have strengthened the traditional disinclination of most members of the Society to turn over the pages of its official organ so soon as it reaches them, and thus the balloting paper has possibly escaped the eyes of all but the few who take an active interest in the election. We hope this notice may have some effect in inducing members to make a point of looking for the balloting paper and of reading what is there printed about the election of officers and Council on page 80 of the Society's *Journal* for December 23.

* * *

The second of our two reasons for referring to the imminence of the Council election is a compound one. Members do not take anything like the interest they should in that important event. Considerably less than a hundred of them trouble themselves about nominating men to serve; and, when it comes to actual voting, we believe we are correct in saying that not more than one hundred and eighty out of a total of six or seven hundred return their balloting papers. This is a lethargic state of things, which, in the interests of the good government of the chief photographic society in the world, we should very much like to see wiped out. It requires very little effort either to nominate or to vote. The Society is at last to have a home of its own, and in other respects it may be expected to redouble its efforts on behalf of the growing interests of photography and photographers, and it is therefore important at this juncture of its affairs that the Royal Photographic Society should be governed by men having the clearly expressed confidence of the members. That confidence can only be signified through the Council election, and, as it naturally follows that the members' interest in the affairs of the Society can be estimated by the number of votes cast at the election, we earnestly hope that on the second Tuesday of next February the task of the scrutineers at No. 12, Hanover-square will be the heaviest that has fallen to the lot of those amiable if unpicturesque officials.

* * *

But this is not all. Few persons, if we may be allowed to say so, enjoy such favourable opportunities as ourselves for gauging the opinions of photographers on subjects of immediate interest to them. That of the composition of the Society's Council is

a matter we have heard many times discussed during the past twelve months by numerous more or less inactive members, who do not take the trouble to nominate or vote, and yet profess to be dissatisfied with the councillors elected to serve. To those men, of whom, to our personal knowledge, there are scores in the Society, we strongly appeal to exercise all the privileges of their membership at the forthcoming election. In particular we urge upon professional photographers, of whom there are so many in the Society, to actively interest themselves in the matter. Why do not these gentlemen, who furnish such a very considerable percentage of the total membership of the Royal Photographic Society, combine in an unofficial and unaggressive way to see that they are represented on the Council, and that their interests in the Society are not neglected?

* * *

We put this last question not, of course, for the purpose of stirring up strife in the Society or of creating class antagonism therein, for naturally it is quite out of place in such a quarter, but by way of retort to the many complaints of which we are from time to time made the recipients in regard to the way in which the affairs of the Society are managed—from a typical professional photographer's standpoint. Some of the most eminent men in the profession, Londoners and countrymen, have taken us into their confidence on the subject, and this is practically what they say: The Society's meetings have no attraction for them; there is no chance of their getting on the Council, which is therefore not at all representative of the large professional element in the Society; the Exhibition is conducted on lines that exclude, rather than attract, professional work; the Judges are not properly or popularly chosen; the medals go to the wrong people, and so on; many minor complaints need not be specified.

* * *

Now, we who, so to speak, are well inside the Society, know precisely to what extent these objections are justified, and can see where and how remedial measures are applicable; but we are not now called upon to discuss or argue the subject. We simply say to those men who have made complaint—they are good men and many—that their opportunity of taking a hand in bringing about what they may consider a better state of things is immediately before them in the Council election. They have time to nominate their own candidates and possibly the power to get them in. Then, they have the safety valve of the Annual General Meeting to avail themselves of. At that meeting the whole question of the past management of the Society can be discussed and suggestions put forth for its future guidance. We shall be curious to see to what extent those members of the Society in whose interests we are writing these lines will avail themselves of the opportunities they will shortly have for making the Royal Photographic Society of use to them where they now allege it is useless. For the present we have said enough, but we shall resume the subject in succeeding issues of the Journal.

* * *

With reference to one of our last week's leaderettes on the subject of lantern plates, Mr. J. Bisset, of Dundee, writes: "You express surprise that none of the publishers of lantern slides have issued a series of slides of the works of the old masters. I beg to say, for the benefit of those of your readers who may not know, that a very excellent and very numerous series of this kind is published by Messrs. Valentine & Sons, Limited, Dundee, and may be obtained from any of the dealers."

COMFORT IN THE DARK ROOM.

In our last article under this heading we dealt mainly with the question of heat as affecting operations in the dark room, a subject of far more real importance than the merely personal aspect under which it can be viewed. We would again accentuate the importance to be attached to temperature during development. If time development is to be adopted, and it is practicable and time-saving for studio operations, at any rate absolute uniformity of temperature is an essential, especially when carbonates of the fixed alkalies with pyro are adopted.

In a well-ordered dark room one condition, which is, as far as our experience goes, much more honoured in the breach than the observance, is that for ease and comfort every bottle should be labelled, clearly labelled, and permanently labelled. A book of photographic labels can be purchased for sixpence at almost any dealer's, and, if that expense should be considered needless, neatly cut strips from waste albumenised paper will answer as well if legibly written upon; but ordinary ink is the least suitable, as it is apt to blur if a liquid should run over it. Labels are far better for being written in Indian ink, which no photographer is without if he have even a minimum of spotting to do. But a label once purchased or written is a poor thing if left by itself. It should be permanent as well as legible. What looks more unsightly than a bottle, once labelled, but now illegible through solutions of one sort or another having run down and smeared it almost out of existence? (Here let us interpose the remark that a tidy operator will always, when pouring out of a bottle, hold it in such a manner that any drops running down the side afterwards will be upon the side furthest from the label.) What should be done when a bottle is first labelled is to coat it with a size—where gelatine is used as a mountant a solution about twice as strong as is necessary for mounting is all that is needed as sizing. It should be painted on with a camel's-hair brush, and then allowed to dry. After this a coating of copal varnish should be painted on with a similar pencil, and for a bottle often in use a second coating should be given. When the varnish is quite dry, which will be in a few hours' time, the work will last for years. No one but those who have worked on these systematic lines can conceive what added comfort in working accrues from the adoption of this simple plan. As a variant on this we have seen the contents described by writing with Brunswick black upon the bottle itself, the result being very easily legible in the dull light of the room.

Another method we have seen adopted is to write the labels with a sealing-wax in alcohol varnish. A recent writer in the *Chemical News* suggests, as a pen for this purpose, a glass tube brought almost to a point. But, whatever plan be chosen, we say, Label, label, label every bottle in the room, and so shall comfort attend all operations.

Another simple matter in this important portion of a photographer's premises is the measure glasses. Only the expert knows what his bill amounts to annually for breakages in this direction. True, measures of sufficient exactitude for ordinary purposes can now be purchased at a very low rate, but still, even then, the cost of broken measures soon totals up to an

unpleasant extent. Measures are almost invisible in dull light, and so the disasters happen. We have seen a very ingenious method adopted to obviate to some extent this evil. The photographer we refer to had painted all his measures in regular use with two rims of white paint (made by diluting white lead paint paste with copal varnish), one round the outside of the mouth of the measure, and the other covering almost the whole of its foot, but underneath instead of on the uppermost surface. We can say, from our own examination, that the measures so treated were plainly visible in the darkest corner, where an ordinary measure could not be seen. With some such object as this, measures have been made of flashed opal glass with a strip of the opal surface ground away till clear glass only remained. Our own experience of them, however, is that they are less legible than the ordinary colourless glass. One photographer of our acquaintance had experienced such an epidemic of breakages that he said he would not replace any other that was broken. He acted on his word, and when last we were in his working laboratory there were no glass graduates visible, but in their place were a number of wide-mouthed glass bottles—$\frac{1}{2}$ ounce, 1 ounce, $1\frac{1}{2}$ ounces, 2 ounces, 4 ounces, $\frac{1}{2}$ pint. These, he explained, covered all his requirements, and never got broken. The commonest disaster that happens to a graduate is for its foot to be broken off, after which it is practically useless; but we have taken note of an ingenious device we saw adopted where this had happened: a small, cut-down pill-box was taken, and while the footless measure was held upright, resting upon the bottom of the box, some freshly mixed plaster of Paris was poured in. A minute or two sufficed for it to set, and by the next day it was quite hard. Then the box was peeled away, and a plaster foot was an excellent substitute for the original one of glass. In this state it was porous and liable to become saturated with a variety of chemicals. To avoid this, our ingenious friend informed us that he held the new foot in front of a fire till it became very hot, and then he rubbed it with a penny paraffin candle, after which it was as non-porous as glass.

We trust that these various hints will, if adopted, be the means of adding, with little trouble, to the comfort of dark-room working.

Acetylene Items.—Gloser's *Annalen*, in a recent number, has a paper by Dr. H. Gerdes, giving an account of an important series of experiments by Herr Julius Pintsch, of Berlin, undertaken to ascertain the true position of acetylene as regards safety, in view of the common opinion as to its highly dangerous character. He explodes many fallacies, and puts the gas in its true place. The sins laid at its door were that it was very poisonous, that it formed dangerously explosive compounds with copper and copper alloys, and that in its pure state it was as explosive as ordinary coal gas was when mixed with air.

It was easy to test the poisonous properties if they existed. Needless to say, they were shown to be non-existent—a fact already conclusively proved by experts in this country. It is no more poisonous than the ordinary illuminating gas. This, as is well known, is, even when unmixed with water gas, sufficiently dangerous, not so much on account of its properties *per se* as because of the carbonic oxide gas which it contains.

To test its power of forming explosive copper compounds, Herr Pintsch filled a number of specially prepared steel vessels with rods formed of alloys of copper with metals such as tin, zinc, nickel, &c., the rods being placed crossing each other so as to give a large amount of surface for the gas to act on. A small amount of moisture was caused to be present in each cylinder by the addition of a small quantity of water, and then pure acetylene and acetylene mixed with oil gas and coal gas were placed respectively in the various cylinders. The acetylene cylinder was charged at a pressure of ten atmospheres. Finally, all the cylinders were placed in the open air on a roof, and exposed to sun, wind, and the heat and cold of summer and winter for a period of nine months. Result: No acetylides possessing explosive properties were found. He did discover that it was possible to prepare such an explosive copper acetylide, but only by keeping pure copper exposed for a long time to large quantities of the acetylene.

It is now well known that the pure gas does not explode when at ordinary pressure, and that, if heat is applied, the decomposition does not spread catalytically through the mass, but only occurs at the point where heat is applied. When cylinders of gas have exploded upon the application of heat, it has only been when enough heat has been applied to produce an explosive pressure, which, it is needless to state, would be dangerous under any circumstances.

New Electric Light.—It is not impossible that the next few years may see an entire change in the system of applying electricity to illuminating purposes. There are now many entirely novel lamps on the market, and already studio electric lighting appears to be leaving the arc principle and relying upon a number of incandescent burners. The latest suggestion is from Professor Nernst, of Göttingen. He does away entirely with the delicate filaments of the well-known incandescent globes, and also with the necessity for any vacuum at at. He has discovered that, when magnesia is raised to a very high temperature, it is a good electrical conductor, and can then be kept luminous by a feeble current. To make his lamp, he places the magnesia in the focus of a reflector, on the inner side of which is a platinum spiral kept incandescent by the electric current. This radiation being concentrated by the reflector to a focus wherein is placed the magnesia, the latter becomes white hot; a feeble current is then passed through it, and keeps it luminous; the platinum current, being no longer needed, is switched off. It is estimated that the light can be produced at a third of the usual cost, and, through the high temperature of the radiating source, with greater purity of illumination.

Grease Spots on Prints.—It is within the experience of professional photographers to be consulted as to the copying of grease-marked prints, or possibly to remove grease spots from some favourite photograph. When these are recent, it is rare that benzole suitably applied will fail to remove them. But, when old and deep-seated, there is occasionally a difficulty. This may possibly be obviated by a method recently proposed in *Der Leiten Fabricant*, the application of a mixture made as follows: Aniline, 1 part; soap, 1 part; water, 19 parts. Though the formula is given for use with woven fabrics, there is no reason to suppose it should not answer with paper.

Referring to grease spots reminds us of a plan which is by no means generally known for easily removing petroleum oil stains from paper, cardboard, or even clothes, the occurrence of such accidental stains being common at a season when optical lanterns and enlarging lanterns occupy attention. The usual method is to apply soap, or benzole, or other solvents. Nothing of the sort is necessary. All that is required is to hold the paper or garment in front of a hot fire: the stain will "dry" out like so much water, and leave not a mark behind. It is as well to give the caution that, if there is a large amount of the petroleum present, the article should not be held too close to the fire, as the vapour might become lighted and extend to the article itself.

ON THINGS IN GENERAL.

I HAVE received my ALMANAC! At first, I thought some one had been sending me a copy of Kelly's *Directory*, its bulk was so immense; but no, it was the good old B. J. P. annual—a very hardy annual. Shade of Henry Greenwood! What would he have said had he lived to see his little waistcoat-pocket memorandum book of nearly half a century ago expanded by his successors to its present magnitude. And its size is only equalled by its real value. A short time ago I was belated for an hour or two near midnight at a road-side railway station. The engine had given out, and a fresh one had to be sent for—or specially made for us, I should imagine, from the time we were kept waiting—and to while away the time I amused myself with reckoning up a few figures in connexion with this portentous-looking ALMANAC. They may interest some readers; but the Editors are quite at liberty to cross all this out if they think their columns can be put to better use.

The usual thing with comparisons of this sort is to take St. Paul's Cathedral as a kind of standard. Now, taking in round numbers (in this case almost exactly) the volume to weigh three pounds, and its size to be seven by five inches, it figures up something like the following, assuming a minimum edition of twenty thousand. If the copies were all piled upon one another, they would form more than a dozen columns of the height of St. Paul's, or, if they were placed in a single pile, the height of the highest mountain in Great Britain, there would be still a column or two left to top St. Paul's. If all the leaves were spread evenly, edge to edge, on the ground, they would cover 250 acres, or, if every page was opened out and turned to be visible (which would need two copies), it would extend from here to beyond New York. When it comes to handling the copies, the work would be something titanic. Twenty-seven tons or thereabouts, which would take sixteen or seventeen lorries, each carrying a ton and a half, to convey the load, or, if it was done by man power, each man weighted with, say, half a hundredweight, it would require an army of over a thousand men to move the copies away. I will end this, what some will consider, rather useless computation, by alluding to the payment for the copies; for all those thousands it would, at 1*s.* each, only amount to a round thousand pounds, which, if paid in silver, would weigh nearly two and a half hundredweights. Mr. Bedding, your health!

Every one will be interested in the account of Mr. Storey's paper on "Photographic Copyright," read at the Camera Club, and I cordially re-echo his sentiments. He said his paper was not intended to be exhaustive, his purpose being rather to induce a discussion from which he himself might learn a great deal. He wanted to know what photographers thought about this subject of copyright, and what amendments of the present law they would suggest in order to protect their own interests. I can assure Mr. Storey that I know several photographers who think a great deal more than they have cared to express on the subject of photographic copyright, and there wants to be a full, free, and open discussion. Now, we have been told that certain members of the Committee of the Photographic Copyright Union have been giving time, care, and anxious consideration to this matter. Would it be inopportune to suggest that, at as early a period as possible, they should put the whole body of photographers in possession of their views? A very little time would suffice to show whether the Committee voiced the desires of the whole body. This would add to their influence, redound to the credit of the Union, and, in all probability, lead to the influx of more members, sufficient at least to enable a quorum to be formed at the annual meeting of the Union. Criticism would be a natural sequence, but by no means necessarily hostile. If favourable, this Committee might feel that they had a mandate from photographers in general. At present they have no mandate, their recommendations can only, in their present condition, be those of themselves.

The theory of the latent image is like the poor, always with us. Mr. Townshend has given a thoughtful addition to it. By the bye, why does he give us as a bogey "a battering engine" of $\frac{dy}{dx}$; why not $\frac{y}{x}$? His paper is, as I said, thoughtful, and it is no derogation to its value to point out difficulties in its acceptance. If we take his explanation of the action of light to be that phosphorescence is brought about when light arrives at the film, "that the action of light is to set the gelatine atoms" (molecules?) "phosphorescing or vibrating, and that these phosphorescent motions of the gelatine gradually produce the latent image (whatever it is)," we are bound to ask whether two identically acted-on plates, one developed instantly after the light impact, and another a day after, ought not to show considerable difference in apparent exposure, seeing the effect is "gradual?" As a matter of fact, no one seriously attempts to show that such dissimilarity would exist. While on the subject of the theory of phosphorescence (perhaps the use of the term fluorescence—there is no essential difference—might have appeared more apt), it will be well to draw attention to a protest once made by Sir G. G. Stokes (he was Professor Stokes then) with regard to the explanation being attributed to him that phosphorescence was caused by short waves being converted into long ones. He wrote: "It is not to be supposed, according to a view which has erroneously been attributed to me, but which I never for a moment entertained, much less published, that the refrangibility is changed in the act of reflecting from the molecules."

The Editors' personal experience of ammonia in the breaking of a bottle in the dark room should be sufficient for ever to explode the absurd notion that all the papers, a little while ago, got hold of that, in case of a place on fire, the throwing of a gallon or two of ammonia thereon would extinguish it, and allow of the immediate entry into the apartment of any person at hand.

The Answers to Correspondents column is generally interesting reading, and on December 9 there was a question rather of the nature of a poser. The writer asks why, when he followed the directions for making a retouching medium given in the ALMANAC, and mixed an ounce of resin with one of turpentine and two of oil of lavender, no solution of the resin takes place. I should have been inclined to say with King Charles's philosopher, when a similar poser was put to him, "Please, your Majesty, I doubt the fact," for the writer says the liquid has become brown and there are two layers of sediment. If he used yellow resin, he should know that it contains water, which would account for some sediment. There is no doubt that three ounces of solvent to one of resin would give a thick mixture. Possibly he did not reduce the resin to powder or small particles, and he may rest assured that the "best oil of lavender" could never have been intended by the compiler of the recipe, seeing that it is worth from four to five shillings per ounce, wholesale.

The editorial remarks on p. 757, referring to electric light "not being the great use that some might imagine when the fog pervades everywhere, and, however brightly the sitter may be illuminated, the fifteen or twenty feet of smoky fog intervening between the sitter and the fog necessarily mars the brilliancy of the picture," afford a very good peg whereon to hang a diatribe against the absurd method of construction adopted by the manufacturers of incandescent electric light illuminating devices. One and all that I have seen—and I have seen many—are backed with a translucent fabric that spreads the unused light over the whole of the room. Hence all the space between sitter and lens is illuminated, and, this is, no doubt, what the Editors refer to. If the umbrella-shaped reflectors were backed with, even, black paper, which would not perceptibly increase the weight, only a short space of the intervening atmosphere would be illuminated, and no one knows better than the Editors that the thickest fog ever seen in a room if not illuminated would have not the slightest effect in marring the brilliancy of a picture, it would only lessen the aggregate light, and would not fog the shadows. To the manufacturers I may say, *Verb. sap. sat.*

A gentleman from Cornwall writes me, through the Editors: "The 'free-portrait swindle' is not the worst pest that professional photographers have to contend with," and he gives his experience of

some photographic enlargers. He sent several negatives to one of these gentlemen, and, at the end of five months, could get neither negatives nor enlargements back; and his solicitor tells him there is no remedy but a Metropolitan Police Court, which, as it would involve several journeys to London, is virtually no remedy. My suggestion would be, County Court and claim for damages. Then, if he got a judgment in his favour, and could be prepared to swear that the man was able to pay, he might get a judgment summons and have the man committed if he failed to pay. I am afraid this is not an isolated case, from all I can hear; but the great delay proves the enlarger to be a rascal, and not the victim of circumstances. Why do photographers send out their work to be enlarged? What a rod they have prepared for their own back! But for their supineness in this direction we should have neither the free-portrait swindle nor newspapers taking up the trade of enlarging. This latter encroachment can only have arisen through suggestions from some of the enlargers themselves.

FREE LANCE.

PREPARING NEGATIVES FOR PRINTING.

[A Paper read before the Photographic Club, December 21, 1898.]

I WILL describe, to the best of my ability, the various methods adopted for the improvement and modification of negatives, prior to placing them in the hands of the printer.

In this matter there is nothing new, for, practically, the limit of improvement was reached years before our modern gelatine films were thought of. There are, of course, some few plans rendered possible by the robust character of a gelatine film that were quite impossible with the more delicate collodion ones, and to which I shall allude in due course.

As the necessity for doctoring negatives has always existed, and the faults and shortcomings remain of a similar character, the means of improving them will of necessity be of a stereotyped nature.

The very question of doctoring, faking, touching, or improving negatives, or whatever term may be employed, has from the first been a subject for argument, and will possibly remain so. We may assume that, whatever hand work is put on a negative, it is presumably for the purpose of improving it; whether it always has the desired effect is another matter; any way I will waive the question of legitimacy and recapitulate the plans that have been, and are, adopted to successfully modify or improve the negative.

As negatives vary in character, the treatment of each has to be adapted to its own peculiar requirements. We will suppose a number of negatives are placed in our hands to make the best of. The first thing to do is to sort them, and for convenience we will divide them into two classes: the too dense, and the too thin. The too thin ones may be grouped into the over-exposed, the under-exposed, the under-developed, and correctly exposed; and the too dense ones into under-exposed, over-exposed, over-developed, and correctly exposed. In addition to these are *local* faults, such as spots and pinholes, abrasions of the film, and irregularities of development or density. In treating these negatives, let us first take the thin negative from over-exposure, one of the most common faults that occur. Now, here we have a negative full of detail, almost too much in fact, and one that will produce only a poor insipid print, unless it can be in some way improved. If we start intensification without giving it any previous preparation, we only make a slower printing negative with little improvement in brilliancy, therefore the first thing to do is to remove some of the image from the deepest shadows by submitting it to a bath of ferricyanide of potassium and thiosulphate of soda, five grains of each salt to the ounce of water. We lay the negative in a *white* dish in this solution, and when the dish can be seen tolerably distinctly through the *deepest* shadows remove it, and thoroughly well wash, when it will be in a condition for intensification by any process usually approved. This plan invariably gives good results, *unless* the exposure has been so prolonged that reversal of the image has begun to set in, when the case may be considered hopeless. Negatives too thin from under-exposure are usually so deficient in detail that very little good can be expected from them by any treatment, *slight* intensification may be resorted to and the printing conducted in a weak light in order to encourage the printing of as much detail as may exist, much intensification of such negatives only produces the familiar soot and whitewash prints. Correctly exposed negatives, if too thin, are usually so because the development has not been continued sufficiently long. Intensification *without* any preliminary treatment is indicated. This want of density is frequently caused by the use of unsuitable developers, rapid plates being more prone to this fault than slow ones, which indicates that possibly the exposure is at the bottom of the trouble. Slow plates are seldom lacking in density whatever developer may be used. Too dense somewhat under-exposed negatives are best reduced by a weak solution of iron perchloride, followed by refixing. In this operation care must be taken not to carry the change too far, as no reduction is noticeable in the perchloride solution, which reduction only becomes apparent *after* the action of the fixing bath; a few experiments with worthless negatives should be made previously as a guide. The process can be repeated time after time if the reduction is insufficient. Small patches of density may sometimes be conveniently reduced by mixing a little gum with the reducing solutions and applying with a camel's-hair pencil; the gum is added to prevent the solution spreading, of course well washing afterwards. Too dense over-exposed negatives are best reduced with potassium ferricyanide and thiosulphite of soda solution, and, if only a slight reduction is required, a dilute solution of hydrochloric acid will frequently be found sufficient for the purpose. Over-developed negatives can be reduced in a similar manner.

We will now consider the way clear for local treatment of a physical character. In dealing with a too thin image there is no more effective and elegant way than the powder process, by means of which the whole or any portion of a negative can be altered in density at the discretion of the worker, and altered or cleaned off without the slightest detriment to the negative. This plan was advocated years ago by Mr. J. Werge, who specially recommended it as a means of adding backgrounds to portraits. The *modus operandi* is as follows: The back of the negative being very carefully cleaned from any adhering bits of film or any dirt that might obstruct the light, and polished with whiting and spirit of wine and finally with a soft cloth or wash leather, a solution consisting of bichromatised dextrine is made as follows:—

Dextrine	60 grains,
Sugar candy	60 ,,
Hot water (filtered)	2 ounces,
Ammonium bichromate	30 grains.
Water	2 ounces,

(filter and mix). This solution is poured on the back of the plate like collodion, once or twice as the case may be, drained off, and the plate dried by artificial heat in the dark room by a spirit lamp or hot-water plates, until the coating is quite hard and bright; the negative is then laid face up on a board covered with black velvet or cloth and exposed to the light for a minute or two; it is then laid on a retouching desk and fine plumbago brushed over the coated surface, when it will be found that the pigment will attach itself to it in proportion as the light has acted on it, the least in those parts most exposed to the light thus forming a negative on the back of the original that may be made of any density at will by more or less brushing with plumbago; if the first try is unsuccessful, it can be rubbed off and the process repeated. The whole can be done in a luminous yellow light. After completion, expose to the sunlight until the film is equally hard and bright all over. If the colour of the bichromate seems too yellow, merely pouring a little warm water over it will render it quite colourless without injuring the image. If a *background* is required to be added to a negative, the negative must be nicely varnished, as the coating has to be applied to the *face* instead of the *back*. A little dry whiting rubbed with a pad of cotton-wool on the varnish will permit the solution to flow equally. The negative image to be introduced is then printed on it in a pressure frame in the usual manner, and developed with plumbago to match in density with the negative to which it has been added. The whole process is so much under control that many modifications may suggest themselves.

A negative may be otherwise good but thinner at one part than another, a fault common enough in the early days of gelatino-bromide plates with hand coating, but seldom met with now, at any rate from irregular coating. We remedy this by rubbing fine black lead, with the finger tips, over the thin parts, so that the density is equalised; this is, of course, done before varnishing, as all negatives should be if worth retaining, Masses of shadow may be somewhat lightened and improved in the same way, or any other parts where a little extra density would be an improvement. Bear in mind, this sort of thing must not be overdone, or the remedy will be worse than the disease; but, judiciously applied, it is a very useful and easy method of adding a little brilliancy, irrespective of detail.

A too thin negative, *without any detail* in the shadows, had better be consigned to the dustbin, for no known process will make a decent printing negative of it. If there is a little shadow detail, slight intensification *may* improve it, but we must look to the printer to make the best of it, by printing in a weak light through pale yellow glass, or by coating the back of the negative with yellow varnish; a little iodine added to the ordinary negative varnish will answer the purpose.

We now come to the treatment of local faults and shortcomings. The first to engage our attention are pinholes, spots, and abrasions of the film. With a little Indian ink and a fine sable brush (some operators prefer indigo blue or other colours; for my own part, I prefer a semi-transparent colour that will match up fairly well with the image, and Indian ink supplies this) a pinhole is lightly touched in the centre as nearly as may be, and, provided the colour is of the proper fluidity, the fault will quite disappear, care being taken not to get the pigment on the edges of the fault, or instead of a black speck on the print there will be a much more conspicuous white one. Larger spots are got rid of by a series of fine dots, until they are stippled up to match the surrounding film. When a piece of film is bodily removed, the stippling on the face may be supplemented by an even wash of colour on the back of the

negative. The larger the fault, the more trouble and skill is required to remedy it. If it occurs on any important part of the subject, added to the stippling should be a little skill in drawing, so that the missing part of the subject is filled in a manner that the hiatus is unnoticeable. It is curious what large gaps may, with a little practice, be filled up, and attract no attention when printed. It may also be remembered that small holes in the film appear much larger than they really are, and give a false idea of the amount of colour that is needed to fill them up; an almost microscopic dot of pigment will stop an apparently large pinhole. My advice to all engaged in this work is to under, rather than over, do it. Having got rid of the holes, pin and otherwise, we proceed to do so with the *opaque* spots. Being provided with a sharp knife and needle, the larger spots must be scraped carefully down, without cutting through the film, and objectionable points of light, in masses of shadow or elsewhere, picked out with the needle point. Faults that occur in the sky portion of the negative are often best remedied by painting out the sky altogether, so that it prints white, afterwards printing in clouds. Clouds can be painted on the back of some negatives, and, by making their contour hide the blemishes, will in many cases be found a very satisfactory plan.

It often happens that, owing to local colour, the bright part of a landscape is rendered with much less contrast and sparkle than it should be to represent the view correctly, or even a little extra brilliancy to that existing would be an artistic improvement. In such cases, accentuating the light with crisp judicious touches of lead pencil or colour will wonderfully improve the subject, increasing the scale of tone and brightening up the whole production.

A general increase of illumination on masses of subjects can be obtained by a *light* sketchy stipple, with soft lead pencil, over the part that requires lighting up, without any, or very little, reference to the details, so long as the stipple agrees in a measure with the character of the portion being treated, and the pencil lines are not *hard*. At first sight it might be thought that the lines would appear as defects, but they do not do so, the photographic image showing through and between them—a distinctly different effect to that produced by rubbing lead over the part with the finger-tip, although the thickness of the depth of lead, so to say, may be the same in both cases. Of course, this pencilling must be done on the *unvarnished* film, which, if too hard and glossy, may be made into condition by rubbing a little finely powdered resin over the surface with a pad of cotton-wool.

We now come to a different kind of doctoring, namely, covering the back of the negative with either tracing paper or varnish, coloured or uncoloured, and its removal from those parts that require more printing than the rest. On the whole, I give the preference to tracing paper for landscape negatives, and to varnish for portrait ones, but the character of the negatives must determine which to use. Much depends on the tracing paper—a white papier-mineral lends itself best for this purpose, for, when of good quality, the effect approximates very nearly to ground glass; it also provides an excellent surface for working on with either pencil or colour. I have found the best way to attach the paper is with mucilage of gum arabic, clear and free from dirt; it should always be well strained before use. Lay the paper, cut to size, on a clean flat surface, and evenly apply the gum, but not too lavishly; apply the gummed paper to the back of the negative, press it on smoothly, avoiding air bells, and let it dry. When dry, with a sharp knife cut round the portions from which it is desirable to remove the paper, then moisten it with a wet sponge, and in a few minutes the tracing paper can be easily stripped off. Sponge off the gum where the paper laid, and, when once again dry, it will be ready for any other treatment that may be deemed necessary.

Negatives thus prepared must be printed in diffused light or the edges of the paper will cause defects on the print. Too dense portions of negatives may be much improved by the well-known method of rubbing down with a soft pad moistened with spirit of wine. When the reduction is required with a straight clean edge, a strip of thin cardboard, laid on the negative and held firmly in place, will act as a guide, or stencil plate, during the process of rubbing and limit the area of reduction more neatly than would be possible without such aid. Rubbing down will sometimes save a valuable negative that has been accidentally exposed to the light, by having the shutter partly withdrawn in the act of removing the dark slide from the camera or otherwise, but it must be understood to be successful. The proper exposure has already been made before the accidental light has had access to it. In developing, the fogged edge must be developed rather longer than the rest, as, after drying, the fog has to be rubbed off with the spirit pad, the proper image will be found intact if somewhat weaker below it, and with a little pencilling and doctoring as already described can be made to print as well as the uninjured parts. In case of a collodion negative this rubbing down is, of course, out of the question, and getting out detail from the dense parts by judicious masking is the business of the printer.

In architectural subjects it is often advisable to block out the sky entirely. In doing this it is a good plan to carefully paint round the building with Indian ink about an eighth of an inch wide, and fill up the rest of the sky with black varnish; it is more easy to work the ink than the varnish round delicate tracery and ornamentation without encroaching on the subject, varnish is so apt to spread in an operation of this kind and spoil the outline. Sometimes portions of a building, projecting into the sky, pinnacles, and suchlike, do not have sufficient relief; at the same time it is undesirable to block out the sky entirely, in this case the high lights on the pinnacles are strengthened with pencil or colour, and the sky immediately adjoining slightly shaded with lead pencil, vignetting it off into the rest of the sky. The introduction of clouds will often be found a convenient method of gaining relief in cases of this kind, the clouds being painted on the back of the negative.

Sometimes portions of interiors of buildings are so badly illuminated that the detail is not sufficiently strong to print; in such cases the leading lines of light may be strengthened by pencilling over them, and when the subject permits, a slight wash of colour may be put on the back where a little additional strength is required.

Sometimes in seascapes the separation of water and sky is not sufficiently defined; we improve this by *ruling* a straight line where the horizon should be, and softening it off into the sky with a little pencil shading.

It frequently happens in a landscape that a spray of foliage comes in at the top or sides of the picture without any apparent connexion with it; in such cases it is advisable to stop them out altogether by colour or black varnish according to their size; blurred branches from movement against the sky are almost always better painted out.

We now come to negatives that have been cracked or broken. One that is merely cracked, or even broken, providing the film is undamaged, may be restored to its pristine usefulness by transferring the film to another plate. A very dilute bath of fluoric acid, a few drops to the ounce of water, will soon cause the film to separate with a little assistance, from its supports, when another piece of clean glass may be introduced beneath it, and the two—film and glass—lifted out together, adjusted to its proper position on the plate, and set up edgewise to dry. If the transference of the film is not desired, the negative may be laid on another piece of glass the same size, and bound together by pasting paper round the edges like a lantern slide; prints from it *must* be taken in diffused light, and, by preference, with a piece of white blotting-paper laid over to still further modify the light, which should be permitted to fall *along* the crack, not across it. If the negative is broken into several pieces, a piece of glass the size of the original negative is prepared by coating the surface with a little Canada balsam, and the glass made fairly hot; the broken negative is then adjusted, face upwards, on the balsamed glass, and the pieces pressed into close contact, squeegeeing out as much balsam as possible; this is laid on a perfectly level surface and left to harden, the broken piece of negative and its support are then bound round the edges with paper, and the balsam that may have oozed out between the pieces, as on the surface, nicely cleaned off with a soft rag and turpentine; the chipped film is then repaired by stippling with colour, and printed in the same manner as a cracked negative.

Collodion negatives are subject to an annoying fault, consisting of vermiculous cracks all over the surface, owing to the contraction of the varnished films. The best remedy is to rub over the surface finely powdered black lead with the finger-tip, which will fill up the cracks and make the negative again useful. Occasionally, in addition to the cracks, the film will leave the glass and rise in ridges. This is remedied by pouring some methylated spirit into a sufficiently large dish, in which is laid a small block or two in the spirit, so that the negatives, placed on them face upwards, will just be above the spirit level. Cover the whole closely down for a little time, when the vapour of the spirit will soften the film, and the ridges will be found to have disappeared. These faults are owing to the unequal contraction and expansion of the varnish and the collodion. The usual method of cleaning a collodion negative is by means of a solution of potassium cyanide, but after this cleaning the negative must on no account be revarnished, or the probability is the image will be dissolved partly or entirely, and the negative destroyed. I have now, I believe, recapitulated most of the ways and means of preparing negatives for the printer, all of which are or have been adopted successfully at one time or another. It only remains, as it were, to give the finishing touch, for the sake of neatness, by lining and blacking round the edges of the negative. *Before* varnishing, the size and amount of subject should be decided upon, as giving the most artistic appearance to the print. With the aid of a flat ruler and sharp knife-point, a line is clearly cut in the negative film enclosing the subject. Then, after varnishing (for I consider all negatives worth keeping are worth varnishing, as I have before said), with a ruling pen and black varnish, *just outside* the scratched line rule a black line, and fill up the space between the black line and the edge with black varnish. This will give a finished appearance to the print, and much facilitate trimming; it also affords a suitable space for name or number.

EDWARD DUNMORE.

PHOTOGRAPHIC BAS-RELIEFS.

It is surprising how few have attempted this exceedingly neat photographic process. Perhaps it is because the depth of the relief is not sufficient to justify many taking the trouble it necessarily entails. However, says Mr. P. Rowe, in the *Photo-American*, notwithstanding that, delicately and beautifully modelled reliefs can be obtained in the following way, which are quite a change from the usual print.

Take a quarter-plate piece of glass (preferably ground) and flood it with the following mixture—

Gelatine	70 grains.
Water	1 ounce.

Soak the gelatine in water until it has absorbed as much as possible, and then place the vessel containing it in water, just sufficiently warm enough to melt the gelatine. When completely dissolved, stir in—

Powdered bichromate of potassium	12 grains.
Ammonia	10 drops.

adding it to the gelatine drop by drop, the heat of the water being maintained.

After thoroughly mixing, allow to stand for five minutes, and at the end of that time skim off the surface skin and all air bubbles with strips of paper, leaving the mixture as clear as possible. Now place the glass plate somewhere perfectly level (on top of a tumbler does very well) with the ground side uppermost.

Pour the mixture carefully from vessel slowly on to the glass plate, and flood it with as much of the solution as you possibly can, until it stands about one-sixteenth of an inch in height. Then add the remainder, drop by drop, until the whole of it is used up. If the glass has been previously warmed, it will considerably facilitate it, spreading more evenly and smoothly. Be careful to leave no bits of dirt or air bubbles on the surface when coated.

Let it rest for five or ten minutes until the gelatine has set, and then stand it up on one corner to dry—in a darkened room, of course. Heat should not be used in drying, as the gelatine contracts considerably, chipping off pieces of the ground-glass surface with it, and, of course, is spoiled.

When dry, place it in a printing frame, behind a negative, just the same as a piece of paper, and print in the sun about one and a half times as long as a silver print, or until the details in the high lights are just visible, which can be seen by looking through the glass at the back.

When fully printed, place in lukewarm water for three or four hours, when, at the end of that time, the affected parts will stand up away from the rest; rinse, and wipe off all superfluous moisture with a clean cotton rag.

With a soft sable brush go gently over the whole surface with a drop of oil.

Mix some plaster of Paris with water to the consistency of thick cream, and, placing the gelatine plate at the bottom of an old quarter-plate box, pour the plaster over it until it stands, say, half an inch in height.

Before it has time to set gently stroke the surface of the plate up and down through the plaster to remove all air bubbles, &c. Now let it set until quite hard and brittle, which will take a few hours.

When quite set, force a knife blade at one corner between the plaster and the film, and with a little force separate the two.

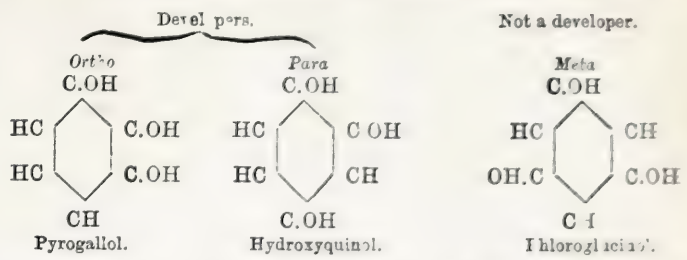
The result will be a delicately moulded relief in plaster, and this will form the basis for future copies in gelatine, ebonite, plaster, &c.

PHOTOGRAPHIC DEVELOPERS AND DEVELOPMENT.*

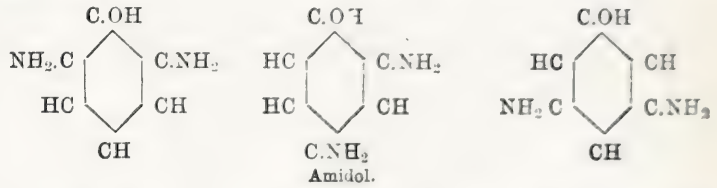
The fact to which I wish especially to draw attention is that all the members of Eder's first group owe their developing power to hydroxyl groups only; whereas those in the second group contain both amido and hydroxyl groups. It is a noteworthy fact that no developer containing amido groups without an hydroxyl group has yet been adopted for practical purposes. Other compounds, such as orthomethylamidophenol may be added to Eder's second group, and it would seem that we must attribute to the amido group the peculiar property of developing and making visible those parts of the image where the action of light has been smallest, with practically the same rapidity as those parts where the action of light has been greatest. This view is supported by the fact that this peculiarity is more marked when more than one amido group is present. In any case there can be no doubt that the property of developing in this way makes the group of developers especially valuable when dealing with subjects that have great extremes of light and shade, particularly where circumstances are such that only a minimum exposure has been or can be given.

It is, however, necessary to point out that there is no hard-and-fast line between the two groups of developers, and even the mode of action of one and the same developer depends on the manner in which it is used.

With the trisubstitution derivatives, *i.e.*, those in which three hydrogen atoms of the benzine have been displaced by hydroxyl or amido groups, or partly by one and partly by the other, the same general law holds good. The ortho and para derivatives are developers, while the meta derivatives are not. As examples we may take the three trihydroxybenzines, the ortho derivative being pyrogallol.



And also some of the diamidophenols, of which there are six altogether.



In these cases the effects of substitution in the hydroxyl or amido groups themselves are similar to those observed with the bisubstitution derivatives, making due allowance, of course, for the fact that, where three hydroxyl groups are present, displacement of the hydrogen of one of them only will not destroy the developing power if the two that are left are in the ortho or para positions.

Other points concerning the relation between chemical constitution and developing power have received attention, and notably the influence of the carboxyl group, COOH, and the sulphonic group, HSO_3, but at present no very definite conclusions can be drawn, and the results do not seem to be of much practical importance. Generally speaking, it would seem that the introduction of either of these groups into the molecule reduces the developing power of the compound, and in some cases destroys it altogether. Here again the naphthalene derivatives show differences from the benzine derivatives.

Since the developing power of carbon compounds is traceable to the presence of hydroxyl and amido groups, it becomes a question of some interest whether these groups show developing power when they are in one free state as hydrogen peroxide (dihydroxyl HO.OH) and hydrazene (diamide or amidogen $H_2N.NH_2$) unassociated with the benzine nucleus, and this interest extends to hydroxyline, $NH_2.OH$, which may be regarded as a compound of both groups.

It was stated a few years ago by Le Roy that hydrogen peroxide in strongly alkaline solution will develop the latent image on gelatino-bromide plates, and that alkali peroxides behave similarly. This statement I am able to confirm, and I show some examples. The developing power of hydrogen peroxide is comparatively feeble, but that of alkali peroxide is much stronger, and it is not greatly inferior in energy to some of the organic developers. The evolution of oxygen that accompanies the reduction causes the gelatine to swell up in innumerable small blisters. Hydrazine, in presence of an alkali, has also considerable developing power (examples shown), whilst hydroxylamine is still more efficient, and may, in fact rank, with the ordinary organic developers. The power of hydroxylamine was recognised in 1884 by Egli and A. Spiller, and probably the only cause that has prevented its general adoption is the fact that the nitrogen liberated in the reaction produces small bubbles or blisters in the gelatine. The same phenomenon is observed in a greater degree with hydrazine.

The developing power of hydrazine and hydroxylamine is found to exist also in derivatives that do not strictly conform to the general laws previously stated. That phenylhydrazine, $C_6H_5HN.NH_2$, is a somewhat powerful developer was recognised so long ago as 1887, by E. Jacobsen, who also found that its homologues and naphthylhydrazine behave in a similar way. Phenylhydrazine has the same composition as phenylene diamine; but, in the one case, the nitrogen atoms are in direct union with one another, whilst in the other they are not, but are associated with different carbon atoms. In the one case the phenyl group has been substituted for one of the hydrogen atoms in the hydrazine molecule $H_2N.NH_2$, whilst, in the other two, amido groups have been substituted for two hydrogen atoms of the benzine molecule.

Phenylhydroxylamine, $C_6H_5.NH.OH$, and its homologues also have developing power, and it is noteworthy that the relation between phenylhydroxylamine and amidophenol is very similar to that between phenylhydrazine and phenylenediamine.

All photographers are aware that these various developers will not act by themselves, but have to be mixed with an alkali, or, in some cases, with an alkali sulphite only, in order to bring their developing powers into play. They are potential developers rather than actual developers. Very generally, too, when an alkali sulphite is also added, as recommended by Berkeley in 1882, mainly for the purpose of preventing the discolouration of the developer and the consequent staining of the film. In view of these facts, it is customary to speak of the organic developers as "alkaline developers," but the question at once arises, What do we

* Concluded from page 826.

mean by "alkaline" in this connexion? Chemists recognise different degrees of alkalinity, as shown by different indicators, and these different degrees have a different significance. There is alkalinity or acidity to phenolphthalein, and there is alkalinity or acidity to methyl orange, which are by no means the same thing, and there is also alkalinity or acidity to the familiar litmus, which is less definite in its significance than the other two. When we speak of alkaline developers, which degree of alkalinity do we mean?

Many years ago Abney showed that pyrogallol will develop an image when simply mixed with an alkali sulphite, and this result has been confirmed, and it has further been shown that the same result is obtained when special care is taken that the sulphite contains no alkali carbonate. It is then not alkaline to phenolphthalein, but is alkali to litmus. It has been stated that quinol and catechol do not develop when mixed with a sulphite only, but I find that, as a matter of fact, development does take place under these conditions, though very slowly, in complete absence of an alkali carbonate or hydroxide. It requires thirty hours at a temperature of about 50° Fahr. to reach a moderate degree of opacity.

Again, pyrogallol will develop an image completely in presence of an alkali bicarbonate, and in these cases also the solutions are alkaline to litmus, but are not alkaline to phenolphthalein. Development is naturally slower than with the normal carbonate, but the method can be applied with distinct practical advantages to plates that have been much over-exposed, or that show a marked tendency to general fog if treated in the ordinary way.

Further, paramidophenol, methylorthoamidophenol, metol, amidol, and diamidoresorcin, all develop when mixed with an alkali sulphite free from carbonate or hydroxide.

It follows, therefore, that the minimum *active alkilinity*, if I may use the expression, is alkilinity to litmus. It must, however, be understood that, with this degree of alkalinity, development is usually very slow, too slow, in fact, to be of practical value except in special cases. Amidol (diamidophenol), diamidoresorcinol, triamidophenol, and probably other derivatives that contain at least two amido groups with a hydroxyl group are exceptions to the general rule, since they give a workable rate of development when mixed with normal sodium sulphite alone.

As a rule, however, a normal alkali carbonate, or an alkali hydroxate, must be added; that is to say, the liquid must be made alkaline to phenolphthalein, and, with the exceptions just mentioned, this degree of alkalinity must be regarded as the working alkalinity.

In most cases sodium carbonate or potassium carbonate is the alkali used; sodium and potassium hydroxide have to be employed with great care, and ammonia gives satisfactory results only with pyrogallol, and that only with comparatively few of the various brands of gelatine bromide plates at present on the market. The great drawback to the use of alkali hydroxides (caustic alkalies) is that, unless the proportion is kept very low, the developer becomes too energetic, and produces general fog, or, in other words, reduces silver bromide that has not been exposed to light, instead of attacking only that which has been exposed.

Unfortunately, at the present time, we are almost entirely without exact information as to the relative effects of sodium and potassium carbonate. It is generally believed that potassium carbonate is the more energetic of the two, and this is probably the case; but, so far as I am aware, no really careful comparison has ever been made. It may serve as an example of the loose kind of experimenting from which exact photography suffers so much if I point out that, in a number of such comparisons as have been made, a given weight of anhydrous potassium carbonate has been compared with the same weight of soda crystals, that is, hydrated sodium carbonate, containing very nearly two-thirds of their weight of water. It is scarcely to be wondered at that, when compared in this way, potassium carbonate was found to be more energetic than sodium carbonate.

There are a few exceptions to the general rule that solutions must be at least alkaline to litmus in order to obtain developing power. In this respect also naphthalene derivatives seem to provide exceptions. Eikonogen, when dissolved in water, yields a solution that is decidedly acid to litmus, and I find that such a solution will develop an image on an exposed plate, although the action is very slow, even when the plate has received many times the normal exposure, a period of about forty-eight hours being required to obtain a satisfactory opaque image with a two per cent. solution of eikonogen. Given sufficient time, however, enough and more than enough opacity can be obtained, and I think development in this way is worthy the attention of any one who has to develop plates that in ordinary phraseology are known to be "hopelessly over-exposed." It was recognised some years ago that eikonogen will develop very fairly well with no addition except sodium sulphite, but I have not been able to find any previous definite evidence that it will develop in a solution acid to litmus. So far as my own experience goes, eikonogen is in this respect unique amongst all the ordinary developers. Amidol and diamidoresorcinol do not develop in solutions acid to litmus, even when allowed to act for so long as seventy-six hours on plates that had much more than a normal exposure, though the addition of some sodium sulphite at the end of this time sets the developing action going at once. Probably other naphthalene derivatives analogous to eikonogen will behave in the same way as it does.

Phenylhydrazine is also an exception in that it will develop with some energy in a solution that is neutral to litmus, but I have not been able to obtain any developing action when the solution was acid to litmus. Hydrazine and hydroxylamine also will not develop if the solutions are acid to litmus.

Referring once more to the action of sodium sulphite, it is obvious that, as all the ordinary developers will act in presence of the sulphite alone, this substance not only keeps the liquid from becoming discoloured, but also has a weak accelerating action of its own. Since, however, the rate of development in presence of an alkali sulphite is very much lower than when an alkali is added, it follows that, in the operation as usually carried out, the accelerating effect of the sulphite is a practically negligeable quantity. At the same time it ought not to be forgotten that sodium sulphite, in moderately concentrated solutions, has a distinct solvent action on silver bromide, and it is conceivable that this action may play some part in the process. At present, however, there is no direct evidence that this is the case.

In order to avoid the inconveniences attending the use of alkalies, and notably of caustic alkalies, MM. Lumière have proposed the use of tribasic sodium phosphate, Na_3PO_4, a salt which is fairly stable. When dissolved in water, it splits up into the ordinary sodium phosphate (disodium hydrogen phosphate) and caustic soda, to an extent depending on the degree of dilution. Its effect is consequently the same as that of caustic soda, but the variations in the proportion of caustic soda present, that result merely from different degrees of dilution, introduce complications that are not without influence on the result.

Another novel and very interesting method of providing the necessary alkali has been devised by MM. Lumière. It is based on the well-known fact that aldehydes and acetones unite with acid sodium sulphite to form crystalline compounds. If to a solution of normal sodium sulphite, containing pyrogallol or quinol, a small quantity of formaldehyde, or ordinary aldehyde, or acetone, is added, interaction seems to take place with formation of aldehyde sodium bisulphite or acetone sodium bisulphite and the sodium salt of the pyrogallol or quinol. The change may be represented in this way:—

$$C_6H_4(OH)_2 + 2Na_2SO_3 + 2C_3H_6O. = \underset{\text{(Acetone)}}{} C_6H_4(ONa)_2 + 2NaHSO_3.C_3H_6O.$$

At any rate, the addition of the acetone or aldehyde confers on the solution powerful developing properties, the rate of action depending to a considerable extent on the proportion of aldehyde or acetone added.

The most satisfactory results for general purposes seem to be obtained with pyrogallol and acetone. A solution is prepared containing

Pyrogallol	1 part,
Sodium sulphite	5 parts,
Water	100 „

and to this acetone is added up to an amount not exceeding ten parts The developer works regularly but fairly rapidly. The method has some distinct advantages, and seems likely to become of considerable practical importance. Some examples are shown on the screen. Quinol and sodium sulphite, and formaldehyde are said to yield a developer very useful where negatives with strong contrasts are desired, and paramidophenol also develops in presence of sulphites when an aldehyde or acetone is added.

The only other substance commonly added to developers is a soluble alkali bromide, the action of which varies according to the nature of the particular developer. It generally lowers the rate of development, but, within certain limits as to the proportion added, its only other effect on the final result when development is allowed to proceed to its limits is, according to my experience, to reduce to prevent general fog. When development is not pushed to its limit, the bromide, if in sufficient quantity, has a material influence on the character of the negative, as photographers have long believed, and as the later experiments of Hurter & Driffield seem clearly to prove. Broadly speaking, the effect is the same as if the plate were somewhat slower, or had received a shorter exposure, but the matter requires further investigation.

Concerning the chemical changes that go on during development, I propose to say very little, and, indeed, there is very little definitely to say. It is recognised in a general way that a developer is a reducing agent, and that the operation of development is a process of reduction. It is important not to forget that, in its ideal form at any rate, it is a process of *selective* reduction, and the ideal developer is one that will not reduce silver gelatino-bromide that has not previously been exposed to light. In this case, as in so many others, the real is often very different from the ideal, but the ideal is not unattainable even under ordinary working conditions, though it must be confessed that, in the desire to obtain high sensitiveness, the silver bromide in many gelatino-bromide plates is brought into such a highly unstable condition that it is attacked by the developer even without any preliminary action of light.

It is also recognised that the developer undergoes oxidation, but no definite oxidation products have yet been satisfactorily isolated. The matter is especially difficult to investigate, because only a small part of the change in the developer is due to its action on the photographic plate, the greater part is due to the action of the air on the developer.

Three chief hypotheses have been propounded concerning the nature of the change in the silver bromide. There is the view expounded by Abney that the undeveloped image consists of a minute quantity of silver sub-bromide, which is reduced by the developer to metallic silver. The silver thus liberated unites with the silver bromide that is in contact with it to form more sub-bromide, which, in its turn, is reduced, yielding still more silver, and this, in the same way, forms more sub-bromide, which is again reduced, and so on. Secondly, there is the view that the reduction of the silver bromide is to be regarded as a process of electrolysis initiated by the minute quantity of silver that results from the action of the developer on the material forming the latent image. Lastly, there is the view of Hurter & Driffield that every particle of silver forming the developed image is represented in the undeveloped or latent image by a corresponding particle of silver bromide that has been affected by light, and has thereby been thrown into a state of such unstable equilibrium that it is reduced by the developer; they accept neither the sub-bromide hypothesis nor the hypothesis of electrolytic action.

In considering the question, I think it is important to bear in mind that the chemistry of development is a chemistry of dilute solutions. An ordinary developer on an average contains 5 parts of the developing agent in 1000 parts of solution, or a gramme molecule in 22 litres. It is possible, however, to develop a normally exposed plate in a solution containing only 1 part of pyrogallol in 10,000 parts of solution, *i.e.*, a gramme molecule in 1260 litres, or a degree of dilution far beyond that which obtains in ordinary chemical operations. The first example exhibited was developed for two hours in a solution containing 1 part of pyrogallol in 5000. The second was developed for 100 minutes in a solution containing 1 part of pyrogallol in 10,000. In explainlng these phenomena it may be necessary to take into account the special properties of very dilute solutions.

The main reaction, whatever its mechanism, is, of course, the separation of bromine from silver, the metal remaining to form the image, whilst the bromine dissolves in the form of an alkali bromide. At the same time the developer is oxidised, apparently at the expense of the water that is present. The reaction does not seem to me to be one that can properly be represented by an ordinary equation; many attractions are at work tending to keep the system in its original configuration, whilst many counter attractions are tending to bring about a change of configuration, that is, a rearrangement of the atoms with the production of new substances. Under proper conditions the occurrence of any change at all is dependent on the initial change produced by the action of light. When a change does take place, the reaction is not a reversible one, but, nevertheless, the relative masses of the reacting substances have a distinct influence. The change is accelerated within certain limits by an increase in the relative masses of the reducing agent and the alkali; but, on the other hand, it is retarded by an increase in the mass of alkali bromide, which is one of the products of the reaction. In some cases also it seems to be retarded by the product of the alteration of the developing agent. The whole question has been the object of much speculation, and a little experiment, but many of the problems that it includes have still to be solved. C. H. Bothamley, F.I.C., F.C.S.

Discussion.

The Rev. F. C. Lambert said one of the most interesting points mentioned was the developing power of hydrogen peroxide. Most present would be aware probably of the interesting experiments recently made by Dr. Russell on so-called photography in the dark. He understood him to say in a recent lecture at the Royal Photographic Society that he was tending to the opinion that all these curious actions could be traced to the elimination or production of hydrogen peroxide, that the substances which acted on the photographic plate in the dark were those which gave off hydrogen peroxide.

Sir H. Trueman Wood said this subject required for its discussion much greater knowledge of organic chemistry than most people possessed, and he rather regretted that the paper had been fixed for that evening, when many chemists who might otherwise have been present were enjoying themselves elsewhere at the Annual Dinner of the Royal Society. The average photographer would probably look at the paper in three different ways. First of all, he would be struck by the clear and brilliant way in which Mr. Bothamley had treated a subject of great difficulty and complexity; next he would be led to hope these researches would throw some light on the very abstruse phenomena of photographic development; and, lastly, he might be tempted to despair on finding how little was really known of these phenomena, and how empirical was the knowledge which had been gained. Seeing that three or four theories had been put forward as to the nature of development itself, how could they expect to know the action of the various substances which were used as developers? The practical question which would occur to many of them would be, What was the good of having so many developers, and were any of them any better than their old friend pyrogallol? The practical man would say that the results produced by these newer agents were not very different from those produced by the older ones, and that, although metol, for instance, might give you the power of bringing out more easily an image which had been very slightly exposed, the actual benefit derived from the additions to the list was not very great. There was, of course, a great advantage in having, for certain purposes, developers which did not stain. Perhaps Mr. Bothamley could tell them why pyrogallol stained the plate or paper more than metol or hydroquinone, or some of the other substances? Whether the more rapid oxidation of the pyro produced a dye which stained any material to which it came in contact, he, for one, would like to know. He hoped some practical photographers would give their opinion as to benefit derived by having so many different materials placed at their command, but he fancied that nine-tenths of the work was still done with pyrogallol, and that those newer developers were, to a large extent, used by amateurs and experimentalists.

Mr. W. Brooks said he had used acetone pyro for the last six months, and found that it would do all that alkaline pyro would do, and a great deal more. It had rather a tendency to soften the film, which he did not like, but it had the great advantage that it did not stain the hands, which made it very suitable for ladies. He had also used glycin, which was superior to anything he knew of from the point of view of gradation. Some time ago he had to photograph the memorial plate to a Lord High Admiral (Lord Howard of Effingham) in the church at Reigate, the colour of the plate being that of burnt sienna, and the letters black, and he thought it was almost a hopeless case, but, to his surprise, all the letters came out like an engraving. Amidol was another developer which he had found useful. Many people thought glycin was only suitable for line work, but he found it gave the most delicate details possible. With regard to Dr. Russell's experiments with metals, he might say that he worked on that subject at the latter part of the sixties and beginning of the seventies, and he thought Dr. Russell would find that the effect depended on the distances at which the elements were placed in front of the plate; there was a sort of photosphere produced which caused the action, which did not take place when there was actual contact. With zinc the distance might be $\frac{1}{8}$ inch, and with iron $\frac{1}{2}$ inch, but with each metal there was one plane in which the action was most marked.

Mr. Krohn asked whether precautions had been taken, in the case of the acetone experiment, to see that the sulphite was pure and contained no carbonate. A friend of his some time ago experimented in this direction, though he was not able to conclude his researches. As far as he remembered, he tried both acetone and formalin, and in both cases obtained development, but, on neutralising or adding sulphurous acid to the sulphite, so as to get rid of all traces of carbonate, the action was reduced, if not altogether stopped. This was a point frequently ignored, but commercial sulphite sometimes contained as much as twenty-five per cent. of carbonate.

The Chairman said he could not follow the chemistry of the paper in detail, but Mr. Bothamley had done a great service to photographers in preparing it, and it would afford a valuable basis for further research. He had tried most of these developers in a more or less experimental way, but could not say much about them; after all, he thought the old friend pyro was the real stand-by of the photographer, though a good word might also be said for ferrous oxalate. This had one advantage over organic developers, that you knew exactly what you were working with; the others, especially in tropical climates, were liable to decompose. In India the great difficulty was to keep things fresh; sometimes the pyro looked nice and white, but when put into water it gave a dark brown or almost black solution. Eikonogen, which he had also used, sometimes appeared as a brilliant purple-blue powder. Ferrous oxalate for a long time was the favourite on the Continent, and was largely used there, but was not much used in England. Glycin was valuable when you knew how to use it, and he liked it very well for certain purposes, though it was said to be slow. With regard to guaiacol, it showed how easy it was to mistake the action of an impurity for that of the substance with which it was mixed. When he was working with guaiacol it was not so commonly used as now for medical purposes, and was not so pure. Lumière showed that *pure* guaiacol had no developing power, and it seemed likely that the developing action was due to minute traces of pyrocatechin, which, he had found by experiment, had considerable developing power, even when reduced to $\frac{1}{300000}$ gr., and one per cent. solution of caustic potash. Carbolic acid or phenol was another case in point. The pure phenol was not a developer, but samples of carbolic acid, that had been kept for some lime and turned red, had considerable developing power. Cresol, paracresol, and phlorol had also some power of development. Hydroxylamine hydrochlorate was also an exceedingly valuable developer if you could use it, but the difficulty was to prevent the little bubbles and blisters; this defect had prevented its use. He had lately used pyro acetone, which gave good density and tone and freedom from stains, but he found it had a tendency to frill and reticulate, at any rate in the summer. One of the nicest developers was paramidophenol hydrochlorate; it was something like rodinal, but he preferred the salt itself, It was very good for office use, because you could put your plate in, go away and attend to visitors, and come back and find the plate all ready. It had also great keeping powers, and was always ready for use. Eikonogen was also useful for ordinary work and in making reversals. He thought it was a good thing to have a large choice of developers, because one would serve best for one purpose and another for another, but it required experience and skill in making a selection. Metol had become popular because it was a snap-shot developer, which could be used after very short exposures or in places where the light was weak.

Mr. Bothamley, in reply, said as far as he could form an opinion, Dr.

Russell had practically proved that the pseudo-photographic effects he had noticed were due to the action of hydrogen peroxide in very small quantities on the plate. It was well known to be formed in almost all cases where a metal, or anything else—varnish, for instance—was oxidised in the presence of air. He had himself repeated some of Dr. Russell's results, and found that very small quantities of hydrogen peroxide would produce very dense latent images, that is to say, latent images which, when developed, showed considerable opacity. It had also been shown long ago by Captain Abney that hydrogen peroxide, in solution, would destroy the latent image if it were allowed to act on the photographic plate. In a paper read at the British Association he (Mr. Bothamley) had shown, not only that hydrogen peroxide vapour, if allowed to go on acting, would in time destroy the image that it had first produced, but that turpentine and one or two other substances would do the same thing. Hydrogen peroxide would produce a latent image, destroy it, and develop it, according to the conditions under which it acted. Years ago it was shown by Brodie that hydrogen peroxide would act sometimes as a reducer and sometimes as an oxidiser, and in one and the same liquid it would be reducing and oxidising at the same time. With regard to the practical result of researches of this kind, he thought they were distinctly useful, mainly because they showed in what direction to look for new developers. Metol, which was to a certain extent the outcome of this work, was a distinct gain, as it was very useful for special classes of work —difficult interiors, and the like. It was a great advantage to have substances which did not stain, such as metol, paramidophenol, and others. They gave images on a gelatine bromide plate which had always practically the same colour, which was not the case with pyrogallol; there the colour was more or less brown, but it varied a great deal. With metol and other substances the colour of the image was almost always the same, it was only the degree of opacity which varied. Why some developers produced stains and others did not was a difficult question. Why one dye would dye wool and another cotton, and why some would dye gelatine and others would not, were questions which he doubted if any chemist could answer at present. Some years ago, when making experiments in orthochromatic photography, he observed frequently that some of the eosine dyes would readily stain gelatine a deep colour, and certain others would not—rhodamine, for example. There was no doubt that many of these new developers, like metol, were not acted on by the oxygen of the air to anything like the same extent as pyro and some others. A solution of metol or of catechol, with a very little sulphite in it, might be left exposed to the air for a long time without showing any marked colour. Amidol, though it produced a deep colouring matter by the action of the air, did not apparently stain gelatine, nor did it stain the fingers. Ortol, which he used largely for lantern slides and bromide prints, was also remarkable for its freedom from stains. Probably the great majority of negatives were still developed with pyrogallol. When Dr. Paul Liesegang was last in England, he told him that he believed in Germany they had gone back to pyrogallic acid for all practical purposes, except in those cases where they still used ferrous oxalate. His own opinion was that metol, ortol, amidol, and paramidophenol were all distinct practical gains, and glycin also was very useful. With regard to the acetone experiments, the sulphite contained no carbonate. Although the solution was not alkaline to phenolthalein, to make quite sure he added a small quantity of metabisulphite of potassium, a strongly acid salt, and still the development went on very rapidly, even with a small quantity of acetone. It was a new thing, and wanted working out, but he thought under proper conditions it might be very useful. It was much more convenient to have a small bottle of acetone than a big bottle of soda solution, and you escaped all the unpleasantness of using a caustic alkali. There was no difficulty now in obtaining, at a moderate price, under 1*s.* per pound, sodium sulphite, which contained only a small trace of carbonate. Of course, you must be careful where you obtain it, because he knew that some of the so-called commercial sulphites were the greatest rubbish. He thought it probable that the guaiacol used by the Chairman was a vegetable product, because at that time synthetic guaiacol was not readily obtainable; it was probably far purer than the natural product.

Mr. Howard asked why metol acted on the fingers, and if anything could be done to prevent it?

Mr. Bothamley said he believed it was a question of idiosyncrasy. He had found no ill effects himself from using it, but, on the other hand, he knew that some few people did experience serious skin trouble from it.

ERRORS TO BE CORRECTED IN PHOTOGRAPHIC LENSES.

In the course of a recently published paper on this subject, Mr. E. M. Nelson, President of the Royal Microscopical Society, points out that the first and principal error to be met with in all dioptric lenses, photographic or otherwise, is that of chromatism; this need not be enlarged upon, as all microscopists are acquainted with it, and its method of correction, by combining a high-power positive lens, having low dispersion with a low-power negative lens having high dispersion, the power of the combination being the difference between the powers of its components.

The second error may, like the first, and for the same reason, be dismissed in a word or two. It is, of course, the spherical aberration of the direct pencil, which in this instance we will restrict to axial parallel rays. This error is due to the spherical form of lenses causing axial parallel rays, passing through a part of a lens remote from the axis, to have a different focus from those passing through the axial portion of the lens. In some lenses the aberration is negative, which means that the marginal rays have a shorter focus than the central; in other lenses it is positive, or the axial rays have a shorter focus than the marginal. Spherical errors are corrected by combining lenses which have equal amounts of positive and negative aberration.

The third error is curvature of image; this means that a real image formed by a lens having a positive focus is curved, presenting its concave aspect to the lens, and the radius of curvature is (approximately) equal to the focal length multiplied by the refractive index. Thus, for example, if we take the refractive index as 1·5, the diameter of the curvature of the image may be estimated at three times the focal length of the lens which formed it; so the image from a 6-inch focus lens would have a diameter of curvature of 19 inches, or a radius of curvature of 9 inches.

This error is, as far as possible, corrected by reducing the aperture, and by giving to the lens a suitable form. Thus, in a single landscape lens, an inverted meniscus is used. It generally turns out, however, that when an advantage is gained in one direction something is lost in another. In this instance spherical aberration is introduced by this form of lens, so the correction of the third error is accomplished by introducing the second. In a lens which has a flat field a want of sharpness may be noticed in images formed by even direct axial pencils.

The fourth error is distortion; this, which is commonly called pincushion and barrel distortion, is caused by the too great refraction of oblique centrical pencils. It is corrected by opposing two lenses of symmetrical form to one another. It should be noted, however, that these lenses may be, and often are, asymmetrical both as to their foci and as to chromatic correction; all that is necessary is that they should be symmetrical in their outward form, or nearly so.

The fifth, the astigmatic error—one most difficult to correct—is caused by the focal lines of oblique and eccentrical pencils. The mathematical analysis of this subject is both complicated and prolix. The corrections are obtained by combining glasses possessing relatively high dispersion and low refraction with those of low dispersion and high refraction. This is now rendered possible, owing to the production by the Jena firm of glasses having their ratios of refraction to dispersion different from any hitherto made.

To very briefly explain astigmatism: When a small oblique pencil is refracted by a lens, the rays are not brought to a focal point, but to a line, and afterwards to another line; these lines are called the primary and secondary focal lines. When a lens has negative aberration, that is, when the lens brings aberrated rays to a focal point situated between the lens and its geometrical focus, then the primary focal line lies between the lens and the secondary focal line; but when the lens has positive aberration, that is, brings aberrated rays to a focal point beyond its geometrical focus, then the secondary focal line lies between the lens and the primary focal line. In general, the circle of least confusion lies half way between the focal lines.

Now, a plane passing through the axis of the lens and the axis of the principal oblique incident pencil, is called the primary plane, and the primary focal line is always perpendicular to this plane; but the secondary focal line lies in it; therefore the focal lines are at right angles to one another. If, now, points are imaged by lines, it is very easy to see how the image of a lined object in a certain direction would be blotted out. By means of a hole in a card, a small oblique beam of sunlight may be passed eccentrically through a hand magnifying glass, and the focal lines be conveniently studied by receiving their images on a piece of paper.

These focal lines have nothing whatever to do with spherical aberration, as some have supposed, for they can be originated by pencils falling obliquely on a plane refracting surface. It is here that we meet one of the differences between reflection and refraction; a plane refracting surface has a diacaustic, but a plane reflecting surface has no catacaustic.

The sixth and last error is a smaller one, viz., the chromatic error of the secondary spectrum. This is due to irrationality in the dispersion of the media of which a compound achromatic lens is composed.

This error is removed in two ways, viz, (*a*) by the manufacture of glasses having proportional dispersions; and (*b*) by combining three different media instead of two; in other words, by making an achromatic triplet of three different media, instead of a doublet of two different media. Of these two methods the first is the better, and great strides have been made in this direction during the past ten or fifteen years.

To sum up, we find that there are no less than six errors to be corrected in the photographic lens, viz.:—

1. Chromatic aberration, primary spectrum.
2. Spherical aberration of direct pencil.
3. Curvature of field.
4. Spherical aberration of oblique pencil.
5. Astigmatism arising from focal lines of oblique pencils (caustics).
6. Chromatic aberration, secondary spectrum.

By these considerations the following question is suggested, viz., What is meant by the term aplanatism?

There can be no doubt that formerly it was applied to a single lens which had only been corrected spherically for a direct pencil, *e.g.*, the aplanatic meniscus. Subsequently it implied the correction of the spherical aberration for parallel axial rays, and at the same time the correction of the chromatic aberration of these rays for the primary spectrum. Now, however, the term has been used more loosely, and it is often applied to a combination in which spherical aberration for axial parallel rays has been intentionally introduced for the purpose of flattening the field.

ROYAL PHOTOGRAPHIC SOCIETY.

THE FOLLOWING LIST GIVES THE ATTENDANCES OF OFFICERS AND MEMBERS OF COUNCIL DURING 1898.

Number of Council Meetings.	Number of Committee Meetings.	Name.	Number of Attendances at Council Meetings.	Number of Attendances at Committee Meetings.
13	11	The Earl of Crawford...	9	3
13	0	Captain W. de W. Abney	4	0
13	0	T. R. Dallmeyer	1	0
13	6	Chapman Jones	11	6
13	0	Sir H. Trueman Wood .	5	0
13	12	G. Scamell	12	10
10	12	Colonel J. Waterhouse .	10	12
13	3	H. Wilmer	9	0
13	0	F. Ince	0	0
13	4	Thomas Bedding... ...	10	2
13	4	T. Bolas	12	3
10	0	C. H. Bothamley... ...	1	0
13	8	F. A. Bridge...	9	6
13	0	J. Cadett	4	0
13	0	A. Cowan	11	0
9	3	R. W. Craigie	8	1
13	0	W. E. Debenham ...	10	0
13	0	A. Haddon	12	0
10	0	J. A. Hodges	7	0
13	6	Rev F. C. Lambert ...	11	4
13	9	A. Mackie	12	8
13	4	J. W. Marchant	7	4
13	0	A. Pringle	5	0
13	0	J. Spiller	9	0
13	0	J. W. Swan	2	0
9	8	W. Thomas	4	4
13	7	H. Snowden Ward ...	8	5
13	0	L. Warnerke...	5	0
10	3	J. B. B. Wellington ...	8	2

BUTLER'S SINGLE, OR STEREOSCOPIC, COLOUR CAMERA.

THIS is a single or stereoscopic colour camera for the purpose of taking either one, two, or three separate negatives, and in either of the latter cases taking them simultaneously and at one exposure by means of the same lens or pair of lenses.

It consists of a camera fitted with single or stereoscopic lenses which may be adjustable and having either one or two coloured glass reflectors set at an angle of forty-five degrees with the base of the camera and two or three coloured screens to act as ray filters.

The reflectors are of a colour complementary to the colour desired to be reflected.

The first reflector may be greenish-blue, the complementary colour to red. The second reflector may be yellow, the complementary colour to violet.

The image proceeding from the red rays of the subject to be photographed is reflected upwards by the first reflector and is focussed on a sensitive plate placed horizontally fixed in a dark slide, which produces negative No. 1. A red plate of glass may be placed beneath the sensitive plate which causes the red parts of the picture to be more intense.

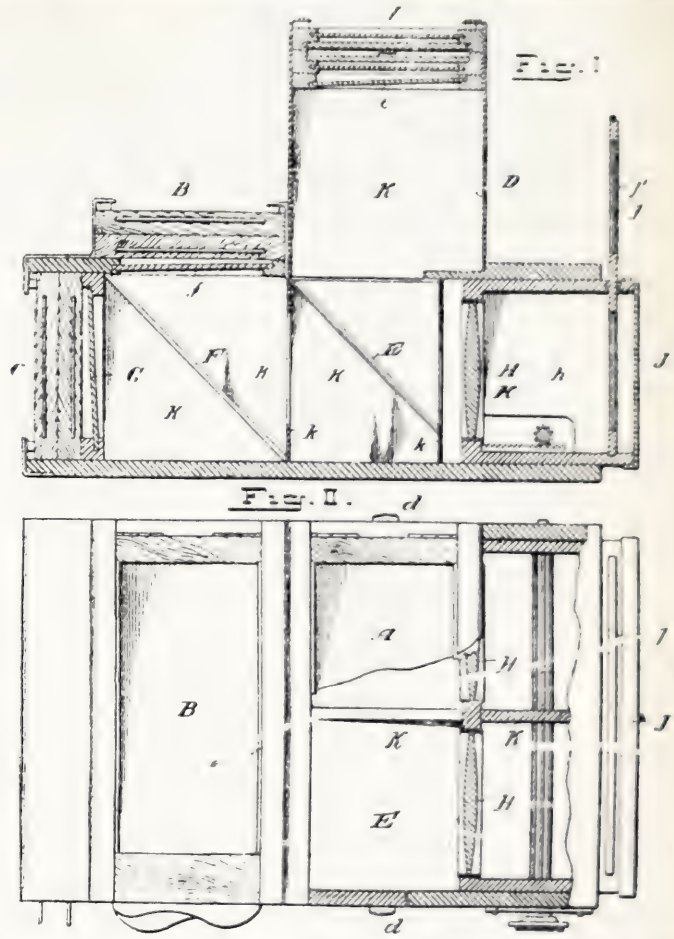
The image proceeding from violet rays of object to be photographed is transmitted by the first reflector, and is reflected upwards by the second reflector and focussed on a second sensitive plate placed horizontally in a dark slide, which produces negative No. 2.

A violet-blue glass is placed beneath the No. 2 sensitive plate which causes the violet parts of picture to be more intense.

The image proceeding from green rays of the object to be photographed is transmitted by both the first and the second reflectors and is focussed on a third sensitive plate also in a dark slide placed perpendicularly, which produces negative No. 3.

A green glass may be placed before No. 3 sensitive plate, which causes the green parts of the picture to be more intense, by its absorption of other rays.

All the negatives are taken simultaneously at one exposure, and by one lens if the camera be single, and a pair of lenses if stereoscopic, which



ensures the views on each being the same, excepting as regards density, which differs on each plate according to the strength of colour represented.

Fig. 1 is a sectional side elevation.

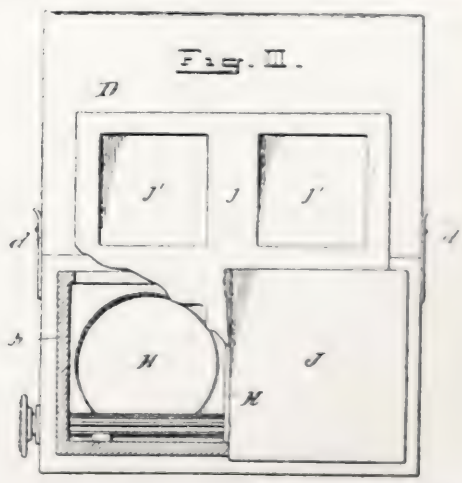
Fig. 2 a sectional plan, and

Fig. 3 a front view, also partly in section, of a stereoscopic camera constructed to take three negatives simultaneously at one exposure.

Fig. 4 is a sectional side elevation, and

Fig. 5 a plan, also partly in section, of a stereoscopic camera constructed to take two negatives simultaneously.

Referring to figs. 1, 2, and 3 of the drawings, Mr. Butler constructs the camera of wood or other suitable material, preferably lined with black



velveteen, having two dark slides, A and B, arranged horizontally above, and a third dark slide, C, arranged vertically at the back of the camera. The dark slide, A, is carried in a box portion, D, which is connected to the body of the camera by spring clips, *d*, so that it can be readily removed for the purpose of gaining access to the inside of the camera when desired.

Below the dark slide, A, in the position shown, is situated the greenish-blue reflector, E, for reflecting the red rays, proceeding from the subject being photographed, on to the plate in the dark slide. *e* is the red plate of glass for intensifying the red parts of the picture.

F is the yellow reflector for reflecting the violet rays, transmitted by the reflector, E, upwards on to the plate in the dark slide, B. *f* is the violet-blue glass which causes the violet-blue parts of the picture to be more intense.

G is the green glass which intensifies, by its absorption of other rays, the green parts of the picture transmitted by the reflectors, E and F, on to the plate in the dark slide, C.

In the example the camera is shown fitted with a pair of single lenses, H, mounted in a sliding body, *h*, actuated, for focussing purposes, by a rack and pinion as shown. The front of this sliding body is fitted with a cap, J, and also with a double screen, *j*, having suitably coloured glasses, j^1, as and for the same purposes as those used with ordinary cameras.

Partitions, K, are arranged between the lenses and through the camera

Fig. IV.

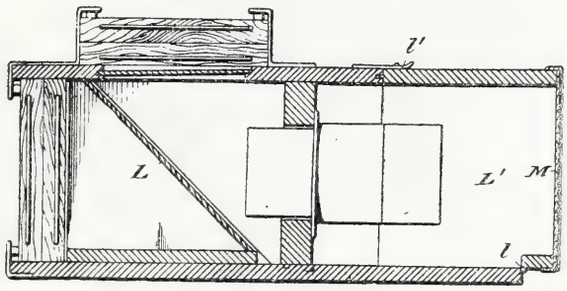
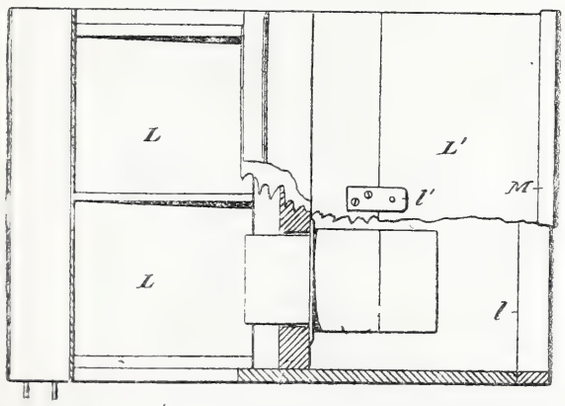


Fig. V.



so as to separate one stereoscopic side from the other, and a diaphragm, *k*, is placed before each reflector to exclude all surface reflection from the lenses and thus prevent fogging of the plates.

Different kinds of sensitive plates may be used under the same exposure for the different colours; thus an orthochromatic plate, which is more sensitive to the red, may be used in the dark slide, A.

Transparencies taken in the ordinary way from the negatives thus obtained may be used in the kromskop or for other purposes.

When only two negatives are desired to be taken simultaneously, only one reflector need be used of a colour complementary to the colour represented by one negative and analogous to the colour represented by the other. Such a camera is shown in figs. 4 and 5, the reflector, L, being mounted so that it can be removed and another substituted, as desired, in place of being permanently secured, as in the first-described example. With this form also one may employ a pair of lenses, each of which can be focussed by hand independently of each other, the said lenses being enclosed by a light-tight box, L^1, hinged at *l* and secured by a spring catch, l^1, or otherwise removably connected. The front of this box is fitted with a cap, M, and may or may not be provided with a coloured screen. Also any ordinary means may be used for interposing a coloured screen before the lens or lenses when desired.

Although the examples described are stereoscopic, the same relative positions may be occupied by the various parts when it is desired to take two or three single negatives simultaneously, in this case, however, one lens only being employed.

SELKE'S PROCESS AND APPARATUS FOR THE PLASTIC REPRESENTATION OF SOLID BODIES BY THE AID OF PHOTOGRAPHY.

THE essential features of this invention consist in producing from the model or object to be represented or imitated a series of photographs, which photographs are then aggregated for building up a plastic or solid representation of the said model or object.

For effecting these operations, so-called series apparatus are employed for obtaining a number of consecutive photographs, such apparatus being similar to cinematograph apparatus or the like; but the successive photographs do not, as in that apparatus, record a series of movements of the objects, but a series of different light and shade effects, or "light sections" of the objects which are produced by means of one or more sources of light in conjunction with a screen having a relative motion to the object, as will be hereinafter explained.

Fig. 1 is a side elevation of the apparatus. Fig. 2 is a plan of the same.

A movable pedestal or platform, 1, carries the sources of light, 2 2, of any required number, and an elastic or linked light screen, 3, in such a manner that these objects are always situated in the same relative positions. The pedestal is connected with a part of any suitable known moving mechanism; for instance, the film roll of the photographic series apparatus, by a traction device for instance, by a chain, 5, passing over rollers, 7, so that when the photographic apparatus is set in action, the pedestal is also simultaneously pulled or moved a certain way forward or backward. On placing the model to be photographed at 6 on a stationary stand within the light screen, 3, so that the light coming from the sources, 2, does not yet touch the object, and then setting the series apparatus, 4, in action, the pedestal with light sources and screen will move simultaneously from the front backwards while the object remains stationary, so that on the model there are formed light sections, the limiting lines of which depend upon the form of the model. These light sections can, of course, also be obtained in reverse order; for instance, by letting the limiting lines of the light and shade pass over the model from the back to the front in a continuous or successive movement.

Each of the photographic pictures formed will thus give a differently formed light section, black on white ground. During the taking of the photographs, one could, of course, also move the model and let the light sources with screen be stationary. The negative film strips obtained are afterwards again passed through the series apparatus and exposed on a photographic plate, &c., over one another, and by printing, for instance, on a chrome gelatine layer and swelling the same, a plastic or solid form is obtained, or one may cut or corrode out the light sections singly, and put them together in the successive order and the position of the photographs so as to produce a form, the intermediate spaces of which are filled up with plastic material.

For producing complete solid bodies, for instance, busts by the said

Fig. 1.

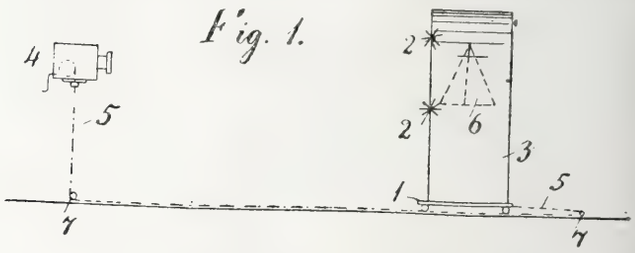
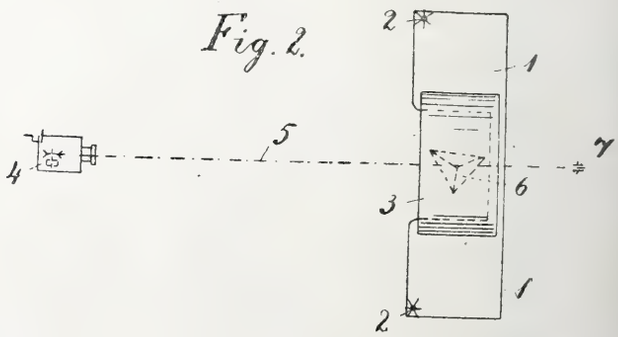


Fig. 2.



process, it is necessary, on using the apparatus according to figs. 1 and 2, to take two series of photographs, one from the front of the model and one from the back of the same and to unite them both, or the apparatus shown in fig. 3 may be used. Fig. 3 is a plan of the apparatus. 8 is the model to be reproduced, round which, on the circular guide rails, 9, a pedestal, 10, or a similar support can move in a circle. On the pedestal are arranged a number of light sources, 11, 11, standing over one another in a vertical plane, and an elastic or linked light screen, 12, is arranged in such a manner that a light section is made on the model, for instance, 13, 14. On both sides of the light sources there are series apparatus, 15, 15, whose distances from the light sources, 11, can be varied at pleasure.

When using the apparatus, the pedestal is turned in any suitable manner, while the series apparatus, which are connected with the wheels of the pedestal by suitable known mechanical transmission devices, simultaneously take photographs of the light sections at certain intervals. The photographic films in the apparatus are parallel to the plane of the light sections, so that the light sections are not per-

spectively shortened, but are reproduced geometrically correct. For models of simple form it is sufficient to use only one series apparatus. If, however, the model has strongly projecting parts or deep hollows, there is used on each side of the light source one or more series apparatus. The light sections obtained are corroded out, cut out, &c. When one has worked simultaneously with two series apparatus, the two film strips obtained are placed one over the other, so that the corresponding pairs of simultaneously exposed light-section takings cover each other and form one light section, and the copies or magnified images of the light sections build up a plastic representation of the model. For this purpose the apparatus shown in elevation (fig. 4) is

Fig. 3.

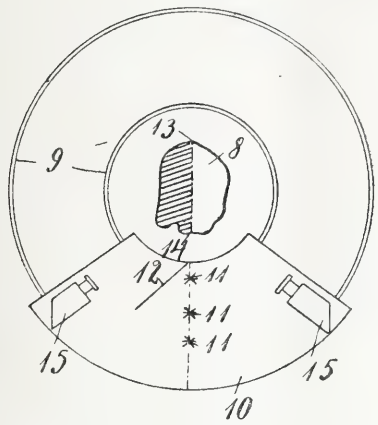
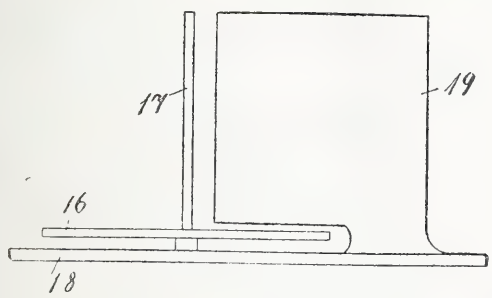


Fig. 4.



preferably used. On a circular rotatable pedestal or platform, 16, is situated a vertical central axis, 17. On the bed plate, 18, is secured a vertical plane, 19, which is directed radially to the disc, 16. The surface of the disc, 16, is preferably divided into degrees, and may be adjusted in any suitable manner. The sheet with the first light section is placed flat against 19 and secured in any suitable manner to the central axle and the pedestal. Then the pedestal is turned round the respective number of degrees, which were situated between the pairs of light sections during the taking of the photograph, and the subsequent light section is secured again by being placed against 17 and 16, &c. Instead of turning the pedestal, the vertical plane, 9, may be turned and the pedestal left stationary. After all the light sections are united, the intermediate spaces are filled up with plastic material and a solid representation of the model or object is thus produced.

Our Editorial Table.

THE AMERICAN ANNUAL OF PHOTOGRAPHY FOR 1899.

Edited by W. E. WOODBURY. New York: the Scovill & Adams Company. London: Dawbarn & Ward, 6, Farringdon-avenue, E.C.

THE three hundred illustrations which this finely produced book contains are not by any means solely representative of American work, but include examples by Demachy, Harold Baker, P. Martin, Inston, Bushby, Hankins, Seymour Conway, Dr. Llewellyn Morgan, and many other European photographers. As an example of good printing and high illustrative beauty, the *American Annual* deserves the very greatest praise. The formulæ, tabular matter, and contributed articles are as useful and varied as hitherto, and all concerned in the production of the book deserve the heartiest congratulations.

THE BIRTAC.

Northern Photographic Works, Barnet.

IN the little pamphlet before us there is given a brief and lucid description of how to use the Birtac, the compact and ingenious instrument designed by Mr. Birt Acres for placing the taking and exhibition of animated photographs easily within the reach of amateurs and others. The method of making the negatives is first of all dealt with, developing and printing being next discussed, and the third section of the instructions tells how the Birtac is adapted for projection purposes, and how a successful display of animated photographs may be safely conducted. Prices and details of the apparatus, films, and accessories are included in the booklet, which we advise all interested in this fascinating branch of work to procure. The simplicity and inexpensiveness of the Birtac should have a very large influence in making practical animatography popular among photographers.

MALONI'S Patents, Ayr, N.B., send us an admirably printed little book containing many reproductions of photographs taken with the Maloni flashlight apparatus. The photographs—groups, portraits, and interiors—are remarkably good. The apparatus could not desire a better testimonial than the fine quality of the results that are produced by its use.

News and Notes.

THE cult of the "poster" is to receive a fresh impetus at Bushey, where a novel idea for a fancy dress ball has been conceived. Each guest is expected to represent one or another well-known poster, of which there are enough by this time to supply a considerable company with models. The idea has so pleased Professor Herkomer that he has lent his big studio for the dance, and is taking a practical interest in the arrangements.

MR. EZRA CLOUGH, Hon. Secretary Yorkshire Exhibition, writes: "You will be pleased to hear that 63,436 persons have passed the turnstiles since the day of opening up to, and including, this evening, December 26. To-day's attendance numbers 6757. The number of pictures sold is forty-four, amounting in value to 65*l*. We have issued a second edition of the catalogue, and will be pleased to send a copy of the illustrated catalogue post-free fivepence."

PRACTICALLY the whole of the world's supply of platinum comes from Russia. Nearly all the important mines have passed into the hands of foreigners. According to a St. Petersburg newspaper, there is a group of mines concentrated in the Verkhotursk district of the government of Perm, numbering about seventy, of which forty are being worked. In the course of last year several of these passed into the hands of foreigners, including a Paris syndicate having a capital of several million francs, and five out of the existing seven great platinum enterprises in the Urals are now reported to have been purchased by foreigners. There is said to be really no demand in Russia for the metal, and when Russians owned the mines they exported the ore in the rough state to be treated in Germany and other countries.

AN exciting incident happened on Monday evening at the Brighton Empire Theatre of Varieties. One of the items in the programme was a cinematograph exhibition of pictures, which was introduced, when the performance had been in progress for about three quarters of an hour, before an audience that crowded the house in every part. By some means the apparatus, which was erected in a gallery, caught fire, and in a few moments the theatre was filled with smoke. Some of the audience hastily left the place, but the majority remained in their seats. A fireman posted on duty within a few feet of the apparatus immediately got to work with a reel fitted on the spot by Superintendent Lacroix, of the Police Fire Brigade, and by this means the fire was extinguished within a few moments. The appearance on the stage of Superintendent Lacroix and the secretary to the Empire was greeted with loud cheers, and, the composure of the audience being perfectly restored, the performance was soon resumed.

A SOCIETY FOR REDHILL AND DISTRICT.—A well-attended meeting, to promote the formation of a Photographic Society, embracing all phases of the art, was held at the residence of Mr. Francis H. Ellwood, Granville House, Station-road, on Saturday, December 17. Dr. S. F. Dufton was elected Chairman, and Mr. Ellwood was asked to act as Secretary *pro tem.* Several speakers dilated on the unique position of this charming neighbourhood, and the probabilities of establishing a very strong Club, and, on his being called upon by the Chairman to do so, Mr. Ellwood disclosed the result of a circular letter sent out by him. He said that he had met with more encouragement than his most sanguine hopes led him to expect, and from the replies he had received there now seemed little doubt of success. Mr. Ralph W. Robinson had most kindly promised to give two or three evenings to the Club, and a similar promise has also been made by Mr. William Brooks. On a motion being put by the Chairman, the meeting resolved itself into the Redhill and District Camera Club. The subscription is 10*s.* 6*d.* per annum, and founders (first twenty-five members) are admitted without entrance fee, but this number is already almost complete. After enrolment of twenty-five, an entrance fee of 5*s.* will be made, and, after fifty, 10*s.* 6*d.* The following officers were then elected:—*President:* Mr. Samuel F. Dufton, M.A., D.Sc.—*Vice-Presidents:* Messrs. William Brooks, William T. Burgess, F.I.C., F.C.S., Frederick Izant, Ralph W. Robinson, and John Sterry.—*Committee:* Messrs. Francis M. Duncan, W. H. Fowler, E. H. Holder, T. Percival Padwick, Clement C.

Robinson, and W. Rowlinson.—*Hon. Lanternist:* Mr. E. S. Gedge.—*Hon. Treasurer:* Mr. Henry J. Blackler, M.B.—*Hon. Secretary:* Mr. Francis H. Ellwood. The Committee were requested to draft rules and submit them to the next meeting in January.

THE BOROUGH POLYTECHNIC EXHIBITION.—The Fourth Annual Exhibition of this Society was opened on the 27th inst. Casting back as well as one can, we have no hesitation in congratulating the members on the improvement in the quality of the prints exhibited by them this year, but would suggest that a little closer attention to the technique of slide-making would considerably improve their slides. The Open Classes were, this year, much stronger than last. The Judges, Messrs. John A. Hodges and E. J. Wall, made the following awards:—Class A, Land and Sea Scapes, silver medal: *Sunlight and Shade*, F. W. Bannister; silver medallions: *Hillside Pastures*, R. R. Rawkins; *The Homestead*, S. H. Kemble. Class B, Architecture, silver medal: The *Retro-choir, Winchester*, S. H. Kemble; silver medallions: *Interior St. Bartholomew's*, A. Bedding; *Gargoyles*, E. J. Hoar. Class C, Flower and Animal Studies, silver medal: *Sea Holly*, L. E. Cotterell; silver medallion: *Head of a Horse*, R. R. Rawkins. Class D. Hand Camera, silver medal: *Expectation*, F. W. Bannister; silver medallion: *Marbles*, H. C. Philcox. Class E, Figure Studies, silver medal: *Turned Eighty*, S. H. Kemble. Class F, Lantern Slides, silver medal: *Marguerites*, R. R. Rawkins; silver medallion: *Architecture*, E. J. Hoar and H. J. Blane. Class G, Open, silver medal: *Mary*, Brooks Thornly; silver medallions: *An Autumn Morning*, H. C. Leat; *Autumn in the Woods*, E. H. Lamb. Class H, Champion; gold medallions: *Head Study*, Prie Macdonald, and *Nancy*, John Stuart. Class I, Lantern Slides, Open, silver medal, *Sunshine and Shadow*, J. Kearney; silver medallions: *Double Cherry*, F. H. Malby. Class K, Lantern Slides, Champion, silver medal: *Capital*, E. Marriage; silver medallion: *Architecture*, E. R. Bull. For the best picture in the Members' Class the silver medal was awarded to F. W. Bannister.

Patent News.

THE following applications for Patents were made between December 12 and December 17, 1898:—

CINEMATOGRAPHS.—No. 26,195. "Improvements in Cinematographic Apparatus and Pictures." J. E. THORNTON.

CINEMATOGRAPHS.—No. 26,196. "Improvements in Cinematographic Pictures and in the Apparatus for Photographing and Exhibiting same." J. E. THORNTON.

EXPOSURE METERS.—No. 26,281. "Improvements in Method and Instruments for Calculating Photographic Exposures." A. WATKINS.

"PHOTOGRAPHIC OPERATIONS."—No. 26,435. "An Improved Method of Conducting certain Photographic Operations and Apparatus applicable therefor." C. RALEIGH.

CINEMATOGRAPHS.—No. 26,471. "Improved Arrangement of Cinematograph Apparatus for Displaying Pictures on Screens." V. CRESCENZI.

PRINTING FRAMES.—No. 26,565. "Improvements in Photographic Printing Frames." Communicated by M. Deloye. G. C. MARKS.

TRANSPARENCY.—No. 26,509. "A New or Improved Form of Lantern Slide or Transparency." C. F. TOWNSEND.

EXPOSURE.—No. 26,704. "Improved Means for Regulating the Duration of Exposure in connexion with Pneumatically Operated Photographic Cameras." Complete specification. H. RÖHRICH and L. SCHARRELMANN.

CINEMATOGRAPHS.—No. 26,722. "Improvements in Apparatus for taking Photographic Views in Rapid Succession and for Presenting the same in like manner." C. RALEIGH.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

January.	Name of Society.	Subject.
2	Bradford Photo. Society	Lantern-slide Contributions to the Yorkshire Exhibition.
2	South London	Lantern Evening: Slides by Affiliated Societies.
3	Gospel Oak	Exhibition of Prize Slides.
3	Hackney	Members' Lantern Evening.
3	Rotherham	*Practical Notes on Outdoor Work with the Camera.* Rev. A. H. Blake, M.A.
4	Bradford Photo. Society	Ladies' and Children's Night.
4	Brentford	Social Evening.
4	Southsea	*Exposure and Development.* Royal Photographic Society Lecture.
4	Woodford	*Some Practical Hints for Photographers in Pictorial Composition.* Mr. Ashby.
5	Camera Club	*Kromskop Lantern Illustrations: An Amateur's Essays in Three-colour Photography.* Saville Kent.
5	Leeds Photo. Society	Annual Dinner.—Paper by W. E. Tindall, R.B.A.
5	Leigh	Members' Lantern Evening.
6	Croydon Microscopical	Lantern Slides: *A Trip on a Norfolk River.*
6	Oldham	Annual *Soirée.*
6	West London	*On Toning Bromide Prints.* Jas. Brown.

ROYAL PHOTOGRAPHIC SOCIETY.

DECEMBER 20,—Photo-mechanical Meeting,—Mr. Thomas Bolas, F.I.C., F.C.S., in the chair.

ON SOME COLLOID PRINTING METHODS.

Mr. E. SANGER SHEPHERD read a paper with the above title, in which he called attention to three matters in connexion with colloid printing methods with which he had lately been experimenting, and dealing first with formulæ for the fish glue or enamelline process. He believed this method was started first in Messrs. Crosscup & West's photo-engraving establishment in the United States, the formula originally comprising only fish glue and bichromate of ammonium. At that time the negatives, which were made by Mr. F. E. Ives, were on wet collodion plates, and their distinguishing characteristic was that the whole of the print was in the negative, they could all be printed and etched for the same time, and they were absolute black and-white negatives. The fish glue and bichromate of ammonium, however, was very sensitive to an extra dash of water, and a little carelessness in washing out the plate resulted in some of the fine dots being carried away, and to prevent this the formula was modified by the addition of a slight percentage of chromic acid. After a little time the fish-glue process leaked out, and many workers experimented with it, but they were unable to secure negatives of the same character as those of Mr. Ives, and to meet their requirements many adopted a formula consisting of albumen, 2 ounces; fish glue, 2 ounces; and bichromate of ammonium, 60 to 160 grammes, which worked very well, the albumen holding the fine dots and allowing the use of a considerable spray of water in washing out. A great many other formulæ had since been published, some of them of an unnecessarily complicated nature; and Mr. Shepherd expressed the opinion that, if the necessities of the process were considered, very simple solutions would be accepted. By the addition of an inert powder to the fish glue and bichromate it was possible to get a half-tone picture on the copper plate, and he had used tube water colours successfully in this way. When printing by electric light, the addition of a little erythrosine greatly reduced the time required for printing. The next point to which preference was made related to the preparation of three-colour lantern slides, and to a modification of the method of printing on gelatine tissue and transferring to glass. If a lantern plate was fixed without exposure, a film of transparent gelatine was produced; if the plate was then treated with a solution of ferric chloride, dried, and soaked in formic aldehyde 1 ounce, and water 30 ounces, the film was rendered sensitive to light. The plate could then be printed from the front, and washed out in warm water, and the necessity for transferring was thus obviated. Proceeding to his third item, Mr. Shepherd said that, in using Mr. Warnerke's tissue for three-colour work, he had found it absolutely necessary to have a fine substratum, and he had experimented upon an idea which he thought was mentioned some years ago by Mr. Edwin Banks, consisting in the use of inverted albumen. The method he recommended was as follows: Mix 4 ounces of albumen, ½ ounce of water, and 30 minims of acetic acid, and well stir. In half an hour the solution becomes fluid. Then strain through swansdown calico, and to the resulting clear liquid add, drop by drop, a solution of sodium hydrate (30 grains to the ounce) with constant stirring. When about half an ounce has been added, the albumen will begin to thicken, and, if left for a short time, it will set to a solid jelly, which must be squeegeed through coarse canvas and washed for several hours to remove the sodium hydrate. The final product is solid at normal temperatures, but is freely soluble in warm water or warm alcohol, and when so dissolved may be flowed over a glass plate, forming a very adhesive substratum, which is unaffected by acids. A perfect resist for collotype plates could be made by taking 1 ounce of the inverted albumen, 1 ounce of water, and 10 grains of silicate of soda.

The CHAIRMAN thought the use of inverted albumen as a substratum would prove very useful, the structure of the albumen being entirely destroyed.

Mr. SANGER SHEPHERD, replying to a question, said bichromate of ammonium was used in preference to the potash salt, because a stronger solution of the former could be employed without risk of crystallising out on the tissue. He used 60 grains of bichromate to 5 ounces of solution, and in a moist climate he would use the smallest proportion that would give insolubility on exposure.

AMINES AS ACCELERATORS.

Colonel J. WATERHOUSE, I.S.C., read "A Note on a New Accelerating Agent for Alkaline Dry-plate Developers," in which he described the results of experiments with amines, especially dipropylamine. He said that it occurred to him some years ago that certain of the amines might be usefully employed in place of ammonia, and that the recent publication of a paper by Messrs. Lumière and Seyewitz had caused him to take up the subject, which he had done with fairly satisfactory results. With a solution of pyrogallic acid, 1 part; sulphite of soda, 5 parts; with water to 100 parts, to which were added 2 to 3 parts of dipropylamine, strong, well-exposed negatives, with a slightly yellow colour, were produced with short exposures. Using Lumière's pyro-sulphite solution, and adding dipropylamine in place of acetone, in the proportion of 1·75 per cent., the negatives obtained with about the same exposures were thinner and not so yellow. With hydroquinone and dipropylamine good dense negatives were secured, plates exposed under identical conditions and developed with an ordinary pyro-soda developer appearing very much under-exposed. Experiments with process plates, while demonstrating the fact that the quality of the plate was of some consequence in estimating the value of developers, appeared to show that dipropylamine could be usefully employed for process negatives with hydroquinone. Plates of various kinds, developed with metol and carbonate of potash, and metol and dipropylamine, gave results almost exactly similar, with no signs of pink fog, the solutions remaining quite colourless after being used for several plates. With pyrocatechin the results were less satisfactory than with metol, in some cases the denser image being obtained with carbonate of potash, and in others with dipropylamine; but there was no pink fog, even when the plate was forced and an excess of dipropylamine added. Trimethylamine, with pyro or hydroquinone, gave very fair negatives, but all the plates tried showed dichroic fog; it was

possible, however, that pure trimethylamine would be free from this defect. Diamylamine caused streaks and markings on the plates, and was consequently useless. Colonel Waterhouse showed many negatives to illustrate the action of the amines in combination with different developing agents, and concluded by expressing the opinion that Messrs. Lumière and Seyewitz had rendered a great service in bringing these substances to notice, and that he had translated their paper, and proposed to publish it in full in the Society's *Journal*.

The Rev. F. C. LAMBERT asked what quantity of dipropylamine per ounce of developer Colonel Waterhouse considered to be the best working proportion.

Colonel WATERHOUSE said he used a very strong solution, 10 minims of which was a fair average to each ounce of developer. The price was about 4*s.* per ounce, but the developer could be used for several plates. A strong developer gave great clearness and density on a process plate.

Mr. TOWNSEND suggested that the benzine derivatives might be tried; but Colonel WATERHOUSE said the aromatic amines did not act.

The proceedings then closed with the passing of votes of thanks to Colonel Waterhouse and Mr. Sanger Shepherd.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 22,—Mr. J. S. Teape in the chair.

Mr. T. E. Freshwater brought forward for examination one of the Ives multiple backs for the photo-chromoscope. It may be adapted to any camera, that shown being fitted for use with a 7½×5 apparatus. It consists of a wooden frame attached to a flange, which slides in the grooves provided for the ordinary dark slide, and has an opening into the camera corresponding in size to that of the standard chromograph, viz., about lantern-plate size. Focussing of the image is done upon a ground-glass screen, which is altogether removable, and in its place are introduced, nearest the lens, a frame containing red, green, and violet-blue screens, side by side, backed by a double plate-holder carrying a plate of the length of the three colour screens. Having focussed and placed the multiple back in such a position that it brings one of the colour screens opposite the aperture in the flange and with it a part of the sensitive plate, the shutter is withdrawn, and the exposure for that particular colour made. The screens and plate are then shifted on the distance marked by a brass gauge, a second exposure made for the next colour on the middle section of the plate, and finally a third exposure, upon the last section through the third colour screen. Three separate exposures are made for the three colour negatives, the ratio being, for the blue one, for the green seven, for the red eight. The cost of the multiple back, with the necessary colour filters—namely, 4*l.* 10*s.*—is not so excessive as it at first appears, when one considers the fact that each of the colour filters has to be spectroscopically tested to ensure its cutting out exactly what is desired of it, no less and no more. These screens are said to be made of stained collodion, two of each colour being cemented together with Canada balsam in a manner to adjust any slight variation of thickness of film liable to be caused in coating the glass plates.

Mr. PHILIP EVERITT showed two 7½×5 negatives, the work of the Steinheil orthostigmats of six inches and four and three-quarter inches respectively. Both were working at an aperture of 6·8, and he thought it would be conceded that the definition and flatness of field were remarkably fine. In the case of the second lens, some ground-glass patterns upon the windows of some houses which served the purposes of the test were plainly rendered. The covering power of the lenses also was well exemplified.

There was some discussion upon a question asked concerning the determination of the chemical focus of a telescope, in view of photographic work upon the forthcoming eclipse of the moon. It was pointed out that the chemical and visual foci were not proportional at all, nor did it always follow that there was a chemical focus. The only course was by trial and error, but Mr. PARFITT suggested that a better course would be to use a photographic lens of long focus.

PHOTOGRAPHIC CLUB.

DECEMBER 21,—Mr. A. E. Staley in the chair.

Mr. H. Snowden Ward introduced to the meeting the representative of Messrs. Riley Brothers, of Bradford, who was present in order to demonstrate

THE NEW RILFORD OXYGEN GENERATOR

in action. The apparatus is a modification of well-known methods of producing oxygen for lantern work, the gas being generated by means of heat from cartridges of chlorate of potash and oxide of manganese. The retort is a long metal tube placed horizontally, and with a diameter of some two inches. The cartridges are supported in this retort in a manner to ensure the free circulation of the generated gas, and are regularly spaced, eight being required to fully charge the retort. To one end of the retort is fixed a rubber tube, connected with a wash bottle beneath, for the cleansing of the gas, which in turn is connected with the receiver, and from which another tube proceeds to the lantern jet. The gas is generated by a spirit lamp, which, at the commencement, is placed at the end of the retort farthest from the outlet, immediately below the first of the cartridges. The gas soon begins to come off, and, passing through the wash bottle, enters the receiver, which it proceeds to fill. The upper and lower parts of the receiver are connected by a flexible gas-proof bag, leaving the upper part free to rise as the gas accumulates, and which it will do, until, reaching its extreme, it actuates a safety valve, allowing the gas to blow off into the open air and disperse. This would not be likely to occur when using the gas in the lantern, but the provision is made in case of any suspension in the consumption of the gas while it was still being generated. In the event of the consumption of gas being such as to exhaust the receiver, the upper portion would slowly sink. Advantage is taken of this sinking and rising of the receiver to control the generation of the gas. The spirit lamp referred to above is connected with a ratchet contrivance, to which is attached a form of lever placed so as to be influenced by the top of the receiver in its rising and falling. Should the receiver sink, the lever returns to its normal position by means of a spring, shifting the lamp the space of one cartridge, and bringing it under a fresh charge. By the time the receiver was approaching exhaustion, the gas would be generating from the second cartridge, and so, automatically, the apparatus feeds itself according to the demand. Eight cartridges are equal, as a rule, to an hour and a quarter to an hour and a half's supply, and in the case of a protracted run, the retort may be recharged without any interferenee with the display, as the gas already in the receiver would suffice until the new charges were giving off their gas. In the event of using more gas than the automatic device could supply, the demand could be met by shifting along the spirit lamp by hand. On the occasion oi the demonstration, the gas was used in conjunction with the Lawson ether saturator, and the pressure was obtained by using a twenty-eight pound weight upon the receiver. A pound of the cartridges costs 1*s.*, and will last at least an hour. The light obtained was voted exceedingly good, a disc of about nine feet being illuminated with a fine white light.

Mr. Welford provided a selection of Mr. Fraser's slides for test purposes—night scenes in New York and excellent flower studies—which latter, until he took up night photography, were Mr. Fraser's pet subjects.

The HON. SECRETARY, in the absence of the author, read a paper on the

PREPARATION OF NEGATIVES FOR PRINTING,

by Mr. E. Dunmore (see page 837).

A short discussion ensued, and a vote of thanks was passed to Mr. Dunmore.

Croydon Camera Club.—There was a large attendance at the meeting on Wednesday, the 21st inst., which was given over to illustrating various ways of developing a negative. The PRESIDENT opened proceedings by outlining the accepted theory of development, and explained the functions of the constituents of a representative developer. Mr. ISAAC then demonstrated the procedures in development with pyro soda and with pyro ammonia. The best results were considered to proceed from the former. Mr. L. G. KOUGH next read a short paper setting forth the uses and advantages of rodinal. Two whole-plates, which he subsequently developed, fully bore out his advocacy of the developer in question. Mr. J. T. SANDELL followed by developing a triple-filmed plate with pyro metol. This was done mainly with a view of showing how easy it was, even when dealing with an unknown subject and exposure, to get a good negative on a Sandell plate. Finally, Mr. JOHN SMITH developed a Sandell plate, which had received the same exposure on the same subject as the above, using pyro soda (Imperial formula) and working by the Watkins' system of timing, with four as factor. Mr. Smith produced a splendid negative in six minutes. He also passed round a set of six negatives taken on a Sandell triple-coated plate near Pulborough, which were remarkable for their brilliancy and for their gradation; whilst the foreground was fully developed, hills twenty miles away were not blocked out, and the clouds in the sky easily printed through. Mr. HECTOR MACLEAN also exhibited a large mount containing a number of half-plates taken on Sandell doubles under trying circumstances as to halation, gradation, and exposure time, at the Brighton works. These were considered convincing testimonies to the advantages of the plates in question. The following were announced as being elected members:—Mr. A. W. Pymer, Mr. Inglis, and Mr. Percy C. Mote. A letter from the Y.M.C.A. was read, asking the Club to give a lantern show at the first of the Saturday entertainments. It was decided to accede to the request, the Club's Hon. Lanternist agreeing to attend to the lantern, and the President taking charge of the platform.

North Middlesex Photographic Society.—December 19, Mr. E. R. Mattocks in the chair.—Mr. J. W. Marchant, F.R.P.S., gave a lecture on

PLATINOTYPE PRINTING.

He gave a short history of the process, saying that in a book called *Platinotype*, by Captain Pizzeghelli and Baron H. Hubl, edited by Captain Abney, it appears that Sir John Herschel was the first to discover the effects of light upon a salt of platinum. The lecturer detailed some experiments these gentlemen carried out. These experiments were followed up by other scientists, notably by Döbereiner, Johanssen, Gehlen and Hunt, who, in his *Researches in Light* in 1844, found that a piece of paper, dipped in a solution of platino-cyanide of potassium and hung up in the sun, undergoes a scarcely perceptible change even after a long exposure; but, if the paper after only a short exposure is treated with mercurous nitrate, a weak positive image is produced, which can be fixed by means of a hot dilute solution of carbonate of soda. In 1873 Willis took out his first patent for a platinum printing process. This was as follows: "A solution of a salt of platinum, iridium, as of old, or a mixture of these salts is applied to the surface of paper, wood, or other suitable material, and dried; it is thence, with ferric oxalate or tartrate, again dried and exposed to light under a negative. A faint brown image will appear, which, after being brushed or with a solution of potassium oxalate, turns a strong intense black." The present process differs widely from that of a quarter of a century ago. A brief outline of the process now in use is as follows: A suitable paper is sized with a solution of gelatine, or, preferably arrowroot. It is sensitised with chloro-platinite of potassium, ferric oxalate, and oxalic acid, and a small portion of chlorate of potassium. The lecturer then dwelt upon the many advantages of the process—its simplicity, sensitiveness—and permanence, &c., and passed round prints, some on silk and muslin, kindly supplied by the Platinotype Company.

Plymouth Photographic Society.—December 16.—This, the last meeting for the autumn session, was a Members' Lantern Evening. The number of slides sent in was exceedingly large, and the quality, in some cases, excellent; but some of the exhibitors require a little more experience in slide-making. It was thought that these younger workers should invite and receive criticism on their productions by the older and more experienced hands, of whom there are many in the Society. The technique of Mr. E. C. Turney's series of cathedral exterior and interior studies was of the highest quality, as also were two slides shown by Mr. W. H. Harris, "A flock of Sheep" and "Arrival of the Steamer." Mr. E. H. Micklewood showed a contribution illustrative of his contention that for hand-camera work the focal-plane shutter gives the best

results. Good work was also shown by Messrs. F. E. Bowden, J. Trouern Trend, and many others. Mr. W. C. Johns reminded the members of his remarks at the previous meeting with reference to the showing of lantern slides with a suitable frame around them, and said, that through the kindness of Mr. A. E. Smith, one of the Hon. Secretaries of the Kingston-on-Thames Society, he was in a position to show them some framed slides made by that gentleman, and also explain the methods by which they were made. The slides were projected, and the members were unanimous in the opinion that the pictures were wonderfully improved by having the borders, and that the results looked more finished. Mr. Smith was evidently a very enthusiastic and clever photographer, and Mr. Johns was asked to convey to him the Society's appreciation of his kind and friendly act in lending the slides for exhibition at that meeting. The attendance was very large.

FORTHCOMING EXHIBITIONS.

1898.		
December 30, 31	Borough Polytechnic Society.	H. C. Philcox, 255, South Lambeth-road, S.E.
1899.		
January 25–31.....	Perthshire Society of Natural Science.	C. F. S. Burrows, Hon. Secretary, 16, Princes-street, Perth.
,, 30, 31.....	Southsea Amateur.	F. J. Mortimer, Cornwall House, Ordnance-row, Portsea.
February 4–25.....	Edinburgh Photographic Society.	Hon. Secretary, J. S. McCulloch, 2, George-street, Edinburgh.
,, 13–18.....	Photographic Society of Ireland.	Hon. Secretary, 35, Dawson-street, Dublin.
,, 21–24.....	Hastings and St. Leonards.	Exhibition Secretary, A. Brooker, 21A, Wellington-place, Hastings.
March 4–11	South London.	Hon. Secretary, A. E. Allen, 27, Princes-square, Kennington Cross, S.E.

Correspondence.

"DELETERIOUS ACTION OF DEVELOPERS."

To the EDITORS.

GENTLEMEN,—Your paragraph in a recent issue was particularly interesting to me, because at the time I was suffering from the effects of an indiscreet fingering of a metol developer. It is some time ago since I had a similar experience, but one cannot get far in the development of snap-shot exposures without falling back on metol or metol hydroquinone. My fingers are now practically in *statu quo ante*, but for a period of four or five weeks there was very considerable discomfort—indeed, a peeling off and shedding of cuticle which approached the alarming—and all for, as I think, such a simple cause. I remember the occasion distinctly. When developing a negative with metol hydroquinone (THE BRITISH JOURNAL OF PHOTOGRAPHY formula, and not therefore abnormal as regards carbonate), I had to use a couple of finger tips in place of the camel's hair brush, which ought to have been handy. That was the cause, in spite of a good wash in hot water almost immediately afterwards.

I am inclined to lay the blame on the *metol* combination with carbonates. With no other developer or combination have I ever experienced the same trouble. If I remember rightly the "Beach" developer was particularly rich in carbonates, whereas the complaint referred to, the irritation and tenderness, and so on, came in with metol.

I have been pleased to note a good useful appliance of Mr. Tylar's in the shape of a trough or bath with dippers for stand development. We cannot afford to banish metol altogether, but it is not safe in some hands, that is, to use it without *bath* and *dipper*.

I am sorry I cannot suggest a remedy for the irritation and other painful symptoms. Sulphur ointment (with a little carbolic acid added) gives relief, and during the *peeling* stage the finger ends may be enveloped in court plaister, frequently renewed. Though practically surrounded with medicaments of all sorts, I have not been able to evolve any better treatment than the above, which is, after all, simply palliative, for the disease will take its own course and time.—I am, yours, &c., J. PIKE.

Nottingham, December, 1898.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries, must be addressed to* "THE EDITORS, THE BRITISH JOURNAL OF PHOTOGRAPHY," 24, *Wellington-street, Strand, London, W.C. Inattention to this ensures delay.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 24, *Wellington-street, Strand, London, W.C.*

PHOTOGRAPHS REGISTERED :—

Wm. Andrew, Dalarnan-terrace, Campbeltown.—*Two paintings of designs on cards used for photographic mounts.*

J. Smith, 4, Lansdown, Stroud, Glos.—*Drawing of new church of Saint George's, Nailsworth, Glos., taken from architect's plans.*

RECEIVED.—"PLUSH;" "GOLD AND PLATINUM;" J. E. HUNT, and others. In our next.

T. R. BEAUFORT.—Received. Many thanks.

OSMAR.—M. Nievsky's address is, The Elms, Avenue-road, Hammersmith, W.

HAROLD WOOD.—We have no knowledge of the whereabouts of any prints by that process. Possibly the Secretary, Royal Photographic Society, 12, Hanover-square, W., may help in the matter.

REFLEX.—The camera named is not on the market, so far as we are aware. Cameras on the reflector principle are made by Messrs. Watson, Messrs. Ross, Messrs. Butcher, and other firms, whose advertisements appear in the ALMANAC.

LANTERN.—C. E. BIGGS. You are certainly wrongly advised. With the five-and-a-half inch condenser you will not get more light on the slide; indeed, light will be far less. Do not make any change whatever in that direction.

P. W. BRAMWELL.—We cannot say from personal knowledge whether the gentlemen named are suitable teachers, but believe No. 2 is. There is also a class at the Polytechnic, 309, Regent-street, W., that might be useful for your purpose.

IGNORANT.—1. We take it that your trade card should give particulars of the business you are engaged in. That which you send simply says that you are a photographer, not a dealer in photographic materials. 2. No registration is necessary.

CINEMATOGRAPH.—R. W. The arrangement described is very good and would mitigate danger, but, unfortunately, it does not meet the County Council requirements, and it would not be permitted in any building under its control. The Council's conditions are given on page 949 of the ALMANAC for 1899.

BAD PRINTS.—H. We cannot possibly say where your printers have "gone wrong," but there is no question that the prints enclosed are bad, not to say very bad, if the negatives are good. As you say you are a photographer with large experience, you, if you give some attention in the printing room, will be much better qualified to say where the fault rests than we are by simply seeing a few inferior prints.

LENS.—R. C. S. Although the wide-angle lens you possess will include, with a small stop, the same angle as the anastigmat named, the latter has advantages over the former, inasmuch as the field will be more evenly illuminated. In the older forms of wide-angle lenses, even when used with small stops, there is a great falling off of light at the margins of the picture. This is specially noticeable when copying.

COL. GUBBINS.—Very difficult to decide without actual measurements on the lines of some such system as that described in the JOURNAL for January 21 last. In actual practice we believe there is little to choose between Nos. 1, 2, and 3. Of the other two mentioned, it may be said that they are theoretically equal except in relation to covering power, No. 5 having the advantage in this respect. The best—indeed, the only—advice we can give is to make a choice by actual trial.

INTERIOR.—CURATE. The fault with the interiors, with the Christmas decorations, is that the negatives are very much under-exposed; also that, being taken on unbacked plates, they show a great deal of halation, that, even if the negatives had been correctly timed, would have quite spoilt the pictures. If the decorations are st ll up, better make another essay, using backed plates, and giving four or five times the exposure. No vamping will make the present negative good or even passable.

INDIARUBBER SOLUTION.—C. CLEMENTS. Your difficulty appears, as you have used the best benzole, to be that you have used an unsuitable kind of rubber, possibly vulcanised. We should advise you to purchase a little rubber solution at any of the dealers in indiarubber goods, and then dilute that to the consistence you desire with benzole. You will find that will get you over the trouble. Indiarubber solution is not to be recommended as a photographic mountant, from the fact that the rubber is liable to become resinised and thus lose its adhesiveness, when the prints will peel off. But for that, it would be one of the best of mountants.

FINISHED BROMIDE ENLARGEMENTS.—BROMIDE. The enlargements show that a large amount of time has been expended upon them. As you ask us to give a candid opinion upon them, we must say that they leave much to be desired. A great deal of work has been put where it was not required and where it does not tell, while more important parts have been neglected. One of the great faults is that the pictures are too hard—too great contrasts between the highest lights and the deepest shadows without well-balanced middle tints. The finishing would do very well for process workers for reproduction. The pictures have been sent on as directed.

INVISIBLE INK writes: "I shall be glad if you will kindly inform me how to make invisible ink to become visible by the aid of water or colourless chemicals."—Invisible inks are in no way connected with photography, and do not call for a reply in this column, which is confined entirely to matters photographic. We may, however, tell our correspondent that receipts for invisible inks are given in most books on conjuring. Invisible or "magic photographs" may be produced by printing from a negative, then fixing (without toning), washing, and then bleaching the image in a solution of bichloride of mercury. The image can then be made to reappear by treating it with hyposulphite of soda. Of course, if a chlorised paper be written upon with a quill pen charged with nitrate of silver, then exposed to light, and afterwards treated as above, the writing will reappear.

MONTHLY SUPPLEMENT

[To the "British Journal of Photography."] [*January 7, 1898*

THE LANTERN RECORD.

CONTENTS.

	Page
ANTERN NOTES AND NEWS	1
ANTERN MEMS. By G. R. BAKER	2
OLOUR PHOTOGRAPHY. By PROF. GABRIEL LIPPMANN	2
OLOUR PHOTOGRAPHY. By F. E. IVES	4
A PLEA FOR THE OIL LAMP. By T. N. ARMSTRONG	7
PORTRAITS BY FLASHLIGHT—SOME PRACTICAL NOTES	7
AN IMPROVED CAMERA OBSCURA	8

LANTERN NOTES AND NEWS.

THE Rev. J. M. Bacon, one of the members of the British Astronomical Association, who has gone to India to observe the eclipse of the sun, takes with him a cinematograph camera, which will produce five or six photographs a second. His instrument, if only it works satisfactorily, will give the most complete series of simulacra ever produced of the corona surrounding the sun.

* * * * *

WE are threatened with free cinematograph exhibitions in the streets. These will not be entirely disconnected with the taking of pills and the declaring that they are worth a guinea a box, and some references may be expected to the possibility of putting an ox into a tea-cup, and the operation of turning a dark-coloured gentleman into a white man with a single cake of soap may, perchance, also be seen. After this we may expect cinematographic entertainments at the music-halls to hang fire.

* * * * *

AT the Jeffersonian Laboratory, Harvard, Professor Trowbridge has a machine for working with the X rays which gives a spark four feet long. The voltage is over a million, and there are 10,000 cells and sixty condensers.

* * * * *

ARRANGEMENTS are now being made for disposing of the English patent rights of a new patent gas, which, it is believed, will supersede acetylene on the grounds of freedom from danger of explosion, economy in cost of production, simplicity of the apparatus necessary for generating the gas, avoidance of the water getting heated, and choking of the burners, and its adaptability for use as a motive power.

* * * * *

A NEW light-house is to be provided, with a light of 30,000,000 candle power, says the *Shipping World*. Light, adds our contemporary, is but a mere exhibition to our sense of sight of a physical fact, just as a musical tone conveys to us the idea of sound, and to the unaided human eye the power of 30,000,000 candles would convey no more meaning than would a power of 30,000 candles; in fact, looked at simply as sources of light, it would require a trained eye to form any comparison between the two. But the averred production of so enormous an arc serves to show that the finite in light is unattainable; there are lights at the dark end of the spectrum of which as yet we know nothing, notwithstanding our knowledge of the X and the other rays, and to-morrow this so-called 30,000,000 candle-power light may have its brilliancy surpassed (*en passant*, there are lights claiming over 100,000,000 candle power). To descend to facts, what does the production of this huge light mean? The scientists tell us that the English standard candle power or light is produced by a sperm candle burning at the rate of 120 grains per hour—a very unsatisfactory starting point, especially when we multiply its palpable liability to error by millions. Thus the Penmarch Point light would mean, were it possible to so produce it, the consumption of 5143 pounds, say, two and a quarter tons of sperm wax per hour. We are, however, told, *inter alia*, that this light is to be produced electrically; and, if the current is to be a continuous one, and the light measured at a considerable angle below the arc, or its horizontal plane, this may account for the evidently grossly exaggerated statement of its power; but, without knowing the type of dynamo, nature and strength of current, whether one or more lamps are to be used, and other electrical details, it is impossible to give accurately the requirements to produce such a light. But a reliable basis for comparison may be found in the fact that the Siemens lamps at the South Foreland were found by Douglas, when measured horizontally, to yield 1254 standard candles per horse power absorbed. Clark, it may further be stated, gives 1000 candle power per horse power absorbed as a general rule. Taking the more favourable figure, which approximates closer to light-house conditions than would Clark's, based, as it is, on the lights being placed at distances apart, and dividing 30,000,000 by 1254, we get, roughly, 24,000 horse power as being necessary to produce such a light.

* * * * *

MR. HOWARD SWAN announces that he has, after a long course of experiment on himself and others, discovered that a certain slow-moving phosphorescence, to be observed with suitable conditions in the dark within the eyeball or nerves of the eye, is sensitive to sound, being then thrown into various movements which are subject to laws, some of which he has determined experimentally. When the sound is a definite word, a tendency is observed for the phosphorescent film to form patterns more or less geometric. The results of the experiments have been shown to various scientific men, and have awakened considerable interest. Mr. Swan has carried out a large number of experiments, and hopes that the results, when reduced to mathematical treatment, will help to open up a vast, and as yet little explored, field of scientific research in correlating nervous force with the vibratory forces of energy.

* * * * *

IN the midst of an entertainment of the sick inmates of the Huddersfield Infirmary on December 29 an incident occurred which might have very easily ended in disaster. It arose out of the vagaries of a cinematograph, which was on the point of exhibiting some interesting pictures. The audience, while waiting with lowered lights for the appearance on the screen of the dazzling

pictures, were considerably startled to see a tongue of flame, nearly two feet in height, dart upwards from the instrument. Fortunately there were no draperies in the immediate proximity, as was the case at the Paris Bazaar, and the flame vanished almost as quickly as it appeared. There were a few terrified shrieks from the female portion of the audience, but the gentlemen present at once reassured them. They impressed upon the audience the necessity for remaining seated, as that would avert all danger. There was no further cause for alarm, and it subsequently transpired that the accident was caused through a leakage of the alum tank. The film became overheated, and brought about the explosion. The cinematograph portion of the entertainment was then abandoned, and dissolving views shown instead.

* * * * *

Brown Slick, in the *Journal of the Photographic Society of India* has the following note on the permanency of lantern slides in India He says: "I believe that there is a good deal in the make of plate used. I have slides made twelve years ago which are as clean as when made. Others of the same age and of later date have lost some of their effect owing to fungus and other markings appearing on them. In going through the whole lot, I find the perfect slides are all by one plate-maker. The reason appears to be that the Indian climate affects the glass support and so harms the film, hence the importance of using the right kind of glass. English glass stands best, but, being rather more coloured than French glass, it is not used by all plate-makers. Collodio-chloride slides used not to stand a single rainy season, but whether they do so now I cannot say. I remember a set of gold medal collodio-chloride slides being sent from England to Calcutta, and after the first rains they were completely spoiled. In some cases the films had left the glass, in others fungus had permeated the films, and further examination showed the roots of the fungus were in the glass. Hence it seems clear that collodio-chloride is not at fault, but the glass support."

LANTERN MEMS.

Philanthropy combined with science is the key-note of the most important announcement as regards the optical and scientific world during the past month. Certainly the will of the late Mr. Alfred Nobel is something that deserves more than a passing comment. To leave sufficient money to secure a sum of ten thousand pounds a year to be devoted in five prizes to science, literature, and peace, is something unique, and the details of the conditions will be read by all learned people throughout the world with special attention, for it is expressly willed that "at the distribution of the prizes no regard is to be paid to any kind of nationality, so that the most worthy competitor may receive the prize, whether he be Scandinavian or not."

* * * * *

Science will benefit as regards natural philosophy to the tune of about 2000*l.* a year as a prize "to devolve on him who has made the most important discovery or invention." Who can say now what this will be? but, with the results of such a development as Baron Röntgen's fresh in our minds and the production of the cinematograph and phonograph, we may be prepared for most wonderful discoveries or inventions, or probably what will count as such, the application of a well-known principle to some useful or beneficial purpose.

* * * * *

It might even fall to the lot of one man to reap, as the reward of his labours, two prizes, for not only have we the science, as exemplified by natural philosophy, but also chemistry and physiology, or even to a third, unless there is some provision to the contrary, for there is a most curious prize offered for "him who has worked most or best for the fraternisation of the nations, and for the abolition or diminution of standing armies, as also for the promotion or propagation of peace."

It may be asked what this latter clause has to do with invention; but, as one of the daily papers suggests, suppose the deceased beneficiaire had in his mind the invention of some machine or explosive that would be so powerful and deadly that it would be simple madness to go to war, then by necessity it must be peace. Literature comes in for a share, and medicine has a chance with physiology. Optical-lantern workers may be fortunate enough to show that something they have accomplished brings them within measurable distance of the goal of the natural philosophy prize.

* * * * *

One would have been glad if the Royal Society of London had been the governing body to which Mr. Nobel's bequests had been intrusted, or at least some of them; but, as it is the Swedish Academy of Science, and two Institutions in Stockholm, it will be understood and accepted that the deceased's intentions will be faithfully carried out.

* * * * *

Colour photography also offers an excellent opportunity for winning this substantial prize, and it is only to be hoped that some of those now working in this direction will be fortunate enough to secure it by completing their present experiments and practical workings before the end of 1898. Whether he is a Britisher, colonial, or foreigner, it is to be hoped that the best man will win, and good luck to him, I say.

* * * * *

The lecture by Professor Lippmann, at the Society of Arts, was a great success, and the reception accorded the lecturer must have been gratifying in the extreme. The attendance, which was large, showed that the exertions of the indefatigable Assistant Secretary, Mr. Child Bayley, had not been fruitless. Several points were elicited, during the discussion that followed the paper, that will, I think, be of interest, and cause a development of the interferential process.

* * * * *

M. Lippmann stated it was possible to make an enlarged picture (negative) by direct process from the small-size one he used, the condition being the same as in the smaller ones, namely, backing the film side of a transparent and finely granulated negative film with mercury. The colours projected from the pictures on the screen by the reflected light from an arc lamp in the lantern were particularly brilliant, and to some of the old hands it was amusing to see a watch (face side round) put in the opaque lantern to show "how it was done." Our old friend the aphengescope has been applied in this instance to probably its greatest scientific use although, before now it has found very useful practical application to surgery and physiology.

G. R. Baker.

COLOUR PHOTOGRAPHY.

[Lecture delivered before the Royal Photographic Society.]

The apparatus is very simple, and differs scarcely in any particular from that which is used for ordinary work. You have simply to take a transparent sensitive film of any kind—you are not bound to any particular substance; you may take, for instance, gelatino-bromide or albumeno-iodide of silver, or any other transparent sensitive film. The film must be transparent and grainless, such as the specimen I show you, quite free from cloudiness or milkiness. You have then to expose it in the camera, taking care that during exposure it is backed by a metallic mirror, which is easily formed by a layer of mercury; you have simply to take a dark slide and make it mercury-tight, lay the plate in the slide, and allow the mercury to flow in from a small reservoir at the back, so that the sensitive film on the glass plate is now backed by mercury, forming a mirror. [Professor Lippmann here showed a dark slide adapted for this purpose, and demonstrated its use; the mercury was contained in a small reservoir attached to the slide, and by means of a piece of rubber tubing, by lifting the reservoir, the mercury could, when required, be made to flow into a cell, of which one side was formed by the sensitive surface and the other by the back of the dark slide, and to flow back to the reservoir after exposure.] When the plate has been exposed in the camera in the ordinary manner for the requisite period, the mercury is allowed to flow back into its reservoir, and the plate can then be removed and treated with pyrogallic acid, amidol,

or any other appropriate developer, and fixed, washed, and dried in the usual manner; while the plate is wet the colours are not visible, but they appear as it gradually becomes dry. You observe, therefore, that, except for these two important details—the mercury mirror and the transparency of the plate—the technique of the process is exactly that of ordinary photography. The first object of which I took a photograph was the spectrum, and I now show you the result; as a physicist I had to take the spectrum, because it is composed of simple colours, and the problem is thus simpler than where composite colours are concerned.

Now, how is it that we see the colour? The photographic operations are the same as in ordinary photography, the result of the operation is the same, a similar deposit of reduced silver is obtained, and the materials of which the image is composed are the same as those in a colourless plate. The difference is that the deposit has acquired such a structure that it decomposes the light by which it is illumined, and sends back to the eye of the observer elements of white light, which together make the natural colours of the object. In the same manner the colourless drops form the rainbow. A soap bubble appears coloured, although consisting of a colourless solution, and mother-of-pearl appears coloured although made of colourless carbonate of lime. It is a phenomenon of interference due to the structure which the deposit has acquired; if you were to use a plate without a mirror, you would get an ordinary negative, but the presence of the mirror changes everything, and this is how it is done: You know that light is made up of vibrations, just as sound is; these vibrations give rise to light waves that rush through the ether and the plate with a velocity of 300,000 kilometres per second; therefore they impress the plate more or less strongly, and thus leave a design of different intensities of the image, but, as they rush through the plate, they leave no record of their own form. And this is what I mean by their own form: Each ray of light of a certain colour has a certain structure, it is made up of waves which have a certain wave-length; you know a wave-length is the distance between the crests of two succeeding waves; red has a comparatively great wave-length, blue has a much smaller one, and the intermediate colours have each a distinct and intermediate length of wave. If you put no mirror, each train of waves rushes through the plate, and wipes off every record of its own form by reason of its velocity; you cannot expect a thing which moves with the velocity of 300,000 kilometres in a second to give a photograph of itself. If you put a mercury mirror behind the plate, then the following phenomena occur: the light is reflected back on itself; the light rushes in with the velocity of light, and rushes out again with the same velocity; the entering and issuing rays interfere, and the effect of the interference is that vibration takes place, but the effects of propagation are stopped, and instead of having propagated waves we get stationary waves, that is, the waves now rise and fall, each in its own place; they pause, therefore, in the interior of the film and impress their form upon it, the largest movement giving the strongest impression, and where the movement is nought the impression is nought. So that you have the form of the vibration impressed in the interior of the film by the photographic process, and the photographic film has really acquired now the structure of the incident rays because they have become stationary and impressed their form upon it. The result is, that if you look through the film you see nothing special, it looks like an ordinary negative; but, if you look at it by reflection, then you see it coloured. And this for the following reason: Suppose at one place the plate has been impressed by red light, the red light has impressed its structure on that part of the plate, and that part of the plate is now able to reflect back to our eyes only the red part of the white rays—only the red element which is a component part of white light, and similarly with every part of the spectrum; it is a mere mechanical adaptation of the form of the deposit to the form of the light vibrations. [Professor Lippmann here showed, by vibrating a length of indiarubber tubing, the difference between propagated waves and stationary waves; he also projected on to a screen the image of a soap bubble, showing the colour reflection from it.]

Now, this is a theory; we want some confirmation of the theory, to show by experiment that the colours we see are really due to interference. There are a good many demonstrations of that; one of them is that you get the colours by any chemical means which give you a fixed photograph, you are not obliged to take a silver salt; you can work, for instance, with bichromate of potash and albumen, or bichromate and gelatine, and get coloured photographs. Moreover, there are a good many experiments which can be made to show that the colours are really due to interference; I will show you only one of these, which is as follows: I have told you already that the colours are not visible while the plate is wet; you must wait until it is dry. If you take the dry picture and make it wet, the colours disappear; if, instead of plunging it into water, you breathe upon it so as to make it somewhat damp, the gelatine swells, and you see the colours gradually change and disappear, and they gradually return as the drying takes place. What is the reason? It is that the gelatine or albumen swells by the action of water, and the interference between the maxima in successive planes is enlarged, and has no longer the value necessary for reflecting a particular element of light; as the drying proceeds the film contracts, and the proper colours gradually return. [A photograph of the spectrum, in colours, was here wetted and projected on to the screen, when no colours were visible; it was then treated with alcohol and again projected, and as the film slowly dried the colours gradually appeared upon the screen.] Another proof of the theory is that the interference colours change with the incidence; if, for instance, you look slantingly at a soap bubble, you will see the red turn successively green and blue, and the same is the case with these photographs which I am about to show you—they must be viewed at the normal incidence; if you look at them slantingly, you see the colours change, the red turning successively to yellow, green, and blue. Moreover, the colours appear only when you look at the photograph in the incidence of regular reflection, that is, you have to let the light fall on the photograph and put your eye in the direction of the regularly reflected ray; if you look from another point, you see only a colourless negative. If the colours were laid on with a brush, you would not get that effect, for you would see the colours in whatever incidence; this is rather a fortunate circumstance, for it makes the touching up with ordinary colours impossible and proves the authenticity of the photograph.

That is the first part of the problem, the part which most interests the physicist, namely, to fix the simple colours of the spectrum; but, of course, we all want to have other colours fixed, the colours of nature. These are composite colours, as you know, all, however complex they seem, of the rays of the spectrum, so that the question is, Will a superposition of simple colours give the same effect as if each simple colour were separated? Here again, as we might expect, the experiment succeeded, and I will show you some results obtained by photographing various kinds of objects. The mathematical theory is somewhat more complicated, and there is not time this evening to attempt to go into it; I will simply say that it is very much akin to the theory of the rendering of composite sound by the phonograph. The theory of the phonograph is very simple if you consider only simple sounds; if you consider composite sounds—the sound of the human voice—the sounds are made up of simple sounds, and they are rendered by the phonograph as perfectly as simple sounds; the theory of that is the same as the theory of the superposition of simple vibrations. I will now simply show you my results, which you will see include every composite colour, and that white is reproduced equally well. It is necessary to use an isochromatic plate, transparent and grainless as before, back it with mercury, expose and develop.

Professor Lippmann then showed, by means of a megascope, a series of photographs produced in the manner which he had described, including stained glass, landscapes, flowers, and portraits from nature. In reply to questions, he made the following further remarks:—

The exposure given in the case of a portrait taken by M. Lumière, and now exhibited, was, I believe, about a minute, and the same period sufficed for a view at Biarritz; in Paris an exposure of from two to three minutes is required for similar subjects. The pictures have been projected for your inspection by means of a megascope, that is, the light is sent from the electric source on to the photograph, and is reflected by the photograph through the projecting lens on to the screen. As colour sensitisers I use cyanine for red, and quinoline red for green, in very small proportions—about one-fiftieth of a milligramme to 100 grammes of emulsion, or one part in 500,000 parts. For twelve years my investigations were impeded on account of the difficulty which I experienced in the preparation of a transparent film; I tried solutions of bromide of potassium and nitrate of silver in water of various strengths, and always got a precipitate, which is not surprising, but I had not thought that if, instead of using pure water, you use water containing gelatine or albumen, you get no precipitate, and by adopting that method I solved the difficulty. I add the colour sensitiser before coating the plates; very good results may be obtained by dipping, but they are not quite so satisfactory. I have tried to reproduce the pictures by printing in contact with another plate, but have not yet succeeded in doing so, although I am quite sure it is possible, the only condition necessary is that the plate shall show complementary colours by transparency, and these can already be made faintly visible. If the film bearing the image were stripped from its glass support and the superficial area enlarged, a new set of colours would be produced, in consequence of the change in the

wave-length; the alteration is analogous to that which occurs when the plate is wetted, but in the opposite direction, the film in that case swelling, whereas, if expanded superficially, it would be reduced in thickness. If the coloured photographs are viewed obliquely, the colours tend to blue rather than to red, a fact which is observed also with regard to soap bubbles, Newton's rings, and all interference phenomena, because the difference of wave between the two rays which interfere is composed, not only of that part of the way which is in the interior of the laminæ, but there is a small exterior way.

When working in sunlight it is advisable to place before the lens a screen to cut off the ultra-violet rays; when projecting the images, a better result is obtained if a piece of black glass is cemented to the back of the plate for the purpose of preventing reflection from the back. There is a certain degree of elasticity in the exposure required, but I think much less than in monochromatic photography; this arises from the fact that we keenly appreciate differences in colour, whereas differences in gradation in monochrome are not so noticeable. If the component parts of any given colour are not in the proper proportion, we get a change in colour; for instance, if there is too much red in what ought to be white, you will see it green, and the eye is very sensitive to that; if you do not expose and develop properly, you have no proportionality between the deposit and the intensity of vibration, and the colour will change. The most suitable thickness of the sensitive film is secured by flowing the gelatine over the plate as with collodion, the film being then about one-twentieth of a millimetre thick, say, as thick as a piece of cigarette paper. A copy or an enlargement in colours could be made from an original by projecting the image in the manner which has been done to-night, a sensitive film backed with mercury being substituted for the screen of white paper which has been used here. For ordinary examination, the plates must be looked at as a Daguerreotype is viewed, and the colours are easily discernible in diffused light. PROFESSOR GABRIEL LIPPMANN.

COLOUR PHOTOGRAPHY.

[Paper read before the Croydon Camera Club.]

THREE genuine and non-secret methods of colour photography have attracted considerable attention.

One is a direct process in the camera, known as the Lippmann process; another is a composite process, in which photography produces a record of colours in three monochrome images—which record is afterwards translated into colour again, either optically or by superposed colour prints. The third method, known as the Joly process, is really a modification of the second method, by which it is sought to obtain the same effect with a single image, which is a kind of mosaic of the three. Besides these methods, which I shall describe and illustrate, others have been announced, which are either secret, or fraudulent, or both, and therefore do not afford material for demonstration.

The Lippmann process, which for a time was more talked about than any other, and of which great things were promised and expected, is based upon the theory that, if the light which forms the image passes through the photographic sensitive film to a perfect mirror, which is in optical contact with it, the reflected light waves, encountering the incident waves, produce the phenomena of interference within the film, the vibrations being neutralised at certain intervals, while at others they are intensified, with the result that the photographic image is made up of strata of silver deposit, separated by clear spaces, the separation of the strata or laminæ everywhere depending upon the wave-lengths of light acting in that part of the film. At the critical angle, that is, the angle at which light is reflected from the surface of a polished black glass plate, such a photograph will reflect light the colour of which depends upon the thickness and separation of the laminæ, as the colours of the soap bubble depend upon the thickness of the soap film. No pigment colour is produced. In practice, a "structureless" film of bromide of silver in gelatine or albumen is used backed with mercury, and very long exposures are given.

In the course of the seven years since the discovery of this method was announced, two or three dozen very striking photographs of landscapes and coloured objects have been produced, but the successes have been so very few and far between that almost every one has given up experiment with it in despair. Most experimenters have found that, even when they succeeded in getting colours, those colours were oftener wrong than right, in photographs of ordinary coloured objects. I have suspected that such success as has been achieved was due in part to special conditions which Professor Lippmann's theory does not take into account, and that a much fuller investigation of the subject would be necessary in order to discover and establish these special conditions; but this is merely a personal opinion, which may not be justified by the facts. At any rate, the results cannot be got with any degree of certainty, and I think they are at best not so true to the originals as results which can readily be obtained by the second method which I shall describe. Nevertheless, whatever its practical value may prove to be, this is, from its very nature, the most interesting of all the methods of colour photography to the physicist.

The general public, however, are more interested in methods calculated to bring home to them a practical realisation of the benefits of colour photography, and this is very well accomplished by one form of the composite method.

In order to understand the various methods of composite colour photography, it is necessary to know certain things about the nature of light and colour.

If I tell you over again some of the things which you already know, you will pardon me, bearing in mind the fact that there may be others present not so well informed. In order to give as concise a definition of light and colour as possible, I once consulted a dictionary, in which I found light defined as "the agent which excites vision," and colour, as "a property inherent in light." Now, every child knows that light excites vision, so that definition is not very luminous. Nor is the definition of colour any better. There are a good many properties inherent in light, and, strictly speaking, colour is *not* one of them.

What, then, is light, and what is colour? Light is not only the agent which produces vision, but it is a form of energy as important as heat and electricity. Not everybody, perhaps, realises that it is a force without which life, even as we know it, could not exist. Vegetable life, the primary source of animal food and therefore of animal life, is dependent upon the power of light to produce chemical change, and our very existence is therefore by virtue of that same power which impresses the camera image upon the sensitive plate. Ordinary white light is a form of energy propagated by a very complex wave motion in the ether, something as sound travels through air, but with a different form of wave, and nearly a million times faster—so fast that many millions of millions of successive waves enter the eye in a single second, yet slow enough to take a lifetime to reach us from some of the stars in the skies.

The highly complex wave motion which constitutes white light can be separated into thousands of distinct and comparatively simple wave motions by the prism, giving rise to the phenomena of colour, and each of these simple wave motions can be split up into still simpler vibrations, and twisted about in the most extraordinary manner, in the polariscope.

Knowledge of the wave structure of light is of great importance to the experimental photographer, because the kind and rate of vibration that produces chemical change in some substances does not affect others, and in some cases the effect of one constituent of a light ray may be neutralised by the opposite effect of another constituent of the same ray.

Only by separating ordinary light into its constituent vibrations, and exposing our sensitive plate to each separate kind, can we arrive at a clear understanding of the possibilities at our command.

We will commence with an analysis of white light by means of the prism. I have in the lantern a metal plate with a narrow slit in it, which would show on the screen as a narrow line of white light were it not for the prism, which separates the different vibrations, as we would open a fan—changing the narrow line of white into a broad ribbon of colours, varying in hue from red, through orange, yellow, green and blue, to violet. It is thus proved that white light is a mixture of different wave motions, which separately produce the phenomena of colour.

We know that in white light most objects show colour. A simple experiment will show the cause of most ordinary colours. If we place a red glass between the source of light and the prism, the prismatic analysis proves that it is red because it absorbs or destroys nearly all of the vibrations in the ether except those which excite the sensation of red in the eye. The sensation of red is excited by the longest ether waves, the slowest vibrations, to which the eye is sensitive. It helps this experiment to project the coloured glass directly upon another part of the screen, so that you can see both the colour of the glass and its analysis by the prism. You see that the red glass and the band left in the spectrum are of the same colour. Similarly, a green glass is green because it transmits only the green rays of the spectrum, and the colours are alike again. But most of the colours in nature are not so pure as these. Bright pink is a mixture of all the spectrum rays except the green or yellow-green—and in this case you will observe that the colour of the glass is not like that of any part of its spectrum. Yellow is also usually a very impure colour, the most brilliant hues consisting of a mixture of all of the spectrum colours except the blue and violet. It is

really surprising that so many people should continue to regard yellow as a primary colour, when such a simple experiment as this proves that the most brilliant yellows may be made up of all of the green, yellow, orange, and red of the spectrum. It is not even necessary to have any of the spectrum yellow present. I have a little block of didymium glass which absorbs most of the spectrum yellow, yet, when we put it over the yellow glass, so that only the red and green gets through, it still appears yellow to the eye.

Although most of the colours in nature are due to specific absorption of some of the constituents of ordinary white light, many objects which ordinarily transmit all of the spectrum as freely as window glass show colours—the most brilliant and beautiful colours conceivable, when spread out in very thin films like the soap bubble, or in the polariscope, in which the vibrations are separated according to their plane, split and twisted, if you please, and the waves made to interfere one with another, so as to suppress some wave-lengths as effectively as it is done by the specific absorptive property of a piece of coloured glass.

The polarisation of light has not been found to directly affect its action upon photographic sensitive plates; but it is of interest as a further illustration of the complexity of the wave motion which constitutes ordinary white light, and as a means of producing some peculiarly gorgeous and beautiful colour displays. I shall therefore devote just a few words to the polariscope.

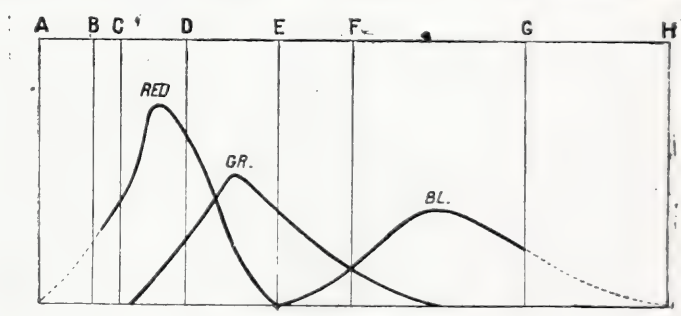
An ordinary light wave, even of monochromatic light, consists of vibrations in every plane along its axis; but, if we pass ordinary light into a crystal of Iceland spar, the vibrations in every plane are resolved into vibrations in two different planes at right angles to each other, and travelling in different directions through the spar. The result is that, although the spar looks like a particularly clear piece of glass, objects appear doubled when seen through it. Now, these separated rays vibrate in different planes, and are therefore said to be polarised. If we cut the spar, and cement it together again in a particular way, only one of these rays will pass through it, and we have a polarising prism. The light waves which go through such a prism, although unchanged to the eye, bear something such a relation to another prism of the same kind as a board does to a picket fence: turned one way, it may be passed between the palings; turned the other way, it strikes against them, and is prevented from passing through. A pair of such prisms constitute a polariscope, in wbich the first prism is called the polariser, and the second the analyser. We have a pair of such prisms in the lantern, and it will be seen that, when they are both turned the same way, the light that comes through the polariser passes freely through the analyser, and illuminates the screen; but, if the analyser is revolved, a point is reached where, although it looks like a piece of clear glass, it will not allow even a trace of the polarised light to pass through it. There are, however, many natural crystals which, either by twisting the plane of vibration or by resolving it into two new and different planes of vibration, will so dispose the light waves that they pass through the analyser even when it is crossed to the polariser. I have a plate of quartz and another of glass, which to the eye are as much alike as two pieces of glass; yet the quartz plate, when placed between the crossed prisms, causes the screen to be instantly illuminated, while the glass has no effect whatever. A very thin film of mica acts like the quartz plate, and a thicker film not only causes the light to pass through, but shows colour, which changes as the mica is twisted about. Some objects, equally colourless to the eye, show symmetrical coloured figures in the polariscope, and others show an extraordinary variety of beautiful and peculiar colours, which change as the analyser is revolved. These are all interference colours. There are other methods of polarising light, and methods of producing interference colours other than by the polariscope; but I have shown enough to sufficiently impress upon your minds the wonderful complexity of the wave motion which constitutes ordinary white light.

We will return now to the spectrum scientists used to divide the spectrum into three parts, which were called heat, light, and actinism, although it was supposed that rays of heat and rays of light were mixed together at the red end of the spectrum, and rays of actinic force and of blue and violet light at the other end. The old and long-standing reproach against monochrome photography, that it rendered light colours, such as yellow, in dark monochrome, and dark colours, such as blue, in light monochrome, was due to the fact that the ordinary iodide, bromide, and chloride of silver plates of the old Daguerreotype and collodion processes are practically insensitive to any but the so-called actinic rays, while the eye is more sensitive to the green, yellow, and red of the spectrum. Although the majority of photographs made to-day have this defect, it is no longer unavoidable, since plates are now produced which are highly sensitive to green, yellow, and red. I have a lantern slide from negatives of the solar spectrum made on such plates, prepared with collodion emulsion, and sensitised for colour by treatment with erythrosine, cyanine, and chlorophyl. These photographs prove that all kinds of visible light have the property of actinism, that is, the power to produce chemical change, but that some chemical combinations are acted upon by the shorter light waves, and others by the longer light waves. Plates are now produced commercially which are so perfectly colour-sensitive that it is only necessary to reduce the action of the blue-violet and ultra-violet by interposing a yellow glass in order to readily obtain substantially correct translation of colour values into monochrome.

We have seen that the spectrum colours change as the wave-length of the light varies; but we now come to a fact of the greatest importance in its bearing upon the subject of composite colour photography. Colour does *not* depend upon wave-length only. If it did, we could not suppress the yellow of the spectrum, as I did with the block of didymium glass a short time ago, and then produce the same colour (visually) by the mixture of the red and green light. It has been proved experimentally that ordinary white light, all the colours of the spectrum, and all the colours in nature, can be imitated by definite mixtures of the deep red, the purest green, and the blue-violet spectrum colours.

The explanation of this is, briefly, that colour is not objective, as was taught by Newton and Brewster, but is a subjective sensation, like hearing, and that for all the varied hues in nature we have only three tests, or fundamental sensations, which, acting together, give us a composite sensation when various spectrum rays are mixed. It is convenient to assume, although the facts may be otherwise, that the three fundamental sensations are due to as many kinds of nerve fibrils in the retina of the eye. On this assumption, the sensation of yellow is produced by exciting two kinds of nerve fibrils at once, the red and the green; and it would evidently make no difference whether this was accomplished by a mixture of red and green light, or by light waves of a length intermediate between the two, as are those of spectrum yellow.

Clerk-Maxwell, who made the first measurements of colour mixtures in accordance with this idea of colour vision, assumed that the pure red rays, the pure green, and the spectrum blue-violet, the colours which can be mixed to reproduce the sensation of all others, excited exclusively the respective colour sensations. By means of a very ingenious optical



Maxwell's Colour Curves.

device, his famous "colour box," he not only reproduced all of the other spectrum colours by mixtures of these, but plotted curves showing exactly what mixture was necessary to reproduce the colour at any point in the spectrum.

Maxwell's Diagram.

It has since been proved that the green of the spectrum does not accurately represent the fundamental green sensation, but that sensation degraded by a considerable admixture of red and a trace of blue-violet. But there is no other means of exciting the green sensation so exclusively in a person of normal colour vision as by exposing the retina to these particular spectrum rays, and Maxwell's colour curves, although not the true sensation curves, meet the requirements of a scientific system of composite colour photography by the combination of three images.

Such a system of composite colour photography, in its simplest form, consists in making three photographs of the objects by mixtures of spectrum colours acting as indicated by the three curves in Maxwell's diagram, and then projecting them upon a screen, each by light of the simple colour which it represents, and superposing and blending the images in accurate register, so as to form a composite image. Each photograph is thus made by the action of a mixture of various spectrum colours in definite proportion, but projected by light of one colour only. All parts of the visible spectrum act in producing the three negatives, as all parts excite vision; but only the pure red, green, and blue-violet rays —the two ends and the middle of the spectrum—are employed in the optical synthesis.

No other procedure can possibly give reproductions of all of the colours without considerable falsification or degradation of hues, and it is this fact which was left for me to point out and demonstrate in 1888—more than a quarter of a century after the first attempts were made to realise a process of composite colour photography.

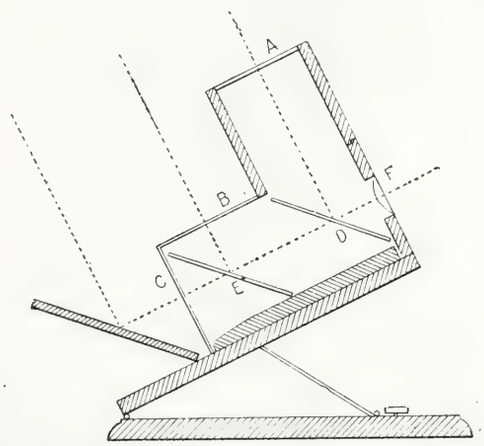
The history of the evolution of the idea, and the working details of the perfected system, have been given in various published papers, and I need not take up your time with such details now, but will proceed with a demonstration of the process by projection, as I first carried it out in 1888, and have already described it to you.

[Mr. Ives then projected upon the screen several colour pictures, showing the coloured images first separately side by side, and then causing them to come together and form a single composite image, from which the crude "primary" colours vanished, as if by magic, and were replaced by the infinite variety of colours of the objects.]

The process as described is complicated and round-about, and of limited application. The application of the principle has been considerably extended, and the practice simplified, by the employment of specially devised cameras for making the colour records, and a small table instrument, the photo-chromoscope, or kromskop, for viewing them in colours. The photo-chromoscope is, in fact, the most important of all the means for carrying out this principle, because it can be used at all times, at a minute's notice, with daylight or gaslight, like the old-fashioned stereoscope, and is therefore competent to bring home to everybody the practical realisation of photographic reproductions in natural colours.

This instrument consists of a case with five pieces of coloured glass, a reflector and eyelenses, which are so disposed as to blend the images, either single or stereoscopic, and focus them upon the retina.

The construction and operation of the photo-chromoscope may be readily shown by reference to a diagram. A, B, and C are red, blue, and green glasses,



against which the corresponding images of the colour record are placed when the instrument is in use. D, and E are transparent reflectors of coloured glass. F represents the eyelenses for magnifying the image. Beyond C is a reflector for illuminating the images at C, those at A and B being illuminated by direct light from above.

The operation of the photo-chromoscope is as follows: The green images are seen directly, in their position at C, through the transparent glasses, D and E. The blue images are seen by reflection from the surface of the glass, E, which makes them appear to occupy the same position, and in fact to become part of the images at C. In the same way, the red images are seen by reflection from the surface of the glass, D, and also appear to form part of the images at C. And, finally, the eyelenses at F not only magnify, but cause the eyes to blend the two images which constitute the complete stereoscopic pair, as in the ordinary stereoscope. The result is a single image, in solid relief and in the natural colours.

When there is no kromogram in the instrument, the mixture of the three pure colours produces white. Shading either of the glasses produces colour, and it is the function of the kromogram, by the varying density of its images, to make such a mixture of the pure colours as will reproduce all the infinite variety of light, and shade, and colour of the objects photographed.

The photo-chromoscope negative is made on a single photographic plate, at one exposure in a special camera, by which the records of colour are obtained automatically and accurately. The positive record is made by contact printing from the negative, in the usual way; the glass plate is then cut in three and mounted on the special hinged frame, designed to bring the respective pairs of images readily into position in the photo-chromoscope. The kromogram, thus formed, can be changed with great facility and quickly folded up for putting away.

By this means one may have in his own home, and in the space of a small cabinet, the treasures of an art gallery, and scenes and objects of interest from all parts of the world.

It is true that this is not exactly the kind of colour photography that the world has been looking for; it does not produce fixed coloured pictures, which can be framed and hung on the wall, or bound up in a book; but in some respects it is better than such results could be, because the colour records, unlike most coloured pictures, are absolutely permanent, and the image as seen in the photo-chromoscope is perfectly free from the surface reflections and distracting surroundings which prevent mere pictures from being perfectly realistic.

Fixed pictures in colour can be produced by a further extension and complication of the method, employing the same negatives to make three-colour prints, which are mounted in contact between glasses, like a lantern slide, or superposed on paper. In this case, inasmuch as the superposition of colour prints adds shade to shade, instead of light to light, the colours of the prints are complementary to the colours of light used in projection and in the photo-chromoscope. The print from the negative to represent red is cyan blue; the print from the negative to represent green is pink or crimson, and the print from the negative to represent blue-violet is light yellow. Although I have already correctly stated the reason for this, I may make it clearer by an experiment with the triple lantern. When there is no slide in the lantern, and the blending of the three discs makes white, we shall find that placing the positive of the red sensation in the red light produces cyan-blue coloured shades on the screen. It is the function of the shades of the positive to take away red light from the screen, making a cyan-blue picture on a white ground. In producing colour prints we must get the same result on our white paper or against white light by laying down a cyan-blue print from the same negative. In the same way, a positive in the green light makes on the screen a crimson picture on the white ground, and a crimson print must be made from the same negative. For a similar reason, a yellow print must be made from the negative of the blue sensation. The mixture of the projection colours in equal parts makes white, and the superposition of the printing colours in equal parts makes black. Therefore, commencing with a darkened screen, we add light to light, red, green, and blue-violet; but, commencing with the white disc on the screen, or with white paper, we add shade to shade by our positives, cyan-blue, crimson, and yellow.

I have a few such permanent colour prints to show. The process is an interesting one, and might be made of commercial value as a means for producing lantern slides; but it is not to be compared with the preparation of photo-chromoscope colour records—kromograms—for simplicity, cheapness, and reliability.

There is one other application of the principle that is worthy of mention, and that is the so-called Joly process. In this process one parti-coloured screen is employed, which may be described as a linear mosaic of the three separate screens used in the photo-chromoscope system.

Such a screen, made up of stripes of colour, red, green, and blue, alternating with each other, when removed so far from the eye that the lines are not separately perceived, shows no colour, but a uniform grey tint, which may be made to appear white under certain conditions of illumination. Theoretically, a single photographic image, made through a suitable selective parti-coloured screen, and then viewed through another (somewhat different) parti-coloured screen, properly registered, and so far removed from the eye that the stripes of colour are not separately perceived, should reproduce the colours as they are seen in the photo-chromoscope. The process can be carried out with an ordinary camera, and the results seen without a special instrument, which makes one wish that it might be quite successful; but very serious practical difficulties are encountered, and I do think that, as it is carried out in practice, the results make a poor show in comparison with the clean and structureless images of the photo-chromoscope.

There is one other interesting matter in connexion with this subject of composite colour photography, and that is *colour blindness*. About one man in twenty-five (and a smaller proportion of women) is more or less colour blind. Red-colour blindness is the most common form, but green blindness and violet blindness are not unknown. The mixture of red, green, and blue-violet light that appears a good white to normal colour vision appears greenish-blue tinted to one who is ever so little red-colour blind, and pink to one who is partly green-colour blind. So certain and definite is this effect, that it forms one of the best and quickest tests of

colour blindness, showing at once its presence even when it is so slight as never to have been suspected as a result of ordinary observation. The slightly red-colour blind find foliage greens in the photo-chromoscope too crude and raw, when a slightly green-colour blind person will be equally positive that they are brown or even magenta coloured.

Special tinted glasses can be made to drop over the eyelenses and make the field appear white, and the colour correct, to partly colour-blind people; but the instrument as ordinarily adjusted, will make the colours appear true to people having normal colour vision. FREDERIC IVES.

A PLEA FOR THE OIL LAMP.

THROUGHOUT the length and breadth of the land, no doubt, very many could be found who have from experience derived no small amount of pleasure from a display of pictures by means of what may justly be termed the *Homely Oil Lamp*.

With the advance of the times and especially with photographers living in large business centres and who have some connexion with photographic societies, the mere mention of a display of slides by means of an oil lamp is calculated to arouse a smile of derision as well as to give rise to such expressions as "obsolete," &c., &c.

The truth is that with many amateur lanternists, the oil lamp has been discarded as a thing of the past, and the lime light in one or other of its several forms has been adopted instead.

It is far from my desire or intention to deride the lime light in any shape or form, for perhaps, when all is considered at the season's close, my experience in lecturing by its means throughout the length and breadth of the land will be found to be as great as that of any other public lecturer, but I must confess that with me the oil lamp has not become an obsolete form of showing pictures by any means, and I continue to use it regularly *within its proper sphere or limits*.

We do not all reside within the reach of house gas or electricity, and there are a great many places and occasions when the lime light, were it introduced, would be in my opinion just as much out of place as an oil lamp would be in a large hall. I refer to such places as small homes in the country farmhouses, &c., where I have no hesitation in saying a lantern display is more appreciated, as a rule, than in the hearts of our busy centres of life.

Neither do I for a moment mean to contend that the manipulation of the homely oil lamp is entirely free from much that is undesirable; but, all being considered, I claim that of the two methods there is far less anxiety and trouble in showing slides by means of a good oil lamp than in the use of the lime light with its attendant requirements in the shape of compressed gas, limes, &c.

I have said that, within its *proper sphere or limits*, the oil lamp need not be looked upon as an obsolete method of lantern projection.

The question, therefore, arises, in the first place, What is the right sphere for the use of an oil lamp, or under what conditions may a good oil radiant be used to do duty for the more pretentious lime lights?

The first consideration, in my opinion, must be the size of the room in which the display has to be given, and in this there is no doubt as to where the oil lamp is useful, provided too much is not expected from it. In making up one's mind to use an oil radiant, I think it may safely be taken as a fixed rule that such should never be attempted to yield a disc that is greater in size than a fourth of the longest part of the room.

This rule holds good likewise in the use of the lime light, and, if attention be given to it, the general effects will be found to be satisfactory, for a small disc in a large hall is quite as much out of place as a large disc in a small room; but, when the proportions of the disc are made to approach a fourth of the length of the room, then a suitable-size picture is obtained that calls for no straining of the sight or other objectionable features.

Taking this proportion of a fourth of the size of the room as a guide to the size of the disc, we are able to form a very fair conclusion as to the limits and capabilities of a good oil lamp.

In many country houses, away from the madding crowd, but few rooms will be found greater in extent than twenty feet, and in many country schools this limit will be found to be very near the mark also.

Now, as any good oil lamp ought to yield a brilliantly lighted disc up to six feet, at least a room of twenty feet dimensions ought not to require a larger disc than five feet, and, if proper precautions be taken to use the oil lamp at its best, a really excellent lantern entertainment can be given without the aid of limelight.

I can look back now over a space of thirty years' experience, and I candidly confess that the greatest pleasure I ever had in lantern lecturing and reading was that derived from the use of two side by side oil lamps, with a finger dissolver in front of the objectives. By this means quite a number of effects, such as falling snow and other dissolving views, were shown to admiring crowds of old and young in country places that no limelight entertainments I ever gave surpassed.

It is not my intention to offer any advice as to which of the many oil lamps now upon the market is the best to employ. A good oil lamp ought not to give off any smoke, nor yield too much heat. Any lamp that will not permit of its being worked without these drawbacks should be discarded.

It must not, however, be thought that a lamp is faulty in these respects when very probably the cause lies in the unskilful manipulation of the same. For a lamp to be kept cool it must have perfect ventilation, and this applies to the lime light as well as the oil lamp. Of late years there was a distinct disposition on the part of lamp-makers to produce the bodies of their lamps of far too small dimensions.

The oil lamp I use personally is adapted for either the lime light, acetylene gas, or the incandescent hydrogen, or oxycalcium, or common paraffin oil, either of which I can use as I feel disposed, according to circumstances. When I received this lamp from the makers, the first thing I did was to improve its ventilation, and in its present form it keeps very cool when being used. It carries a three-wick lamp, which, in my opinion, is the best of all forms in oil radiants. I have tested the candle power of this radiant, and I believe it to be an honest fifty-candle-power light. I am aware there are lamps for which about double this illumination is claimed, but the heat, as a rule, is excessive, and they are more difficult of manipulation.

With a lamp that will yield a good fifty-candle-power light steadily without smoking or any other trouble for a couple of hours on end, much work can be done.

All lamps burning oil require, however, very careful manipulation. The wick channels must be smooth and equal throughout, and this is very frequently found to be a never-dreamt-of cause of the wick yielding tongues of flame that prevent the light being worked at its full capacity.

If a lamp is an old one, and been out of use for some time, or been badly worked, whereby its gauze and other parts are clogged up with dirt and soot, &c., the first thing to be done is to light the boiler fire in the wash-house, and fill the boiler with water, to which must be added a plentiful supply of soda. When the water is boiling, place in the lamp and leave it for half an hour or so. This will do it more good than many imagine. When thoroughly washed and dried, have new wicks ready, and see that they are quite dry and evenly cut.

There is more in the trimming of wicks than many imagine also, and but few are able to accomplish it properly. The best way to do it, I believe, is to use two pieces of zinc, one of which has a perfectly straight edge. Place the end of the wick between the sheets of zinc, and with a very strong sharp knife make *one* clean cut right across, using a fair amount of pressure to hold the wick from moving in the least when the knife is drawn across it. The extreme edges of the wick are then gently paired off with very sharp scissors. When evenly trimmed, cut the three wicks into equal lengths of about eight inches, and insert them, without in any way disturbing the ends that are to be lighted, into the oil chamber. This is not so easily done as many imagine, and several attempts may have to be made before a lamp is well fitted with wicks; but it is just on this that lies one of the crucial points of using successfully an oil lamp.

No doubt, with very many living in large cities, the regular use of oil lamps is unknown. Not so with those living in country places. To such the need of properly trimming an oil lamp is of the first consideration, and it is only by constant practice that any one gets proficient at the job.

To attempt to give a lantern display with a badly fitted or faulty-trimmed lamp will most certainly end in discomfort and failure, but when properly done the pleasure is very great indeed.

T. N. ARMSTRONG.

PORTRAITS BY FLASHLIGHT—SOME PRACTICAL NOTES.

DURING the last year or two the frequent articles in the photographic journals relating to photography by flashlight show the wide and growing interest in that branch of work; but few of them, however, give much practical information as to the best means of getting fine effects. Most of the specimens of such work show rather harsh contrasts, says Mr. T. C. Harris, in the *Photo Beacon*, and such effects as might be expected if the sitter had been posed in direct sunlight. When we consider the quality of the light produced by the flash powder, which is allowed to fall direct on the subject, it could hardly be otherwise.

A practical friend of the writer has given the matter much study and experiment, and his success has been far in advance of anything of the kind I have ever seen. Indeed, he has abandoned the use of daylight and skylight rooms altogether, and does an excellent business, travelling from town to town, making portraits in any convenient room at his hotel or boarding-house. A close examination of his work will show effects precisely similar to that done under the best-arranged skylights, with none of that peculiar and indescribable quality of the ordinary portrait by flashlight.

The special secret of his success is very simple, and may be described as a semi-translucent screen, interposed between the source of light and the sitter. For this purpose he uses a light wooden frame covered with cotton cloth, such as a bleached muslin or a similar material. Ordinary sheeting or shirting is about the proper thing. The location of the flash lamp is above and to one side of the camera, so that the rays of light shall fall on the subject in a way to get the desired effect of light and shade, precisely as one would manage a skylight. The screen, as

described above, is quite near to the lamp, but between it and the sitter, the position of both being fixed and secured to the ceiling by wires.

From the flash lamp, which may be of any pattern giving a strong single flash, depends a rubber tube and bulb, while the shutter in the camera is controlled by a similar tube and bulb, both of which may be operated by the photographer as he stands beside the camera.

When ready for the exposure, a squeeze on one bulb throws the shutter open, which is followed immediately by the flash, and the exposure is done. The screen, interposed between the source of light and the sitter, cuts out all direct rays and diffuses the light and produces a soft effect, without changing the apparent direction or source. The reflection from the walls and ceiling will often serve to soften the shadows, making special reflectors unnecessary. In this respect, however, the operator must use his judgment, as under a skylight.

To intensify the effect, especially if the walls be a dark colour, a semi-circular reflector, also of white cotton goods, is attached to the ceiling, the cloth hanging by its free edge as low as the head of the operator. This reflector may be a strip of muslin, eight or ten yards long and one and a half or two yards wide. It is tacked by one edge to the ceiling, in a horseshoe form, having the position of the sitter as the centre of the arc. The ceiling overhead may also be covered with the same material if it be very dark in colour. The tint of some walls and much of the wall paper in use is so non-actinic as to make this procedure absolutely necessary.

Inside the curved reflector described the lamp and diffusing screen are placed, and much of the light from the flash, which would otherwise be lost, will be thrown forward, making a large charge of powder unnecessary. With such an arrangement, intelligently placed and handled, the finest skylight effects may be produced, at a cost of about two or three cents a shot.

Of course, the smoke or vapour of previous flashes must be removed from the room by free ventilation, or its presence will be made apparent in fogged negatives.

As in other flashlight work, special care must be exercised to prevent any direct rays from the flash lamp entering the lens. A projecting hood of cardboard slipped over the lens tube will serve that purpose.

There are new combinations of carbonaceous substances which, when combined with the ordinary flash powders, increase their efficiency and ease of handling.

AN IMPROVED CAMERA OBSCURA.

The Internationale Automaten Gesellschaft G. m. H. of 14 Alexanderstrasse, Berlin in the Empire of Germay have devised an apparatus similar to a camera obscura, in which the picture of the scene outside is visible to the spectator, looking into the eye piece of the apparatus, as an animated picture in a vertical position.

Fig. 1 shows the apparatus in a perspective view.

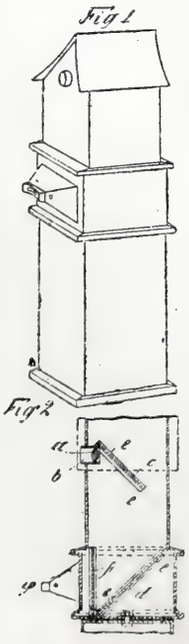


Fig. 2 shows a vertical section as seen from the side of fig 1. As can be seen therefrom, the picture is received by the lens, *a*, which is fixed in an opening, *b*, and projected to the mirror, *c*, lying behind the lens, which mirror is arranged at an angle of 45°. It is reflected thence to a second mirror, *d*, which thus reflects the picture. These mirrors are conveniently fixed in grooves, *e*. Before the mirror, *d*, is fixed a vertical ground-glass plate, *f*, upon which the picture is thrown by the second mirror, *d*, and appears to the spectator through the opening, *g*, as a living picture.

The base part can be constructed in such a manner that the spectator, by turning the upper part of the apparatus, can direct it to any desired point around the horizon.

Bath Photographic Society.—On Wednesday, December 22, 1897, the Society held its second Lantern Evening, when Mr. M. H. Scott read a paper, entitled *From Bath to Stonehenge*. A view of the White Horse, near Westbury, led to some remarks on Alfred and his battles with the Danes, after which the lecturer pointed out the various places of interest *en route*, among them the two churches at Codford, regarding the rectors of which, some fifty years ago, an amusing story was told. A brief but comprehensive account of Salisbury was accompanied by numerous clear and beautiful views of the Cathedral. A view of Old Sarum was then shown, and having given a description of the fortress town, and related how the Cathedral was established in it and afterwards removed to its present position, the lecturer paused for a moment to show the church at Amesbury and refer to its past history, and took his audience to Stonehenge, to which he introduced them by a very beautiful coloured representation of Stonehenge at sunrise. Admitting that antiquaries had not come to anything like a settled decision as to who had erected Stonehenge, or for what purpose, or even what its name meant, Mr. Scott pointed out that the only people likely to have set up such a building were the Phœnicians, who, as sailors and traders, would be anxious to obtain exact astronomical data for their frequently lengthy voyages, and found at Salisbury Plain a place and materials suited to their views and not liable to molestation. He would not attempt, Mr. Scott said, to follow Mr. Story Maskelyne (who lately read a paper on Stonehenge before the Field Club), but he showed that the probable object of Stonehenge was to establish an observatory in the first place, and, in the second place, a consecrated spot, where solemn contracts might be made and ratified, and goods in connexion with them deposited. The sacredness of the place would also conduce to its safety. Such use of a sacred spot is still customary in some of the ports of the Erythræan Sea, whence the Phœnicians originally came. After noticing the settlement of Phœnicians in Ireland, and the connexion between Ireland and Egypt, Mr. Scott read passages from an article by Mr. R. N. Hall (recently published in the *Bath Chronicle*), showing that the Phœnicians had evidently been in Rhodesia, and left monuments resembling Stonehenge there. That Stonehenge, at a later period of its history, had been used as a temple Mr. Scott considered almost certain. Probably the Belgæ, in still later times, finding themselves cut off by their own agreed boundary, the Wansdyke, from Avebury and Bath, established Stonehenge as their *locus consecratus*, near which illustrious dead could be buried. After referring to similar erections, of some of which drawings (made, we understand, by one of his boys) were exhibited on the table, Mr. Scott led his audience by Lake and Heale Houses and through Stratford village back to Salisbury, where a handsome coloured view of the west front of the Cathedral by moonlight terminated the lecture. Mr. Scott acknowledged his indebtedness to Mr. George F. Powell and Mr. Appleby for some very fine slides of Salisbury. The lantern was admirably worked by Mr. Middleton Ashman, to whom the lecturer said he was much indebted for the production of some of his slides.

To the Paris Academy of Sciences, M. C. Matignon recently presented a memoir on the properties of sodium carbide, which, he states, forms a white powder which is not explosive. Heated slightly, it burns in air and leaves sodium carbonate. It far exceeds the calcium carbide in chemical activity.

A foreign journal states that London fog absorbs 11·1 per cent. of the luminous rays from an ordinary gas flame, while 20·8 per cent. of the light from an incandescent mantle are lost in it. This is, of course, due to the fact that the first-mentioned light contains far more red rays than the other, and that fog permits the passage of red rays to the exclusion of the blue is evident from the deep red colour which the sun assumes when seen through mist.

A beautiful lunar rainbow was visible at Blackburn one night last week. The sky had cleared suddenly of drifting clouds at the time, and, the quarter-moon shining brilliantly, the concentric bands of colours remained visible for the space of four or five minutes.

The Prismatic Camera.—The prismatic camera, as used during eclipses, is simply an ordinary camera (with a lens of from two inches' aperture and upwards), in front of which is placed one or more prisms, so that, instead of photographing the sun directly, the light has first to pass through the prism, which differentiates the composite light of corona, prominences, and chromosphere into the many monochromatic images of which it is composed; and, if sufficient dispersion be used, these are so separated as not to interfere with each other, but are perfectly distinct. The advantages of using this slitless spectroscope over one with a slit during a total eclipse is self-evident, for by it all the phenomena round the dark moon can be analysed at once with a maximum aperture, whilst in the case of an ordinary spectroscope only the small portion which the slit crosses can be brought under observation.—W. Shackleton *in* "*Knowledge*."

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THE LANTERN RECORD.

CONTENTS.

	Page
London County Council Regulations for Limelight and Cinematographic Exhibitions	9
Lantern Mems. By G. R. Baker	10
A Plea for the Oil Lamp.—II. By T. N. Armstrong	10
Fatal Acetylene Explosion	11
Manchester Photographic Society (Lantern Section)	12
Tale of the Cinematoscope	12
Enlarging on Bromide Paper	13
Photography as an Advertising Medium. By J. Rees	14
Bradford Photographic Society	14
Acetylene and Calcium Carbide.—The Home Office Regulations	15
Seguy's Portable Rontgen-Ray Apparatus	15
A Mount for, and Arrangement of, Lenses for Use as a Magnifying Glass or Lantern Objective	15
Coles' Improvements in Oxy-Hydrogen Jets	16
Correspondence	16

LONDON COUNTY COUNCIL REGULATIONS FOR LIMELIGHT AND CINEMATOGRAPHIC EXHIBITIONS.

The London County Council has issued the following important regulations respecting the use of Cinematograph Lanterns in premises licensed by the Council:—

Position of Cinematograph.

1.—The cinematograph shall be placed, if possible, behind the sheet, either upon the stage or in some position away from the auditorium.

2.—In case no stage be available, the lantern shall not be allowed to stand in the auditorium, except in a space from which the audience are separated.

Construction of Lantern.

3.—The body of the lantern shall be constructed of sheet iron, and, if wood be placed outside the iron, asbestos shall be interposed between the two.

Illumination in Lantern.

4.—In all cases where possible the electric arc light shall be used as an illuminant instead of limelight. Ether and other inflammable liquids shall not be employed.

Illumination of Enclosure.

5.—The space in which the cinematograph stands shall, where possible, be illuminated by electric light.

Film—Disposition of, after demonstration.

6.—The film shall, in every case, be rewound automatically upon another bobbin, contained in the cinematograph or in a closed box made of sheet iron or other suitable substance; and the opening in the top of such box, through which the film passes, shall be as small as possible.

Shutters.

7.—The apparatus shall be so constructed that when the film ceases to move a shutter of asbestos automatically falls between the condenser and the film, in order to shield the stationary film from the heat of the light.

Operators.

8.—In all cases the operator shall be accompanied by an assistant.

Smoking.

9.—Smoking by cinematograph operators and assistants shall be strictly prohibited during the time they are on duty.

The Council has also issued the following regulations respecting the use of Limelight in premises licensed by the Council:—

1.—The gas cylinders shall be tested and filled in conformity with the following recommendations of the Departmental Committee of the Home Office, which appear in the Report of the Committee on the Manufacture of Compressed Gas Cylinders. (7952 of 1896.)

"*Cylinders of Compressed Gas (oxygen, hydrogen or coal gas).*

"(*a*) *Lap-welded wrought iron.*—Greatest working pressure, 120 atmospheres, or 1800 lbs. per square inch.

"Stress due to working pressure not to exceed 6½ tons per square inch.

"Proof pressure in hydraulic test, after annealing, 224 atmospheres, or 3360 lbs. per square inch.

"Permanent stretch in hydraulic test not to exceed 10 per cent. of the elastic stretch.

"One cylinder in 50 to be subjected to a statical bending test, and to stand crushing nearly flat between two rounded knife edges without cracking.

"(*b*) *Lap-welded or seamless steel.*—Greatest working pressure 120 atmospheres, or 1800 lbs. per square inch.

"Stress due to working pressure not to exceed 7½ tons per square inch in lap-welded, or 8 tons per square inch in seamless, cylinders.

"Carbon in steel not to exceed 0·25 per cent., or iron not to be less than 99 per cent.

"Tenacity of steel not to be less than 26 or more than 33 tons per square inch. Ultimate elongation not less than 1·2 inches in 8 inches. Test-bar to be cut from finished annealed cylinder.

"Proof pressure in hydraulic test, after annealing, 224 atmospheres, or 3360 lbs. per square inch.

"Permanent stretch shown by water jacket not to extend 10 per cent. of elastic stretch.

"One cylinder in 50 to be subjected to a statical bending test, and to stand crushing nearly flat between rounded knife edges without cracking.

"*Regulations applicable to all Cylinders.*

"Cylinders to be marked with a rotation number, a manufacturer's or owner's mark, and annealing mark with date, a test mark with date. The marks to be permanent and easily visible.

"Testing to be repeated at least every two years, and annealing at least every four years.

"A record to be kept of all tests.

"Cylinders which fail in testing to be destroyed or rendered useless.

"Hydrogen and coal-gas cylinders to have left-handed threads for attaching connexions, and to be painted red.

"The compressing apparatus to have two pressure gauges, and an automatic arrangement for preventing over-charging. The compressing apparatus for oxygen to be wholly distinct and unconnected with the compressing apparatus for hydrogen and coal gas.

"Cylinders not to be refilled till they have been emptied.

"If cylinders are sent out unpacked, the valve fittings should be protected by a steel cap.

"A minimum weight to be fixed for each size of cylinder in accordance with its required thickness. Cylinders of less weight to be rejected."

2.—All cylinders shall be used with an approved safety regulator.

3.—All cylinders shall be suitably connected with the lantern by means of iron pipe, or by means of rubber tubing protected on the outside by canvas and coiled wire, and so arranged that it cannot be affected by the movement of the operator, or by others in the neighbourhood of the lantern.

4.—All lighting shall be in charge of a competent person, who can at will raise or lower the lights without risk of their being turned out, and, in order to avoid danger from panic, he should remain at his post during the whole of the entertainment.

5.—The gas shall in no case be stored in, or used from, bags or containers other than those recommended by the Departmental Committee of the Home Office (see No. 1 above).

6.—The combustible gas used shall be either hydrogen or coal gas, and in no case whatever shall ether or other imflammable liquid be employed.

Note.—It is desirable, however, that in all cases, where possible, the electric light should be used as an illuminant instead of limelight, in order to avoid risks from fire.

LANTERN MEMS.

Light, more light, has been the cry for some long time past, and particularly in respect of limelight jets for use with the cinematograph and kindred machines for projection. There are, however, some matters, if not to be classed as drawbacks, that it is as well for operators to bear in mind when using high-power limelight jets. First and foremost, the gas supply must be ample, and next, if the slides are delicate or valuable, they must not be allowed to remain too long on the stage to receive the full power of the heat rays from the source of light.

* * * * *

In the old days of gas bags, when one had to give a dissolving-view entertainment with a double lantern, a pair of gas bags holding about eight cubic feet of gas each was sufficient for an entertainment of two hours. Now it is quite possible to run through ten cubic feet of gas, when using a pair of jets, in one hour, and the other day I heard of a case where an operator, in using a cinematograph, had a cylinder of hydrogen containing eight feet of gas exhausted in less than half an hour, compressed oxygen having been used with it in supplying a jet having an extra large mixing chamber and a large-size orifice to nipple. An operator used to the earlier-pattern mixed gas jets, using these modern jets for the first time, is likely to be out of his reckoning, and liable to be short of gas, and so have a disagreeable quarter of an hour's interval to renew his supply, if he is lucky enough to have a reserve of gas.

* * * * *

No doubt, with large discs to be arranged for, a powerful light is necessary, but for average-sized pictures a moderate light is all that is wanted. The screw-down valve adjustment fitted to the taps of jets or separately to byepasses is, no doubt, a great advantage, as the flow of gas can be regulated to a nicety, and, if for certain specially dense slides a little more light is required, it can be obtained by a turn or two of the milled-head screws of valves, and checked down again after it has been shown.

* * * * *

One point I noticed recently, when using a six-way dissolver on a biunial lantern fitted with a pair of modern jets and supplied by gas cylinders through automatic regulators, was that, although the adjustments of the light were made one jet at a time, the oxygen would accumulate, and, on dissolving, it was not done as satisfactorily as it was when first setting up the apparatus. I would suggest that the supply pipes in biunials be *always* fitted with stop cocks, so that, when all the adjustments are made and the operator has to wait for the preliminaries, the gas can be shut out of the lantern, independently of the byepass. It can, I know, be done from the cylinder, but then it is not so convenient, and makes more noise than turning a tap.

* * * * *

Some of the English producers of cinematograph films have evidently something to learn in the way of technique from their French *confrères*, for in several films that have been passing through my hands lately I find indifferent printing, carelessness about the starting of the subject, so as to get the most interest out of it, also as to dirty marks, scratches, and blemishes. I suppose our French friends, having been a longer time at it, have the details necessary for successful working at their fingers' ends; certainly, to look through a batch of French films and then through English, the comparison is very much to the disadvantage of the latter. This applies, not only to a name well known in connexion with this class of work, but also to that of an unknown (to me) worker in this direction, who has taken trouble to get something good to be photographed, but stops short in the reproduction of his results of that necessary qualification of master work, "perfection."

* * * * *

So far I have not seen any films "made in Germany," but it will not be long before the Teutonic business people find it will be worth while to go in for animated photographic work. Already, I believe, something in the toy line is ready to go on the market, and, when the serious side of the subject is attacked, no doubt good subjects and films will be forthcoming at prices calculated to command a ready sale. Why the English firms who have negatives of good subjects don't take time by the forelock and put a little more life into their business, and "be ready" with A1 films, I can't understand; let them take a lesson from the French producers, and have a fine stock available for selection, all clearly printed and beautifully developed. The system at present in vogue, of "buying a pig in a poke," can't last, for it is all very well to say, "You must take the films as I send them, and not run them through a machine" if they are perfect; but, when they are considerably short of this desired condition, it is a contract distinctly one-sided, and will not do for the British buyer, who likes to *see* what he is buying. It is just possible I have not been in touch with the best English film-producers, and so I don't wish for a moment to disparage the work of *all* British photographers of animated film subjects, but simply use the two makes I have had to do with through agents as an illustration of what seems to be the general rule of business in this line.

* * * * *

I am sorry to see that animated photographs are being shown on hoardings, or to the general public as advertisements, sandwiched between somebody's sausages or thingamy's food, for it brings it down to a level that those interested in optical lantern work and photography will be sorry to see. The fees for showing animated photographs at entertainments are already much reduced from last years, and, if public displays of good subjects are to be made "gratis," it will be difficult for operators to command payable renumeration for their services in this direction.

G. R. Baker.

A PLEA FOR THE OIL LAMP.

II.

In a previous article I referred to the usefulness of the homely oil lamp, and instanced the limits within which a good oil radiant might be used with the utmost satisfaction, for it must be obvious to all interested in lantern projection that there are numerous out-of-the-way places where the difficulty in transit of the necessary adjuncts to a limelight display are very considerable, and where, in fact, the smallness of the room available for such display does not call for the higher-power radiants. I can well remember some years ago an incident that occurred not a hundred miles from Glasgow that speaks volumes for the utility of a good oil lamp.

I had just finished up a hard day's work, and had seated myself snugly beside the fire on a cold winter's evening, when the watch dog gave notice of the approach of some stranger to the house. In a few minutes the oft-repeated old story was told: "Oh, Mr. Armstrong, I have just

run over to see if you can help me! I'm over at Mr. ——, and I've come away with a leaky cylinder, and find myself clean stuck up."

I suggested my pair of oil lamps, side by side, with finger dissolver in front, and for want of gas they were brought into use, and right good substitutes they proved, every one being delighted with their performance.

Oil lamps, however, require careful manipulation, and with some forms a slight alteration in their construction when it is desired to work them to the greatest advantage.

In large towns, where gas is burned, the objection to oil lamps will always be more noticeable than in out-of-the-way situations where oil is in regular use. One of the chief objections to an oil lamp rests with the smell, that is so objectionable to many. With care, however, this can be reduced to a minimum. By carefully attending to the filling and emptying of the oil chamber, no oil need ever be spilled, and, by dusting a little aromatic tooth powder over the top of the oil chamber, much may be done to prevent any serious amount of objectionable odour from the oil that is being burned.

Oil lamps, previous to being used for the actual projection of pictures, should be lighted and allowed to burn for at least a quarter of an hour, the wicks being about a quarter-turn up, or, in other words, allowing a flame slightly less than an inch in height being visible.

Nothing but the best water-white quality of oil should be used; but, as this at times in out-of-the-way places is not always procurable, a few good-sized pieces of camphor should be inserted into the oil chamber for some time previous to lighting up. This will tend to a whiter light, and go far to prevent smoking should the wicks draw too severely on the oil chamber.

After the lamp has been burning for some time, the light should be *very* slowly raised until the flame from the wicks rises to a height of about four inches in a good solid column of light.

One of the chief objections to an oil lamp of the Sciopticon pattern has always been the liability of lamps of this description yielding a black line in the middle of the disc. No doubt, this objection is well grounded, and with some patterns of lamps it is very difficult to avoid. Much, however, may be done by a few simple alterations or dodging of the lights to overcome this dark line. I once cured a very bad case of this kind in the following manner:—

It was a three-wick light, and, as is usual with nearly every pattern of the Sciopticon form, had flanges running along the bottom of the oil chamber; these flanges run in fitted grooves or guides that are fixtures to the bottom of the body of the lamp, and by this means hold the oil chamber in a fixed position. The idea occurred to me, after numerous experiments, that, were an oil radiant capable of being moved somewhat out of this fixed position, similar to the facilities afforded in limelight working, by being able to move slightly to one side or the other the jet on its support pin, the objectionable eyesore in the shape of a dark line might, at least to some extent, be removed. I therefore proceeded to cut away a portion of the flange at the front of the oil chamber, extending backwards to about one and a half inches, and likewise a similar amount was cut away at the rear of the oil chamber. This left the base of the tank, as it were, swinging on a centre flange, and permitted of the light being, as it were, hinged, but slightly from side to side. On testing the effect of moving the light, even however small, I at once saw the objectionable dark line on the screen almost entirely vanish from view; in fact, no one not conversant with this drawback to the Sciopticon lamp could have told that the disc was not perfectly evenly lighted. I have since doctored other lamps in the same way. The slewing of the light, even to a very small extent, has a wonderful effect on the disc, and, by so providing that the oil chamber be capable of being moved, as it were, on its centre, this dark line is got rid of. When this dodge is practised in conjunction with a careful manipulation of the centre wick—*i.e.*, not allowing it to overrun the two side lights—there will be found to be an almost total absence of any dark line on the disc. Some lamps, however, are so constructed that such alterations are not possible.

With the wicks *properly* trimmed—*i.e.*, they yield a solid body of flame without any forking—and the light carefully centered on the condenser, a beautifully lighted disc up to six feet can be easily obtained with even a good fifty-candle-power light. Six feet, in my opinion, is quite large enough for any disc for an oil lamp to yield, and is sufficient for a wide range of usefulness, such as schoolrooms, farmhouses, and mission halls of small dimensions. Beyond six feet I do not think an oil lamp should be expected to yield very good results, and, when larger discs are desired, one or other of the higher-grade radiants must be employed. A six-feet disc is not by any means a poor show.

As regards the most suitable condensers and objectives to use in connexion with an oil radiant, in practice I get the finest results with my six or seven-inch objectives; the latter I prefer to the six-inch, although in confined spaces the disc is slightly smaller. If the condenser and the radiant are so adjusted as to work well together, there should be no difficulty in causing the rays to cross well within the limits of a six or seven-inch focus lens, of course provided the objective is being attached to and working on a telescopic front, which every lamp ought to possess. The seven-inch objective I have referred to is one of my old portrait photographic lenses, and it is a treat to see the manner such will project a critical image on the screen when tested alongside one of the common or cheaper form of lenses; but, then, the original cost of this lens was in itself more than double the price of a complete Sciopticon outfit of the present-day construction.

A really good lens, well centered on the rays emerging from the condenser at the point where they cross, ought to depict a cushioned-shape slide of printed matter or parallel lines, absolutely sharp and free of distortion, right up to the extreme edges of the picture, but few of the cheaper form of short-focus lenses will perform in this manner on such a test slide. In cases where the aberration of an objective is under or over-corrected, an improvement may be effected by bringing the two back lenses close together. This may be done by removing the ring that separates them, and substituting a narrower ring. Such are easily provided by a a piece of cardboard or soft wire. I have known vast improvements effected to faulty objectives by carrying out this simple alteration.

In practice, it will be found that lenses of short focus are more liable to give bother in the yielding of absolutely sharp images of printed matter than those of longer focus. After many years' experience, and no end of testing lenses of every conceivable type, both in the oil and limelight and other radiants, I have formed a very decided preference for a lens of six or seven inches' length of focus, finding such the most handy for general all-round working, with whatever radiant is used, or wherever the lamp is needed, be it in a small room or in a fairly large-sized hall.

To get the best results from any radiant, be it oil or lime light, some consideration must be given to the screen that it is intended to use. As yet I cannot speak from experience of the newer form of silvered-surface screen, but I think I can safely assert that I have experimented as much as any one in every other form, and the result has been that the wall of one of my rooms has a fixture screen attached that is as good as any one need desire. I have no doubt, however, that the attention which has recently been given to the production of a better form of reflecting surface in screens is a step in the right direction. I have seen many a lantern exhibition marred by the use of a poor, thin, miserable linen sheet, which allowed as much light to pass through as was reflected from its surface, with the double drawback of smothering an already weakened image by reflection from the walls behind it. If what is claimed for the newer-formed silvered-surface screens be actually realised, then there is a fresh lease of life in store for a good oil lamp, that gives so much pleasure in out-of-the-way places.

Already opticians in Glasgow and the west of Scotland have begun to discard the use of linen screens, although the bulk in transit of a paper one is much more difficult to accomplish; but we are living in a time of advance in optical projection work. Our jets and screens have been much improved lately, and it will be strange if the old form of oil radiant, beloved by so many old hands, does not likewise come in for some share of attention.

T. N. Armstrong.

FATAL ACETYLENE EXPLOSION.

The works of the United States Liquefied Acetylene Distributing Company, in Montgomery-street, Jersey City, were wrecked on December 24, by a series of explosions, and destroyed by the fire which followed. Two men, says the *Scientific American*, were killed, and a number of persons were injured, and there were many narrow escapes.

The United States Liquefied Acetylene Distributing Company is a comparatively new concern, which has been formed to supply liquefied acetylene gas to a number of companies in various parts of the country, which are endeavouring to introduce the gas for lighting purposes. These companies are organized to work under the Willson calcium carbide patents, and other patents which were taken out by Dr. Julius J. Suckert, for the liquefying of the gas. At least one accident has happened before, owing to the dangerous nature of the liquefied gas.

In the factory the calcium carbide was taken to the generator house, where, in proper receptacles, it was decomposed by the introduction of water. Through pipes it was then transmitted to the main building, where compound compressors, like those used for compressing air, reduced its volume until it was under a high pressure. While this operation was going on, the gas was cooled by refrigerated brine passing about the pipes which held it. Whatever water it held in suspension was extracted by passing it through suitable coils of pipe, and then it was led to the part of the room where it was to be turned into liquid, and sealed up in the steel tubes. In this last process the steel tubes were immersed in a refrigerated bath, kept so cold that, when the gas entered the tubes, the low temperature and pressure upon the gas combined turned it into a liquid form.

This was the work that was going on at the time (9.30 a.m.) of the accident. It was the custom, before filling a tube which had come back, presumably empty, to first let into it a small charge of gas, and then to open a valve and let this gas escape into the room. This was to make sure that no air should be in the tube when it was finally charged. This operation was called "blowing off," and no lights, no smoking, no fire of any kind was permitted about the building, except in the boiler room, and that was as separate as if it were in another building.

The cause of the accident has not been accurately determined; it is known that, while one of the workmen was blowing off a tube, there was

a puff, and a sheet of flame spread through the room. A moment later came the first explosion. It was not nearly as heavy as a number which came later, but it blew a twenty-foot square hole in the side of the compressor room, next to the railroad trestle. There was no sign of fire when outsiders reached the works after the first explosion, and it was ten or twelve minutes before the next one came. Then there began a series of explosions, small compared with the first. Perhaps there were a dozen of these, and then there was a tremendous one, which tore the whole factory to pieces, and filled the air for blocks around with missiles. Many of these missiles were the steel tubes in which the gas was stored. There were about seventy-five of these already filled in the works. Each one is about the size of a six-inch shell, and of much the same shape, being three feet or more long, and weighing about sixty pounds. One of these was shot across the street, where it tore a hole through the false front of the chain works, and landed far in the rear of that building. The doors and windows of this building were blown in, great strips of clapboarding were torn out of the front, and the office was wrecked. No one was at work there.

Right next door to the west of the works, Mr. Byrne recently erected a row of four-story frame tenement houses. These buildings have been occupied for about two months. There were twenty-four families in them, When the big explosion came, these houses rocked back and forth, plaster fell in great pieces from the walls and ceilings, and a moment later, when the air rushed back, the whole side of the building was torn loose from the floor beams, and bulged out for more than a foot. On Fremont-street, just beyond the railroad trestle, were seven houses. These held thirty families. Windows, walls, and wainscoting were torn away in these houses as well. In a moment all was confusion in the neighbourhood. Women ran from the houses, leaving the babes and the aged behind, all screaming and crying out for help. They were no sooner on the street than they encountered new terrors. From the wreckage fire was springing high, and every few moments there were other explosions, which sent great pieces of burning wood and torn metal work flying about. Police and firemen came and did what they could. The police forced the remaining people out of their houses, while the firemen attacked the flames. With the first water that the firemen turned on, they discovered that they were helpless against such a fire. The water found stores of calcium carbide in the ruins, decomposed it, set fire to the acetylene gas, and added to the fierceness of the fire. Acetylene burns with a flame many times hotter than that of ordinary gas.

The railroad trestle was soon on fire, and the firemen devoted themselves to saving this and the adjoining row of houses. Over at the electric lighting plant a big door had been blown in, breaking a steam pipe, and the works were shut down for a short time until this could be repaired. Sixty telephone wires ran past the wrecked buildings on poles. These were destroyed, and the trolley wires were carried away. It was two hours before the cars could be run again.

At 12.20 o'clock there was another violent explosion, doing considerable damage. The loss to the acetylene works alone was $20,000. The explosions of liquefied acetylene gas have been so numerous and serious that its manufacture should be prohibited until it can be made, stored, shipped, and consumed with greater safety than is seemingly possible to-day.

MANCHESTER PHOTOGRAPHIC SOCIETY (LANTERN SECTION).

The Fourth Meeting for this session was held on Wednesday evening, January 26, at the rooms, 44, Mosley-street, when Mr. C. Lord gave a lecture, illustrated with lantern slides made from negatives taken by himself, entitled *A Run through the Dolomites*. The President (Mr. J. Wood) occupied the chair.

After imagining for nearly twenty years what the country was like, it was not until 1896 that Mr. Lord had the opportunity of visiting the places of interest which he had dreamed of so long. The route lay from Toblach to Innsbruch. By name the Dolomites are almost unknown, although some people imagine them to be relatives of the Amorites or Jebusites, whilst the lecturer had been asked recently whether they were situated in the Pacific. He said that the name "Dolomites" was given to a group of mountains situated in the Austrian Tyrol, after the French mineralogist Dolomeau, who was the first to attract attention to their composition and formation. Landslips were common, and were due to the rock being gradually decomposed by the varied weather, when, giving way, sometimes the whole side of a mountain will be dislodged, and crash down, carrying all before it. A view of the lake of Alleghe was shown, and the lecturer said that five villages were submerged under its waters, owing to a landship which had happened in the manner just described. One hundred years ago the site was a valley with the river Corderole running through it, and, whilst some men were at work felling trees on the mountain side, a great portion of the top and side on which they were working, measuring about 100 feet to 200 feet thick, 1000 feet broad, and over 2000 feet in length, suddenly gave way, and, sliding down into the valley, forced its huge masses up the opposite side. By this awful occurrence ninety-five people were killed, which, the lecturer said, meant almost the whole population in this part of the world. The lake formed was two and a half miles long and half a mile broad. From its waters the scene is unsurpassed, the Cirretta, whose rocks rise to a height of 12,000 feet, standing boldly at the end of the gorge.

Schluderbach, one of the most beautiful places in the Tyrol, is the starting point of many excursions, one of which is Tre Croci (Three Crosses), at which place three hunters are said to have been killed. Several views of Drei Zinnen illustrated the dangerous character of the country.

When at Schluderbach the visitor has not far to go to find out where the sacred figures, so frequently seen on the Continent, are made, and not only these, but Noah's arks, rocking horses, jointed dolls, and all such toys are made at the village of St. Ubuch. A life-size figure can be made from beginning to end by a native in about a fortnight, and its value will be equivalent to about 4*l*. Cortina, which is about twelve miles from Schluderbach, was next visited, and, from the lecturer's remarks, it is a most healthy place, epidemics being unknown and doctors very scarce.

The Aquila Nera, an old hostelry situated in this town, shows to what extent artists are known here, the view illustrating *The Seven Ages of Man*, the figures being life size, painted on the outside walls of the house.

At Pieve de Cadore, the Town Hall and the house in which Titiens, the painter, was born are amongst the historical treasures to be seen there, and although the grave of Titiens is unknown, his name will ever be remembered by his country, and, in testimony of this, a fine bronze statue has been erected in his native town. At Vigo Mr. Lord made acquaintance with a real old Tyrolese hostelry, where the entrance was through the coach-house, and, after passing the first floor, a staircase led to the sleeping rooms and haylofts.

After visiting Botsen, one of the principal towns in the Tyrol, Innsbruch was reached, and the lecturer said that no visit should be made to the Tyrol without including the capital. At Innsbruch one of the chief objects of interest is the Cathedral, and some fine views of the bronze figures which surround the tomb of Maximilian the First were shown. A statue of Andrew Hofer, the Tyrolese patriot, was, with street scenes containing bullock waggons, arches, and artistic fountains, shown on the screen.

Leaving the Dolomites, Mr. Lord passed on to Trafoi, which place is encircled with mountains, known as the Ortler group, the Stelrio Pass being the only outlet by road. Several slides showing the curious zigzag road on the mountain side were exhibited, and, after reaching the summit, the return journey was made to Trafoi, calling on the way at one or two of the glaciers on the Ortler. With a moonlight scene of this peak, Mr. Lord concluded his most interesting lecture. Mr. James G. Chapman manipulated the lantern.

TALE OF THE CINEMATOSCOPE.

Dyer *versus* Acres.

Willie Dyer, photographic printer, of 77, Wood-street, Barnet, sued Mr. Birt Acres, photographic artist, and the well-known inventor of the cinematoscope, of Barnet, for 1*l*. 12*s*., wages due in lieu of notice.

Plaintiff said he gave defendant notice on December 11. On the following Monday, however, defendant came and wanted to know who had let him come on the premises, and told him to clear out. Plaintiff applied for the week's wages, but defendant said he would throw him out. He refused to pay, and told him he knew where the Court was. Cross-examined by Mr. Poole, plaintiff said he assisted defendant with his cinematoscope. He denied that a certain Exhibition at the Town Hall, Barnet, in which he assisted, was a failure through his fault. He denied having tried to depreciate Mr. Acres or his cinematescope. He had started in business himself, but he did not use Mr. Acres' machine.

Mr. Poole, in addressing the Registrar, said, that plaintiff, at the Exhibition at the Town Hall on December 10, had so maliciously mismanipulated the cinematoscope as to make the pictures appear ridiculous, especially those of the Jubilee Procession, boats on rollers, regatta, and blacksmith's forge, by rotating the machine at variable rates of speed, and also that he had endeavoured at various times, as he (Mr. Poole) could prove, to depreciate Mr. Acres as an exhibitor and his cinematoscope itself as a failure. Mr. Poole contended that, although the plaintiff gave a week's notice on Saturday, December 11, yet, in the interval between the notice being given and his reappearance at the works on the 13th, the Monday following, during which interval Mr. Acres had been informed as to the behaviour of the plaintiff, there were then sufficient grounds for dismissing him without notice. Plaintiff had held up Mr. Acres and his cinematoscope to ridicule, and had done his best to induce the public to patronise a different class of performer.

The Registrar said that, even if Mr. Poole established everything he had said, it would not affect his judgment. The law was against him.

Mr. Poole asked if the Registrar held that the fact that the defendant knew nothing about the alleged misdemeanour of plaintiff on Saturday, the 11th, when he gave notice, precluded him from dismissing him from his employ without wages on the 13th, during which interval he had learned what had occurred?

The Registrar replied that he certainly held that plaintiff was entitled

to his wages, notwithstanding the facts that had come to defendant's notice during the interval.

Mr. Poole said that it was not so much the question of the money with his client. He wished to vindicate himself in the eyes of the public. He (Mr. Poole) was trying to show moral misconduct.

The Registrar: Moral misconduct or physical incompetency have nothing to do with it. You can get your remedy against him for defamation of character. The law is absolutely against you, though you may be able to prove everything you have stated.

Mr. Poole: But, the moment he heard of the irregularities and delinquencies of the plaintiff, defendant sent him away.

The Registrar: The law is against you on the claim. Depreciation of character is not before me.

Mr. Poole accepted the learned Registrar's ruling, and intimated that as the next case, brought by a man named Honour, was on all fours with the present one, he would not pursue it.—*Barnet Times.*

ENLARGING ON BROMIDE PAPER.

On Thursday evening, January 27, a demonstration was given before the Sutton Scientific and Literary Society, by Mr. J. H. Baldock, F.C.S., Mr. J. A. Fermoy, R.R.A.S., occupying the chair, the subject being "Enlarging on Bromide Paper." Mr. Baldock said: Having been asked to give this demonstration, I have much pleasure in complying with the request, and in dealing with the subject I propose to take the different points, as regards apparatus and mode of procedure, strictly in the order in which they arise in practical working. So many people take small pictures at the present time, either as snap-shots, or because a small camera is so much easier and lighter to carry than a large one, that some fairly easy means of making them larger is, perhaps, more than ever necessary. The *first* question which arises is, what kind of negative is most suitable for the purpose, because *all* negatives are by no means so. It obviously must be sharp, because if off-sharp to begin with it will, when enlarged, be still more so; next, it must not be a *hard, i.e.*, soot-and-whitewash negative, but a soft one, with good gradation; a negative that will give a good silver print, or even a good bromide print, is not necessarily suitable for enlarging. I show you a few such negatives, from some of which I propose to make enlargements this evening. The *second* question for consideration is, what kind of paper to use. There are, as you know, many kinds obtainable, such as rough, smooth, ordinary, matt and glossy surface, rose enamel, &c., and in selecting you must be guided by the negative you are going to use, though probably you would not employ rose or enamel for anything but portraits. Personally, I have a predilection for matt-surface papers, if for no other reason than you can look at them in any light without having reflections. I show you two very fine enlargements, 23 × 17, kindly sent by Messrs. Morgan & Kidd, one on rough surface, the other on rose enamel, papers, from which you can judge for yourselves on this point. The *third* question is, what kind of lens is to be employed, and here I do not agree with a statement frequently to be met with, *i.e.*, that the enlargement should be made with the same lens as the negative is taken with. A portrait, or a rapid rectilinear, lens is better than a single lens, and its focal length should be from 1¼ to 1½ times the length of the plate. If using a condenser, to which further reference will be made presently, you will, I think, find that it is *necessary* to use a somewhat long-focus lens, otherwise the diameter of the glass is not sufficient to pick up properly the cone of rays coming from the condenser; for instance, if using an 8½ in. condenser, you will find great difficulty in obtaining even illumination with a 5½ in. lens of 1 in. diameter, but with a 9 in. lens of 1½ in. diameter you will have no trouble. The *fourth* point to consider is the source of light. Now, of course, daylight is the handiest and cheapest, but it is also the least reliable, because, while there may be an absence of clouds when you make your trial exposure, and by working quickly you think you are all right, and pin up your paper, yet no sooner have you started the exposure than, quite unseen by you of course, a cloud comes along and upsets your calculations. Nevertheless, good enlargements can be, and constantly are, obtained by this method, it being essential to use a reflector placed at an angle of 45° to the negative, such as a piece of opal glass, to work with an aspect facing N., N.N E., or E., and to be sure that no trees or houses interfere with the even illumination of the negative by the reflector. But obviously, to those who can only work in the evening, this source of light is debarred, and substitutes have to be found, and fortunately there are two which answer admirably, *i.e.*, the incandescent mantle, which requires a reflector, and the limelight, which requires a condenser. I show you, diagrammatically, the best mode of using these two sources of light; in the last case (and also in that of a three or four-wick paraffin lamp, should that be selected), it is of vital importance that the point of light, the centre of the condenser, and the centre of the lens, should be truly axial. The *fifth* point for consideration is the distance which must separate the negative from the lens and the lens from the sensitive surface of the bromide paper. These distances will depend upon two things, *i.e.*, the focal length of the lens to be employed, and the number of times the enlargement has to be, and I cannot, I think, give you this more plainly and concisely than in the words of the late Mr. J. Traill Taylor in his "Optics of Photography." At p. 114 (1892 edition) he says; "1. Add one to the times of enlargement for reduction required, and multiply the sum by the equivalent focus of the lens. The product is the length sought for. 2. To find the other conjugate focus, divide the equivalent focal length of the lens by the times of enlargement (or reduction) required, and add it to the equivalent focal length. The sum is the length sought for. Thus, for an enlargement of four times with a 9 in. lens, the formula would be $4+1\times9=45$ in. from lens to paper, and $9\div4+9=11\frac{1}{4}$ in. from negative to lens." The *sixth* point for consideration, and it is a very important one, is the exposure, which is, in enlarging, as in negative-making, the one unknown quantity.

Unfortunately, no hard-and-fast rule can be laid down to indicate what the correct exposure is, because it depends on so many factors, viz., the density of the negative, the degree of enlargement, the focal length of the lens, the intensity of the light, the sensitiveness of the bromide paper, and the size of the stop used. With reference to the second and fourth of these factors, it must be borne in mind that "*the intensity of the light varies inversely as the square of the distance from the source of light.*" But, though all this looks very formidable when set down in black and white, yet in reality, and in practice, it is comparatively simple and easy. A little experience with negatives of his own making will soon indicate to the worker the approximate exposure, and then, by means of trial slips, pinned *diagonally* across the picture, so as to embrace, as far as possible, all the gradations, and exposing these slips for different times, say ten, twenty, forty, and eighty seconds, and developing the slips, it will soon be seen which of these times is the correct one, or if the correct one lies between either of them. I show you several such trial slips, also a slide indicating the results so obtained. Indications will also be given as to whether any part of the negative requires shading, masking, &c., so as to stop exposure of certain parts, allowing a longer exposure to other parts. Of course, this can only be done when the image is projected on to an easel; it cannot be done if the enlargement is made in the camera. I have dealt rather fully with this sixth point because of its importance, but I think, with due attention to the details I have indicated, you will not have much difficulty in mastering the question of exposure. The *seventh* point which, in due course, presents itself is that of development. In this connexion I may just mention that bromide paper is not quite so amenable to development, as a compensation to errors of exposure, as are dry plates. Another thing, too, is that more light may be used with bromide paper (except, perhaps, the very rapid brands) than with dry plates; consequently, its development can be carried on with greater safety and comfort in working. There is a good choice of developers, but pyro cannot be used on account of its liability to stain. I do not altogether recommend hydroquinone *alone*, though in conjunction with metol (Ilford formula) it forms a capital developer. Ferrous oxalate has always been a favourite, and is still largely used; the objections to it are two, viz., it has no *latent* strength, and is useless for *under*-exposed prints; and it involves the free use of the *acid clearing bath* to ensure that no iron is deposited in the fibres of the paper, as this would stain and ruin the prints. Apart from these drawbacks, and with properly exposed prints, it gives a strong, clear, and brilliant image, of a fine black colour. Two very good developers are amidol and metol, either of which gives good black tones; they are easy to use, clean, non-staining, and can be used more than once. Amidol is used with *pure* and *good* sodium sulphite alone, while metol requires sodium carbonate in addition; either require about two grains of potassium bromide to each ounce of developer.

Should it be found that some parts of the print do not develop up by the time the rest of the picture is well out, pour off the developer, wash the print (with *acid water* if iron is being used), and then, by means of a brush, cotton-wool, or the tip of the finger, *locally* develop those parts which lag behind. In the case of the clouds, tilt the dish, pour in a little developer, and try, by means of cotton-wool, to get detail in the sky. Finally, give the print or prints a good rinse, and fix them about twenty minutes in the *acid fixing bath*, and then wash *thoroughly* for about two hours. The *eighth* and last point to which I have to direct your attention is that of clouds. Now, if a small picture, such as a quarter-plate, looks bad with a perfectly white sky, and is greatly improved by the addition, judiciously made, of suitable clouds, how much more necessary is it in the case of an enlargement, in which nothing looks worse than a vast expanse of white paper, supposed to represent the sky. Proceed as follows: Throw the image on the easel, and roughly cut out a cardboard mask, following the horizon line fairly correctly; but, if trees or a church spire project into the sky, these may, as a rule, be disregarded, as they will print over the clouds. Having done this, select a cloud negative, soft, and with not too pronounced effect, *lighted from the same direction as the landscape*, place it in the lantern, cap the lens, and make a trial exposure, as indicated under point 6 relating to "exposure;" having found this, pin up the enlargement paper, and make the necessary exposure on it, shielding the landscape portion with the already prepared mask, *which must be kept moving, and as near the lens as possible.* To soften the effect, and prevent the formation of a hard line, recap the lens, remove the cloud negative, and replace it by the landscape negative, the exposure necessary for which has been previously ascertained under point 6; uncap the lens and give this exposure, recap, remove bromide paper, and develop as under point 7. You will pro-

bably find that a certain amount of local development has to be resorted to here, as explained under point 7. This, of course, assumes that the sky in the negative is sufficiently dense to print white; by means of vermilion water colour, mixed with gum instead of water, must be resorted to. I should like to be able not only to amplify much that I have said, but to go into the questions of intensifying, reducing, and toning bromide prints, but time forbids, and I must now proceed to give you a demonstration of the actual working of the different processes I have sketched. In conclusion, I must not omit to thank the Eastman Photographic Company and Messrs. Morgan & Kidd for their kindness in supplying me with some of their bromide papers, and also for specimens of enlargements done by themselves for the purposes of this demonstration."

PHOTOGRAPHY AS AN ADVERTISING MEDIUM.

It is rather strange, considering the undoubtedly high advantages which photography has to offer as an advertising medium, that more use has not been made of it in that direction. A disagreeable idea, probably, to the artist and impressionist, but with due respect to their inclinations and views, and with all credit given them in the capable carrying out of an agreeable hobby, or the more earnest attempt at lifting photography, technically and artistically, by original effort in various directions, there is another class of worker to be considered, the one working for a living, although there is no reason why the two should not get on well enough together.

The tone and tradition of The British Journal of Photography having ever run into practical sympathy with this latter, the professional, in the way of readily giving possibly useful hint, or fruit-bearing suggestion, as he is the one most likely to benefit by any extension of the present domain of photography, the following is offered in continuance of such evidence of good feeling.

That the lay advertiser should not have availed himself of the help of photography is perhaps excusable enough, when it is noted how little photographic firms themselves use it in introducing and pushing their own wares. A few instances there are where it has been done, a taking little picture shown to illustrate the possibilities of a camera, or some kind of motion snapped off to indicate the capacity of a shutter, and as it may also be noticed, that the firms which have gone in for this sort of thing are certainly well in the forefront as business successes and paying commercial concerns, the inference must be drawn that it has paid them. It would pay equally well, if not better, to others who, from the nature of their commodities, advertise much more widely, persistently, and liberally. That they have not done so already is certainly not due to any want of spirit upon their part, nor that they would begrudge the expenditure if they saw its justification, but merely from the fact that the possibilities have not been shown and made clear to them. Let the professional in particular, in a direction so eminently suited to his particular powers and skill, see whether he cannot supplement his much-complained-of dwindling receipts by something good that may be waiting the picking up along this a newer road.

Take the draper, for instance, whose business appears nowadays to have developed into a series of "seasons" sales, "great," "immense," or "gigantic," in the year, with a subsidiary filling up between of the sale of "remnants." In the dressmaking department, say, we have a new and fashionable form of winter cloak or cape that it is wished to put before the public. How has it been done hitherto? By sending out a catalogue illustrated—Heaven save the mark!—by figures wearing the article. Such idiotic simpers, and indescribably ludicrous attitudinis ng of impossible anatomies; such—— but then it is the dress you want to show, true enough; but how can you do that to any advantage on an angular arrangement of wires, put together by a tinsmith, and sketched by a fourth-rate artist? Where is the photographer with his lens so well adapted to show detail, surface, and texture—items so well rendered that we grumble at their very extent when they do not quite suit our purpose, as in a portrait? But, to show off a sealskin jacket, or excellence of material in a dress, what could be better? Fitting well upon one of the charming young ladies whose duty it is to sell it, and thus photographed, would it not be likely to prove an attractive bait to a prospective buyer? Expensive? Well, not particularly so, turned out in one of the many processes of reproduction now in ordinary use; and, as in the case of the present catalogue and illustrations, it would ultimately, doubtless, find its way in some form or other into the bill. There is another aspect, too, worth considering. Submitted to the husband in the tentative, experimental way wives have of doing such things, instead of being tossed back with a smile, and a disparaging comment upon the figure, as the present illustration is, would it not stand a better chance of being well looked at, and, partly by virtue of the face and figure, making its appeal effective? "Good-looking girl this, isn't she?" "Yes, very; but what do you think of the cloak?" What else can he say, after a glance at his wife, than, "Very nice indeed; I fancy something like this would suit you, my dear." The beginning of the end, *facilis descensus averni;* she gets a sealskin cloak—and, pray, why shouldn't she?

Equally to the purpose would be the photographed light and airy dress of summer upon another suitable form; or, from the millinery department, the newest-shaped hat above a pleasant face. What mother, again, could resist the buying of the child's dress, bonnet, or slippers, artistically presented in a photograph, as worn by a dainty little one of the same age as her own? Or, on the male side, one would imagine that the picturing of a rational-looking being engaged in some every-day occupation, showing at the same time the comfort or suitability of such an article of dress as a coat or jacket, would be far more likely to attract favourable notice than the crude dummies we have now figuring upon our hoardings, or staring at us in fashion plates.

My grocer sells me an uncommonly good bacon, and, strange to say, it is what it purports to be, "genuine home-cured." In the scepticism born of dealings with others of his trade, and the unsatisfactory sampling of their Irish bacon as "genuine home cured," it took some time before I got hold of the true man. Now, if he could have sent me a little sketch of his farmyard, or the piggery corner of it, with himself, an undoubtedly capable judge, looking at a satisfactory porker, that doubtful period would have been shortened, to his material gain. And what of the great mass of buyers who are still eagerly searching, with the money in their hands, for the grower of the genuine article, and to whom the right thing, attractively and effectively presented, would be as satisfactory as to the seller himself? The false man might certainly have a doctored sketch, but then, that is inevitable, cannot be helped, applies in any and every direction.

There is no need to particularise further; the possibilities, as may be readily seen, are infinite. Indeed, from the choice of cradle one's parents might have—with a baby taken in it to prove fit and comfort—to the choice of hearse open to one's executors, "showing desirable style, combined with a judicious and artistic expression of grief," there is no time of life, nor condition of it, in which photography as an advertising medium could not find a place, and an interesting and profitable one, to boot.

In many directions, more or less effective sketches are already in evidence and use, but the contention is advanced, that they cannot compare with photography as a process lending itself with such readiness and ease of application, as much as superiority of finished result. It has the additional material advantage also, that it is possible by its means to easily express a telling scene, or phase of life, and, in so doing, broaden things out altogether. To take one instance in illustration: a person wants to buy a bicycle; at the same time that he would like a good mount, he has no intention of going in for any very fast and sensational riding, but, being a sensible sort of fellow, is more particularly taken by the possibilities bicycling offers, to leave the town streets and life for the sweetness and freshness of the country. He has a vague, pleasant picture in his mind's eye, compounded of hedges sprayed with dog roses, or honeysuckle, single-arched, greystone bridges, spanning clear, running streams, cool country inns, home-brewed, and so on. Now, in his choice of a machine, would not that firm be most likely to find first consideration which had the "nous" and enterprise to send, in addition to their technical description of the article, a well-finished little sketch, showing the bicycle leaning against the wall of the village inn, with a rider in the act of discussing the glass of ale which the landlord, jug in hand, had just poured out? A small matter, admittedly; but, if any one will take the trouble to review his life, and analyse course and cause of action, it will possibly surprise him to find how small and insignificant in themselves the deciding factors have ever been.

The high-strung soul who cares not for the outlook can let this side severely alone, and go ahead along his more artistic and solitary path over the marshes, follow the ebbing tide with his camera, try to catch the breaking wave, express the twilight cloistered shades of old-time cathedrals and abbeys; but there is no reason why, at the same time, photography should not be lifted on its other side as high as possible in the scale of the applied arts, to the gain and advantage of all concerned.

J. Rees.

BRADFORD PHOTOGRAPHIC SOCIETY.

On Monday evening, at one of the largest gatherings which has ever taken place in connexion with this Society, Mr. Cecil Wray gave a cinematograph exhibition of an excellent character, the proceedings being opened by a short explanation of the cinematograph, its origin and gradual progress. Mr. Wray, having pointed out that living pictures were by no means so new as the general public supposed, said that credit must be given to the Edison Company, who, with the kinetoscope, really laid the foundation for all the present instruments. The living pictures which were thrown upon the screen after the lecturette, were of a varied and interesting character, showing different makes of films with different perforations, all perforations being suited to the Wray & Baxter cinematograph, a great point in its favour. It must be confessed that the effect in some cases was jerky, but other films amply made up for this slight failing, more especially a splendid one showing trains leaving and entering Queensbury tunnel, and a most lifelike representation of a bull fight, which, when the bull brought down a horse, brought down the house also. A noticeable feature of the cinematograph used was that the films were kept cool by the use of a water bottle for a condenser instead of the ordinary glass. By this means, firing of the gelatine is practically impossible, and a picture may be left in front of the light for half an hour without the slightest risk.

ACETYLENE AND CALCIUM CARBIDE — THE HOME OFFICE REGULATIONS.

AGREEABLY to the request of several correspondents, we reproduce the Home Office regulations relating to acetylene and calcium carbide :—

Relating to Ac-tylene Gas. — Whereas by section 104 of the Explosive Act, 1875, it is enacted that Her Majesty may, by Order of Council, declare that any substance which appears to Her Majesty to be specially dangerous to life or property by reason either of its explosive properties or of any process in the manufacture thereof being liable to explosion, shall be deemed to be an explosive within the meaning of the said Act, and the provisions of the said Act (subject to such exceptions, limitations, and restrictions as may be specified in the Order). shall accordingly extend to any such substance in like manner, as if it were included in the term "explosive" in the said Act. And whereas acetylene, when liquid or subject to a certain degree of compression, is specially dangerous to life or property by reason of its explosive properties. Now, therefore, Her Majesty is pleased, by and with the advice of her Privy Council, to order and declare, and be it ordered and declared as follows :—Acetylene, when liquid or when subject to a pressure above that of the atmosphere capable of supporting a column of water exceeding "100 in. in height," and whether or not in admixture with other substances, shall be deemed to be an explosive within the meaning of the said Act.

Relating to Storage of Carbide of Calcium.—Whereas it is expedient to exempt small quantities of carbide of calcium, when kept under certain conditions, from the operation of the Order of Council of 26th February, 1897, in virtue of which certain parts of the Petroleum Acts 1871 to 1881 are applied to carbide of calcium in the same manner as if the said substance were petroleum, to which the Act applies. Now, therefore, Her Majesty is pleased, by and with the advice of her Privy Council, to order and prescribe that, notwithstanding anything to the contrary in the said Order in Council, the quantity of carbide of calcium which may be kept "without a licence" shall be as follows :—

(*a*) Where it is kept in separate substantial hermetically closed metal vessels containing not more than 1 lb. each, 5 lb.

(*b*) Where it is kept otherwise, none; and the said Order in Council shall be deemed to be amended accordingly.

The unabridged form of Order of Council may be obtained or purchased, either directly or through any bookseller, from Eyre & Spottiswoode, Fleet-street, London, E.C.

SEGUY'S PORTABLE RONTGEN-RAY APPARATUS.

THIS is a portable apparatus intended for the application of the Röntgen rays. It comprises a complete installation, consisting of a battery or accumulator, and induction coil or transformer of secondary induction, a dianodic Crookes tube for producing the X rays, and an inspecting apparatus, the whole forming a single portable apparatus.

Fig. 1 shows a longitudinal section of the apparatus as it appears when open and ready for operation.

Fig. 2 shows the inspecting apparatus, composed of a dark chamber in the form of bellows, analogous to a photographic camera, and provided on the front with a viewing glass, Q, adapted to the form of the human face by means of a spring complying with its different conformations, the border of this viewing glass being provided with velvet, or any other suitable material.

The bottom, P, of the viewing glass is movable, and constitutes a screen coated with a thin layer of platino-cyanide of silver and of

Fig 2

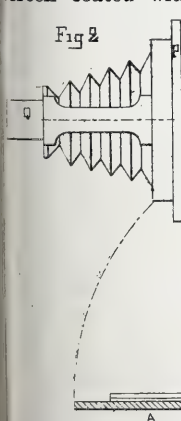
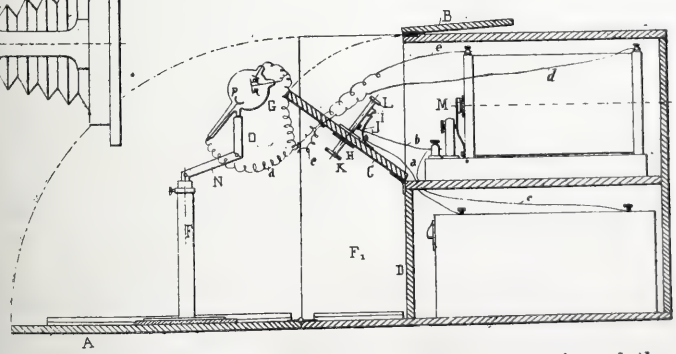


Fig.1.



platinum, which substance becomes efflorescent under the action of the rays. The screens can be coated with any other efflorescent or phosphorescent substance.

The apparatus shown in fig. 1 is composed of a box, divided by partitions into four compartments, in which the induction coil, or the transformer of secondary induction, the battery, or accumulator, the di-anodic tube, with its support, and the inspection glass are respectively placed. The compartment in which the latter is placed is behind the compartments of the induction coil and of the battery, and is not shown on the drawing. The box can be opened by means of hinged doors, A B, which, in fig. 1, are represented open. When the box is open, the doors, C and D, enable the induction coil and the battery to be approached. The door, A, being turned down, that is to say, opened, a support, F, carrying a Crookes tube, G, can be removed from its compartment, F^1, as it is constructed to slide on rails provided on the bottom of the box and prolonged on the door, A. These rails also, when the box is closed, render the support, F, stable, and prevent the tube, G, from being broken when the apparatus is moved.

The door, C, is provided in its centre with a socket, through which a rod, H, slides, carrying an inclined nose, I, which can be brought into contact with a spring, J, on drawing out the rod, T, by means of its handle, K.

The spring, J, is connected by a wire, *a*, with one of the poles of the battery. The rod, H, is connected by the wire, *b*, with one of the terminals of the induction coils.

The other terminal of the coil and the pole of the battery are connected together by the wire, C. Finally, the wire, *d* and *e*, connect the electrodes of the Crookes tube with the terminals of the induced current from the coil. An open circuit is thus formed which can be closed by establishing the contact of the nose, I, with the spring, J. The rod, H, carries a plate, L, of insulating material, which presses on the hammer, M, of the coil when the door is closed and contact is broken. When the rod, H, is pulled out, in order to establish contact, the hammer, M, being sharply released, receives an impulsion, and continues striking.

When the inspecting apparatus is not required, it can be folded up and placed in its compartment. The tube, G, can be placed in any position, by means of the articulating rods, N and O.

The object to be examined is placed between the tube, G, and the frame, P, in the interior of which there is applied a sheet of paper coated with phosphorescent material; contact is established by pulling out the handle, K, which operates the induction coil, and the effect is seen through the opening of the viewing glass, Q. This system, by means of the viewing glass, which intercepts any other light, even the visible light from Crookes tube, enables the efflorescence of the screen to be much more distinctly seen.

In order to examine heavy objects difficult of removal, which would otherwise necessitate their being placed in very large dark chambers, the apparatus can be utilised for examining these objects in full daylight, without having to remove them.

For examining wounded and sick persons it is not necessary, with the apparatus, to transport them into a dark chamber, as the operator can examine them at any place, which saves them the useless suffering caused by their being moved.

A MOUNT FOR, AND ARRANGEMENT OF, LENSES FOR USE AS A MAGNIFYING GLASS OR LANTERN OBJECTIVE.

MESSRS WAGNERS' invention relates to the construction of a magnifying glass whereby it gives high magnifying power, and possesses a field which is sharp, flat, and rectilinear throughout from centre to edge, and at the same time gives fine definition and is free from distortion, the said lens being adjusted optically for magnifying, or for projection purposes with a lantern, or for engraver's use.

Fig. 1. Fig. 2.

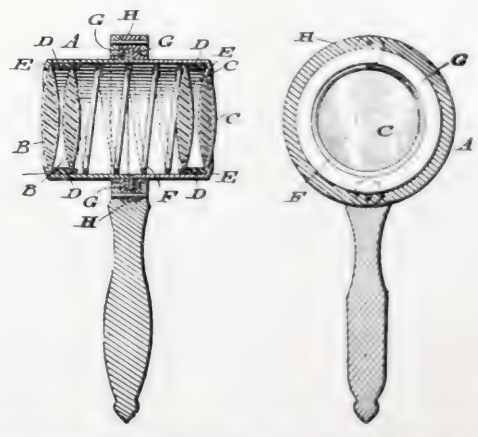


Fig. 1 represents a longitudinal section of a magnifying glass embodying the invention.

Fig. 2 represents a transverse section of said apparatus.

A designates a tube or casing, within which, and at the ends thereof, are the double-convex lenses, B B and C C, it being noticed that said lenses are arranged in pairs, one pair being at each end, the members of each pair being separated by an intervening ring, D, which is located within the adjacent portion of the casing, A, thus keeping said members a proper distance apart. The outer lens of each pair is prevented from

displacement from the casing by means of the flange or rim, E, on the end of the latter, while the inner members of the pairs of lenses are pressed outwardly by means of one or more coiled or other springs, F, which is located within the casing, and bears in opposite directions against the relative lenses, thus firmly holding the lenses and rings in position.

It will be see that, by the present construction, the glass possesses high magnifying power, and its field is sharp, perfectly flat, and rectilinear, of great brilliancy, of exquisite definition, and free from spherical or chromatic aberration, and consequently from distortion.

It will also be seen that the device is inexpensive, even less than that of the ordinary, uncorrected spherical lens.

In order to conveniently apply and remove the lenses, the tube, A, is divided or formed into sections, constituting the cells of the glass, the same, in the present case, having their inner ends formed with flanges, G, which are engaged by a ring or collar, H, or any suitable means, it being evident that, when the sections are separated, access may be had to the interior of the same, and consequently to the lenses and spring.

The interior wall of said ring or collar is grooved to receive the flanges, G, whereby the cells are firmly held together.

COLES' IMPROVEMENTS IN OXYHYDROGEN JETS.

Mr. W. J. Coles' invention relates to improvements in oxyhydrogen jets, by means of which great power of heating, and consequently of light, may be obtained, even if one of the gases is at a very low pressure, the jet being constructed in such a manner that it may be used, without alteration, with gases of the same or different pressures, and also that the usual mixing chamber may be dispensed with.

Fig. 1 is a side elevation, and fig. 2 is a plan in section.

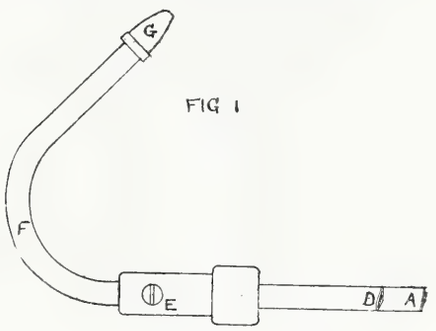


FIG 1

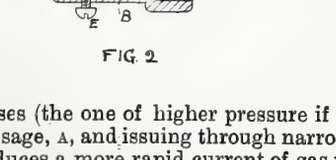


FIG 2

One of the two gases (the one of higher pressure if there is any difference) entering by passage, A, and issuing through narrow annular space, B, at a high velocity induces a more rapid current of gas through the central jet, D, the gases mix and pass along through C, thence by pipe, F, to nipple, G, at which they are ignited.

The passage, C, may be formed in a separate piece in such a manner that it can be moved backward or forward, thus altering area of annular space, B, the movement being controlled by an eccentric screw, E, or other suitable means. By this arrangement the quantity of gas coming in by passage, A, can be regulated so as to bear the correct proportion to the gas coming through central jet, D.

The mixture of the gases brought about by this arrangement is so perfect that the usual mixing chamber may be omitted, but, if desired this may be inserted, at any point between passage, C, and the nipple, G.

Correspondence.

OIL LANTERNS.

To the Editors.

Gentlemen,—In reply to "B. B. W.'s" letter of January 21, he has surely not heard of or seen the 100-candle-power lamp as made by the Optimus Company.

This lamp will do far more than he requires, only he must act up to the full instructions (getting the lantern cotton, oil, &c.) as issued by Messrs. Perken, Son, & Rayment.—I am, yours, &c.,

1, *St. Vincent-place, Glasgow, January* 21, 1898. W. A. Jackson.

ANIMATED PHOTOGRAPHY.

To the Editors.

Gentlemen,—I have only just had the opportunity of reading your able article in this year's Almanac on the subject of *Animated Photography*, and, as my name appears in that article, perhaps a few supplementary remarks from me may not be out of place.

In 1889 I constructed a camera with twelve lenses with a simple form of shutter, which caused twelve successive images to be taken on a plate measuring 8×10 inches. The incident was too short, and the very palpable objection of parallax caused me to condemn it, and so I did not fully work that machine out. I, however, in 1890, designed and made a machine to take an unlimited number of $3\frac{1}{4} \times 3\frac{1}{4}$ plates or films; and, in 1891 or 1892, I forget which, exhibited a series of cloud pictures showing the movements of clouds, and although it was not exhibited as an animated photograph, it is good evidence of the work I was actually at. In 1893 I took out a patent for this apparatus, particularly describing it as an apparatus for taking and projecting a series of photographs in rapid succession. I was entirely unaware of the work of Mr. Friese Greene, but have since always given him credit for it when lecturing on this subject. In 1894 I designed what is practically my present apparatus before the Edison kinetoscope was heard of. In 1895 I photographed the Oxford and Cambridge Boat-race and the Derby, and I have every reason to believe that this Oxford and Cambridge Race series picture was absolutely the first animated photograph of a public event that had ever been successfully taken, and I know that my Derby of 1895 was absolutely the first of its kind. I photographed Royalty with this machine in the person of the German Emperor, Kiel, 1895, and I was the first to exhibit before Royalty (see The British Journal of Photography account of my exhibition at Marlborough House in 1896), by special command of H.R.H. the Prince of Wales, who then graciously gave me permission to take animated photographs in the grounds of Marlborough House on the occasion of the wedding of the Prince and Princess Charles of Denmark. In addition to other pictures I secured an excellent series of photographs of the garden party scene.

My exhibition to which you allude at the Royal Photographic Society was the first that had been seen in England, although I had given several private shows many months before, so that I venture to claim a series of firsts along the line so far as actual work achieved is concerned.

Apologising for the length of the letter,—I am, yours, &c.,

Barnet, January 30, 1898. Birt Acres, F.R.Met.S., F.R.P.S.

Calcium Carbide.—Researches of a somewhat lengthy description, which have been carried out at the Liverpool Research Laboratory, involve the use of calcium carbide as a metallurgical reducing agent. In the first instance, an excess of litharge was heated to redness in contact with the carbide, in a clay crucible, the reaction being accompanied by vivid incandescence, resulting in the formation of metallic lead and calcium oxide CaO. A further portion was now selected, in which the proportion of carbide exceeded that of the litharge; this was further subdivided into various smaller portions, each portion being exposed to various temperatures, resulting in a regulus of calcium and lead of various percentage, together with the expulsion of CO_2. The alloys thus formed, says *Acetylene Gas Lighting*, are all more or less brittle, and, to a certain extent, sonorous when struck, their melting point ranking below that of pure lead, and are slowly but completely decomposed in contact with aqueous vapour, the reaction being much less energetic than that afforded by alloys of lead with the alkaline metals. Stannic oxide, cupric oxide, and also ferric oxide, at corresponding higher temperatures, were readily reduced, yielding results of no practical value, in the case of the cupric alloys those samples containing under one per cent. of calcium being rendered cold-short, and breaking under very small strain; while, on the other hand, iron containing calcium approaches in appearance that of ferro-manganese, being even more brittle, and very oxidisable, in contact with water.

Messrs. Archer & Sons, of Lord-street, Liverpool, announce the issue of a new and complete set of lantern slides of the Cunard Company's steamships.

Bristol and West of England Amateur Photographic Society.—Mr G. W. Gwyer gave information on recent improvements in ether saturators, explaining the construction of the pendant saturator, and demonstrating its safety by various experiments. He lighted the vapour coming from the outlet valve of a pendant saturator fully charged with gasolene and oxygen by applying a light to the nozzle. The saturator was then inverted and shaken violently without any fluid coming from the open valves or any variation in the flame. Mr. Gwyer also showed a jet of an inexpensive type recently designed by him, and from which a light of great power was obtained.

Messrs. R. J. Moss & Co., of Abingdon, state that their business is being taken over by a syndicate, who will trade as the Abingdon Acetylene Illuminating Company, Limited, office and works at Birmingham.

MONTHLY SUPPLEMENT

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THE LANTERN RECORD.

CONTENTS.

	Page
TERN NOTES AND NEWS	17
TERN MEMS. By G. R. BAKER	18
EA FOR THE OIL LAMP.—III. By N. ARMSTRONG	19
YLENE EXPLOSIONS	19
YLENE	20
WARZ'S IMPROVEMENTS IN BRODE PRINTING APPARATUS	21
CHESTER PHOTOGRAPHIC SOCIETY (LANTERN SECTION)	21
THORN & HODDLE'S RECEPTACLE FOR SAFELY STORING CALCIUM CARBIDE	22
A SUGGESTION TO THE PROFESSIONAL. By J. REES	22
THE COMPARATIVE ADVANTAGES OF ENLARGEMENTS AND DIRECT PHOTOGRAPHS	23
EDEY'S FLASHLIGHT APPARATUS	23
THORN & HODDLE'S ACETYLENE JET FOR LANTERN USE	23

LANTERN NOTES AND NEWS.

E *Scientific American* states that the Board of Fire Commissioners of Jersey City has adopted regulations for the manuure and storage of acetylene gas. The regulations provide: hat the manufacture of carbide of calcium or the liquefaction calcium carbide be prohibited except under certain prescribed tations to be designated by the Board. That it declines to nit the use of any acetylene-gas regenerator in this city except e devices be first submitted to the Board for careful test, examina-, and approval of the Board. That, after the careful examination le into the methods of operation of the Bournonville gas reerator, and finding the same to be operated on safe scientific ciples, and in view of the small quantity of carbide treated by device and the careful storage and distribution of the same, the embargo laid by the Board against the use of this machine withdrawn and its operation sanctioned, provided that the hods now employed be not altered or made more dangerous. It rther provided that the use or storage of calcium carbide be fined to quantities of five pounds each, which must be stored in vy block-tin vessels, and until ready for use hermetically sealed, that no dwelling, factory, or other building, be permitted to p on storage a total quantity in excess of twenty-five pounds in s or vessels of five pounds each."

* * * *

OR the purpose of colouring the incandescent gas light, it is said M. Salomonow has taken out a patent in Russia for the owing mixture for saturating the cotton fabric of the mantle:—

Anhydrous sulphate of magnesia	12 parts by weight or a corresponding quantity of crystallised salt.
Zinc sulphate	4 parts by weight.
Potassium bichromate	1 part by weight.
Ammonium bichromate	½ part by weight.
Distilled water	50 to 100 parts by weight.

l a few drops of a solution of nitrate of silver. A mantle pred with the above mixture will give a pink colour, which will be nger if a little tin nitrate has also been used. If tetrachloride of inum is substituted for the silver nitrate, the light will be of a len hue.

AN American contemporary describes the following adaptation of the well-known incandescent mantle to the purposes of an oil lamp. The principle is the same as that of the Welsbach light, the illuminating quality of the oil having nothing to do with the result. The light is produced by heating the mantle—which is the same as, or similar to, the Welsbach—to a white heat, the light radiating from the incandescent mantle, and not from a flame. A Welsbach mantle is placed on the lamp. Above it is an oil-vapourising tube, which is heated from the mantle, and injects the oil vapour thus produced into an oil-supply tube with such force as to carry with it a proper supply of air. The air and oil vapour mixed are forced through a minute hole into the base of the mantle, where they burn with an ordinary Bunsen flame, heating the mantle to incandescence. The pressure of the vapour is also used to raise the oil to the vapourising tube. In street lamps it is proposed to lay small tubes in the street to supply the lamps with oil by pressure at the works. The lamp is started by an alcohol flame. As the light produced by the Welsbach mantle depends upon the degree of heat to which it can be raised, and as oil will produce a much more intense heat than gas, the light of this lamp is very much greater than a Welsbach light, which is nominally sixty candle power. The advantages claimed for the light are that it more nearly resembles sunlight than any other artificial light, and that colours are as readily distinguishable as by sunlight. In economy it is claimed to be the cheapest of all. The consumption of oil averages one quart for each nine hours of continuous burning.

* * * * *

ACETYLENE enjoys a wider range of explosibility (if the phrase may be allowed) than any other combustible gas, that is to say, a smaller percentage of it in the air will make an explosive mixture than is the case with other combustible gases, and that, when the percentage of air in the mixture has become so small that the mixture is not explosive for any admixture with the air other than acetylene, there may yet be enough oxygen present to allow of an explosion with that particular hydrocarbon. The following figures are given:—Mixtures of acetylene with air are explosive if the percentage of the former is not less than 3 or more than 82 (a range of seventy-nine per cent.), while the same limits are from 5 to 72 (a range of sixty-seven per cent.), for hydrogen, from 13 to 75 (a range of sixty-two) for carbon monoxide, from 4 to 22 (a range of eighteen) for olefiant gas, and from 5 to 13 (a range of eight per cent only) for marsh gas.

* * * * *

IT was recently stated that several experiments have been made with the micro-phonograph of M. Dussard. Dr. Laborde and Dr. Gellé have been trying it on deaf mutes, with satisfactory results in many cases, and MM. Berthon and Jaubert have been able with a combination of the micro-phonograph and the telephone (?) and the cinematograph to reproduce scenes with the conversations and ejaculations complete. It is possible that in the near future the "sights" and the "sounds" of many exhibitions may be reproduced for the edification of spectators and audience.

A RECENT invention connected with incandescent lamps provides an improved light-refracting and magnifying envelope to concentrate the light rays downward or as required, but without causing shadows in the opposite direction. With this view the bulb is enclosed by a closely wound spiral of glass rod of circular or other section, having throughout its length the property of a biconvex lens or prism, producing a concentrating and magnifying effect. When not required to apply the envelope to the entire lamp, the upper or the lower half may be employed as desired.

* * * * *

ACCORDING to a contemporary, another great telescope is approaching completion in America. In 1895, the Rev. John Peate commenced at Greenvill, Pennsylvania, the construction of a mammoth glass speculum for a reflecting telescope designed for the American University, Washington. After two years of arduous toil, Dr. Peate has given the great mirror its final touches—that is, in grinding and polishing—and it is now ready for silvering and for the further and important stage of mounting. This large disc of glass is more than sixty-one inches in diameter.

* * * * *

REGARDING the action of acetylene on indiarubber, a correspondent of the *English Mechanic* has the following interesting note in that journal: "I took a perfectly new gas bag, made of the ordinary 'double-texture' drab macintosh material, and tested its soundness by forcing air into it, and leaving it distended for three or four days, at the end of which time no perceptible leakage had taken place. I then filled it with acetylene from one of the ordinary generators (no special care being taken to purify the gas), and placed it between pressure boards, the weight of which was sufficient to exercise a slight pressure on the gas. In less than half an hour a strong smell of acetylene gas was perceptible in the room and the bag began to collapse. In less than three days almost the whole of the gas was gone. I also distended one of the ordinary indiarubber toy balloons with acetylene, and the same gradual but continuous shrinkage was observed. It thus appears that indiarubber bags cannot be depended upon to hold acetylene, though perhaps they might do to hold the excess of gas escaping from an acetylene generator, in preference, at any rate, to allowing it to pass directly into the room. The action of acetylene upon the rubber does not appear to be a chemical one. At any rate, the material is not corroded or deteriorated in properties, as was proved by filling the gas bag again with air (all traces of acetylene having been swept out), when it proved as tight as at first; also, the toy balloon was distended with air, and it seemed as tough, flexible, and elastic as it was before acetylene was put into it. I believe that the action is similar to that of carbon dioxide upon a soap film. When a soap bubble is blown with carbon dioxide, the gas passes through the film with far greater rapidity than it should do according to Graham's law of diffusion, the fact being that the carbon dioxide is dissolved by the water at the inner surface of the film, and passes thus in solution through the film until it reaches the outside, where it quickly escapes into the air. Similarly, it would seem that the indiarubber dissolves acetylene, and thus a procession of molecules of the gas passes through, and not between, the molecules of the indiarubber, being handed on from one molecule to another, until the outer surface of the sheet of rubber is reached."

LANTERN MEMS.

"COLOUR vision is more acute in women than men." So said Mr. Brudenell Carter in his lecture at the Society of Arts on Wednesday, February 23; while on Friday evening, the 25th of the same month, at the Royal Institution, ladies showed that colour photography had a fascination for them to an equal, if not greater, degree than gentlemen interested in this branch of the art-science of photography.

* * * * *

BEAUTIFUL as many photographic and other productions in monochrome are, Nature has so constituted the human race that it cannot help being pleased with a closer reproduction of her works than ca be achieved without colour; and from the earliest times it has bee sought to portray historical and other events in coloured represents tions as nearly like the original as the skill of the artist or portraye and the material at his command would admit. That some of th colours known to and used by the ancients were marvellously pur and permanent has been shown by the monuments discovered i Egypt and other places.

* * * * *

WHEN Captain Abney's lecture on the theory of colour in relatio to colour photography was announced, it was expected that th subject would be of great interest to the scientific world, and secur a big audience; but few were prepared for such a packed or "fu house" as was the case in the theatre of the Royal Institution o Friday, and the lecturer justified the anticipation of interest b condensing into the limited time of one hour a great amount c information on this subject, and giving demonstrations that clearl brought home the various points of the lecture, and showed th simple character of the colour theory and its known principles c application.

* * * * *

IT was due to the researches of Clerk Maxwell that this theor was reduced to such simple proportions, and experimenters wer able to continue the work, knowing that white light was practicall made up of the three colours, red, green, and blue-violet. It was i 1861 that this theory was propounded and three-colour photograph foreshadowed, and now we have the beautiful examples of Mr. Ive Professor Joly, and others, which the audience appreciated to th full when shown at Captain Abney's lecture.

* * * * *

SOME of the apparatus used on this occasion has been seen ofte in the photographic world before, but did not lose one atom b being employed again in reproducing old and new designs i Mr. Ives's clever instrument, the photo-chromoscope, while newe instruments employed by Captain Abney to produce artificia spectrum by revolving three pieces of coloured glass of the colour mentioned secured results that were clearly seen.

* * * * *

IT was rather a curious fact, and more than once commented on a the *conversazione* in the library after the lecture, that Captain Abne made no mention of the Lippmann process or the colour photograph obtained by Mr. Bennetto, and shown by the lecturer at one of h previous lectures. In the latter case it may have been that, as n details of production could be given, owing to the American pate not being completed, the lecturer could not introduce the matte but, as regards the Lippmann, a passing notice of it would ha been graceful, especially as in the same theatre a few months befo the Professor had given a lecture, and received a tremendo ovation on exhibiting the results of his invention, which were a mitted to be, so far, the most perfect for purity of colour. N doubt, in the necessary condensation of his lecture, the matter wa overlooked.

* * * * *

THE examples of the Joly process, exhibited on the lantern and o an illuminated stand in the library, were very beautiful, an when viewed at a distance, very pleasing. The Joly phot graphs, as no doubt is generally known, are taken throug screens of orange, green, and blue, and the lines are one tw hundredth of an inch broad. The viewing or projection scree are red, green, and blue violet. From what has already be achieved, and the possibilities of developments in colour photograph in the near future, I think it safe to predict we are with measurable distance of the publication of a process that an amateur can use, and at once get positives in colour from a negati in monochrome. Certain it is that colour photography is somethin more than "in the air," or "in the imagination of those whose wi is father to the thought."

I WAS glad to see the editorial expression of approval in THE BRITISH JOURNAL OF PHOTOGRAPHY of the artistically coloured lantern photographic transparencies submitted to him by a well-known slide-colourist in London, and, as I had the pleasure of inspecting the slides referred to, can endorse what was said of them. This brings to my mind that I have several times said how much properly coloured slides are appreciated by an average audience, and only this week I saw a letter wherein the hirer of a set of coloured photographs (that retail at 2*s.* 6*d.* each), said, on returning them, that the slides were thoroughly appreciated, and acknowledged to be the finest set ever shown in the district. If users of slides would purchase or hire only those coloured slides that had been properly and artistically painted, the life of the common daubs would soon come to an end, for it is not reasonable to suppose justice can be done in the way of colouring for 3*d.* or 4*d.* per slide. Better leave a slide uncoloured than attempt to do anything that approximates to the representation of natural colouring at such a price; but that it is possible for English artists to do as good work as the Japanese for the same price can be proved by those who take the trouble to inspect the stocks of those opticians who have a reputation in the lantern world for high-class coloured slides.

* * * * *

I COULD not help being struck with the fact that Mr. Brudenell Carter took the photographic camera as the means of illustrating the mechanism of the human eye, not so much that it was a model for comparing the various parts, but the lecturer, by so doing, presupposed that the audience understood all about a photographic lens and camera, including the diaphragm, focussing screen, &c. It shows that, if *everybody* is not a photographer, at least he or she is supposed to know all about the apparatus and how it is used.

G. R. BAKER.

A PLEA FOR THE OIL LAMP.

III.

THAT much may be done to improve or mar the brilliancy of a disc, be it either that from the lime light or an oil radiant, by the employment of an unsuitable screen, is a well-known fact to most lanternists. A poor thin sheet, that will permit of a large proportion of light passing through, almost always detracts from an entertainment, both on account of the loss of brilliancy on the screen by non-reflection from its surface, as well as the degradation arising from the light that has passed through being reflected back upon the screen, and very probably flooding the room or back of the picture with light that ought not to be present at all. With an oil lamp, especially, should there be provision for the very best results being obtained, and hence the employment of paper screens in distances where discs of only moderate size are being utilised. The great advantage of linen screens lies in their portability, and, no doubt, with any one who travels regularly from place to place with his lantern they are almost a necessity. A good paper screen, however, should if possible be employed whenever the radiant is that derived from an oil lamp.

Any wholesale stationer will supply strong web paper of sixty inches in width, up to a reasonable length, and when larger sizes are needed they can be had by applying direct to any of the paper mills, where the width of the rollers sometimes reaches up to sixteen feet.

In practice, I use for my oil-lamp work a six-foot paper screen, and this is how I set about getting it suitable. Having procured a good stout web paper, I prepare a quantity of whitewash in a clean bucket by warming about a pound of size and mixing up the finest whiting I could obtain. When this was beaten up with hot water, and made free from every particle of lumps, I added as much indigo blue as gave the colour wash a distinct tinge of blue, thereby getting rid of any proneness to a yellow-coloured screen. The web of paper was then laid on the floor, and a clean whitewash brush used to colour-wash the surface of the paper. After about ten minutes' working carefully over every part of the surface, and when it was seen that no lumps or spots were left on the surface, it was set aside to dry all night, and in the morning the result was a beautifully even light blue screen, that was a treasure when used in conjunction with my oil lamp.

This screen is a fixture in my work-room, and is regularly used to test every lantern slide I make. All my slides are tested by means of an oil lamp of about fifty candle power, and, when I get them to show up well and brilliantly with the aid of this radiant up to a five or six-feet disc, I know that they will behave equally well when projected by means of the lime light up to twelve or fifteen feet.

If dissolving effects are required by means of oil lamps, then two side-by-side radiants must be employed, and such must be worked from the right and left of each lantern by means of suitable carriers, such as Beard's pattern, the cut off being effected by means of a finger disc, or dissolver, that passes close in front of the objective, and which is actuated by a lever rod passing between the lamps and fitting into a socket at the back of the lantern box. The dissolving disc is hinged in the centre so as to fold the flaps together when it is desired to employ both lanterns on the screen at the same time. It is quite wonderful what beautiful effects can be obtained by means of this old-fashioned front method of dissolving, effects that quite equal, if, indeed, do not surpass, those obtained by means of the turning on and off, by an intricate mechanism, the gas from the jets of a lime light.

In single lantern working, however, the great advantages of an oil lamp lie through its being so easily brought into use, a few minutes only being needed to light up; and, when the lamp is used in conjunction with a single dissolving carrier, very striking results are obtained.

It is a *sine-quâ-non* in all good lantern displays that the white screen should never be shown during the entire entertainment, but that each slide should be projected in such a manner as to follow the previous one, and, if possible, be made to assume exactly the same position on the screen which the previous one occupied. When any lecture set is provided with masks of the one shape and size, this is a matter of easy accomplishment by means of the dissolving carrier I have alluded to. There is no doubt the using of this carrier gives a most unique finish to any single lantern entertainment, and goes far to place biunial lamps in the background, especially for plain lecture sets where no effect slides are required.

The carrrier I refer to is not the see-saw, or right-push-through (first to the right and then left) pattern, necessitating working across the top of the front of the lamp, more or less, but is one of Beard's masterpieces of mechanism, and, although it is somewhat costly, is well worth the money. By its means a slide is inserted, the brass lever being pushed home and again withdrawn, the next slide is then placed in position in the runners, and when the lever is pushed home again the second slide appears in front of the first, but out of focus; the withdrawing of the lever again not only registers exactly the second slide, but at the same moment withdraws the first slide, thus making the second slide take its place, and the effect being such as if the one picture is dissolved into the other.

The employment of this carrier must to a great extent popularise single lantern working, for it enables the slides to be inserted and withdrawn on one side only of the lantern, and that at the same point. The screen is never left without a picture, and there is no see-sawing or ludicrous pushing of one picture on, and another off, before the eyes of the audience. I look upon this carrier as one of the most important improvements in lantern apparatus of recent times, and when such is used with a good oil lamp it goes far to add to the effect that is obtained.

For a long time an opinion was expressed, and generally adopted, that in oil-lamp working the slides to be shown should be specially selected of a less dense character than those intended for the lime-light lantern, and to a certain extent there is sound logic in this advice. I find, however, with fair average slides, *i.e.*, those either of collodion or gelatine, it makes but little difference, provided the disc is not made to exceed the proportions I have previously alluded to.

To get the very best results only of a low-power radiant, such as an oil lamp, attention should be given to several other important points, that to many might appear merely trivial matters. Among these may be mentioned the leakage of light from the lantern, and the utilising of an absolutely dark room for its working. In some forms of lamps, especially when such are constructed to do duty both for the lime-light jets as well as the oil and gas lamp, there are some parts of the body virtually open, and from which emits a large quantity of light. When such is present, there ought to be provision made to trap the same by such means as a suitable curtain. These curtains are easily made by making an iron hoop, or ring, that is easily lifted over the top or funnel of the lamp, and to which is sewn a curtain of some suitable thick dark material. When the curtain is attached to these rods of iron rings or hoops, it is lifted on or off in a moment, and is much to be preferred to the fixed brass rails so commonly in use.

Whenever an oil lamp is to be used, every consideration should be given to choose the darkest possible situation for the display, and, when the company are assembling, the room ought to be as dark as it can be made. The lantern should be lighted some time previously, and the lens capped. Any leakage of light should be seen to and stopped off, if possible, by means of the curtain. Attention to these little matters goes a long way to heighten the brilliancy. A leaky lamp used in a room where there are numerous articles reflecting the light emitted from the lamp lowers the effect in a very marked degree.

To those of my readers who make up their minds to pay a fair amount of attention to their oil lamp (provided it is a good one), I can promise, when such is used within its proper sphere, much satisfaction and pleasurable enjoyment.

T. N. ARMSTRONG.

ACETYLENE EXPLOSIONS.

DEVELOPMENTS have been somewhat retarded with this new, and, we must admit, excellent, illuminant, by the various accidents which have occurred at various times, and under certain conditions. It must be remembered that acetylene is an inflammable hydrocarbon gas, and possesses, by reason of its combustible properties alone, certain

properties common to all gases of this series or mixtures of the same. Explosions of illuminating coal gas are common, and many of our coal-mine disasters are due to the explosion of mine gases; similarly, vapours of benzine, dust from mills, factories, or coal breakers occasionally inflame and explode under certain conditions. Therefore, says *The Scientific American*, the simple fact itself is not an exclusive property of acetylene, but rather that belonging to all combustible material under certain well-defined conditions.

The condition referred to is, that sufficient oxygen shall be present, and intimately mixed with the gas or finely divided combustible matter to produce and support combustion after spontaneous or purposive ignition has taken place. Usually this oxygen is supplied by the air; and, therefore, certain definite mixtures of air with various gases are explosive, the latter term indicating that combustion takes place more more or less instantly, thereby generating a considerable amount of heat, which, imparted to the gases of combustion, expand instantly, and tend to increase in volume to such an extent as to burst the confining vessel or do other serious damage. Thus, if we have acetylene confined in a small gas-holder such as accompanies some generators, or in the generating vessel itself, it is harmless so long as it is not mixed with air; but, as soon as any vent or cover is opened, admitting oxygen, the mixture is liable to detonation when an open flame is brought in contact with it. And thus was caused all the explosions of non-liquefied acetylene gas which we have any knowledge of. Carbide is of such good quality that there never will be sufficient phosphorus in the gas to cause spontaneous combustion upon the admission of air to it, and, should such a gas be made, it would have such an evil smell that the carbide would be rejected; for the odour of acetylene is due to the phosphureted and sulphureted hydrogen it contains. These impurities exist primarily in the lime and carbon used to make the carbide in the electric furnace.

Let us now take a brief survey of some of the principal accidents that have occurred. In France there have been a number of minor explosions. While brazing a generator which they believed perfectly free from gas, some workmen of Paris were seriously injured, as the vessel was but partially empty and contained the requisite air and gas mixture. At Fécamp a similar accident was caused by a workman soldering a gas-holder without taking the trouble to empty it. A café was destroyed at Lyons by a violent explosion, due to the carelessness of a boy who had neglected to close a valve on the generator, thus allowing the gas to escape into the room during the night, all ready mixed for ignition by a candle in the morning. At Milan, a foolhardy inventor looked for a leak in his apparatus with a lighted candle—and found it, but was dangerously wounded in doing so. While attempting to solder a generator containing a mixture of gas and air, two workmen of Chateauroux were wounded by the resulting explosion. Again, near Toulouse, a tinsmith and his helper were endeavouring to make a generator work, and by their recklessness of consequences caused an explosion which killed both. At Compiègne, in a generator factory, while a generator was being tested, the foreman left the shop for a moment, advising his helper not to approach it with a light. He was scarcely gone before the inquisitive workman lit a candle and approached the apparatus (the bell of which had been removed), and was killed by being struck on the head by a flying fragment. At the restaurant of M. Marignac, at Portet, in Haute-Garonne, the proprietor and another man attempted to clean a generator which had just been installed. He was removing the cover when an explosion occurred, injuring him seriously about the body and legs, while his friend had his right leg maimed.

Another phase of these explosions appears in an explosion at the shop of M. Caron, a bicycle manufacturer of Paris. He sold carbide to supply the acetylene lamps of wheelmen. This carbide was shipped in hermetically sealed tin cans in wood cases, having the top soldered on. While attempting to open this can in the usual way by using a hot soldering iron, he found it was not hot enough, and carelessly used the flame of a plumber's lamp instead. The solder melted, but there had been enough moisture in the air enclosed with the carbide to generate some acetylene gas, and this was ignited by the flame of the plumber's lamp. A detonation followed, and M. Caron, who was sitting on the can, was burned about the upper part of his body, and his workman was hurt by flying pieces of the can about the head and chest. Although this differs from the other explosions slightly, the cause is the same—applying a flame or incandescent body to a mixture of gas and air. All could have been avoided by ordinary precautions.

In Germany, we find similar accidents, and in England in less degree. In the United States there are a few examples of note. At Rochester, while working about the safety valve of a galvanised iron gas-holder, the experimenter was dangerously injured, and a bystander narrowly escaped. It is said that the injured man was bending over the gas holder, and was attempting to pull it out, evidently drawing air in at the same time and forming an explosive mixture. The room was dark, and a gas jet was burning above the apparatus, the cause of an explosion thus being not difficult to trace. Similarly, at Wilmington, a boy was temporarily left in charge of a generator, and, finding the gas light growing dim, attempted to operate the apparatus. He is supposed to have opened the generator by unscrewing the cover, and to have taken a candle to examine its interior to see where the trouble was. Naturally an explosion followed. It is thus apparent that these accidents were caused by igniting an explosive mixture of acetylene and air, which mixture may contain from three to fifty per cent. of acetylene, the maximum effect being obtained between twelve and twenty per cent. The range with coal gas is less, beginning at about eight per cent. of gas, and the explosive intensity is not so great.

Acetylene should not be kept under a pressure of more than about 25 pounds per square inch gauge pressure, and compressing directly in the generator has been found dangerous, as the temperature generated is liable to cause decomposition; just as acetylene under low pressure has its one great element of danger—explosive mixtures of air and gas—so compressed or liquefied acetylene has its *bête noir*—temperature.

Liquefied acetylene expands remarkably under the effects of temperature, about one atmosphere (15·4 pounds per square inch) for a rise in temperature of about 2° F. Consequently, the heat does not have to be very great to cause the pressure in the storage flask to exceed its strength, and it bursts. The liquid at once expands into gas, and expands still further if it comes in contact with fire, or explodes with tremendous violence, if allowed to mix with air before ignition. New Haven the past year witnessed a very destructive explosion of a flask of liquefied acetylene. The evidence indicated that there was a leak in the valve of the flask caused by a fracture, and that the escaping acetylene was ignited by a match or candle used to test the regulators. The escape of gas was evidently larger than ordinary, causing a large development of flame, which heated the flask up to bursting point, and the shop was demolished by the resulting explosion. At Paris an explosion occurred in the laboratory of Professor Pictet of a similar cylinder, due to improper handling by an *employé*.

About a month ago the works of the United States Liquefied Acetylene Company, of Jersey City, were demolished completely by exploding cylinders of liquefied acetylene. Although the coroner's report has not as yet been issued, the evidence seems to point to the fact that a flame was seen in the room before the explosion, apparently coming from a cylinder which had been partly filled with acetylene, and blown out again to remove any air that may have been contained. This escaping gas must consequently have been ignited somehow, although the witnesses who could have told how were killed by the explosion. It must be remembered that acetylene gas is readily ignited by a spark, a lighted cigar or pipe, a red hot coal or similar incandescent body, and that carelessness or ignorance of these conditions evidently has caused many accidents. After the first cylinder exploded, the burning gas generated such a high heat that the score of other filled cylinders exploded like a pack of gigantic fire crackers. A boiler was projected through the air to a distance of 200 yards, and earth tremors were felt as far as Staten Island.

These explosions, all of which were more or less disastrous, must one and all be traced to carelessness. A careful man does not go into a cellar in which there is a leaking illuminating gas pipe, carrying a lighted candle; neither does he tumble a can of nitroglycerine off a wagon or throw a lighted cigar into a keg of powder. With the same degree of carefulness, he will not approach a mixture of air and acetylene with a lighted lamp or cigar, nor will he place a flask of liquefied acetylene where any escaping gas will be ignited or the flask itself unduly heated.

A great deal of groundless fear has been induced by the above disasters. As a consequence, we still hear about acetylide of copper, although experience and experiment have not corroborated the oft-repeated warnings against it. Similarly, phosphuretted hydrogen has caused much disquietude, but thus far no harm has been traced to this substance. However, when the carbide is unusually impure, the gas will have a very decided fœtid garlic odour, and the products of combustion, when not permitted to escape, may cause discomfort while breathing it. American carbide is quite free from this defect, and, owing to the small consumption of this gas (one-half cubic foot for a twenty-five candle power light as compared with five cubic feet of illuminating coal gas), the formation of vitiated air is slow in comparison. When breathed, it is not so poisonous as coal gas. And we may safely state that, if we observe the two necessary precautions of low temperature and keeping an open flame away from the generators and gas holders, this gas is perfectly safe to use.

Therefore, generators should be located in well-ventilated places, preferably out of doors, and should be opened for filling and cleaning only by daylight. Liquefied acetylene is scarcely a safe form to use this gas in, as the pressure necessary for liquefaction is at least sixty-eight atmospheres—a pressure that, in itself, is dangerous, and admits of no defective apparatus. Acetone, as a solvent, has not as yet received sufficient application to judge of its possibilities.

ACETYLENE.

Before the Wakefield Photographic Society recently a paper on "Acetylene Gas" was given by Mr. Atkinson, of Belle Vue, and a series of experiments as to its use in portraiture, in lantern projection, and in enlarging were made. Mr. Atkinson began by declaring that in his

opinion a paper or lecture before a photographic society should, above all, be practical, theory being all right in its place, and may suit some, but had little value when in the hands of faddists. It has long been felt that some cheap and handy method of using artificial light suitable for photographic use was wanted other than magnesium, the soot-and-whitewash effects, its lightning-like intensity producing the most fearful grimaces on the sitters, the clouds of smoke resulting from the flash, are only a few of the inconveniences resulting from the use of magnesium flashlight. Now, the acetylene light has none of these drawbacks. It is an exceedingly soft light, giving in portraiture a perfectly natural expression, so seldom seen in flashlight pictures; in lantern projection we get a beautifully even disc, and a penetrating light that augurs well for good results in enlarging.

The gas is obtained from calcium carbide in contact with water when both the carbide and water are decomposed. Acetylene gas has several distinctive properties; first, its diffusiveness, so different from electric light, which requires covering with some semi-opaque substance in order to diffuse it, this meaning loss of light. Acetylene does not vitiate the atmosphere like ordinary gas, as it only uses about one-twentieth the amount of oxygen that an ordinary gas jet does. As for its actinic value, which is the most important item to photographers, acetylene gas gives a spectrum almost identical with sunlight.

Here two exposures were made on two sitters, the time given, with a portrait lens *f*·4, being three and five seconds, both being good; after which some diagram slides were projected, showing comparative strength of acetylene gas against ordinary gas; acetylene, burning half a foot an hour, at ten feet from screen, gave thirty candle power, whilst an ordinary gas jet, burning six feet an hour, at seven feet, gave only fifteen candle power. As for cost, acetylene, in small quantities, costs 2*s*. 1*d*. 1000 feet. Diagram slides of the generators and other apparatus were also shown and explained, and Mr. Atkinson continued: "I know that many prejudices exist against acetylene; one, and I must admit quite a natural one, arises from the pungent odour of the gas; but with proper apparatus and burners that give perfect combustion there should be no smell whatever; another objection is its explosiveness. Like coal gas, it *is* explosive. If you allow a quantity of either gas to escape, and then go with a candle in search, you may expect trouble. At about five atmospheres' pressure, I understand, it is very explosive; but, seeing that one inch to one and a half inch (that is one-twentieth to one-thirtieth of an atmosphere pressure) is all that is necessary, with ordinary care, there is absolutely no danger. I may say that I am working with a three-inch pressure, and it would require special apparatus to increase this fifty times. Of course, to recharge or discharge near to a light is dangerous. In order to facilitate quick decomposition it is better to break the calcium into small pieces."

Such, then, are a few of the properties of the new light, which are naturally interesting to photographers.

Now by means of the acetylene light, which is nothing less than bottled sunbeams, an amateur photographer, who is engaged during the ordinary daylight hours, has opened to him fields of photography, portraiture, enlarging, copying, micro work, &c., in which he has hitherto laboured under very great drawbacks.

Swift, speaking of one of his characters, says:—"He had been engaged eight years upon a project for extracting sunbeams out of cucumbers, which were to be put in phials hermetically sealed, and let out to warm the air in raw inclement weather. He told me he did not doubt that in eight years more he should be able to supply the Governor's garden with sunshine at a reasonable rate."

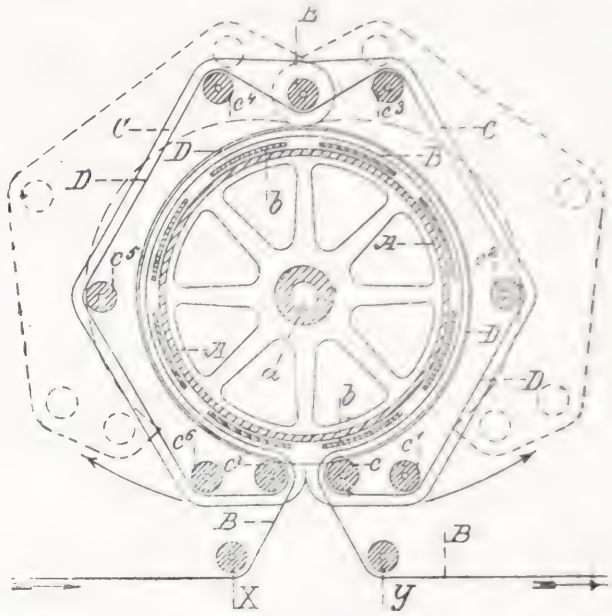
What Swift ridiculed as impossible, we have achieved. We can extract sunbeams, we can store them in concentrated form in small phials, and use and distribute them at our will and pleasure. I need hardly explain that we don't use the cucumber from which to extract our sunbeams, we use calcium carbide.

SCHWARZ'S IMPROVEMENTS IN BROMIDE-PRINTING APPARATUS.

In the apparatus used for illuminating sensitised paper for the purpose of printing off photographic copies, the negatives are firmly pressed, by the aid of a blanket, against the sensitised paper. When the paper has been sufficiently illuminated, fresh sensitised paper is inserted under the negatives, for which purpose the blanket must be removed.

When only a limited number of copies is required, the ordinary apparatus are sufficient, but, when a large number of copies are wanted, such apparatus ceases to answer the purpose, as the removal and replacing of the blanket entails too great a loss of time.

These defects are remedied, according to this invention, by using a rotary blanket such as illustrated, by way of example, in the accompanying drawings. The transparent negatives, *b*, are fixed in any suitable manner upon a transparent or translucent cylinder, A, turning upon the shaft, *a*; over this cylinder passes the suitably guided sensitised paper which enters at X, and leaves off at Y. Guiding rollers, *c*, c^1, c^2, c^3, are distributed round the cylinder, A (preferably in a detachable frame, C), endless blanket, D, being passed around the same in such a manner as to surround the cylinder. This blanket firmly presses the sensitised paper, D, against the negative, *a*, on the cylinder, A, such pressure being produced by the aid of the pressure roller, E, arranged between the two guide rollers, c^3, c^4. This pressure roller is arranged to slide relatively to the cylinder, A, so that, by bringing such roller in close proximity to the cylinder, the pressure



of the blanket on the paper can be regulated according as required; as the cylinder, A, turns, it carries away with it the sensitised paper, B, and the blanket which are firmly pressed against the same, but, while fresh paper is led to and removed from the cylinder the blanket turns constantly over the rollers, *c*, c^7, and the cylinder, A. The speed of the cylinder, A, is so calculated that, while the sensitised paper ascends upon and descends from the cylinder, the image is properly developed.

To affix fresh negatives to the cylinder, the frame, C, is opened so that the blanket may assume the position shown in dotted lines, and the negatives are placed upon the cylinder, A, while the same rotates. In the arrangement shown the cylinder is transparent, and the source of light, such as one or more electric lamps, is placed inside the same. This, however, is not indispensable, as an opaque cylinder may also be used, provided the blanket is made of transparent or translucent material, in which case the negatives are affixed to the blanket, turning herewith upon the cylinder, A, and the rollers, c^1, to c^7, successively beat, as soon as they turn on the cylinder, upon the sensitised paper, while maintaining their position relatively to this paper, until the blanket runs off the cylinder and rotates over the rollers, *c*, to c^7, and off. In this second arrangement the light from outside falls through the blanket, D, and the negative, *b*, upon the paper, while in the first arrangement the light emitted inside reaches the sensitised paper through the cylinder, A, and the negatives, *b*.

MANCHESTER PHOTOGRAPHIC SOCIETY (LANTERN SECTION).

FEBRUARY 23, the President (Mr. J. Wood) occupying the chair.—Mr. H. Woolley took up the first part of the evening with an interesting lecture upon the *Lofoden Islands*. Mr. Harry Wade manipulated the lantern.

The Lofoden Islands are situated on the north-west coast of Norway, and are about 1000 miles north of Manchester. They are chiefly composed of hard granite, some of the rocks rising some 4000 or five thousand feet above the sea level. The chief occupation of the natives is fishing, cod and herring being the most abundant. Owing to the swampy nature of the ground, all the houses are built on piles. Mr. Woolley and his two friends made ascents of several of the rocks, and the views of the surrounding country as seen from the summit were much appreciated by the audience. The various islands were visited, and slides of many of the tarns and lakes were thrown upon the screen. As there are no grand hotels in some parts of the islands, the lecturer and his friends had to resort to a tent, making their camp amongst the tall ferns which grow so abundantly there. At one of these camps they experienced a "three days' rain," which did not improve the situation, as the rocks at the back were almost perpendicular, leading the water down in sheets, which made it difficult to keep anything in the tent. Several views of the camp illustrated the lecturer's remarks.

For the second part of the evening Mr. J. B. Robinson was announced to give a lecture on *Photo-micrography*. Mr. Blakeley kindly offered to read the list belonging to the slides, which, however, would have interested the audience more if Mr. Robinson had been present to give an account of the subjects, but unfortunately he was unable to attend.

THORN & HODDLE'S RECEPTACLE FOR SAFELY STORING CALCIUM CARBIDE.

MESSRS. THORN & HODDLE provide a cylindrical or any suitably shaped vessel, partly covered in by a dome-shaped top. This top has an aperture for the admittance or withdrawal of the calcium carbide, and two rims are provided, one fixed on the edge of aperture and the other fixed at any suitable distance outside it, in such a manner that a luting may be inserting in the intervening space or channel.

A lid or cover is also provided, also having two rims affixed, one being sufficiently large to overlap both the rims affixed to the receptacle, and

FIG 1.

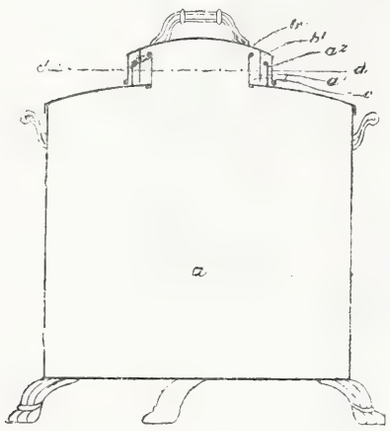
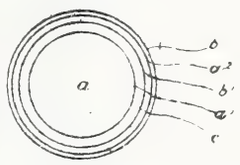


FIG 2.



the other of a suitable diameter to fit into the luting, in channel, between the two rims, on said receptacle, in order to thus form an hermetically sealed joint.

Fig. 1 is an elevation of apparatus.

Fig. 2 is a horizontal section on the line *d d* of fig. 1.

a is the body of calcium carbide receptacle or holder, and *b* is the lid or cover. a^1 a^2 is the double collar on receptacle, and *c* is the channel for luting. b^1 being the inside collar or rim on lid or cover which fits into the luting, when closed, and thus forms an air-tight joint.

A SUGGESTION TO THE PROFESSIONAL.

THE professional photographer, although confessedly much needing, and ardently wishful for, improvement in his work and trade, as far as such would result in better pay, looks in a very sceptical fashion, as a rule, upon the suggestions occasionally made by outsiders towards that end. Not that he, it must be admitted, resents them in any angry, unpleasant way, being sensible probably of the good intention lying at the bottom, but rather in the somewhat dry, cynical fashion characteristic, I fancy, of him, as of such others, lawyers and doctors, for instance, privileged to see human nature with some of its articles of clothing laid aside for the time being; the mayor anxious as to the full value of the mayoral robe being given in the photograph, the preacher that his eye and look be as soulful as possible, the business man that thoughtful gravity of demeanour be in evidence, or the little angel in blue eyes and golden hair that her preening has duly extended the feathered plumes of her pinions.

"'Be a bit more artistic? go in for a little impressionism, and try to idealise in face or head?' My dear fellow, that sort of thing may answer all right going in for a prize competition, with the winning result to be hung in the vestibule of the Free Library, but you cannot profitably combine art and business in a general, retail, way; and it wouldn't hang in the shop window, or show-case at the door. There would be but few, of wider education, who could appreciate such work; and they, as a rule, with ampler means, would argue that, if you could do it well, it could yet be done better in a larger town, or in London, upon their next visit; for a photographer, like a prophet, finds no honour in his own country. The face you may wish to idealise again, spite of all the artistic lies of novelists, belongs most often to the wrong body, to the body carrying the wrong soul, or no soul at all, and will have none of your experiments; whereas the true artistic soul is most likely enshrined in a body having so commonplace a face as to be altogether beyond lending itself to your purpose. Finally, both kinds are so few and far between as to take too much looking for. What ordinary woman, for instance, in the first case, would allow you to sink her best dress for the sake of the face? and how are you to treat, by 'diffusion of focus,' vibration of camera, or any other operating dodge, the lantern jaws or turnip cheeks of the second, who, appreciating your aspiring effort, is willing to make dress a secondary factor?

In this fashion expresses himself our friend the professional, from his experience of "men and things." Photographic pictures taken with home surroundings, and sensible people to deal with, he admits can in many cases be made very telling ones, but can never become general in there being so heavy a light in ill-lighted (photographically) rooms, and the difficulty of preserving the impression of freshness, and spontaneity of pose, with the necessarily much lengthened exposure. There is a weight of common sense about all this, that, although not giving the full case, must be granted a due place. Ninety per cent. of the people who look in at the photographer's window do not wish for anything better, because they have never given a thought to the possibility of there being anything higher; they are perfectly satisfied with the style of thing they see before them, do not worry about the lighting being forced and false, the pose stiff, the unreal effect of extreme retouching, the gloss and gilt of print and mount generally. If the pay were all right, it would be too much to expect the producer to do anything in the way of educating up to better taste the educatable proportion of the ninety per cent. referred to; but prices are far from being all right, they sadly want lifting up, and something must be done. Rather a sordid view of art perhaps, one dependent upon cash value, but the particular direction of photography is not peculiar in this; views generally are apt to get sordid under the pressure and weight of the bills of butcher and grocer, the rent call of the landlord, and the sight of three or four healthy boys and girls growing out of their clothes.

It goes without saying, of course, that any change and bettering must come from the individual effort of the photographer himself, and that it means thought and work upon his part. It must be a *sine-quâ-non* also that any change must mean as little expense as possible. Now, as he in the dreary winter months will have ample time to spare, instead of half hibernating over the studio stove, brooding upon the altered condition of things, and regretting the old order, that can never return, let him try to evolve out some fresh scheme for improving matters. Towards helping in that direction the following suggestion is made, with the very earnest hope that it may lead to something of good, and the heavier loading of the purse in the pocket of many a hard-working, honest man, gallantly trying under many peculiar and trying difficulties to make both ends meet.

Assuming the chief effort to be, to attract as much attention as possible to the work in window and case, as a necessary preliminary and inducement to the walking upstairs, how is it to be most effectively done? The one great something common to, and so value-reducing in, all present work, is its objectless nature; the people have gone to be photographed, and have simply been photographed as so many heads, faces, bodies, duly ornamented and dressed. It seems such a pity to have pictured so much human clay, as clay, where it might, in many cases, have been possible to have shown a glimpse of the enclosed soul. Clearly the effort should be to supply an object. What it is to be, must depend in a great measure, upon the worker; he need not lack ample choice, and the wider its appeal, the better and more valuable will it prove.

Granted a little thought, and the cue be held worth accepting, I can hardly imagine any one not to be possessed already of many instances, well within his own experience, in illustration of the point. In mine there are several, some to a degree materialised, as yet, in quarter-plate negatives and prints, but which, with anticipated enlarged means, will also be enlarged to suit the richly bound folio I have in my mind's eye, figuring as a future prized item of possession. To take one to make clear the statement—that of a curly-polled boy upon the occasion of his first appearance in trousers. I am very naturally prejudiced in favour of the picture, because he happens to be my boy; but, enlarged, suitably displayed and titled, *His First Pair*, I am certain that the supreme air of laughing conscious satisfaction with which, with his little hands thrust well into the pockets, he looks down at his new item of dress, would have attracted my pleased attention, and made me laugh, had he been anybody else's child. And how naturally, in that case, would my inclinations and thought have turned towards giving the same photographer a chance with my own, in the same general direction, if not in exactly the same way; and so would those of the majority of fathers and mothers who might see it.

The execution means little, but you must know exactly what you do want to show, and it is in knowing what the majority would like to look at that the photographer has his chance. Love of children it is here—a very safe card to play, generally a trump card; and yet to think of the thousands of photographs of children we have seen, and so little in them of that inexpressibly charming child life we rightly think so highly of. One of the greatest boons which photography has put within reach—more particularly that of the thoughtful amateur—is that of being able to readily make a record of the child life of the home—a pleasure now, but what will the value of that album be as its leaves are idly turned over by the winter fireside twenty years hence, when the toddling steps of to-day upon the stairs and along the passages have become confident and assured ones, and led possibly to distant wanderings?

But, to return to our more immediate purpose, this and many other of the broader human feelings, together with the every-day play of life in the streets, are photographable enough, with the help of but few and inexpensive accessories: the young girl of seventeen, putting on her first ring; a workman, with the grime of the day's toil upon face and hands, cutting up a bit of plug tobacco for the smoke homeward; the newsboy, crying out the evening paper. No difficult matter, with

little arrangement, to take such as these, and numberless similar ones, in the studio; they have been passed over so far, possibly because they are so common; but it is in the telling representation of the common that genius has its look in—the something shown that is immediately recognised, and recognised as true, and which further surprises in its not having been seen before. If the photographer will but try this blocking out of the expression of an emotion in a simple figure, or show, instead of the bare individual, a type of a class, he will probably be surprised at the attention and interest his work will command.

Finally, as another desirable item in style of treatment, sufficient space and emphasis is not given to the cheery, lightsome side of life; the "Faith," "Charity," "Prudence," "Meditation" kind of thing is all very well in its way, but apt to give a touch of the "blues" in an overdosing. A rollicking party playing "Nap" would do one's heart a world more good very often, both metaphorically in happy suggestion, and actually, by giving it the stimulus of a hearty laugh to send the blood heartily racing through the remoter capillaries; and the photographer who could not command three or four friends to sit for him, or allow him to picture them at an actual game, either in the studio or the "constitutional" club, must indeed be a cheerless orphan. What an excellent advertisement upon the smoke-room walls of the club! or "A Game of Whist," if the stately but genial town councillors, members of the same or similar club, prefer it! They ought to be good for an enlargement apiece anyway if it were well done, and a little tact, trouble, and magnesium wire should go a long way towards that. Pleasanter, too, than brooding, or travelling along the same old roads, grumbling at their increasing ruttiness.

All this in an experimental way just yet, if you will; the Mary Janes and John Henrys, who will have the reliable old 'cabinet' as it is, could be looked after at the same time. Or, though his worship's face be so broad and grocer-like as to be artistically better as a side one, if dignity conferring breadth be thereby lost, or some portion of beard or badge of office lost in a three-quarter presentation, in all conscience take him full front, at full length—or even in Jubilee Court dress. If the parson's chin be undeniably a little weak to suit the general air of earnestness, strengthen it at the retouching desk; let the elderly maiden's blouse be as airy as possible, to conceal flatness of bust, and the wrinkled face receive as delicate attention as possible with the pencil; and, as for the blue-eyed little seraph with the smile, give her its full value, or some suggestion of wing; it will help in getting a husband, and by the time he will have found out the fleeting nature of the one, and the absence of the other, the photographs will probably have been paid for. Bread and cheese must be kept in the cupboard; when the experimental side shall have gone beyond that stage, and developed into a paying success, there will be a chance of picking and choosing—any way, it ought at least to add celery as a zest to present fare. J. Rees.

THE COMPARATIVE ADVANTAGES OF ENLARGEMENTS AND DIRECT PHOTOGRAPHS.

In the course of a recent discussion at the Edinburgh Photographic Society on this subject, Mr. W. Hume said: "I must frankly admit—what nobody can deny—that there may be loss—*much* loss—incident to the process of enlargement; loss of sharpness, loss of contrast, loss of detail, loss of artistic feeling, loss of everything a picture should show. It is quite true that an enlargement *may exhibit* loss of care, loss of temper, loss of character and reputation, with no one to care for it—not even its producer; finding no admiring friends, but presenting only the melancholy spectacle Shakespeare tells of 'the one who hath had losses, go to.' There can be no question as to the losses a picture may *possibly* sustain by enlargement, but I deny that the process of enlarging is at all responsible for any of these. The faulty enlargement may have only emphasised the greater or less defects in the original, while the unskilled worker may have contributed to the list of losses in the process of enlarging where there would have been no loss in skilful hands.

"Want of sharpness in the original should be guarded against by careful focussing and sufficient stopping in the field or studio, and in the enlarging room. Contrast, detail, and artistic feeling secured by careful treatment of the original negative, should be not only faithfully reflected in the larger picture, but these qualities may be rendered in a still more pleasing manner in the enlargement, not only by the opening out of crowded detail, that mere amplification gives, but also from the scope for modification and breadth which the treatment allows. I admit we have as disadvantages contributing to the losses which may be incurred in enlarging the comparative thickness and the high relief of the gelatine plate, and the comparative largeness of the metallic grain, especially in the more rapid emulsions. In the collodion plate we have an infinitely thinner film and a structureless vehicle, while the deposit partakes more of the nature of a stain than of a granular emulsion. A collodion negative, therefore, is better suited to crisp enlarging than the average gelatine plate, and this simple fact goes to prove my contention that ths losses often attributed to enlargement are entirely outside and beyond the process of enlargement *itself*."

EDEY'S FLASHLIGHT APPARATUS.

Mr. Edey provides an adjustable support, mounted on a tripod or on a permanent socket, the upper end of the support carrying a T-piece, to which a horizontal trough or a number of trays is or are attached. The trough, or each of the trays, is provided with fuses or sparking points, so arranged as to fire the flashlight powder on an electric circuit being made by a switch or the like.

Fig. 1

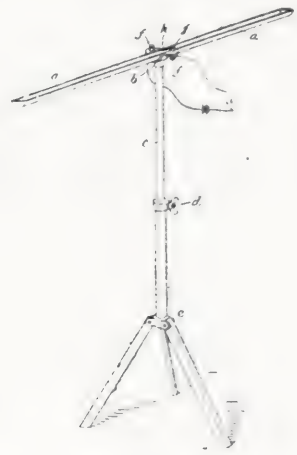


Fig. 1 is a perspective view of the apparatus provided with one long trough.

Fig. 2 is a section illustrating the application of a fuse.

Fig. 3 is a plan view showing the arrangement of a number of trays.

Referring to figs. 1 and 2, *a* is a trough carried by a T-piece, *b*, suitably jointed to the standard, *c*. The standard or support is preferably made telescopic and provided with one or more thumbscrews, *d*, for

Fig 2

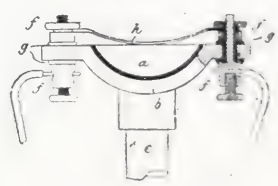
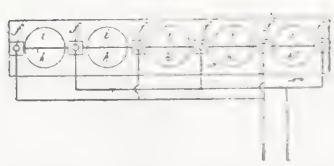


Fig 3



fixing the tubes at the desired height. *e* is a tripod supported by legs as shown. The tripod and legs may be dispensed with, and the standard supported in a fixed socket or by other suitable means.

The T-piece, *b*, is fitted with terminals and binding screws, *f*, to which the electric conductors are connected, the terminals and binding screws being insulated from the T-piece by the insulating eyelet, *g*, as shown in fig. 2. *h* is a fuse electrically connected to the terminals as shown.

In fig. 3 a battery of trays, *i*, is shown provided with terminals and the like, *f*, and fuses or sparking points, *h*. These may be so connected with a switch that any number may be placed in circuit as desired.

In using the apparatus the various points are assembled, and the flashlight powder of a highly explosive nature is placed in the trough or trays. On the circuit being completed, the fuses become heated, or sparks pass between the sparking points whereby the powder is ignited, thereby causing the desired flash of light. The current may be taken from a battery, a dynamo, or other source of electric power.

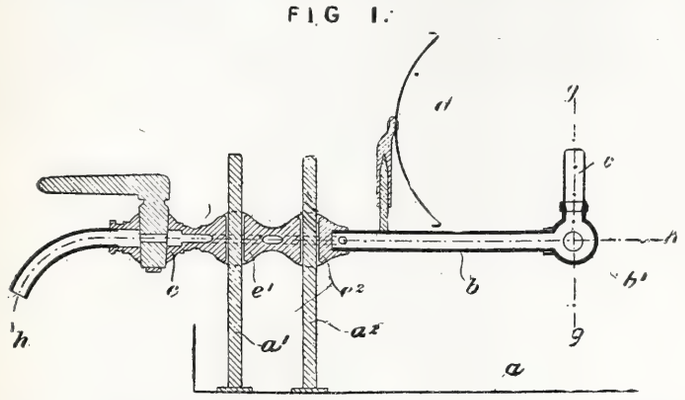
THORN AND HODDLE'S ACETYLENE JET FOR LANTERN USE.

Messrs. Thorn and Hoddle provide a tray or base plate adapted to slide into the ordinary grooves at inside bottom of lantern or projector. To this tray or base plate they fix two upright pins, either at right angles to, or parallel with, back of lantern or projector. They also provide a bar or bridge, adapted to slide up or down, on said pins and also set screws to fix bar on said pins at any height. In the centre of said bar or bridge

they attach a short gas bracket, terminating at back of lantern in a flexible tube stop cock.

At the front end of bracket, terminating inside the lantern or projector, they attach a special burner holder, adapted to carry three burners, in such a position that their flames are presented to the condenser of the

FIG 1.



lantern or projector edgeways, the middle burner being fixed lower than the outer ones. The two outer burners are inclined inwards towards the middle burner, which is upright; also, at a suitable distance from the burners, they provide a silvered, parabolic reflector.

Figure 1 is an elevation of apparatus.

Figure 2 is the horizontal section on the line, *h*, *h*.

FIG 2

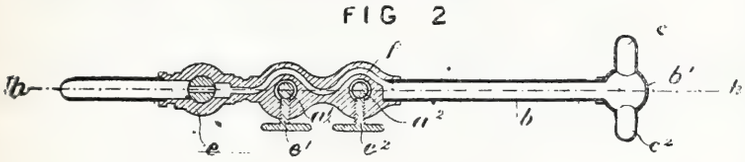
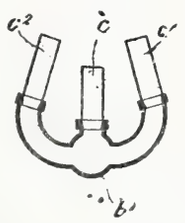


Figure 3 is the vertical section on the line, *g*, *g*.

a is the tray or base plate. a^1, a^2, are the pins riveted into tray or base plate, *a*. *b* is the sliding bar or bridge and bracket. b^1 is the three-

FIG 3.



burner holder. *c*, c^1, c^2, are the burners. *d* is the reflector. *e* is the stop cock. e^1, e^2 are the set screws for fixing sliding bar or bridge on to pins, a^1, a^2. *f* is the channel by which the gas is conducted round the pins, a^1, a^2.

Animated Pictures at the Alhambra.—In the Court of Queen's Bench last week Mr. R. W. Paul sued the Alhambra Company (Limited) to recover damages for wrongful dismissal from defendants' employment and for breach of contract to employ him. It appeared that the plaintiff had been exhibiting the animatographe, otherwise called animated pictures, at the Alhambra Theatre from March 1896 to March 1897, and had been paid originally 66*l.* a week, a sum which was gradually reduced to 30*l.* a week. According to his case, he went to great expense to secure pictures of the Queen's Diamond Jubilee Procession, and entered into negotiation with the defendants for the exhibition of such photographic reproductions at the defendants' place of entertainment. He made an offer to Mr. Moul, the managing director of the defendant company, to exhibit these pictures for eight weeks on the terms that he was to receive 40*l.* for four weeks and 20*l.* for the remainder of the period. Ultimately plaintiff asserted that a definite agreement was come to that he was to receive 30*l.* a week for eight weeks, it being understood that this arrangement should be put into writing. After he had exhibited at a *matinée*, a letter written by Mr. Moul, purporting to embody the terms arrived at, was placed in his hands, and it was stipulated in it that the item should be exclusive for London, and that he should not perform within ten miles radius of the defendants' theatre. Plaintiff repudiated this latter term, and said that the agreement arrived at was that, although of course it was understood that he should not play at such competing places as the Empire, the question of where he should exhibit in the metropolitan district was, as under his original contract, left to his discretion. The matter then went off, and plaintiff brought his action. The defence was that no concluded agreement had ever been arrived at, and that it was distinctly understood that the terms, which were to be reduced to writing and in regard to which letters were to be exchanged, included one that the performance should be an exclusive one within the metropolitan area. Mr. Cock, Q.C., and Mr. Morton W. Smith appeared for the plaintiff; and Mr. Witt, Q.C., and Mr. D. C. Leck for the defendant. The jury returned a verdict for the plaintiff for 150*l.* Judgment accordingly.

Astronomical Cinematography.—M. Camille Flammarion, the well-known French astronomer, has undertaken the task of photographing, or "cinematographing," the sky. As there is no cinematographic machine which could work from sunset to sunrise, and as the apparent movement of the celestial bodies is very slow, M. Flammarion contents himself with taking between 2000 and 3000 photographs of the firmament every night when the sky is clear. He contends that they will be amply sufficient to show the motion of the moon, stars, and planets without any perceptible break in the continuity. It appears that the object-glass he employs in his photographic apparatus is such as to embrace 180°, so that the whole firmament will be seen when the photographs are put into the cinematograph. Commencing at dusk, the moon and stars will, as darkness comes on, appear one after the other in proportion to their magnitude, and be seen pursuing their course in the sky till the light of the rising sun in the east produces the inverse of the phenomenon witnessed in the evening. Of course, as is commonly the case with the scenes of terrestrial life reproduced by the cinematograph, the apparent motion of the heavenly bodies will be hastened, so that their course from east to west will not occupy more than a few minutes. M. Flammarion also states his intention to treat the spots on the sun in the same way, and that he hoped very shortly to be able, with the cinematograph, to show to the inhabitants of our little planet the movements of those formidable vortices of fire in the sun's envelope as correctly as the movement of water and the breaking of the waves of the ocean are now shown. Even that is not, however, all. M. Flammarion's ambition is to complete his work by photographing all the phases of the planets, and present them to the public by means of the cinematograph. He thinks that with patience that task will not present insurmountable obstacles. It is at present impossible, and it will probably always remain impossible, to photograph the movement of the earth in space as seen from the moon or from one of the planets; but, with the object of producing the illusion, M. Flammarion has photographed a globe he constructed for the purpose, and placed in a hall in front of a background representing the sky. The globe, lighted by one single source of light, representing the sun, and revolving on its axis by means of a clockwork arrangement, was photographed for the cinematograph. The animated photographs representing that scene, shown by M. Flammarion at the last meeting of the French Astronomical Society, were greatly admired, and won hearty applause for their author.

Dr. Isaac Roberts, F.R.S., delivered an address at the Royal Societies' Club, last week, on "Recent Intelligence from Regions in the Stellar Universe." Sir Clements Markham, who presided, mentioned that this was Dr. Roberts' maiden lecture, despite the fact that for many years past he had been engaged, with great success, in the investigation of star clusters and nebulæ. The lecturer at the outset showed photographs of his observatory on Crowborough-hill, Sussex, and proceeded to reproduce on the screen numerous areas of nebulosity. One of these areas, he stated, represented only as much of the surface of the sky as would be covered by a sixpence held at arm's length; yet within it no fewer than 37,000 stars were visible, and there was reason to believe that there were as as many more which were not visible. Unfortunately, we had practically reached the limit of the photographic method, but it was always to be remembered that we viewed these phenomena from the bottom of a murky and disturbed atmospheric ocean. These multitudinous stars were found to be disposed in lines and curves. How did those curves come into existence? Was there not a strong reason for believing that these nebulæ were now undergoing transformation into stars? Were they not the progenitors of the stars which we saw in the sky, though it might be they would take hundreds of years before they arrived at maturity? Stellar evolution seemed, like terrestrial evolution, to be conducted upon one great principle, but upon diverse methods. The lecturer proceeded to give illustrations of classes of nebulæ which appeared to be rapidly forming into stellar systems, and of nebulosity which had not yet attained to any definite or symmetrical form. To carry the matter one step backward, they might ask how these cloudy, luminous matters came into visible existence. There could be little doubt that clouds of invisible nebulous matter existed in space. If two of them collided in any manner, or if a sun, extinct or otherwise, rushed into one of them, vortical motion was set up, and there was a commencement of a stellar system which would run its stages in orderly sequence. This would involve the smashing up of suns and planets to provide material for new bodies out of the wreckage. Remarking that these discoveries had all been made during the past ten years, the lecturer stated that the time had been so short that we could, not as yet, detect any movement among stars or nebulous matter, but undoubtedly our survivors would discover motion.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*April* 1, 1898

THE LANTERN RECORD.

CONTENTS.

	Page
LANTERN NOTES AND NEWS	25
LANTERN MEMS By G. R. BAKER	26
LIMELIGHT EXPERIENCES.—I. By T. N. ARMSTRONG	27
LANTERN-SLIDE MAKING BY THE WOODBURY PROCESS. By J. R. WILLIAMS	28
GLYCERINE A HEAT-ABSORBENT IN LANTERN PROJECTION	28
A NEW (?) SAFETY FLASHLIGHT POWDER	29
RADIO-STEREOSCOPY	29
THE JOLY PROCESS OF COLOUR PHOTOGRAPHY	29
STEREO WORK. By COMTE D'ASSCHE	30
PUTNEY PHOTOGRAPHIC SOCIETY	30
MANCHESTER PHOTOGRAPHIC SOCIETY	31
DERBY PHOTOGRAPHIC SOCIETY	31
BOUILLAUD'S APPARATUS FOR ARTIFICIAL ILLUMINATION	31
GAUMONT'S IMPROVED ENLARGING APPARATUS	31
CORRESPONDENCE	32

LANTERN NOTES AND NEWS.

In a review of the past year given by the *Progressive Age* (New York) it is stated that the demand for calcium carbide is far in excess of the supply, and that plans are now maturing for the construction of an enormous plant to utilise 100,000 horse power entirely for its production.

* * * * *

The following are the calculated illuminating values of mantles made from the oxides named per cubic foot of gas: Thoria (commercial), 6·0; thoria (pure), 1·0; zirconia (commercial), 3·10; zirconia (pure), 1·5; ceria, 0·9; yttria, 5·2; lanthania, 6·0; erbia (commercial), 1·7; erbia (pure), 0·6; alumina, 0·6; chromium oxide, 0·4; barium oxide, 3·3; strontia, 5·5; magnesia, 5·0. Ceria gives a reddish-yellow light; erbia, zirconia, and oxide of barium, a yellow light; alumina, a whitish-yellow; strontia and magnesia, a white light.

* * * * *

In a note on the use of compressed coal gas, Mr. C. E. Ashford, in *Nature*, gives the following interesting details of the disadvantages attending the storage of compressed hydrogen: "A 40-feet cylinder was filled with coal gas at a pressure of 120 atmospheres by a leading London firm on March 15, 1897; a small quantity was used, and the cylinder stood till October 9. It was then used for a mixed jet, and at the end of half an hour the light began to decrease, and in another quarter of an hour practically no gases were issuing. On relighting the jet the light was found perfect, and the fault was ascribed to the Beard's regulator. The cylinder was again used on March 5 last, and again, after half an hour, the light began to fail; but, on turning the taps full on, something audibly blew out of the nozzle, and the light was perfectly restored. The lime blackened excessively; while white-hot, the 'hydrogen' was turned off and the oxygen allowed to play on it, when the deposit turned a brilliant orange-red. The coal gas was then passed through a glass tube gently heated in a Bunsen flame—a copious metallic mirror which gave the test for iron was formed. It seems probable that the jet was choked by the decomposition of iron carbonyl at the high temperature. In any case there is an obvious disadvantage in storing for a considerable time compressed coal gas in steel cylinders, altogether apart from the possible damage to the cylinders, which has been shown to be small." Mr. Ashford's experiences were, doubtless, those of others who have kept coal gas in cylinders for a considerable time.

Messrs. Fuerst Brothers, 17, Philpot-lane, E.C., write that they are now prepared to supply the Lumière cinematograph camera, for projection only, at 20*l.* There are two different models, "A" for the Lumière gauge, and "B" for the Edison gauge.

* * * * *

Mr. Walter Tyler, of 48, Waterloo-road, S.E., recently sued the Great Eastern Railway Company at the Lord Mayor's Court, before the Common Sergeant, Sir Forrest Fulton, Q.C., and a jury, to recover the sum of 19*l.* 14*s.* 9*d.*, in respect of damages for the loss of a magic lantern. Mr. Minton Senhouse, barrister, who appeared for the plaintiff, stated that his client was in the habit of supplying magic lanterns for entertainments in different parts of the country. On November 9 last, it was proposed to give a magic-lantern entertainment at the Public Hall, Loughton, and the organizers contracted with the plaintiff for the hire of a lantern for the purpose. The entertainment was timed to commence at eight o'clock, and Mr. Briginshaw, the plaintiff's representative, arrived at Liverpool-street station, with the lantern and a compressed gas cylinder, at about a quarter to seven, intending to travel by the 7.6 train to Loughton. According to Mr. Briginshaw's evidence, it appeared that he informed a porter of the fact, and asked him to have the luggage labelled to Loughton, adding that he had to declare the compressed gas in the cylinder. The porter at first refused to take the gas cylinder to the parcel office in Bishopsgate-street, where it had to be declared, but ultimately, after obtaining the superintendent's permission, he took it over to the office, and the compressed gas was declared. By that time witness had missed his train. He instructed the porter to send it on by the next train, by which he himself travelled, but when he arrived at Loughton he found that the gas cylinder had been sent, but not the lantern, consequently the proposed entertainment could not take place. It afterwards appeared that the box containing the lantern had been sent to Berkhampstead, the only label upon it being "Briginshaw, Berkhampstead," whence it was returned by the London and North-Western Railway Company. Plaintiff had refused to pay the company's charges, and he was still without the lantern. He now claimed for 15*l.* 15*s.*, value of the lantern, 1*l.* 11*s.* 6*d.*, the fee he was to receive for the entertainment, and 2*l.* 8*s.* 3*d.*, the expenses incurred by the organizers of the entertainment. For the defence, it was denied that there had been any negligence on the part of their porters. Matthews, the porter who took the luggage to the parcels office in Bishopsgate, denied that he refused to take the goods there. He said that Mr. Briginshaw asked him to label the luggage for Loughton, but he refused to do that, as it was necessary for the cylinder to be declared He took the cylinders and the box to the office, and left them there. The porter at the office said that Mr. Briginshaw made no mention of the box, and it was not till after the cylinder had been sent off that he noticed a box, which, being labelled "Briginshaw, Berkhampstead," was sent there on the following day. After further evidence had been adduced, the jury found for the plaintiff for 19*l.* 4*s.* 9*d.*, to be reduced to 3*l.* 19*s.* 9*d.* if the lantern was returned in good condition.

At the Clerkenwell County Court, on the 25th ult., before the Deputy Judge, Miss Maud Huet, of 71, Bridport-place, Hoxton, sued to recover the sum of 10*l.* from the Interchangeable Automatic Syndicate, Limited, the price paid for a cinematograph, which was afterwards found to be unworkable. After the plaintiff had given evidence, Mr. Norman Wallace was called as a witness on behalf of the plaintiff, and, in reply to Mr. Horton-Smith (the Deputy Judge), witness said he was a "professor." The Deputy Judge: That is rather vague. What do you profess? Witness: Well, I'm a professional. (Laughter.) Mr. Popham, who appeared for plaintiff: That does not throw a very fierce light on your calling. Witness: Well, put it in this way, I am a public performer. (Laughter.) Mr. Popham: A performer on what? Witness: On the cinematograph. I'm an operator. Witness, in reply to further questions, said that in February of last year he called at the defendants' works in St. John's-road, Holloway, and inspected a second-hand cinematograph, which the firm's representative recommended to him as a good machine, and fit for music-hall performances. He asked 10*l.* for it. Mr. Popham: What did you do then? Witness: I goes to Miss Huet, and advises her to buy. Being a female, she don't know nothing about these machines (laughter). She gives me the 10*l.*, and I walks off to Holloway. I don't mean the "Castle," but the defendants' offices. (Roars of laughter.) Witness, in answer to further questions, said that, some weeks after buying the machine, he accepted an engagement to appear at the Garrison Music Hall, Colchester, where he attempted to work the cinematograph, but with unsatisfactory results. He appeared next at the Gaiety Music Hall, Colchester. Mr. Popham: And with what result, Professor? (Laughter.) Witness: The cinematograph proved to be a frost, and I spoiled their business for the rest of the week. I did, straight. (Renewed laughter.) Mr. Popham: What happened at Dover? Witness: In the middle of the performance the manager comes up to me and says, "You and your machine is a pair of frauds. You just pack up and sling your blooming hook, and pretty quick." (Laughter.) Mr. Popham: And you naturally answered, "Now we shán't be long." (Laughter.) Mr. Essell, who appeared for the defendants: Had you been accustomed to operate with a cinematograph when you bought this one? Witness: I have operated with limelight views, but I did not know as much about cinematographs then as I do now. Mr. Essell: Is Miss Huet also a professional? Witness: Yes; in the shooting line. We have played together in *William Tell*. Mr. Essell: I suppose you were William Tell and she was your son? Witness: No; she was the target, and I was the operator. (Laughter.) Evidence was then given to the effect that the machine was one of the earliest type, and, like the rest of that class, was crude in construction and design. An up-to-date machine, it was stated, would cost 50*l.* His Honour gave judgment for the defendants, and costs.

LANTERN MEMS.

Science and discomfort. I am obliged to associate the latter with the former in my reference to scientific meetings during the past month, for, at three different societies' meetings I have attended, the fact has been painfully brought to mind, through the ill-designed and uncomfortable form of the seats provided for the members and audience. Two out of the three meetings were held in theatres of institutions only recently built, and therefore there should be no excuse for perpetuating a form of seat adopted at the third and older meeting place, which consists of a simple band support that comes against the shoulders, instead of where support would be agreeable, in the middle of the back.

* * * * *

As a rule, these meetings are held in the evening, and quite a number of members are professional or business men, who have already been engaged for eight, ten, or more hours, and so come comparatively tired. If the lecture or paper is not of paramount importance to them, they will hesitate to go if they cannot listen in comfort to the same. The modern theatres, both in the centre of London as well as in the suburbs, realise how important it is to provide comfortable seating accommodation even in the cheaper parts of the house, and there is no doubt it pays to do so. I should like some one of the Council who sit in arm or comfortable-back chairs to sit out for an hour or two a technical lecture with no support for their backs; one might as well sit on a form without any support as to have the band placed where it is on the seats I have mentioned.

* * * * *

Now that I have made my mind easy by calling attention to this matter, in the hope that some of those interested in the societies may read these "Mems." and call in a Waring, Maple, or Shoolbred to advise them on "comfort," I will "go on to the music," if I may so frivolously refer to what follows. No doubt we have a good deal to thank or blame the weather for, and recently the balance has been on the blame side, for, with the cruel north-east winds and cold rains, there has been a distinct incentive to develop liver.

* * * * *

That weather phenomena can be a very attractive subject, those who listened to Mr. A. W. Clayden's lecture at the meeting of the Royal Meteorological Society recently will be able to verify, for not only were the facts stated in a clear manner and the deductions lucid, but the experiments were interesting and the projected photographs beautiful. It is astonishing how charming nature is in her work, which was particularly instanced in the way in which hoar frost forms on simple things, such as a string, iron network, and branches of trees, &c.; the photographs of these results taken by the lecturer were much appreciated by the audience.

* * * * *

In the photographs of clouds, Mr. Clayden had succeeded wonderfully well in producing the blue sky and roseate hues by chemical development only, for it was felt that he had gone a fair way on the road towards the goal of "colour photography," and the audience readily accepted the statement of one of the speakers after the lecture, that there was every chance of ultimately being able to produce by a development of his method photographs in all the colours of nature.

* * * * *

In showing similar pictures taken in colour and monochrome, the detail was shown by the lecturer to be greater in the latter. Two lanterns and two discs were employed, so that the audience might see the two pictures at one time. One lantern had an electric arc lamp for its illuminant, and the other a lime light. Why is the electric light "skied" in the Institution of Civil Engineers? It may be convenient to have the whole of the theatre available for the audience, but certainly it is bad optically, for none of the square pictures shown on the screen were rectilinear. I should have thought a platform could have been arranged at the back of the hall, as it is done at the Society of Arts, somewhere central with the screen, for the elevation is so great where it was used that the screen would have to be brought out at the bottom quite a large amount to get a proper-shaped projection.

* * * * *

I remember, at a recent exhibition of lantern photographs, the owner of some of the slides going up to the operator at the eleventh hour and requesting him to re-erect his apparatus so as to be on the level of the centre of the street, as he would not have his photographs shown out of true shape. In this case the screen was a folding linen one, and stretched on a frame which had been drawn forward at the top to neutralise the tilting of the lantern upwards. This little fact had been overlooked by the gentleman, who was assured that his pictures would be properly shown, and there was no time to alter the apparatus if there had been the disposition to do so. The results fully justified the statement, and every one, including the owner, expressed himself pleased with the projection of the photographs.

* * * * *

This shows that a moderate amount of angling of apparatus is permissible if the screen is arranged to neutralise it and as long as

the top is brought forward; but to bring the bottom portion forward seems unnatural if the audience are at a lower level than the centre of the screen, which is invariably the case in meeting places of societies, and which generally now employ opaque screens with heavy roller at the bottom.

* * * * *

I HEAR that a very big thing in the lantern world is on the *tapis*, and that presently will be seen at one of the large panoramic halls, an optically projected panorama. A series of lanterns, say a dozen, are arranged in the centre of the building, and each one contains a painting of a section of the panorama, which, when projected on the wall, forms up with the next and makes a continuous panorama. These pictures are to be, I believe, about 10×8 inches in size, and if the whisper I hear is true, they are to be coloured by machinery. What this machinery is, I should very much like to know, and must keep my eyes and ears open to witness any demonstration and hear explanations that may be forthcoming. What a chance for the colour-photography workers this would be if they could perfect their process and reproduce the phenomena of nature in panorama. How delightful would it be to see the Falls of Niagara, or some of the best parts of the Rhine, a grand panorama of Rome, and dozens of other grand scenes that travellers have seen, but stay-at-home people can only read about and partly appreciate from photographs of "bits."

* * * * *

THIS panoramic or multiplex lantern must be something of the order of one I mentioned in this JOURNAL some time ago, which I found fully illustrated in a patent specification at the time I was searching for mechanically worked lanterns. The *raison-d'être* for its existence is the fact that projections are hoped to be obtained of a panorama as perfect as if it were painted direct on the wall, and at one-tenth, or even less, of the cost, for a fine panorama represents tens of thousands of pounds. G. R. BAKER.

LIMELIGHT EXPERIENCES.

I.

A FEW years ago it was asserted by some that the optical lantern had begun to lose its popularity. An assertion prompted, no doubt, from an honest conviction formed by personal observation in some locality where very possibly a force of circumstances had transpired to weaken the public taste for this undoubtedly instructive and popular form of entertainment. That such a falling off, however, is merely confined to some particular districts or towns may very probably be true enough, nor are the reasons for such difficult to seek, when we see limelight lecturing prostituted in outside places to such an extent as we find it. Week after week the village hall is occupied by country parsons, schoolmasters, &c., who never tire of hearing their own voices, and who aspire to lecture upon subjects, they have never studied minutely, and of which they have no practical knowledge, but merely read aloud a threadbare lantern pamphlet, probably descriptive of scenes in foreign lands they have never witnessed, and one half of the words of which they are incapable of pronouncing properly. A little of this sort of thing soon works an incalculable amount of injury to the popularity of a lantern entertainment in any district, and goes far to detract from the popularity of *bonâ-fide* lecturers, who spend much time and no end of study in preparing a limelight lecture the data and material of which may have taken them years to put together.

I know of one country parson who has been a great sinner in this respect, and who has brought the limelight lecture to a very low status in the district in which he resides; it has cured itself, however, for empty benches speak plainly what others ought to have told him but had not the courage, viz., if the funds of any scheme want replenishing by means of a limelight lecture, such must be of the very first class, and the lecturer one who from practical experience is competent to lecture upon the special subject selected.

The public are not slow to appreciate a good thing when brought before them, neither are they slow to sicken before "Cauld kail het," as we say in Scotland, and shall I add very far from het sometimes?

In my opinion the optical lantern will never lose its popularity so long as limelight lecturing is in the hands of competent gentlemen. I am not speaking now of the lantern's popularity for school children, or in cases such as where slides of all descriptions are merely rushed through in the form of an entertainment; in these instances the delight such yields far surpasses any other form of entertainment for childhood and never will grow stale. There is, however, a higher sphere of popularity for the optical lantern, such as we have seen within recent years, even to its almost universal employment on the Sabbath, for during the last five years, what may be termed the P.S.A. movement (Pleasant Sunday Afternoon) has continued to advance in an alarmingly dreadful degree to the minds of those strict Sabbatarians who can only look upon advanced ideas with a feeling of dread as to what such is likely to lead up to in the future.

The fact is, the popularity of the optical lantern is not upon the wane, but on the contrary is upon the whole. I believe, more popular than ever, nor will it lose this popularity so long as opticians, and those who undertake the management of limelight entertainments devote a proper amount of attention in seeing that everything connected with a limelight display be of the very first order.

Unfortunately, in this class of entertainment we at times find out the incalculable amount of injury that may be caused by an incompetent operator or the want of reasonable foresight in sending out faulty apparatus. I can well remember the fiasco I witnessed in Glasgow some years ago when a gentleman from Liverpool was to lecture before one of our leading photographic societies. Of this gentleman's qualification as a lecturer nothing can be said but the most unqualified praise, and he probably stands in the very first rank of limelight lecturers, but on the occasion in question he committed, as he candidly confessed at the time, his first error, viz., taking for granted that everything would be right and in order with the lantern when he went upon the platform. There are, no doubt, very many living in Glasgow who can remember the fiasco I refer to, and which was solely traceable to a want of personal supervision and testing of the apparatus before the meeting commenced.

In his case such an omission may in a sense be almost pardonable, for on the occasion he brought with him a thoroughly competent party from Liverpool to stand by the lantern and to work into his hands, but, unfortunately for the lecturer, this gentleman failed to see the lamp tested also. The *dénouement* was a practical exemplification of the wisdom of never failing to see anything tested and in working order some hours before the commencement of a lecture. This is a golden rule, and never fails to ensure successful results, its omission is certain, sooner or later, to end in trouble, as was the case in question.

Nothing must be taken for granted, everything should be tested *personally*. In stating this, I know that many lecturers place so much confidence upon their operator attending to the lantern department that they leave the matter entirely in their hands. I have always found, however, that there is nothing like seeing into everything oneself, this gives a lecturer confidence and ease of mind when on the platform, so necessary to an entire concentration of thought upon his subject alone.

Operators are generally found to be a careful class of individuals; they are, however, only human, and it often happens that they are liable to suffer from faulty or tricky apparatus themselves. Most lecturers contrive to have always the same party, and a very good custom it is to follow. Sometimes, however, strangers have to be engaged; that may lead to a feeling of uncertainty, for no two men will be found to work exactly similar; therefore, when any one finds himself suited with an operator, it is wise to have him regularly.

In connexion with limelight lecturing there are so many little things that are liable to happen, and which in many instances even foresight could not even have avoided, that cause much annoyance.

I remember one occasion, when *en tour* lecturing in the Highlands of Scotland, of meeting in with a very unusual hitch, and, seeing that such was just a case in point of where even foresight could have been of no avail, I relate it for the benefit of the readers of THE LANTERN RECORD lest at any time they may find themselves similarly situated.

I had just started to speak from the platform when the light suddenly went out in the lantern. After waiting a few seconds, I could see that something serious had happened, and so, sending round to the lanternist the caretaker of the hall, I received a message back from the operator that the oxygen gas was run out. Judge of my feelings and amazement on being told this before an audience of some seven hundred people, and right at the beginning of my lecture.

On rapidly scanning the situation in my mind on the platform, a few well-chosen words addressed to the audience at once allayed any feeling of uneasiness amongst them; and so, leaving the platform, I quickly went to the lantern, where consternation reigned in the operator's mind. His first and only remark was, "It's been a leaky cylinder." "Nonsense," I replied. I tested the contents at 7 p.m. (an hour before the lecture), and it contained thirty-three feet, but then we were both of us unable to get any gas out of the nozzle. Now, have any of my readers ever had a similar hitch, I wonder? I have often related this incident to experienced lecturers and operators, not one of whom have ever met in with a similar trouble. However, there we were, regularly stuck up, and the audience waiting, when all of a sudden I recalled to mind a conversation I had some years previously with Mr. Brier, the then courteous manager of the Oxygen Company. This conversation related to cylinders and their method of being filled or charged, when he referred to the lowness of temperature and coldness of the metal as being liable to form particles of ice in the nozzles of the cylinders. This experience at once flashed across my mind, and, suddenly taking hold of the cylinder key, I gave the nozzle one or two sharp raps, when to my amazement, but equal satisfaction and delight, I blew out of the nozzle large sprays of finely powdered ice, after which away came the gas right merrily, and on went the lecture without further bother to the end.

T. N. ARMSTRONG.

LANTERN-SLIDE MAKING BY THE WOODBURY PROCESS.

[Paper read before the Photographic Club.]

THE Woodburytype process is practically a method of obtaining carbon prints on glass or paper mechanically. The process is so little understood by photographers generally that I think a few remarks on the subject are likely to prove interesting to many.

It is not possible, in the short space of time I have at my disposal this evening, to give you a demonstration of the whole process, on account of the length of time each of the various operations takes. For example, the development is so slow that a piece of tissue that took only four hours to develop would be useless, as the mere fact of the development being completed in this time would be quite sufficient proof that it had been exposed too short a time to be of any value as a relief.

Some two years ago I had some fine negatives of Japan sent to me by Professor Burton. Now, at that time there was a very great demand for any pictures or slides of Japan, so I was most anxious to get the slides made in the shortest time possible, and, although I had a powerful electric arc lamp placed at my disposal, I found I could not get the reliefs made and the slides commenced under ten days.

Although I cannot give you a demonstration of the way reliefs are made—and this is really the most important part of the process—I have brought with me some ink (as the solution of gelatine coloured with Indian ink is technically called), some glass plates, and a printing block or mould, and I dare say we shall be able to print a slide or two and try them on the lantern.

There are few people who have not seen an ordinary carbon print developed, and have probably noticed how the image or picture stands out in more or less high relief, the depth of this relief being regulated by two things: firstly, the amount of pigment with which the gelatine of which the tissue is formed has been mixed; and, secondly, the amount of exposure to light. If a dried carbon print in high relief be placed on a block of soft metal, such as lead, and be then subjected to a heavy pressure, such as one can readily obtain by means of the hydraulic press, the parts of the picture that stand out in relief will be forced into the soft and yielding surface of the metal, and form a series of depressions, which will fairly represent the gradations of the picture; but a sheet of ordinary carbon tissue has but a thin coating of gelatine, and it would be impossible to obtain from it sufficient depth in the depression to yield a good print, and for this reason it is necessary to make a special tissue, the coating of gelatine on which shall be fully the thickness, when dried, of a thick postcard.

The method now in use is to collodionise large pieces of plate glass, which have been previously carefully cleaned and then well rubbed with powdered talc. The collodion used needs to possess two qualities. It must be extremely tough and strong, and at the same time not too contractile. It cannot be made from any formula I know of with any certainty of being of first-rate quality. The plan I adopt is to get various samples of low-temperature gun-cotton and try them, and when I come across a sample that fulfils all the necessary conditions, I purchase enough to last a long time, as the collodion rather improves by keeping if kept well corked in a cool place.

The plate to be collodionised is placed on a levelling stand and collodion poured upon it until the round pool formed in the centre extends to every corner. It must then be allowed to set thoroughly, and it is well to see that whilst setting it is not exposed to any currents of air, or the plate will be sure to show wave-markings, and in some cases the film may crack.

When thoroughly set, it is washed for some time under a tap, until all signs of greasiness caused by the presence of ether and alcohol in the film have disappeared, as these would have the effect of preventing the gelatinous coating adhering properly. This done, the plate is warmed carefully in front of a fire or with a spirit lamp. It is then replaced on the levelling stand, and a mixture of gelatine, to which has been added sugar, glycerine, and bichromate of ammonia, and pigment in the following proportions:—

Water	480 parts.
Gelatine	100 ,,
Bichromate of ammonia	20 ,,
Sugar	20 ,,
Glycerine	20 ,,

Indigo or India ink enough to colour deeply.

As soon as the gelatinous coating has set, it must be placed in a box nearly filled with chloride of calcium, as it must be dried quickly, or it will become insoluble. In summer it will take one day to dry, but in winter it is apt to take from two to three days to dry.

When dried, the tissue is stripped from the glass plate (this is easily done if the talcing of the glass has been well done), and cut up into suitable pieces with a knife or a pair of scissors. It is then placed under the negatives (which, as in ordinary carbon printing, need to be provided with safe edges) and exposed to light. The exposure in the best light in the month of June may, perhaps, not need to be longer than half an hour, but ordinarily it requires much longer.

The exposure can be gauged by means of an actinometer, for although, unlike carbon printing, it is possible to see the image on the tissue, and thus to tell when the printing has gone far enough, it is not well to open the printing frame often, as the tissue absorbs moisture, and then prints unequally.

The tissue now needs to be developed, and, as it would curl up and be very unmanageable if left to itself, it is customary to attach it temporarily to a piece of glass or a piece of zinc grained by immersion in a mixture of nitric acid and alum. It is attached to either of these supports by means of a solution of indiarubber in naphtha. This is poured over the plate, and allowed to dry for about four hours. The tissue is then placed, with the collodion side downwards, on the plate and passed between rollers. For this purpose the family washing machine rollers answer very well.

The plate is now placed in a dish or tank containing water heated to about 100° Fahr., and after it has been in water of this temperature for an hour, and the greater part of the uncombined bichromate has come out of the tissue, the water should be changed and the temperature increased to 120° or even 150°.

When the development is completed, which may easily be known by the appearance of bare collodion in the highest lights, the plate should be rinsed with hot water, and then dipped in cold water and set to dry. When dry, the film must be most carefully stripped from the rubber support, and placed either on a book or under a weight so as to keep it flat. It ought to remain a day or so before pressing into the lead, otherwise it is apt to crack.

In making the mould, the relief is placed collodion side downwards in a sort of shallow steel tray, the sides of which are bolted together. A piece of soft lead is then placed upon the relief, and a pressure of about six tons to the inch is applied by means of the hydraulic press, which usually suffices to impress the image into the surface of the metal. The pressure is left on for about a minute to allow the lead to flow, and the sides of the tray prevent any lateral extension, which would soon burst the relief to pieces.

The tray or chase is then unscrewed and the lead taken out. The relief is easily detached from it, and can be used several times. The lead has now to be planed at the edges, and, at the same time, any flaws caused by spots on the negative can be removed by means of a sharp chisel. In printing from the mould a press is used which gives a truly parallel motion. The mould is attached to the base of the press by putting a few drops of the warm gelatinous fluid we call ink.

The surface of the mould is then well oiled, and, after the superfluous oil has been rubbed off with a piece of chamois leather, it is ready for printing. An ink, composed of, say, fifty grains of gelatine to the ounce of water, and coloured with Indian ink to suit the depth of the relief, is poured upon the mould, and then a piece of plate glass, which has been previously warmed, so as to avoid chilling the ink, is placed upon it, and the lever of the press is lowered so as to exert a moderate pressure.

In this room the ink would take about ten minutes to set, the time of setting depending on the amount of gelatine in the ink or the temperature of the room. The cooler the room the less gelatine would be needed.

When the gelatine has set, the glass can be taken up by inserting a point of a knife between it and the mould. I will now proceed to make one or two slides. [A couple of slides were made.] Mr. Foxlee has brought with him a couple of stannotype moulds made by Mr. Woodbury, which are extremely interesting, and he will explain to you how they were made as a means of printing Woodburytype without the necessity of employing a hydraulic press. J. R. WILLIAMS.

GLYCERINE A HEAT-ABSORBENT IN LANTERN PROJECTION.

MR. A. W. KING, of the Blackburn Municipal Technical School, writes, enclosing us a cutting from the *Blackburn Weekly Standard* relating to the use of glycerine as a heat-absorbent in lantern projection by Mr. Bellingham, of that town:

Mr. Bellingham is a lecturer and amateur photographer of considerable local fame, and neither he nor myself is aware of glycerine having been used for this purpose previously. We have had trouble and disappointment on other occasions with the ordinary alum bath, but the glycerine certainly acted perfectly. During the whole of two hours not a bubble made its appearance, nor was a slide at any time more than slightly warmed, and at the end of that time the condensers were by no means extremely heated.

The lantern and case and trough for the bath were made by Mr. Holt specially to be of sufficient size to allow of the bath being placed between the arc lamp and the condenser. Mr. Bellingham states that, if the bath is to occupy this position, it is necessary that the glycerine should be anhydrous; if it is to be placed between the condenser and the slide, this is not necessary.

The full severity of the test will be more readily understood if I add that the screen was 20 feet square, the lantern 95 feet distant, and a current (continuous) of a little over 15 ampères used.

The following is the extract referred to:—

"By the way, Mr. Selous' coloured slides were 'thrown' from an

electric lantern of 2000 candle power, into which for the first occasion in the history of lanterns, a new device had been introduced at the instance of Mr. Bellingham. The heat of the light required for a large projection has long been a recognised disadvantage and danger—a danger both to the condenser of the lantern and to the slides of the lecturer. As far as risk to the slides goes, this has generally been obviated by what is known as 'the alum bath,' which is a glass trough filled with a solution of alum, and placed between the condenser and the lantern slide. This to a great extent has saved the slide from injury from heat. Occasionally, however, the bath has been found to bubble, and even boil, the pictures thrown on the screen being thereby very much impaired. It occurred to Mr. Bellingham recently, in the course of some experiments which were being made by himself and Mr. Holt, the electrical engineer at the Technical School, himself an expert lantern operator, that the use of anhydrous glycerine in place of the alum solution would be a vast improvement, glycerine boiling at something over 500° Fahr., and further showing no trace of the bubbles which so seriously impaired the ordinary bath. Further experiments made with a trough specially designed and contrived by Mr. Holt proved that it was possible to place the bath not merely behind the slide as heretofore, but actually behind the condenser, and before the actual source of heat, and, after an arc light of 2000 candle power had been in use for two hours, it was found that the glycerine had attained a temperature of only 176° Fahr. Glycerine, moreover, being optically inert, allows of the transmission of almost the whole of the light power. There can be little doubt, I think, that Mr. Bellingham's idea will prove of very considerable use to lanternists. He himself is of opinion that its employment would prevent very much of the risk that has attended the cinematographic displays. I heartily congratulate Mr. Bellingham upon his discovery. He has personally suffered the melancholy pleasure of seeing his own slides cracked and frizzled up when lecturing, and, as a fellow feeling makes us wondrous kind, he will be happy to think that this both by himself and fellow-lecturers may be a thing of the past.

A NEW (?) SAFETY FLASHLIGHT POWDER.

Herr Weiss, of Strassburg, is responsible for this invention, the novelty of which, however, is hard to perceive; he describes it as a mixture which does not fire when rubbed or struck, but ignites only at a high temperature, fulminates instantaneously, and produces a very bright and most effective photographic light of considerable actinic power.

This effect, he says, is produced by the hitherto unknown (*sic*) mixture of powdered aluminium (aluminium pulvis) and powdered perchlorate of potassium (kalium perchlorat pulvis). The mixture is made in the usual manner, whilst the proportions of the constituents of the mixture differ considerably, and are to be measured always according to the purpose in each particular case, that is to say, the proportions depend upon whether a moderately quick, quick, or very quick, combustion is to be effected, and the production of smoke more or less prevented.

Experiments made with this object have shown that as well mixtures of 85 parts of perchlorate of potassium with 15 parts of aluminium as such of 40 parts of perchlorate of potassium with 60 parts of aluminium give still useful results, so that all mixtures lying between these limits from 85 to 40 parts of perchlorate of potassium with corresponding parts (from 15 to 60) of aluminium respectively may be regarded generally as suitable for photographic purposes.

A suitable mixture which gives average effects in relation both to quickness of combustion and quantity of smoke resulting is one, for instance, composed of 60 parts of perchlorate of potassium to 40 parts of aluminium.

So far so good. Herr Weiss, however, may be interested to know that so long ago as 1891 M. Villon proposed aluminium as a substitute for magnesium, and gave several formulæ for its admixture with chlorate of potash and other reagents. Consequently, Herr Weiss is at least seven years too late with his invention.

RADIO-STEREOSCOPY.

"The progress of radiography seems to open up a field of usefulness for the long-neglected stereoscope. If it be realised that upon the radiographic film or the fluorescent screen there are thrown upon one flat surface, as in a transparency," says Dr. W. S. N. Hedley, in the *Lancet*, "the shadows of a variety of objects, which latter in reality occupy in space very different planes; and if, further, it be borne in mind that such light and shade as the radiograph presents are nothing more than indications of relative opacity to the X rays, it is evident that such a picture can only very imperfectly display the true relationship of objects, and must entirely fail to give any adequate idea of the contours of their surfaces. In the case of foreign bodies, an exact localisation can, of course, be secured; that is to say, the radiographer is able to give the exact position of the foreign body with reference to certain artificial surface marks; but such nformation cannot convey to the mind, as sight does, a clear conception of the various objects that go to make up the picture. Yet this is what is chiefly wanted. Any method, therefore, must be acceptable which will enable the surgeon to see with his own eyes at one glance, and at any time during an operation, the *tout-ensemble* of the region he is dealing with. It appears to me that the stereoscope is able to accomplish this.

"To obtain a stereoscopic effect, it need scarcely be said that the first requirement is true binocular vision on the part of the observer. The second indispensable condition is that there be two corresponding pictures of an object—the one seen from the point of view of the right eye, and the other from the point of view of the left eye. It is evident that, in the case of the radiograph, these can be secured either by moving the object itself, or by laterally displacing it in a direction parallel to the plane of the sensitive plate, the source from which proceed the X rays. In dealing with the living body, the latter is the simpler process. But the vital point to ascertain is, what ought to be the proper extent of this displacement, and what are the physical and physiological considerations upon which the extent of this displacement must be made to depend? In other words, given a certain distance of the positive electrode from the object to be radiographed, and the thickness of the object itself, what is the proper lateral displacement of the focus tube? or, given a certain displacement of the tube, and a certain thickness of the object, what is the proper distance of the anode from the object to be radiographed? I have experimented on a purely empirical basis with the ordinary lenticular stereoscope, and have at times obtained effects which were fairly correct. More often the relief is exaggerated or otherwise untrue. But M. Marie and M. Ribaut have lately attacked the question from another standpoint, and have published certain formulæ, the use of which will save a vast amount of experimental trouble. These writers point out that, in looking at an object in the ordinary way, the angle of convergence of the eyes and the accommodation vary simultaneously in passing from one plane of an object to another plane; but in stereoscopic vision the images are on one plane, and therefore accommodation remains constant, while the angle of convergence of the eyes varies as it passes from one plane of the reconstituted object to another. This angle depends upon the thickness of the reconstituted object and its distance, and these two, of course, depend in their turn on the distance from the real object and the thickness of the latter. This distance and this thickness must vary indefinitely, but the maximum limit of the displacement of the tube cannot exceed a certain amount. Now, given the distance of the object and its thickness, the lateral displacement of the tube may be calculated by the following formula: Where Δ is the relative displacement of the tube and object, D the distance of the tube from the object, and T the thickness of the object, $\Delta = D \frac{(D + T)}{50\ T}$. Thus, if the object be, say, 3 cm. thick, and the distance from the tube be 20 cm., then the displacement of the tube would be 3 cm. When the displacement of the tube is equal to the distance apart of the eyes, say 6·6 cm., the virtual image appears at the distance that the object has been photographed from, and is the proper size. Therefore, when practicable, the displacement ought to be 6 6 cm. This being a known quantity, and the thickness of the object also being known, the following formula is given to calculate under such conditions the proper distance of the object from the tube: $6{\cdot}6 = D \frac{(D + T)}{50\ T}$.

"I have lately worked on these lines, and have been able fully to verify the accuracy of the method. Immediately the negatives are taken, the images may be fused in the stereoscope without reduction, even with plates 8½ in. by 6½ in. in size. In the case of metallic foreign bodies there is sometimes an apparent want of truth in the result, owing, perhaps, to the fact that those objects which are most distinct in the field of vision have a tendency to appear nearer. Such cases are best dealt with by the lengthier methods of localisation. But when, as occurs in the great majority of cases, it is of importance to realise the relationships of the various structures in all their dimensions, as in bone surgery at the present time, without anticipating the soft tissue radiography of the future, it appears to me that radio-stereoscopy is destined to play an important part."

THE JOLY PROCESS OF COLOUR PHOTOGRAPHY.

To our contemporary, the *English Mechanic*, Mr. J. W. Swan, M.A., F.R.S., addresses the following note on the Joly process of colour photography:—

If a plate of glass is covered with transparent coloured lines of one-two-hundredth of an inch in thickness, and the lines are of three colours, the colours being such as transmit the kinds of light which produce the three fundamental colour sensations in the eye, and if the coloured lines are arranged in recurring tricolour line bands, then, when such a line screen is looked through against a white background, the light transmitted by the tricolour bands will affect the eye with the sensation, not of the three colours transmitted behind the screen, but with the blended effect of white light.

If, in a number of contiguous colour bands, one or more lines of the

same colour are blotted out by opaque lines coinciding with them, such bands will appear coloured. For example, if all the lines, except the red lines, of a succession of, say, ten contiguous bands are blotted out by another line screen partly covered with opaque lines of the same width as the lines of the colour screen, then those ten colour bands will no longer seem white, but red.

If, instead of the green and blue lines being blotted out, as supposed, the green and red had been the effaced lines, the colour of the bands thus modified would have seemed blue; or, if the red and blue had been effaced, then the colour of the supposed ten bands would appear as one broader band of green.

If it be supposed that a photographic plate, equally sensitive to the light of all the three colours of the lines, be placed in the camera with such a colour-line screen as the one described, in front of and in contact with it, and that the object before the camera is variously coloured (such, for example, as a bouquet of flowers of different colours), under these circumstances the plate will be so acted on that opaque, or partially opaque, lines or parts of lines will be produced behind all those lines which transmit light corresponding in colour to the colour of that portion of the object which emitted those particular rays. For example, the rays emitted by a red carnation or poppy would pass through the red lines in that part of the plate where the red rays fell, and immediately behind these there would be produced in the negative opaque, or partially opaque, lines, while little or no effect would be produced behind the contiguous green and blue lines. The light from green leaves would pass almost exclusively through those of the green lines, struck by the green radiation from the green leaves, and the adjacent blue and red lines would almost wholly intercept them, and preserve the sensitive plate being acted upon immediately in their shadow.

Similarly, the radiations from two mixed colours would pass through two of the colour lines of each of the colour bands impinged upon, as, for example, the radiations from a purple flower would pass through the red and blue lines more or less equally, and produce in the negative corresponding dark lines.

Radiations from a white object—a lily, for example—would pass through all the three colour lines, and, therefore, the portions of the sensitive plate acted on by the white radiations would be opaque, or partially opaque, unbroken by lines.

Having taken a negative under the conditions described, if a positive be made from it by printing through it on another sensitive plate, in the manner usual in making photographic lantern slides, and if this positive be accurately fitted to the original colour line screen, through which the negative was taken, so that the lines of the photograph coincide and register with the proper lines of the line screen, the effect of a coloured photograph is produced.

These somewhat exacting conditions are practically and quite successfully realised, with one exception, in the highly ingenious process of colour photography invented by Professor Joly, of Dublin. The point in which Professor Joly's process, as practised, differs from the ideal process described, is that the photographic plate on which the negative is taken is not equally sensitive to the three kinds of light which produce the three fundamental colour sensations; no such photographic plate as this has yet been made. In consequence, accommodation has to be made in the colours of the lines of the taking screen to compensate for this defect in the photographic plate, a defect which exists in even the most orthochromatic of orthochromatic plates; so that in practice the taking screen and the viewing screen, while agreeing in the number and width of the lines, differ in colour so far as to produce the equalising effect required.

STEREO WORK.

[Translated from the Photo Gazette.]

Stereoscopic work is not difficult, it is not expensive, and does not require a special camera. These three facts, if more widely appreciated, should lead many photographers to devote their attention to a branch of work with which ordinary photography cannot be compared. Badly mounted prints have done much to prejudice public taste against the stereoscope. It has been a common experience to hear people say, when looking into the stereoscope, that they can see three or sometimes two pictures, and that they find it best to close one eye when making their examination of a view! This want of superposition in the stereoscope is due merely to bad mounting, though this operation is one of the simplest when properly performed, and any one who can mount an ordinary photograph can mount one for the stereoscope. To the amateur who has appreciated the infinitely superior rendering of relief, separation of planes of the subject, and natural appearance given by a stereo print as compared with one obtained by a single lens, this department of the art science will recommend itself. Certain rules must, of course be observed, but the same remark may be made in reference to any branch of photographic practice. Without saying anything about the theory of the stereoscope—a subject which has received ample treatment at the hands of able authorities—the writer wishes to bring together a few notes for the aid of those who wish to take up this class of work. In the first place, note that no special camera is required, that the bellows may be either square or conical, and the apparatus the simplest or the most elaborate. For convenience and excellence of results I recommend the sizes 9 × 12 cm. or 13 × 18 cm. (corresponding to 3½ × 4¾ inches and 7 × 5 inches, the nearest English sizes being 5 × 4 and 7½ × 5). The 9 × 12 is particularly suitable, and it is a singular fact that no maker has yet adopted it for the purpose. Plates of this size are to be obtained anywhere, whilst, in regard to the smallness of the size, a special study of the question has convinced me that stereo prints should not be wider than 2·36 inches (= ·06 metre) without fear of fatiguing the eyes. To make a camera of this size suitable for stereo work, two lenses must be mounted on the front instead of one, and the interior must be divided by an opaque partition. The 18 × 13 is, if anything, a little too large, and prints should be well trimmed. Special-sized cameras, by reason of the difficulty experienced in getting plates for them, are not to be recommended. A square bellows instrument is generally advised, but, provided the front is wide enough to take a pair of lines separated 2½ inches (65 millimetres) between their centres, a conical bellows is better, being lighter and more portable. A central partition is indispensable to separate the two views. One can easily be made from a piece of black material, provided along its top and bottom edges with an elastic, to each of which are sewn two hooks, these hooks being attached to the inside of the lens board and to the back near the ground glass. Next as to lenses. For photographing near objects, wide angle rectilinears of about 3 inches (7·5 cm.) are most suitable; for general work a pair of lenses of about 5 inches focus (12·5 cm.) whilst for a perfectly complete outfit a pair of 6·3 inches focus (16·6 cm.) may be added. If the worker wishes to economise, a pair of single lenses of 5 inches focus will suffice. These are sold at a low figure and will serve for both architecture and landscape. The slight distortion which they give disappears in the stereoscope. If cost is no consideration, the more perfect objectives, such as the anastigmats of Turillon and Zeiss, &c., offer advantages in many respects, particularly in point of rapidity, which, in view of the fact that the most prevalent defect of stereo negatives is under-exposure, is a great advantage. By full exposure we shall avoid those hard glaring prints, the bad qualities of which are intensified when they are examined in the stereoscope The lenses must be accurately paired by a conscientious optician, not merely as regards length of focus but also as far as working aperture is concerned, since it is absolutely necessary to have equal intensity of illumination on each half of the plate. To complete the apparatus, a good shutter for exposing both lenses at once. That of Otto Lund is excellent, but expensive. It works in the lens mount. Next comes the Thornton-Pickard, working on the lens hoods or on the camera front. The base of the camera must not be too high. From 3 feet 7 inches to 3 feet 10 inches is about the best height. A higher position includes too little foreground, the importance of which in a stereo view cannot be over-estimated. A spirit level is useful for ensuring the plate being horizontal. If this is not the case, there is some trouble in mounting. The chief value of a stereo view lies in the impression it gives of relief, solidity, and separation of the planes of a subject. Hence it is indispensable to include some prominent foreground; a figure, the trunk of a tree, a rock, a hedge are objects which may serve this purpose in landscape work. In interiors, a chair, a pillar can be substituted; in fact, any object from which the eye can derive the idea of relief. To the human eye objects distant more than 650 feet (200 metres) do not appear in relief. In the case of objectives the same thing happens at a much shorter distance. At 200 feet (60 metres) with lenses of 4 inches focus (10 cm.), and at 100 feet with lenses of 2 inches focus (5 cm.). Hence the point of view should be so selected that some striking object occupies a position some 20 or 23 feet (6 or 7 metres) from the camera. Portraits look very effective as stereo views, and, owing to most of the effect being due to the relief, the management of the lighting is not of such importance as in single-lens portraiture. Rapid plates should be used to avoid under exposure. The great object in stereo work, is to get soft negatives full of detail in the shadows. The stereoscope gives a good deal of vigour of the image, and, if the negative is at all brilliant, the prints appear hard. To obtain the sharpness of definition necessary for stereo work, a small stop must be used. Hence the necessity for a rapid plate. Backing plates, to prevent halation, is a precaution much more necessary here than in single-lens work, since this defect, even if slight, presents a very bad appearance in the stereoscope. Most developers give good results. Hydroquinone is perhaps to be avoided, owing to its liability to give hard results. Metol and eikonogen are good. Metol especially gives excellent negatives, perhaps a little thin, but with plenty of detail in the shadows. A slight veil which it seems to give over the whole negative softens the print.

Comte d'Assche.

PUTNEY PHOTOGRAPHIC SOCIETY.

March 17.—The members of the Richmond Camera Club paid a return visit to this Society, and gave an excellent exhibition of lantern slides. Dr. Sheppard occupied the chair. The pictures shown had been taken in Normandy, Wales, Scotland, North Devon, Italy, Spain, India, and elsewhere, forming a very interesting collection of slides, which were contributed by the following members: Messrs. Hunter, Neville, Williams, Davis, Ardaseer, Purcell, James, Richardson, and Gibson. A set shown by Mr. Purcell illustrated very fully a Spanish bull-fight.

MANCHESTER PHOTOGRAPHIC SOCIETY.

March 23, a selection of members' slides was shown, Mr. J. Wood (the President) in the chair.

Mr. W. Tomlinson opened the evening with views of the River Wye and neighbourhood, Raglan Castle, and Hereford, and also tree studies at Silverdale. The group of narcissi taken by this member was very pleasing.

Mr. W. B. Wood showed a good set of hand-camera subjects, chiefly taken in the Isle of Man.

Mr. B. I. Beckton's views of the Lake district included Langdale, Troutbeck, Rydal Water, and one or two snap-shots of pole-jumping at Grasmere Sports.

Mr. H. M. Whitefield showed an excellent set of Haddon Hall, which illustrated the Hall both from interior and exterior standpoints, the Chapel with its Norman font, and the Banqueting Hall being exceptionally fine slides. The famous terrace and doorway with which the name of Dorothy Vernon is connected were also amongst those which delighted the audience.

Mr. F. W. Andrews had a few Whitby views, but the peculiar skull and Japanese ivory carvings were his best slides.

Mr. W. G. Coote showed views of Bolton Priory, the interior of the church at Torcello, near Venice, and Plumbly Mill. A curious slide was also shown illustrating the after-effects of the gas explosion a few months ago at the Regent Hotel, Salford.

Mr. F. Edwards had a few beautiful slides of Normandy towns, as well as some of North Wales and Barnard Castle.

Mr. J. Wood showed some good slides of the Menai Straits district and of Blackpool sights. Amongst Mr. Wood's set were some beautiful flower studies and snow scenes.

Mr. Harry Wade, commencing with views of the Lake district, had some good slides. London streets, scenes at St. Anne's-on-the-Sea, and excellent slides of the stage of the Comedy Theatre, Manchester, taken during the recent pantomime, were shown.

Mr. J. Wilde concluded the exhibition with views of the River Wye, Hereford, and Raglan Castle.

Mr. J. Wolfenden manipulated the lantern.

DERBY PHOTOGRAPHIC SOCIETY.

March 22, Mr. C. B. Keene presided.—The result of 1897 outdoor meeting competition was announced, Dr. Brass (Spondon) having won the silver medal with a silver print from a negative taken in Miller's Dale, and Mr. E. Fearn (the Hon. Secretary) the bronze medal with a platinum print from a negative taken in Lathkill Dale. The Glasgow and District Convention Slides, numbering about 200, were exhibited under the direction of Mr. A. N. Haslam and Mr. Keene, after which the Hon. Secretary gave particulars of the dates of the 1898 outdoor meetings. The following dates have up to the present been arranged: May 7, Haddon Hall; May 21, Risley; June 11, Wirksworth; June 25, Monsall Dale; July 9, Melbourne. Suggestions were invited as to the outings for the remainder of the season, but it was decided to leave the matter in the hands of the Committee. Mr. A. N. Haslam informed the meeting that a somewhat novel scheme would be adopted in connexion with the Monsall Dale meeting, a scheme to which attention had been drawn recently in the photographic journals. Each member participating in the outing would be invited to expose a definite number of plates, and the prizes would be awarded according to the general results. This would be a good test of the merit of the general work of members. Mr. R. Blaylock was duly elected a member of the Society. Mr. A. H. Bennett being unable to undertake the duties of Hon. Librarian to the Society, Mr. J. Walker was appointed in his stead, and Mr. D. Deeley was elected Hon. Reporter.

BOUILLAUD'S APPARATUS FOR ARTIFICIAL ILLUMINATION.

This apparatus has been designed for artificially illuminating objects for photographic purposes, and utilises all kinds of artificial light of sufficient photographic power; amongst others, magnesium, aluminium, electric arc, &c.

Figs. 1 and 2 are respectively front and side elevations of the apparatus, and figs. 3 and 4 are respectively vertical section and plan. Figs. 5 and 6 are perspective views, showing respectively an arched and an oblique shaped front form of the apparatus, which possesses the following features:—

1. It is movable around an axis, and is thus able to direct or concentrate the rays and to vary their effect as may be desired.

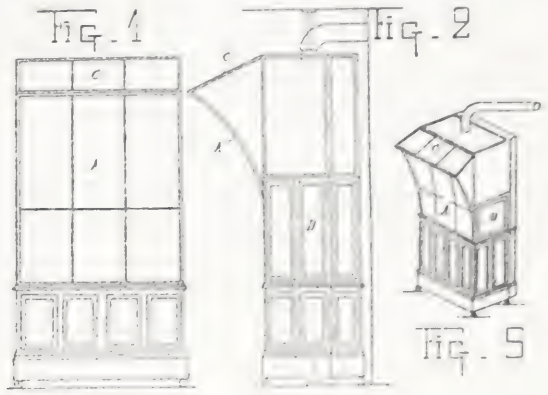
2. Owing to the internal arrangement of the apparatus, the smoke and other matters resulting from the combustion of the illuminating substances are carried off immediately by the chimney.

3. The front is glazed and of roughened glass, in the form shown in fig. 5 or fig. 6, A or B, and is inclined in such a manner that it forces the luminous rays to take a predetermined direction in order to give to the head of the object to be illuminated the desired *alto relievo* effect.

4. The top (C, figs. 1, 5, and 6), is glazed, and is of transparent or polished glass, and thus powerfully illuminates the white painted ceiling of the room where the operating is carried on, and helps to suitably spread and diffuse the light.

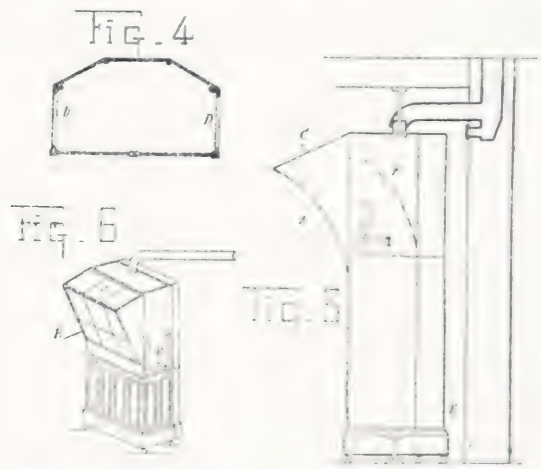
The interior of the apparatus is painted white and varnished, in order to give the reflected light its maximum intensity.

5. The magnesium or aluminium charges, or the electric arc or arcs,



or other artificial lights, are placed in the interior of, at a predetermined height, according to the effect to be obtained, and the apparatus, for the convenience of manipulation, is provided with a door or doors, D, on each side (see figs. 2, 4, 5, 6). An arched or oblique reflector, F (see fig. 3), may be arranged in the interior, behind the lamps.

6. In connexion with the use of magnesium, the interior of the apparatus is supplied with one or more jets of gas (preferably Auer's or Welsbach's), or with two large petroleum lamps.



The latter arrangement has three distinct objects:—

a. It allows of obtaining a sufficient idea of the more or less artistic fashion of illuminating the object, and of modifying it if necessary.

b. It serves for focussing the picture, and

c. The heat produced by the jets or petroleum lamps produces the chimney draught. In point of fact, the charge of magnesium scarcely falls before the products of combustion have entirely disappeared, whether the doors of the apparatus be closed or not.

As will be seen by an examination of figs. 2 and 3, the apparatus is placed right in the draught of a chimney, the intake of which is at E (fig. 3).

GAUMONT'S IMPROVED ENLARGING APPARATUS.

M. Leon Gaumont claims that this enlarging or "amplifying" frame is distinguishable by extreme simplicity of construction and the readiness with which it may be operated when it is desired to obtain double or treble enlargements of photographic pictures.

Fig. 1 is a vertical section of the enlarging frame as arranged for enlargements in the proportion of 1 to 2; and

Fig. 2 is a similar view of the frame arranged for enlargements in the proportion of 1 to 3.

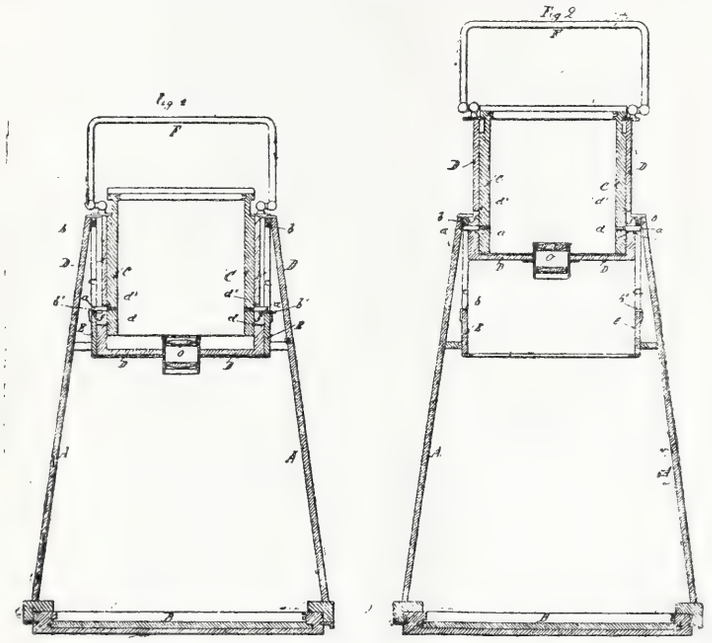
This frame consists of a pyramid-shaped case, A, which at its base receives a frame, B, containing the sensitised surface whereon the image to be enlarged has to be formed.

At the top of the pyramid there is provided a box with a slide, by the operation of which the proportions of the enlargement may be fixed at will at 1 to 2 or at 1 to 3 by varying the distance between the object-lens and the sensitised surface, and also the distance between the object-glass and the image to be enlarged.

The slide, C, adapted to move in the box, D, has an object-lens, O, fitted in it, and is, moreover, provided with pins or studs, *a*, which serve to limit the extent of displacement of the box, D, while at the same time doing duty as a stop for arresting the slide at the required distances, by abutting against the ends, *b* and b^1, of the grooves, *c*, formed upon the stationary case or sheath, E, wherein the said box and slide are arranged to move. For the operation of the frame, the box, D, is provided with a handle, F, which enables the apparatus to be moved to either of the two positions shown in the drawing.

In fig. 1 the frame as stated is adjusted for enlargements in the proportion of 1 to 2, for which purpose the box, D, is moved right home to the bottom of the sheath, E.

When it is desired to enlarge a picture in the relation of 1 to 3 (fig. 2), the negative is placed at the upper part of the slide and the handle, F, is pulled so as to raise the box, D. As this movement is being



performed, the box, D, carries the slide, C, along with it until its pins, *a*, meet the bottom surfaces, *b b*, of the grooves, *c*, of the sheath, F, thereby arresting it. Then the said box, D, continues to ascend until the bottom, *d*, of its recesses, *f*, in their turn come into contact with the pins, *a*, when the frame will be in readiness for enlarging the negative in the proportion of 1 to 3.

In order to so adjust the apparatus as to make double enlargements (in the proportion of 1 to 2), as illustrated in fig. 1, the box is pushed home by means of the handle, F; this box first descends, carrying the slide, C, along with it, until the pins, *a*, strike the bottom, b^1, of the grooves, *c*; then the said box, D, continues its downward movement until the bottom surfaces, d^1, of the recesses, *f*, in their turn come into contact with the pins, *a*.

By such means the apparatus may be exactly set, so that the distance between the objective and the sensitised surface, as well as the distance between the said objective and the picture to be enlarged may always be accurately proportioned to the required enlargement.

Correspondence.

STOLEN CINEMATOGRAPH OF THE SOLAR ECLIPSE.

To the EDITORS.

GENTLEMEN,—Some correspondence with reference to Cinematography and the Solar Eclipse having appeared in your columns, I should esteem it a favour if you will allow me to make public the following particulars:—

On Wednesday last I awaited the arrival of the *Palawan* at the Royal Albert Dock, with a view to bringing away our eclipse film for immediate development. The vessel was late in arriving, however, so I had only time just to go on board and arrange with the Rev. J. M. Bacon to have my apparatus and the exposed film sent directly to this address.

On Thursday the cases arrived here. Proceeding to open them, I found they had already been opened; when, and by whom, I could not say. It could hardly be by the Customs officials, as the things were "Customs-free, by order of the India Office." I did not, however, attach much importance to the fact at the time.

On Friday I proceeded to develop the eclipse film, but unforeseen developments had already arisen. The receiving box, in which the film should have been coiled, was empty! My first impression was that some mistake had been made, or some failure of the instrument had occurred. Then I remembered the unfastened cases. The only thing to do was to measure all the returned film, and see if the whole length sent out had come back. This I have done, and find that the piece used during the eclipse is missing. There can be no question about it, the film has been stolen. Mr. Bacon thinks it probable that the theft occurred in camp, at Buxar. These circumstances are particularly unpleasant, to say nothing of the disappointment caused. I was quite prepared to find something had gone wrong at the crucial moment; machines are liable to vagaries of that kind, as every mechanician knows to his cost, but I was not prepared to find our efforts frustrated by thieves.

Mr. Bacon has offered a reward for information leading to the detection of the culprits. I fear, however, there is little chance of our having even the poor consolation of punishing them.—I am, yours, &c.,

Egyptian Hall, W., March 29, 1898. NEVIL MASKELYNE.

In reference to the foregoing, the following advertisement has been published:—

> £50 REWARD.—ABSTRACTED from the "receiver" of a Cinematographic Camera, a NEGATIVE FILM of the SOLAR ECLIPSE, believed to have been stolen, either at Buxar, India, or during the transit of packages from the Royal Albert Docks to the Egyptian Hall, on Thursday last.—The above reward will be paid by the Rev. J. M. Bacon, of Coldash, Newbury, for information leading to the conviction of the thief or thieves.

SELF-LUMINANT COLOUR.—The many preparations that are luminous in the dark generally consist of calcium sulphide or barium sulphide. As regards their effect, they are much excelled by calcium tungstate, which is best prepared by heating in a Hessian crucible several hours to red heat 30 parts sodium chloride, 30 parts sodium tungstate, and 30 parts calcium chloride, well mixed. The mass melts into a vitreous paste, which is bruised after cooling and breaking of the crucible and lixiviated in water, whereupon the fine crystals of calcium tungstate remain. These are fixed on the surfaces by applying a layer of glue.

CROYDON CAMERA CLUB.—When an audience finds itself listening to one who speaks in familiar language, and who elucidates his subject by apt experiments, and when, moreover, it finds this is done without note and without flurry or delay, it is to be congratulated. This was the case on Wednesday, when Mr. A. E. Isaac undertook to initiate his hearers in the working of the optical lantern and its appurtenances. This he carried out in a manner which made the somewhat intricate points clear to most of those assembled. Without even giving a complete *résumé*, we would say that the lecturer dwelt upon the optical principles involved in the choice and use of lenses, their relation to each other and to the light used, which points were illustrated by a number of experiments. Different forms of lanterns were next described. Regarding oil lanterns, and the unpleasant smell which not infrequently makes their use so objectionable, Mr. Isaac explained that it was usually due to oil outside the lamp and inside the lantern, which, when heat was applied, threw off the forbidding odour with which many are familiar. Kerosine and similar mineral oils have a peculiar property of spreading or creeping, so that, if the lamp is left in the lantern for a week or two, the oil will be liable to spread all over the inside of the lantern. The remedy is to empty the lamp when it is done with, and keep it as clean as possible. About fifteen minutes before using the lantern light up the lamp, preferably in a room other than where the lantern is to be used; then put the lamp into the lantern, and no smell will offend the audience. In reply to a member, the lecturer stated that he considered camphor, as a rule, was not an improvement to the light emitted by a mineral oil lamp used in a magic lantern. The blow-through and mixed jets were described and shown in action, their various advantages being made clear. The ether saturator was also shown in action, and its desirability discussed. The lecturer considered that there existed no danger in the above substitute for hydrogen, provided it was used by one who thoroughly understood how to handle it. Chief risk was in carelessly pouring the ether from its storage bottle into the saturator; any tangible amount of the ether, if accidentally spilled on the outside of the apparatus, would be liable to flare up and set fire to inflammable matter near at hand.

THE Britannia Works Company recommend the following metol-hydroquinone as an alternative formula of development for Ilford bromide paper and special lantern plates:—

No. 1.		No. 2.	
Metol	50 grains.	Sodium carbonate (crystals)	½ ounce.
Hydroquinone	25 ,,	Potassium bromide	30 grains.
Sodium sulphite	1 ounce.	Water up to	20 ounces.
Water up to	20 ounces.		

Take equal quantities of No. 1 and No. 2.

It is important to note that no clearing solution is required with this developer.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*May 6, 1898.*

THE LANTERN RECORD.

CONTENTS.

	Page
LANTERN MEMS. By G. R. BAKER	33
STEREOSCOPIC PROJECTION OF LANTERN SLIDES. By W. J. CHADWICK	34
LIMELIGHT EXPERIENCES.—II. By T. N. ARMSTRONG	34
THREE-COLOUR PHOTOGRAPHIC PRINTING. By CAPTAIN ABNEY, C.B., D.C.L., F.R.S.	35
THE OBSTRUCTION OF BURNERS USED FOR ACETYLENE GAS. By M. HEGE	37
THE PHOTO-ROTOSCOPE	38
TRICKS IN PHOTOGRAPHY. By GEORGE W. CURTISS	38
THE PROPERTIES OF LIGHT. By T. W. DRINKWATER, Ph.D., F.C.S.	38
LANTERN LIGHTS	39
ATWATER'S HAND CAMERA	39
LANTERN TRANSPARENCIES OF SPHERICAL SUPPORTS	40

LANTERN MEMS.

That the Exhibition of the Royal Photographic Society at the Crystal Palace is a big success, all who have been to Sydenham will admit, for not only have a large number of fine examples of the photographic art been brought together and well arranged, but one of the best collections of apparatus is to be seen under such advantageous circumstances, that if professional and amateur photographers do not avail themselves of the opportunity of making their selections they will be the losers. Whatever may be the ultimate result financially to the exhibitors, the good accruing from this opportunity of showing novelties to thousands must be inestimable.

* * * * *

I was glad to see that lanterns and projection apparatus were adequately represented, and was much struck with the ingenuity displayed in designing and constructing new models in enlarging, science, and ordinary optical lanterns; also with the improvements shown in the construction of electric arc lamps, cinematographs, and cameras for kinetic photography. The apparatus used for the lectures was also deserving of praise, and the projection of the kromgrams and stereoscopic photographs attracted considerable attention. Mr. Anderton's clever adaptation of polarisers to a biunial lantern has been christened the "Analyticon," and will, no doubt, draw good audiences while the Exhibition is open.

* * * * *

I should personally be glad if this invention could be made a commercial success; but, to speak candidly, I think, after once the results have been seen and the ingenuity of the apparatus, with its scientific results, admired, most people will prefer to see the single photographs as ordinarily shown in the optical lantern. The use of binocular analysers by each of the audience, which is necessary to separate the confused projection of the two halves of the stereogram when partially superimposed, is not taken kindly to, or the loss of light which follows the use of same is to the disadvantage of the analyticon projections against ordinary, and thus in popular entertainments the results are not fully appreciated.

* * * * *

A feature particularly noticeable is the pains taken by proprietors, managers, and assistants at the various stands to explain any new method or apparatus, and the willingness with which questions are answered and demonstrations made, and I feel sure that those interested in any special branch of photography or lantern work will have only themselves to blame if they fail to elicit the necessary information to guide them in deciding on suitable apparatus, material, or chemicals, for their particular requirements. This distinctive character of the Exhibition was forcibly brought home to me both on the opening day, which was graced by His Royal Highness the Prince of Wales, and also on Saturday, when there was one of the largest attendances I can recollect for a scientific Exhibition.

* * * * *

I had occasion to ask a few questions about apparatus I was particularly interested in at two or three stands, and can testify to the courtesy shown by those in charge. It was not the "push" and desire to take money that one finds at bazaars, but practical explanations from men—and ladies, too, for the matter of that—who had their business or work at their fingers' ends. This treatment is sure to be conducive of satisfactory results, and it is to be hoped that those of the general public who are hesitating about taking up photography will go to the Crystal Palace while the Exhibition remains open.

* * * * *

Some fine lantern transparencies by several well-known firms are on show, and excellent results of amateur and other work are here and there, which deserve more than a passing glance. The Exhibition is one that time can be given to most profitably, and in that it differs from some others that have preceded it. I heard of one held recently where ten minutes was considered sufficient to "do" the whole show. The Royal Photographic Society are to be congratulated on the results of the Sydenham Exhibition, and it will be difficult to adequately praise the work of the Committee, or overestimate the services of the indefatigable Assistant Secretary.

* * * * *

I see by a prospectus I have been favoured with that there is to be an Exhibition of acetylene-gas generators at the Imperial Institute from June 1 until the end of August, and certain forms of generators will be shown in operation, while all apparatus will have to be passed by the Committee prior to admission. As the Committee is composed of scientific gentlemen whose names are well known in connexion with engineering, gas-making, and chemistry, the Exhibition should have, as one of its results, the establishing of the industry of acetylene-gas making and its use on a satisfactory basis.

* * * * *

The generators are to be divided into three groups: 1. Those in which the gas is generated by water being allowed to drip or flow in a small stream on the top of the carbide; (2) those in which water rises around the carbide; (3) those in which the carbide falls on the water. These, again, are subdivided into automatic and non-automatic. As photographers and lanternists are so much interested in acetylene gas as an illuminant, this Exhibition will be looked forward to with much interest.

G. R. Baker.

STEREOSCOPIC PROJECTION OF LANTERN SLIDES.

In a recent copy of *Nature* Mr. G. H. Bryan calls attention to "a complicated arrangement" for showing lantern slides in stereoscopic relief which was exhibited by Professor Porter at the Physical Society a few weeks ago, and makes slight reference to another "equally elaborate" arrangement by polarised light for securing a similar effect, and next calls attention to a "much more simple" arrangement which he has invented.

Mr. Bryan's idea is to project the dual pictures of a stereoscopic slide side by side on the lantern screen, to view one picture by one unassisted eye, and, by an arrangement of mirrors for the other eye, the second picture could, by adjustment of the mirrors, be brought into apparent coincidence with the picture seen by the first eye; of course, there is to be a projecting partition between the right and left eye to prevent either eye seeing the wrong picture.

There can be no doubt about the extreme simplicity of this arrangement; the only objection to it is, that it will not work, as a very elementary study of stereoscopy and the laws of reflection will show.

Mr. Bryan acknowledges to have been anticipated by *one* other inventor; but, I can assure him, the same idea has occurred to at least a score of others.

The arrangement shown by Professor Porter is not new (nor does he claim it as new); it is fairly successful, but unsuitable to an audience such as lantern projection is intended for.

The polarised-light method is the most perfect arrangement that has yet been tried for the purpose for which it is intended; but it is by no means *practical* for a general audience. W. I. Chadwick.

[Copy of Letter in Reply to the Foregoing.]

"It is sufficient answer to say that it is obvious from first principles that stereoscopic vision *can* be obtained with such an arrangement as I suggested, subject, of course, to certain obvious conditions. The mode referred to by me of projecting the two stereoscopic images one above the other has been *actually exhibited* in France, but I am unable to give a reference to the account at present. I believe, however, that it formed the subject of a note in *Nature* some year or two ago, and will endeavour to find it. The number of *Cosmos* referred to in my letter contains accounts of a number of devices and suggestions for obtaining stereoscopic relief both with lantern slides and otherwise. [Signed] G. H. Bryan."

LIMELIGHT EXPERIENCES.

II.

A more annoying circumstance than the collapsing of a large screen, either in the presence of an audience or otherwise, can hardly be met with in limelight lecturing. The employment of frames made of round poles or bamboo canes is, no doubt, one of the most convenient forms to adopt; and, once an operator be possessed of even a slight intimacy with the particular set of poles he is for the time being using, it is really marvellous how rapidly and well, moderately sized screens may be stretched and placed into position. In dealing with larger sizes than, say, twelve-feet screens, unless specially constructed supports are provided, there is a great liability for the screen to come tumbling down about one's head, with its attendant danger if there be any small jets of gas alight in the front of the platform round about.

As I write I can recall a very serious breakdown of this kind, whereby for a few minutes almost a panic reigned among the audience situated near the platform; luckily for the occasion, those in the gallery and back of the hall had the good fortune to look upon the comic side of the picture, and instead of treating the accident, as many would have thought most likely they would have done, in a serious vein, they saved the rest of the audience from panic by a spontaneous outburst of laughter. As it was, one corner of the sheet got somewhat burned from an adjacent peep of gas before the *débris* could be removed.

Since then I firmly adhere to a fixed determination to always suspend sheets, whenever possible, by means of sufficiently strong ropes or lines from some convenient position. To many this method of setting up a screen may appear antiquated and fraught with unnecessary trouble; in practice, however, such is not the case, and, once a rule is made to adopt this method of procedure, what beforehand might be deemed obstacles disappear before a few simple contrivances kept regularly at hand for the purpose Of course, there are vast differences in regard to the suitability of the various halls, theatres, churches, &c., where lectures have to be delivered in respect to the ease in fitting up the ropes or lines necessary to carry a large-sized screen, such as, say, sixteen to twenty feet, but still *there are always* some facilities, and the best must be made of what exist, and, for the time being, are at the disposal of the lecturer. By means of stout eyes or hooks, and a few small blocks or pulleys, a strong rope is easily run across most places, and quite as often some situations will be found where no eyes or hooks are even needed. Once the cross line is made taut across the hall the rest is easy, and, oh, what a relief it is when lecturing to feel absolutely sure that no danger is at hand of the sheet being brought down about your ears by the sudden admission of a strong current of air through the thoughtless opening of a door in the vicinity of the screen.

There are many ways of stretching a sheet properly when the same is suspended from ropes. One of the main factors lies in having one side of the sheet cut absolutely straight, and the other opposite side slightly cut away into the centre, the reason for this being that, if it be found that the screen has to be run on a rope that forms a straight line, as would be the case when such is stretched from correspondingly the same heights at each side, such as from a gallery—then the straight edge is the better side to use at top. If, on the other hand, circumstances transpire whereby it may be found necessary to bridge across the hall with a drooping line, then the cut-out side of the screen should be placed uppermost. As previously stated, however, but very little experience will be needed to ensure the adoption of this method where large sizes are concerned, in lieu of the very risky employment of poles.

The question as to what is the most suitable size of screen to adopt is one that, in my opinion, is very easily answered. I have a distinct liking for a fair amount of margin on a screen after the size of picture has been decided upon, and this, of course, means the providing of screens of different dimensions, according to the size of the lecture hall, and calls for at least some definite rule to follow as to what size of picture is best for any particular hall. As the outcome of now nearly thirty years' experience of lantern work and lecturing, I see no reason to depart from the simple rule I have all through followed, viz., to provide a picture in the proportion to a fourth of the size of the room or hall, and let it be borne in mind that this little rule holds good, either for rooms of large or small dimensions.

Take, for instance, the case of where a private entertainment or lecture is being given, in some homely parlour, the length of which very probably would be found to be about fifteen or eighteen feet. A rough estimate of such a room, according to the rule stated, gives a disc of four feet, and, although to many accustomed to use larger discs in confined situations by means of short-focus lenses such might be deemed too small, still, on trying the experiments, I am satisfied nothing but approval would eventually be expressed. A disc of four feet is a most comfortable size to look upon at such close quarters as we are considering; an eight or even seven-feet disc at such close quarters before any great length of time is very trying to the eyes, and engenders a restlessness of vision that soon becomes uncomfortable.

Then, again, if we consider the application of the same rule to halls of seventy-five or eighty feet in length (a dimension very commonly met with in town halls, &c.), a disc running near to twenty feet will be found to yield a most agreeable result to the greater portion of the audience, but as a rule, in all cases where large discs are being used, it is a *sine-quâ-non* that such be erected as far back over the platform as it is possible to arrange; this assists in a material way the comfort of those sitting nearest to the screen.

To carry out this rule means the necessity of providing a pretty wide batch of lenses of varying foci as well as different-sized screens, but such more than compensates for the outlay by reason of the superior results they permit of being acquired.

It is an old saying that nothing looks worse than a postage stamp in the shape of a screen in a large hall, or an eyesore of big folded back screen in a small schoolroom.

Apart from the comfort of gazing for such a length of time as, say, an hour and a half, at a pleasing size of picture, there are likewise other very important considerations that have to be considered, the omission of which is very liable to verge upon the ridiculous. One of these may briefly be mentioned, such as the providing of a sized picture too small, or so small as to prevent some especially designed slide being properly seen from a long distance. If, however, the simple rule of providing a picture a fourth of the size of the room, with a surplus of white margin, be adhered to, then nothing but a pleasant result follows.

Another very unpleasant procedure to some in an audience is the placing of a leaky lantern in the front of a hall, or so far forward as to be an annoyance to all those in the audience sitting in a direct line behind or near the sides of the lamp. This is a procedure very often practised where short-focus lenses are employed at close quarters to yield large sized pictures on the screen. The way to overcome this drawback is to employ long-focus lenses, or to work the lantern with a powerful radiant as far back as possible.

This, of course, means the providing of special lenses that can be brought into use whenever they are required, to work at short or long distances. A good six-inch portrait combination is quite short enough (a seven-inch is better, perhaps, all being considered) for any close work either in a private house or a small hall; and the front lens of the combination can generally be used (if the possessor is lucky enough to have

a good one), as an excellent long-focus lens, when the concave surface is mounted outwards in the back cell and a one-inch stop placed about two inches in front. It must not, however, be thought that the utmost can be derived out of such a use of a front lens of a portrait combination unless suitable condensers be used in conjunction therewith. A very common form of condenser in use almost universally at the present time is a double plano-convex mounted close together, and the focus of these, as supplied for a six-inch objective, is nearly always about three inches. Now, a condenser of this class is, no doubt, admirably suited for working a large oil radiant, but not anything like the same results can be obtained with them in conjunction with lenses of long focus. The best results in optical projection can only be secured by the adoption of suitable condensers for the various focal lengths of the objectives that are being used.

I have always had a great partiality for working from a standpoint well in advance of the platform, and the utilising of long-focus lenses. The lens that I like best for a fair amount of long-distance working is one of twelve inches' focus, having a clear diameter of three inches, and, when such is used in conjunction with a Herschel form of condenser of four and a half inches both in focus and diameter, a superbly illuminated disc is provided of almost any dimensions up to twenty feet.

The use of long-focus condensers tends to prevent the cracking of the back lens, because the jets are not driven so close up in working. I am aware that the high price of such a lens as I am referring to precludes its use from those who merely feel disposed to invest a few pounds in a lantern, and for such an outlay expect to be supplied with everything first class. The fact remains the same, however, that, if the very highest results are to be had, then provision must be made that will yield such results. No one set of lenses can possibly be made to yield the best results. The condenser must be used that best suits the objective that must be employed to yield the desired-sized picture from a certain distance.

I don't know if many of my readers have ever thought of using a lens of twelve inches' focus and three inches in diameter in conjunction with their homely oil lantern. The great weight of the objective at the outset (four pounds) might to many make it appear impossible of accomplishment, but such is quite easily provided for by adopting a very simple attachment.

I use a twelve-inch portrait lens with an oil lamp often when testing certain slides in my work-room, and it is a treat to see its performance.

To fit it to my lamp was a matter of the greatest ease. By sliding off the front from the platform guides, I obtained a lantern that was free of anything in front of the condenser. I then provided a hard-wood runner, with the edges bevelled, so that the runner slides firmly but easily in the metal guides. On the end of the wooden runner I have an upright screwed that carries the flange of the lens. By this simple attachment this huge lens, weighing four pounds' weight, is kept as rigid as possible, and can be slid into any position in front of the condenser.

When used in a suitable room to project a four-foot disc with my oil radiant, the brilliancy of the disc has to be seen to be believed. I am often told such looks as well as the lime light. Oil lamps are very useful when small discs are only required, but they need lenses of larger diameter than are generally supplied by the trade. In most lantern work the lime light is somewhat different, a good condenser of fairly short focus can be made to converge all the rays somewhere within a circle of nearly two inches up to a point about nine inches from the back of the condenser, but beyond this point lenses of two inches' diameter will lose light, and then comes in the advantage of using lenses of large diameter.

Some very useful work can be done with an eight or nine-inch objective, but these are very often to be found of most excellent kinds in the front combination of a short-focus portrait lens, and it is needless for any one to go to the extra expense of an objective of this kind. As a rule, these front lenses are seldom to be picked up larger than an inch and five-eighths to three-quarters in diameter; but even at this, and when used with a one-inch stop in front, they pass a larger amount of light than many would suppose, and perform wonderfully well.

If it be desired to always work with double combinations as objectives of the portrait class, much may also be done by employing lenses of varying foci, as the front combination keeping the back combination the same.

T. N. Armstrong.

THREE-COLOUR PHOTOGRAPHIC PRINTING.

[*Journal of the Society of Arts.*]

The Society of Arts has done me the honour to ask me to read a paper on three-colour printing by means of photography. I have responded affirmatively to the request for the reason that I am most obviously unbiassed by any external influences of trade secrets, and that I can approach it from a scientific side, and that I have no practical knowledge of any systems of trial and error, which are said to prevail in some classes of three-colour printing. After all, we theorists are not to be despised entirely by the practical man, for I need only allude to Mr. Ives to show you what predominant an influence science has had on some who felt the evil influence of rule-of-thumb work. When we have to deal with colours we have invariably, for theoretical purposes, to resort to—I nearly said fall back upon—the spectrum for inspiration as to how to proceed; and to-night I shall attempt to explain to you the theoretical basis on which three-colour printing ought to be worked. We have the spectrum on the screen, and we see that at first sight and without detailed examination it appears to be made up of red, green, and blue, which includes the violet. The other colours may be called incidental. It is this red, green, and blue which, when mixed together in varying proportions, give us any or all of the colours of nature. The colours are now recombined by means of a lens to form a white patch, and if we pass a slit through the spectrum we get practically patches of monochromatic light on the screen. Passing a series of slips through the spectrum without interposing a lens, we get overlapping images of the face of the prism we are employing for analysing the electric light, and the overlaps show us that red and green make yellow, and blue and green that greenish blue which is often called peacock green or blue, whilst blue and yellow make white. Replacing the lens, it combines all the colours passing through the various slits, and we have a patch of mixed colours. If, instead of a multiplicity of slits, we have only three, we can obtain the same effects. We can multiply our colours and tones to any extent by opening more or less widely any or all of the slits. Instead, however, of altering the width of the slits, we may obtain the same effects by cutting off more or less light by means of photographic deposit on developed plates placed in front of the slits. This we do, and we see that we get colours of varying hues; or we can cut off more or less light from the slits by rapidly passing in front of them apertures more or less widely apart. In fact, we can have a symphony of colour, and I show one which I recently prepared for a lecture at the Royal Institution. We can have various harmonies as it were by means of this arrangement; but I also wish to show that, in order to produce these colours, it is not essential to have any very pure colours, for I can withdraw the slits and let those parts of the spectrum which are opposite the three lines of apertures (holes) pass through, and they will combine, and we have still practically the same symphony of colour on the screen. We thus see that we may use a considerable part of the spectrum at three places and still obtain good effects of colour. Now, Mr. Ives has already in this theatre shown how he combines the light coming through coloured media to obtain his beautiful results, and I can here show you that, by the use of media like his, any colour of the spectrum can be obtained. By use of three glasses in a disc, and by cutting out suitable masks and then sending a slice of light through them whilst they are rotating, we have a very fair representation of the spectrum.

Thus every colour of the spectrum with a fair amount of accuracy may be represented by the mixture of the light coming through these three glasses, if the intensities are properly arranged. So far, then, we have seen that by mechanical means we can obtain any shade or hue of colour. It now rests with us to see how we can utilise this scientific fact, to produce the colours as seen in nature by means of photography. Taking the spectrum colours we find that certain width of slits in the three colours, red, green, and blue, give white; if we cover up the blue slit, we find that we have a yellow; if we cover up the green, it is purple, and if the red it is blue-green. If, then, we have media of red, green, and blue, which allow the same relative brightness of these three colours to pass through, as do the slits in the spectrum, we readily see how a red, a yellow, a green, a blue-green, and blue, as well as white, are to be secured by means of three photographic positives. Suppose the problem before us as to how we should represent flat surfaces of these seven colours which have the same relative brightness as these spectrum colours on paper, how should we proceed? If we photograph them on three different plates, and take transparencies from them, and manage that the colours on each transparency are represented as follows (total transparency being represented by T, and perfect opacity by O),—

	No. 1 Plate.	No. 2.	No. 3.
White	T	T	T
Red	T	O	O
Purple	T	O	T
Yellow	T	T	O
Green	O	T	O
Blue-green	O	T	T
Blue	O	O	T

we shall find that if No. 1 be backed by a red medium, No. 2 by a green medium, and No. 3 by a blue, each of the right brilliancy to make a white when mixed, then the images when superposed would give the seven colours exactly. Again, suppose we had a dull yellow of half the intensity of the spectrum yellow—if in No. 1 and No. 2 plates the transparency were in each reduced to half, say, then we should get the reduced yellow, and so on. We can form some idea of the way the three images when backed should look by an artifice that I have introduced for producing a monochromatic image. We can throw an image of the carbon points *on the prism*, and the light after decomposition by the prism and recombination by the lens outside the spectrum, will form an image of the surface of the prism upon the screen, and, as this surface has an image of the carbon points upon it, the carbon points are seen on the screen. We may place three slits in the spectrum, and again we

have the same (mainly) white image. By using three lenses instead of one we can project each coloured image separately and have them side by side. Instead of the carbon points we can place against the prism small squares of coloured glasses, and we get the three images of these. The one corresponds to the transparency to be illuminated by the red, the next by the green, and the third by the blue. It is such transparencies that we must aim at obtaining. Now, I need scarcely say that a negative taken through a red medium, and second through a pure green medium, and the third through a pure blue medium would not be effective. Think of what a spectrum on the screen would look like if thus photographed. One negative would give a transparency which would only allow a narrow band of red to show, the next of green, and the next of blue, and thus the spectrum would be represented by three bands of colour simply. There would be no overlapping of colours to show the intermediate colours. It is evident that we must obtain media which would allow more of the spectrum to pass through in order to obtain an overlap.

Quite recently, at the Camera Club, I have brought forward a colour sensitometer to enable a plate to be tried for the three colours most suitable to use as taking screens. The principle on which this is designed is as follows:—Take a number of small coloured squares of glass such as enumerated above, which only allow certain colours to pass through. Choose the three colours with which the three transparencies are to be backed, and by mixture of these standard colours find out how much of each of them is required to match the colours of the glasses both in intensity and hue. Measure the brightness of the light coming through the coloured glasses. Then, to make a sensitometer to enable you to choose the proper screen for taking the "red negative," as I will call it, reduce the brightness of the different glasses to the extent which is necessary to cause all the red light required to come through the different colours to be of equal intensity. Then, in a proper negative, all of the deposits should be of equal opacity, and for any brand of plate used a screen must be sought for which will give this result. Take another similar set of glasses and reduce the transmission of them so that the green transparency should allow equal light to penetrate, and a screen must be sought for till such is the case. The same for the blue. We thus shall have found three screens through which to photograph to give us three transparencies from the three negatives that, when backed with the chosen colours, red, green, and blue, will give us the true colours of the objects. This sensitometer, I hope, may prove of use in the future to those who are doing three-colour printing.

I am not to have the privilege of showing you Mr. Ives's work to-night, so far as three combined images are concerned, because he has shown you them himself on a previous occasion; but I am allowed to show you what is a modification of it, viz., Joly's process. Dr. Joly obtains only one negative, but that negative really contains three. In contact with the plate he places a screen ruled in three colours with lines $\frac{1}{200}$ of an inch broad, and touching one another. One line answers to the red-taking screen, another to the green, and the third to the blue. (In front of the lens he places a coloured medium to tone down the blue.) The plate is exposed through this screen, and as a result he obtains the red, the green, and the blue negative intermingled one with another, each being represented by one third of the surface. From this a transparency is made, which is backed by another ruled surface of red, green, and blue lines of the same width and proper intensities. The red lines fall on the portions which were taken through the "red taking" lines, the green on the green, and the blue on the blue, so that we have a coloured representation of the objects, and very beautiful they are. We can show you a taking screen, a viewing screen, a negative, a positive, and a positive backed by the ruled screen, and that will give you the process. (Slides were here shown of various coloured objects.)

We have now led up to the question of photographic printing in colour, not by mixing the light coming through three separate transparencies, but by the use of transparent colours and using the negatives from which to obtain coloured images. This is really a question of absorption of light, and depends on exactly the same principles as have been just enunciated for the mixture of light from three images. We may take it that the colours suitable to back the positives must form the basis of any process; but we shall see that the colours to be used are exactly complementary colours to the three fundamental monochromatic colours of red, green, and blue. A complementary colour, be it remembered, is that colour which with the original will give a white.

Reverting to the spectrum, we place the three slits in it, and once more form white light. The red and the green and the blue are now in proper proportions. If we cover the red slit up, we have a blue-green formed, and that is the colour from which we must print from the red negative. When the green slit is covered up, we have a pink or purple, and that is the colour to be used with the green negative, and a bright yellow similarly is derived from covering up the blue slit, and is the colour that must be used with the blue negative.

These, be it remembered, are exactly the complementary colours of the fundamentals, and the nearer we can imitate these the more correct we shall be. If we pass an opaque strip along the spectrum, we shall see we have the complementary of the colour blocked out, but in this case, if the strip be very narrow, the complementary will be too white. The criterion as to the suitability of the colours in regard to purity is that when two colours are superposed the resulting colour should approximately equal in hue and purity the fundamental colour. Here I have, thanks to Mr. Warnerke, several gradated annuluses of gelatine coloured with pink, blue-green, and yellow. I place them in the spectrum, and we see that we have a fairly large portion of the spectrum transmitted through all, though in different positions and overlapping. (The transmission of a small band of red through the blue-green is a misfortune, though it counts but little in reality.) Placing the pink and blue-green together, and sending the light through them both, we see that we have a fair blue. With the pink and the yellow together, we have a good red, and, with the yellow and the blue-green together, we have a good green. These colours match very fairly Mr. Ives's standard colours, which should not be widely departed from for practical purposes. We may take it, then, that these particular hues that I have shown are not far off theoretical correctness.

Now, why have we to print the red, green, and blue negatives with these complementary colours to obtain a print in colour?

Let us take the instance of a white object. Here each of the three negatives would show the white as opaque deposit; consequently, when printing each of them on some sensitive surface coloured with these complementary colours, there would be a blank on each, and, if the three images were superposed on white paper, there would be no colouring matter from any of them. Let us take a red object. Here the red negative would show the object as opaque, whilst the green and blue negatives would show it as totally transparent. If the green negative be printed on a sensitive surface and coloured with pink, we should have for the red object a full pink, and if the blue negative were printed with a yellow we should have it a full yellow. When the two transparent but coloured films are superposed, we should have a yellow film lying over a pink film, and, as we have already seen, the light penetrating would be a red. Once more, let us take a bright yellow. Here our table shows us that we shall have total opacity in the red and green negatives (since in the transparency they have to be shown as totally transparent). Consequently, the only negative which, when printed on the appropriate sensitive surface, is the blue, and that we have to print in yellow. Hence we have the object shown in yellow on the white surface. Mr. Ives has shown this fact in making lantern slides by this method. He prints on bichromated gelatine, and then dyes his three prints with the appropriate complementary colours, and superposes them. Of this method he has kindly lent me a few specimens. What answers for the lantern slide will also answer if the films are placed on paper. This would be photographic printing; but the same principle applies to blocks. Suppose a typo block is prepared from the red, green, and blue negatives by any of the various processes, and that the block from the red negative is worked in with transparent blue-green ink, that from the green negative with transparent pink ink, and that from the blue with transparent yellow ink, and that these separate impressions are superposed with accurate register. Then we have a mechanical method of printing in colours. This is the theory of the matter, and all practice must eventually be derived or come to it. There are several firms who work in these directions, and no more beautiful work has been done than by Messrs. Waterlow, who have kindly allowed me to show some specimens of their work. The *Graphic* send specimens of their three-colour printing, and also Messrs. Cassells, and excellent work it is.

Mr. Warnerke informs me that in Russia a machine has been perfected which allows the three inks to be distributed uniformly over each block, and that each block prints on to a hard surface, the registration being made in the most perfect manner. When the three inks have been printed on the fixed block, this last is brought in contact with the papers, and the impression is pulled at one operation. Mr. Warnerke has kindly lent me slides illustrating this, and shows photographic prints produced by the same machine. Such a process as this should be able to give results not only with transparent inks, but with opaque inks, where the colours are obtained by dots of the three fundamental colours placed side by side. More, probably, may be heard of this process by-and-by.

CAPTAIN ABNEY, C.B., D.C.L., F.R.S.

[Specimens illustrating the process of three-colour printing were lent by Messrs. Cassell & Co., the proprietors of the *Graphic*, Mr. Leon Warnerke, Messrs. Waterlow & Sons, and Messrs. Husnik & Hausler, of Prague (through Mr. F. C. Clarkson).]

DISCUSSION.

The Chairman, in inviting discussion, said Captain Abney had well explained the principle on which photography in colours was carried out, and there were few more interesting applications of science than that of photography to colour printing. They all knew the ordinary chromo lithograph, in which a separate stone had to be prepared for every colour, or nearly every colour, which the artist had employed in his picture, and by successive printings on the same piece of paper the effect was produced. Some very beautiful pictures were produced in this way, and it was rather the pride of the chromolithographer to say how many stones a particular print had taken, and to show his skill in obtaining accurate register, so that all the colours fitted exactly into their proper positions, with no overlapping and no thin white lines where the colour did not appear. One of the chief things which Captain Abney

had shown was that all the colours and tints of nature could be produced by combinations of three colours only, and it was an obvious simplification of the process to reduce the numerous printings to three. The pictures kindly lent by the *Graphic* were interesting illustrations of this fact, being all produced from three colours, which were selected according to the skill and judgment of the worker. This process, however, was only used occasionally, the greater part of their work being still done by the ordinary process of chromo-lithography. He was informed that there were very few operators on the staff of the *Graphic* sufficiently skilful to select the three tints and lay them out on the stones so as to produce by their combination the finished pictures such as those exhibited. By means of photography, this was done automatically. Now, it was, apparently, a very simple matter by filtering out the different colours from white light, applying the proper screens to divide up the white light into three such portions that you could produce three printing surfaces—stones or blocks—which, by their combination, would give all the colours of the original, but in practice it was a very difficult matter. It was a good many years since they first heard that some one had succeeded by this process in obtaining, more or less, good results, but it was only lately, thanks to the researches of the gentlemen to whom Captain Abney had alluded, Mr. Ives, and others, not omitting Captain Abney himself, that such knowledge was gained as enabled the theory to be reduced to practice. He was sorry that none of Mr. Ives's work had been shown that evening, though it had been exhibited there before. It was in that room that Mr. Ives showed the results of his work when he first came from America, and more than once they had had the advantage of seeing there the results of his perfected researches, but still he regretted that, through an accident, they had no specimens that evening. He, however, congratulated the members on having had for the first time the opportunity of seeing some of the very beautiful results of Dr. Joly's work. It was rather remarkable that, although from the birth of photography the dream of its followers had been to produce photographs in colours, and some of the earliest workers did do something in this direction, so little advance had been made in this direction. The only man who really had obtained a photographic picture in natural colours was Professor Lippmann. He produced a photograph which, when white light was thrown upon it, with proper precautions, reproduced the colours of the original. Others, like Mr. Ives and Dr. Joly, relied on coloured media; they did not use the real spectrum, but that imitation spectrum which had been shown that evening, and to reproduce a spectrum by means of properly selected coloured media was, in itself, no small feat. It was by such means that the beautiful results of Mr. Ives, and Dr. Joly, and others were produced. That was not photographing in colours; it was viewing a photograph by means of coloured media in such a way as to reproduce the colours in nature. In the same way three-coloured printing was not the natural reproduction of colour by photography, but the careful selection of colours by photographic means so as to produce, more or less, the same appearance as the colours of nature. He hoped Mr. Warnerke would be kind enough to give some further information about the ingenious Russian invention which had been mentioned. As he understood, the principle of it consisted in using three blocks for printing three colours, but, instead of printing from those blocks direct on to the paper in succession, each block transferred its ink to a separate roller, and from that roller the three different coloured inks were again transferred to one single block, from which the impression was taken on the paper. The mechanical devices for accomplishing this were complicated and difficult, but, when they were overcome, there was no difficulty about register, as the whole thing was printed at once.

Mr. L. Warnerke said the principle of the machine had been so clearly described by Sir Henry Wood that he had very little to add. It was invented not long ago, but had already superseded all other machinery in the State paper manufactory in St. Peterburg, as it had so many advantages over ordinary machines used for colour printing. In the ordinary way, separate blocks had to be used for each colour, and, after one colour had been printed, it had to dry before the second could be printed, and so on, and that made it very difficult, and, in fact, almost impossible to get perfect register on account of the different hygroscopic conditions of the air, differences in temperature, &c., especially when very fine engraving, such as had been shown on the screen, was in question. In this case there was a rotary machine with a large cylinder, on which there was a separate *cliché* for each colour, with separate ink ducts, so arranged that, by one revolution of the cylinder, each *cliché* was inked with its appropriate ink. These inks were transferred to one large composition roller, which, in its turn, inked the *cliché* which printed the sheet. There were very perfect arrangements for putting the paper into the machine and for removing it, interleaved with plain sheets to prevent smudging. The peculiarity of the rosette patterns which had been shown, and which were specially applicable to cheques and bank notes, consisted in the fact that the very finest lines passed from one colour to the other without the slightest break or fault in the register, and, of course, an enormous variety of designs could be produced by applying different coloured inks. On the wall were shown impressions produced from a three-colour photographic block. For bank notes sometimes four or five colours were used, but for photographic colour printing there were sufficient blue, yellow, and red. The advantages of this method were very great. If one examined carefully some of the finest colour prints produced in the ordinary way from separate blocks, one would find a sort of *moiré* appearance, which was entirely absent when this new machine was used. The photographs which had been shown were taken on the spot under some difficulty, and he might say that some fifty of these machines had been at work for the last two or three years.

Mr. F. E. Ives said Captain Abney had presented the subject in so admirable a manner that he should not be justified in taking up time by attempting to elucidate it further. He would only apologise for the absence of any illustration of his own work by saying that it was purely accidental. Specimens had been selected and addressed to Captain Abney, and where they had gone to he could not tell. As the Chairman had said, it was of the less importance, as they had been seen before.

The Chairman said, if no one else had any remarks to offer, he must propose a hearty vote of thanks to Captain Abney for his paper. There could be no greater treat to any one interested in these subjects than to see Captain Abney manipulating the spectrum, because he had a wonderful gift of demonstrating, in a practical and lucid manner, scientific problems of great complexity and difficulty. That was the great advantage of hearing a lecture in that room. People might read Captain Abney's papers in the *Philosophical Transactions*, or his more popular handbooks, but they could not adequately appreciate the phenomena described unless they saw the actual experiments which Captain Abney was so competent to place before them.

The vote of thanks having been carried unanimously,

Captain Abney, in reply, said he had no doubt that when this paper found its way abroad it would be severely criticised in certain quarters, but he did not mind that, as he was perfectly certain that the principles which he had enunciated were correct.

THE OBSTRUCTION OF BURNERS USED FOR ACETYLENE GAS.

[Translated from *Ombres et Lumières.*]

It has been frequently pointed out to us that the jets or burners used for acetylene very readily choke up in use, and we have had the same thing occur in our own experience. The best burners—all the burners on the market are sold as such—give at first a beautifully white and brilliant flame, but this flame of brilliant purity gradually gives place to a smoky one, tinged with yellow, which becomes still worse in this respect with lapse of time. All users of acetylene are aware of this, and, no doubt, find it as necessary as we ourselves do to renew their burners.

We have recently made some practical experiments with different types of apparatus (kindly placed at our disposal by Messrs. Mazo). These included instruments in which (1) the carbide was lowered into the water, (2) water fell on the carbide, (3) carbide was allowed to drop into water; this latter arrangement is the one preferred by Messrs. Mazo. The choking up of the burners is certain to result at the end of a certain time, and it is due to the formation of carbon at the exit, where the gas makes its escape so much more rapidly that it drags with it a larger quantity of water vapour. It has been our experience that, of the different burners we have tried, the slit burners obstruct most rapidly, whilst those with orifices, like the "Manchester butterfly," answer very well. When they choke up, all that is necessary is to dip them in alcohol and to brush them with a small brush, or to pass a very fine pin through the aperture, they are then in as good condition as ever.

Our experiments were, of course, made purely with a view to the use of the light for projection purposes, in which case it is possible to have two burners, and to substitute the second for the first. A short interval when the exhibition takes place will allow of the change being made. We have just pointed out that the rapidity of formation of carbon in the burner appeared to increase with the quantity of water vapour in the burning gas. This observation led us to have a small chamber made in which the gas could be dried before combustion. The following arrangement was devised: The use of copper being inadvisable (in consequence of the explosive properties of copper acetylide), we obtained an iron tube, of sufficiently large diameter, to the base of which we soldered an iron disc, whilst the upper end was provided with a stopper also of iron, screwing into the tube so as to form an hermetical seal. The gas was led into this tube at the base, and drawn off at the top—in each case by a small iron side tube.

We attached this simple appliance—which any one can easily construct for himself—to the apparatus, so that the gas had to traverse it in its passage from the generator to the burner, and have found it very satisfactory in practice. We first of all stuffed it with a very dry sponge, afterwards we tried fragments of carbide, and lastly, small fragments of pumice stone moistened with sulphuric acid. The last-mentioned material gives the best results, but possesses the disadvantage of rapidly destroying the drying tube.

[This difficulty could be surmounted by lining the interior of the drying tube with sheet lead; or, if calcium chloride were used, the desiccating properties of which are nearly as great as pumice and sulphuric acid, no corrosion would be experienced.—Translator.]

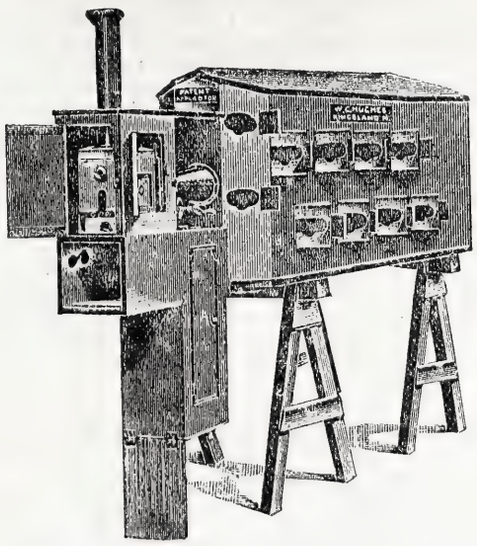
The employment of fragments of carbide is very satisfactory in practice,

but it is necessary to insert a fresh charge of carbide for each exhibition. The use of a drying chamber such as we have described is certainly a great improvement to the working of an acetylene generator. M. HEGE.

THE PHOTO-ROTOSCOPE.

W. C. HUGHES, 82, Mortimer-road, Kingsland, N.

THE photo-rotoscope is an instrument designed for enabling a number of persons simultaneously to view animated photographs in open daylight. The peep show is so arranged in configuration and shape that all can obtain a good view of the interior and proscenium, the angular view



boxes being admirably arranged for the purpose. The whole is exceedingly portable, each part bolted together, and can be fitted up in a few minutes. The films are easily fixed or removed, as the machine turns on its base apart from the lantern, and both can be detached from the locker if large pictures be desired by limelight in public buildings.

TRICKS IN PHOTOGRAPHY.

[*The Professional Photographer.*]

STRIKING photographs are only made from striking subjects. A woman may be as beautiful as a dream, and yet it might be impossible to get a photograph that would do her justice. Why? Because the colours in her skin and hair will not yield up their full value to the camera. Take, for instance, a beautiful blonde girl with the most delicate colour, the fluffiest of blonde hair and blue eyes that have fire and fascination; and yet, possibly, she has never had a photograph that did her justice, because she is too colourless for the camera, and the blue in her skin will not photograph. But if you put that young woman under the skylight and throw enough colour into her skin by means of tinted screens, you may get a picture that will at least not defame her beauty. But you cannot catch the things that go to make up for strength, such as the gleam of her teeth, or the expression of her eyes, which are largely the things that impress you as her beauty. If we tried to photograph her teeth between her parted lips, it would result in distortion, and we cannot reproduce complexion and mobility.

On the other hand, you will doubtless remember cases to the contrary, in which you have first seen the picture of a girl and afterwards the girl herself. The picture was that of a woman fair and curved of line, and perhaps chic. Her pose was full of life and she looked both interested and interesting. The girl herself, when you met her, had a thick dark skin, bad teeth, an ungraceful carriage, and was unattractive generally. You said, "What flatterers those photographers are!" Not so. The girl had lots of olive in her skin, good stuff for the camera to work on. Her features, while not regular, make pleasing shadows on her face when under the complex lighting of the skylight. She had the knack or temperament, or whatever you call it, of unconsciously posing well. A few little touches to an ordinary dress effect made it look stunning, for it is not always the finest and most elaborate clothes that photograph best. She could smile without looking as if some one was forcing her to at the point of a revolver. And thus, you see, the girl's natural colour and her features — neither good — and her excellent posing and artistic clothing, made the photograph a success after the photographer had lighted it. These things the beautiful girl lacked, although, according to the nature of things, she should have made a much better picture than the other girl.

And that reminds me of a case by which this statement may be, in a measure, proved. I have before me a dozen photographs of a young woman in various poses. Nearly all are dashing and snappy, and some of them are beautiful. Now, these do not look as if they were all made with the same subject in the chair, but they were. And the girl is not beautiful by any means, many persons would not think her even pretty. She is dark and rather sallow, with lots of olive tones in her skin. But she is naturally a poser, and exceedingly artistic. The draperies used were very ordinary—some tulle and black lace and a few ribbons and veils and artificial flowers.

Here is a picture of her in a big picture hat. There is always much difficulty in photographing a girl in one of those big hats, because the hat nearly always throws an arbitrary shadow on the face that cannot be illuminated by ordinary methods of reflection. Such was the case in this instance. There was no ordinary way in which I could get the face to cast a shadow on the hat. Then I thought of extraordinary methods, and finally posed her reclining, face down. In this way the light came straight down, and the shadow of her face on the hat brim left a clear, sharp profile, and no confusing and unnatural shadows on the face.

A clever conceit of hers was to be photographed as "the Tiger's Bride." She was fixed up with a bit of tulle for a veil and some artificial orange flowers. The main accessory was a big tiger's skin with a stuffed head. She threw her arm around the tiger's neck and the tulle concealed the absence of the beast's body.

Unusual photographic effects are always produced by unusual methods. Take the effect of wind-blown hair and garments as an instance. This effect used to be produced by an electric fan and instantaneous exposure of the plate. Sometimes the hair was pinned, as if blown out by the wind, to an almost invisible wire screen, and the garments were pulled out by fine wires. Now they are produced by a mechanical contrivance and exposure of the sensitive plate to a flashlight. F. W. Guerin, of St. Louis, has made some remarkable plates of this kind. One of these, called the "Dizzy Whirl," reproduced in the last Convention Number of *The Professional Photographer*, is an instance. It is remarkably lifelike, and reproduces exactly the effect of a young woman whirling rapidly on one toe, her hair and garments whirling with her. The new method of producing photographs of that kind is as follows: The background is turned around on its side, the floorground fixed on a frame coming toward the camera at a right angle from the background. Two holes are pierced in the background, through which two iron pipes protrude. The iron pipes are held by a framework behind the background. Across the iron pipes a board is laid. The girl who is to pose as the whirler lies on the board with her toe just touching the floorground. Her draperies and hair hang down below the board, and are so disposed as to give the whirling effect. The flashlight is made from above, and the photograph is thus taken instantaneously, and a strained effect avoided.

Did you ever see the photograph of a man falling off a step ladder? This is the way it is done. The background is laid on the floor, and the floorground is upright. On the background, on which a picture hanging on a wall has been painted or laid, a step ladder is just touching the upright floorground. To one side of the ladder the man lies sprawled on his back on the flat background, with legs and arms out as if falling. The camera is on a high ladder, pointing directly down at the man lying on his back. The exposure is made by flashlight. In that manner pictures of flight of all sorts may be made.

The latest thing in the East is photographing women at home amid their own surroundings. Many beautiful and natural pictures have been taken in that way, and painters' effects may be produced if the photographer is sufficiently an artist. Pictures of that sort are made by flashlight, and if the man is not an expert the pictures are likely to be hard and unnatural. The flashlight in such instances is necessary because few homes have sufficient illumination for photographing, as is the case in a studio with a skylight.

To get the effect of photographing a painting on canvas, the subject is first taken, and then a piece of burlap is set up and the same plate exposed to get the texture of the cloth. It looks exactly as if the subject had been first painted and then photographed. The photograph on wood is produced similarly. A piece of beautifully grained bird's-eye maple is impressed on the plate by an exposure of two seconds, after the subject has been photographed. The print from the negative is then toned out in wood colours and mounted on the panel originally photographed.

GEORGE W. CURTISS.

THE PROPERTIES OF LIGHT.

[*Transactions of the Edinburgh Photographic Society.*

I CANNOT tell you anything new about light, but when asked to give you a paper on some photographic subject, I thought that a little chat about some of the properties of light would not be out of place, especially as no paper on the subject has been given to the Society for some years. I intend dealing only with the elementary facts as applied to photography, and I address my remarks more to the younger members of the Society than to the older hands, who know as much of the matter, perhaps, as

can tell them. A few experiments will show you that light by itself is invisible, and it is due to the property of light, viz., reflection, that we are enabled to see the visible manifestations. You will notice that even smoke reflects light. The beam of sunlight entering a semi-darkened room is rendered visible by the reflection from the dust particles floating in the air.

I will show you a few diagrams on this screen which will illustrate this. No surface is a perfect reflector, hence a certain amount of light is lost or dissipated each time it is reflected. Light moves in straight lines, as is well seen when the sun is setting in a cloudy sky. The beam of light from the lantern can be seen by means of smoke to pass in straight lines from the lime cylinder. When light passes from the medium to another of greater or lesser density, it is bent or refracted. I will pass the beam of light into the tank of water, and you will notice how it is bent or refracted. The effects of the *mirage* are accounted for in this way. If we refract light through a prism, we separate the constituent parts and produce colour. I will pass a thin beam through these two prisms, one of flint glass, the other a hollow prism filled with bisulphide of carbon, and you will see the different effect, because the amount of refraction depends on the density of the refractory medium. By placing coloured glasses in the path of the beam, we can get some knowledge of the effect of coloured glass on light. You see, it acts as a filter, allowing light of one colour only to pass through. It does not turn all the rays red, blue, or green, as the case may be.

How is the colour produced? Light has velocity, and consists of wave motion. Each colour is produced by a wave motion of certain length and period of vibration. Looking at the spectrum, and tracing the beam, we notice that the red is bent least and violet most. The length of these waves has been measured, and it has been found that there are 38,000 red waves and 60,000 violet waves to an inch, but they all move forwards at the same rate, so that the violet waves must move at nearly twice the rate of the red ones. The colour of natural objects is only residual, the objects absorbing some of the rays and reflecting others. I can show you the effect of monochromatic light by this simple experiment. You will notice the colours of this band of material in yellow light; and when I light a piece of magnesium ribbon, which gives out all the spectrum colours, you see how the appearance is altered.

Lenses are simply prisms put base to base or apex to apex. A few diagrams will make this clearer. Now, a little thought on your part will show you that a simple lens bringing the rays to a focus will not focus the various wave-lengths or colour at the same part. Hence a simple lens is not achromatic. I can illustrate this on the screen. By using two kinds of glass in two lenses, we can correct this to some extent, and by combining three lenses we can procure an achromatic combination. The spectrum has been divided into three parts, one end being heating, the other chemical. This division, however, is not strictly accurate. All parts possess heat waves, and all parts possess chemical or actinic waves; they differ only in degree. This diagram with the curves will explain this.

We are not correct in speaking of colour, for colour does not exist. We should speak of colour sensation, for, if we look, say, at a red disc for some time, and then turn the eye away to a white surface, a green image will be seen. The lecturer then explained how this effect is produced, and concluded by explaining, with the aid of diagrams thrown on the screen, how the waves were received on the retina of the eye and transferred into objective vision by the optical centre of the brain.

T. W. Drinkwater, Ph.D., F.C.S.

LANTERN LIGHTS.

L. Molteni, the well-known writer on lantern matters, has been testing the illuminating power of various lights for projection, with the following results:—

Oil lamp, triple wick	1
Incandescent gas-light No. 2, without reflector ...	1
Acetylene, 1 burner, without reflector	1·06
,, 2 burners, ,, ,, ...	1·70
,, 3 ,, ,, ,, ...	3·20
,, 4 ,, ,, ,, ...	4·10
,, 5 ,, ,, ,, ...	4·50
Oxycalcium light	5·80
Oxyhydrogen	16·60
Etho-oxygen	18·50
Electric incandescent, 32 cp.	0·68
,, ,, 50 cp., vertical	0·93
,, ,, 50 cp., horizontal...	0·93
,, focus lamp, 100 cp.	3·82
,, arc lamp, 7 ampères	39·03
,, ,, ,, 10 ,, ...	75·61
,, ,, ,, 12 ,, ...	86·50
,, ,, ,, 15 ,, ...	117·61
,, ,, ,, 20 ,, ...	160·80

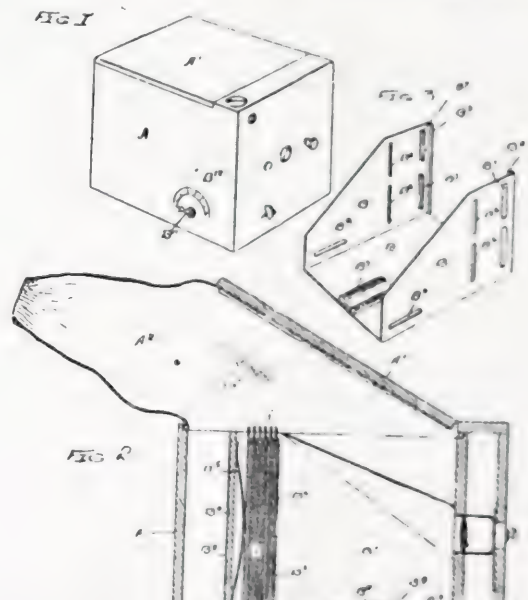
An ordinary optical lantern was used, and a square of 7 cm. was projected to 1 metre square, the screen being replaced by a Bunsen photometer illuminated by a lamp carefully adjusted to a Carcel lamp, burning 42 grammes of oil per hour.

ATWATER'S HAND CAMERA.

Mr. Atwater has sought to produce a camera of simple construction, which will contain a number of plates or films, which may be easily changed in daylight.

Fig. 1 represents a perspective view of the exterior of a camera box, fig. 2 is a longitudinal central vertical section of the same, and fig. 3 is a perspective view of the movable sheet metal casting.

In said drawing A is the light-tight rigid camera box, provided with the cover, A^1, and flexible changing cuff, A^2, the whole constituting a rectangular light-tight box. B is a plate of sheet metal cut and stamped up into the form shown at fig. 3, that is to say, having a bottom piece and two upright sides, B^1 B^1. At B^2 B^2 the ends of the uprights are folded or turned inward to form shoulders, and projections, B^3 B^3, are formed in the said uprights adjacent to said shoulders, B^2. The space between the shoulders, B^2, and projections, B^3, constitutes a groove into which is slipped a wooden end, or backing plate, B^4 (see fig. 2). This backing plate, B^4, carries a spring, B^5. At a suitable distance in front, sufficient to accommodate the required number of plate-holders, other projections, B^6, are formed in the uprights, B^1, to constitute a shoulder, against which the plate-holders are pressed by said spring, and forming the focal plane. On the bottom of the shell is a rack or racks, B^7, and in the vertical sides opposite thereto are cut slots, B^8 B^8, horizontally. A pinion or pinions, B^9, mounted on a shaft, B^{10}, engages these racks, the ends of the shaft having bearings in the camera box, and one end being fitted with a key



or index finger, B^{11}, and the camera box adjacent thereto being provided with an index arc, B^{12}, which may be marked with an index of focal distance.

The changing cuff, A^2, is made of flexible material in the form of a tube, or sleeve, open at both ends, the inner end being attached to the camera box under the hinged lid, A^1, and the outer end being preferably provided with an elastic band or cord to hold it tight about the wrist of the operator.

The operation is as follows: The shell, with its wooden backing plate and spring, is placed loosely in the camera box so that it shall be free to move backwards and forwards. The shaft, with its gear and turning key or finger, is then inserted and the camera is ready for use. When the magazine is filled with plate-holders, and the movable shell is in the position shown at fig. 2, the foremost plate of the series is in the plane of infinite focus of the lens. To adjust the foremost plate to a different focus, the index finger is turned, rotating the cog pinion which moves the shell back from the lens, and carries the plate to the required position, indicated by the index arc. To change the plates after exposure in the camera, the lid of the camera is raised and the cuff drawn out, after which the lid is closed down upon the cuff temporarily to guard against the admission of light through the cuff to the sensitive plates. While the lid is thus closed down, the hand may safely be inserted within the cuff, after which the lid may be raised, and the operator, feeling with his fingers the tops of the plates or films, changes the front or exposed plate by lifting it up and placing it in the rear of the body of plates. After this is done, the hand may be withdrawn from the camera, the lid closed down upon the cuff again, and the hand withdrawn from the cuff. Then the cuff may be rolled up, the lid raised again, and the cuff placed inside of the box, and the lid closed down and fastened.

LANTERN TRANSPARENCIES ON SPHERICAL SUPPORTS.

Herr F. Müller is the author of this device. He says: The ordinary optical projection apparatus, such as magic lanterns and the like, the principle of which has also recently been employed for the construction of so-called advertising lanterns, rests on the property of convex lenses of projecting an enlarged picture of an article removed somewhat more than the focal distance, which picture is received on a white screen or opaque disc. The pictures to be projected are formed of transparent pictures or photographs placed on glass, which are clearly illuminated by a powerful source of light.

A serious difficulty in the pictures produced by means of convex lenses consists in the so-called spherical aberration or departure from the spherical form of the refracting surfaces. In consequence of this aberration, the rays proceeding from one point of the object are not combined precisely at one point, but over a spherical focal surface, whereby the picture projected on a smooth surface or an opaque disc is not clear, more particularly near the edges of the field of projection, and shows strongly disappearing and broken outlines.

By the use of an aplanatic objective arrangement in which the spherical deviation is considerably diminished, the drawback may be somewhat

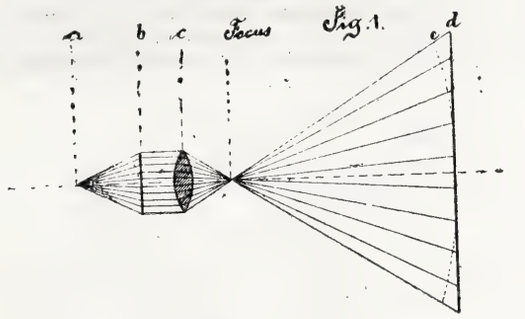


Fig. 1.

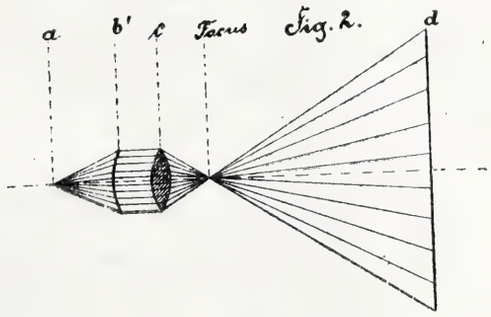


Fig. 2.

diminished, but not entirely removed; but, by the use of transparent representations placed on spherical glass discs, pictures of equal sharpness all over may be obtained, of course apart from the chromatic deviation, which can only be avoided by the use of achromatic double lenses.

The semi-diameter of curve of the spherical glass discs is directed towards the focal distance of the series of lenses employed, and according to the degree of enlargement of the picture projected.

Fig. 1 shows a diagram of the principle of a projecting apparatus when used with pictures painted on a straight glass disc, *a* being the source of light, *b* the transparent picture, *c* the lens, *d* the white screen or opaque disc on which the picture which is not sharp enough at the edges is projected, whilst *e* indicates the surface on which a sharp picture would appear. Thus, according to fig. 1, if a spherical opaque disc were employed as the projection surface, an evenly sharp picture would be obtained. In practice, however, this form of construction is not applicable, because the manufacture of exactly spherical glass discs of more than fifty centimetres is too difficult. Fig. 2 shows the object of the invention also diagrammatically; b^1 in this case indicates the transparent picture of a spherical disc, and *d* the surface on which an equally sharp enlarged picture must appear. It will thus be seen that the proper effect is obtained by the use of this spherical disc, b^1.

Incandescent Lamp Signalling.—The United States Navy Department is fitting up a number of warships with a system of incandescent lamp signalling provided by the Tele-photos Company, of Buffalo, says the *Electrician*. A series of four double lanterns, lighted by powerful groups of incandescent lamps, are hung vertically on strong wire cables, the upper end of which can be run up to a mast or yard arm, while the lower end is intended to be fastened to the deck of the vessel. The upper half of each lantern is white, and has within it a group of three lamps surrounded by powerful lenses. The lower half is red and has four lamps, in order to make the red beams the stronger. The cable supplying the lamps passes to the deck or the bridge, where a keyboard enables the operator to spell out the code signals very much in the same manner as a typewriter is manipulated. The keyboard is arranged on a standard and enclosed like a binnacle, and while operating it the operator stands. By an automatic arrangement, each key, when depressed, lights a combination of the four red and the four white lights, making a letter or a number, according to the code of signals. Another feature of the keyboard is that, when one letter is down, all the other keys are locked, so that another cannot be accidentally pushed down and confuse the signals. This will be recognised as a very valuable feature of the machine. Any key pressed down can be turned one-quarter way around like a screw, which motion locks it in place and leaves the signal burning, in case it is desired to use it as a standing signal for an order in the secret Naval Code.

The Lantern lectures at the Crystal Palace Exhibition are being delivered by Mr. F. A. Bridge, Mr. R. R. Beard working the lantern. Last week the subjects were: Monday, April 25—A collection by various well-known workers. Tuesday, April 26—"English Birds and Birds' Nests," by R. B. Lodge. Wednesday, April 27—A collection by well-known workers. Thursday, April 28—"English Cathedrals and Woodland Studies," by F. H. Evans. Friday, April 29—"Norway," by A. Bridgman and F. A. Bridge. Saturday, April 30—"North and South Devon, The Lake District, North Wales and the Highlands," by John A. Hodges. The lectures are to be continued each evening while the Exhibition is open.

It has been discovered that the soot from an acetylene flame which is burnt so as to be smoky is a very valuable product, while the yield is unusually large, from three to four times the weight, for example, that can be got from an equal quantity of schist oil. The acetylene soot is very light, and is remarkable for its perfect black colour, there being no tinge of brown in it, and for its freedom from the tarry matters found in ordinary soot or lamp-black. It has great body, and makes a splendid pigment and also extremely fine printing ink. It may be used alone, or to enrich cheaper gases which are to be used for lamp-black making, such as the gas of schist oil (the petroleum obtained by distilling shale).

The Biograph.—The American biograph pictures, which have proved such a great attraction at the Palace Theatre of Varieties, Shaftesbury-avenue, London, were last week supplemented by a number of Spanish-American war scenes. There is nothing to indicate sympathy with either side in the pictures, and the crowded audience showed little inclination to make a demonstration. The first scene shown was of the Spanish battleship *Vizcaya*, which called forth a few cheers for Spain and some hissing. A good picture of a gathering of reconcentrados at the Los Fosus Relief Station, Havana, was received in silence. The next photograph depicted the wrecked United States warship *Maine* just after the explosion. The audience seemed too appalled at the sight of the torn and twisted fragments of what a few hours before had been a magnificent ship, and the dead bodies of many of the gallant sailors, to be able to utter a word, and the scene passed away in painful silence. The other pictures were a regiment of Spanish volunteers marching to General Blanco's Palace, Havana, Morro Castle, Havana, with the steamship *Olivette* sailing out of the harbour; Consul-General Lee's departure, and a portrait of President McKinley receiving a dispatch at his home in Ohio, the latter being received with loud cheering. Fresh photographs will be taken as long as the war lasts, and will be exhibited as soon as they arrive.

It is announced from Lemberg that Herr Jan Szczepanik, the inventor of the telectroscope, and his financial partner, Herr Ludwig Kleinberg have arrived at Vienna to negotiate for the purchase of the invention of a Lemberg electrician named Rychnowski. This electrician, says the *Daily News*, claims to have discovered the electric fluid, which he calls electroid. It appears that the discovery has already caused a great sensation among German and French oculists, but has not, so far, been scientifically examined. It seems that electroid is obtained by electrolysis, but is not identical with electricity. Its effects are declared to be startling. It produces light and causes Geissler tubes to show fluorescent rays. It works photo-chemically, will rotate objects in mid air, and produce whirlpools in water. When water is illuminated by it from below, it rises and overflows. Electroid, so it is claimed, kills bacteria of disease. By its means metal and glass can be charged with electricity, and the magnetic needle changes its direction under its influence.

At the Crystal Palace Exhibition there are forty-five exhibits in the section devoted to photography in colours. Of these, several are on glass. Professor J. J. Thomson shows the original three-colour lantern slides, prepared by Clerk-Maxwell to illustrate his classical paper on colour before the Royal Institution many years ago. We should imagine that, if these slides could be shown in conjunction with the demonstrations of the Ives's system of three-colour photography, they would greatly interest many among the audience. The Lippmann photographs are also on glass. It is worthy of note that the kromskop does not find a place in the Colour Section, nor is Ives represented by any of his work.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*June* 3, 1898.

THE LANTERN RECORD.

CONTENTS.

	Page
LANTERN MEMS. By G. R. BAKER	41
IMPROVEMENTS IN THE STEREOSCOPE. By HOWARD GRUBB, M.E., F.R.A.S.	42
ELECTRIC PRINTS WITH PHOTOGRAPHIC REAGENTS. By W. FRIESE-GREENE	45
LIMELIGHT EXPERIENCES.—III. By T. N. ARMSTRONG	46
ACETYLENE: A COUNTERBLAST	47
THE MATAGRAPH	48
GASKELL AND REEVE'S ACETYLENE GASLIGHT APPARATUS	48

LANTERN MEMS.

Majestic projection is but a fair description of the views shown in the Niagara Hall, York-street, Westminster, on a cylindrical screen covering a space of four hundred feet by forty feet. That it is the biggest thing ever attempted in this country in the way of lantern work is at once manifest, and, as it is a home-grown product, and does not come from the country of "mighty" things, it is all the more entitled to our greatest consideration and attention. Large pictures on a screen most of us have seen at some time or other, but, to get the nearest approach to nature, there is no doubt that a cycloramic building is the best for the purpose, as the distance is arranged so that the spectators are placed in the position to secure the proper visual angle for natural effect.

* * * * *

In an ordinary hall very few of the audience are in the position to realise the artist's ideal of the picture on the screen, and generally the higher-priced seats are placed in the worst position for obtaining proper perspective and depth or right proportions of the view, hence a distorted idea of the projection is obtained. In the "Electrorama," as the projection apparatus at the Niagara Hall is called, the audience cannot get to a bad position, for they are all in the position of the principal focus, so to speak, and, although able to walk round, cannot get so near the screen as to lose the desired effect. Of the two circular platforms in the centre of the building the upper or farthest is the most perfect position.

* * * * *

Now as to the apparatus and views. First, the lantern is placed in the centre of the circular platform, on which the audience assemble, and is provided with ten optical systems and stages to contain transparencies. The illuminant at present employed is a compound limelight of great power, ten nozzles being arranged round a lime 1¼-inches diameter, and in this way the whole of the ten transparencies are illuminated at once. Each jet is separately adjusted, and each front can be independently registered, so that the sections of a panoramic picture can be made to agree. After once the light is brought to the point where even illumination of the various sections is effected the whole ten lights can be raised or lowered by a byepass arrangement of dissolver or cut-off. Objectives of about 8 inches equivalent focus are employed.

The transparencies are printed from whole-plate negatives, and when finished are 6½ inches square. They are tinted to a certain extent by a chemical toning process, the foreground being hand-painted, to give contrast. These are so arranged that they can all be changed at one time very quickly during the time the gas is cut off, passing up and down through the stages. Rectangular condensers of about 8 inches are employed for concentrating the light on the photographs, and the illumination of the various sections is very fairly even. Certain little difficulties inseparable from first performances have to be got over, but, as they are not formidable ones, there should be nothing to prevent these representations being the talk of the town and resort of the artistic and technical in the photographic and lantern world.

* * * * *

The exhibitions are given at present continuously between ten and one, two and six, and seven and ten o'clock, but in all probability they will be at stated intervals of each hour or half-hour, so that the necessary time for rearranging gas apparatus, and allowing the lantern to cool, may be obtained without the audience having to wait. Audiences, as a rule, have not much patience, and are bad waiters, although music which charms may attempt the soothing.

* * * * *

Readers of these "Mems" may remember I mentioned this panoramic lantern matter recently in the Lantern Record, and then anticipated the apparatus was of the multiple lantern order, with a series of lights, but the inventor of the "Electrorama" apparatus, Mr. T. W. Barber, C.E., M.E., tells me that the difficulty of obtaining even illumination with many sources of light makes such arrangements impracticable, and so he decided to have one central light, which he obtained by the series of ten mixed gas nozzles round the cylindrical lime, obtaining thereby a band of incandescent light. The results are certainly grand when the eyes have become accustomed to the darkened building, and the illumination of the view is realised. Coming in from the daylight, while the views are being shown, is not so satisfactory for a good impression to be made, as if some few minutes elapsed before the picture is projected on the gigantic screen.

* * * * *

The views were taken on single whole-plates, in a camera fixed on a turntable capable of being very accurately stopped at definite points so that panoramic sections could be built up and make one whole scene. The exposure of each plate was regulated by the intensity of the light and composition of the subject. Certainly the results of some of the Alpine scenery, the valley and lakes, were very fine. Opinions will be divided as to the respective merits of expensive panoramas painted by a large staff of artists and the projected "Electrorama" photographs, but, whichever way it is settled in the minds of visitors to the Niagara Hall, there is no doubt, from a scientific point of view, it should be seen by all

interested in the optical lantern. As to further colouring I have my own ideas.

* * * * *

At the *Conversazione* of the Royal Society at Burlington House, on May 11, several excellent pieces of apparatus were exhibited in connexion with photography, notably the arrangement for viewing X-ray photographs stereoscopically, also Mr. Campbell Swinton's "Röntgen-ray Camera, showing the position, dimensions, and form of the source of the X rays in a Crookes tube." The pseudoscope, by Sir David Salomons, for producing stereoscopic effects by means of a single picture, and a fine micro-photographic camera and complete installation of apparatus for the micro-photography of metals, with room for the observer to sit at the microscope, adjust the object, and then at once connect up with the camera. This apparatus was designed by Professor Roberts-Austen for use at the Elswick Works.

* * * * *

Among the photographs of special merit were the astronomical photographs of the eclipse, photographs of electrical discharges, which were most beautiful and fantastic in form, and the specimens of naturographs, the latter being prints produced by Dr. Selle's process of photography in natural colours. The transparencies were very clear, and quite transparent, while the paper prints produced by the collotype process were very beautiful and closely approximated to the colours of nature. I hope to write further particulars of these later.

G. R. Baker.

IMPROVEMENTS IN THE STEREOSCOPE.

[*Paper read before the Royal Dublin Society*, 1878.]*

When we possess a pair of properly taken stereoscopic pictures, all that is necessary to utilise these in producing that effect which we call "stereoscopic" is some optical contrivance which will enable us to view one picture with one eye simultaneously with, and under the same conditions as, the other picture, viewed with the other eye.

This seems simple enough, and yet, since the first invention of the first instrument, in 1838, only one other has come into general use.

Of these two instruments, the first was invented by Sir Charles Wheatstone in 1838, and is generally known as the reflecting stereoscope of Wheatstone; the second was invented by Sir David Brewster in 1849, and is generally known as the lenticular stereoscope of Brewster.

The first, or reflecting stereoscope of Wheatstone, is the most perfect instrument; but the second, or lenticular stereoscope of Brewster, though inferior in many respects, completely beat its rival out of the field by reason of its compactness, convenience, and cheapness. In fact, nowadays the Wheatstone stereoscope is hardly known. Before describing the various forms of stereoscopes brought before the public at various times, and some new forms, I now, for the first time, venture to bring forward, it may be desirable to consider a little the theory of the stereoscope, and thus, perhaps, arrive at a more correct idea of what condition we require to fulfil.

To go thoroughly into the theory of the stereoscope, we should consider the various theories of binocular vision, in which there are still some points which physicists find it hard to come to an agreement about. While some have shown that we can really only direct our attention to, and see distinctly, one single point of a subject at one time, and have argued therefrom that our general impression of a subject is derived from an enormously rapid survey taken of each point *seriatim*, Professor Tyndall has, it appears to me, shown conclusively that a general idea of the relative positions and distances of all the salient features of the scene can be appreciated without actually directing the eye in succession to every individual point. In his own words: "When the optic axes are converged upon a certain point of an object, the other points produce a certain determinate effect on the retina, and are in some measure the objects of our attention. There is thus established an association between a certain convergence of the optic axes and certain incidental impressions, and this association may, I think, become so refined by habit as to enable us to infer the solidity of a body, or the relative distances of objects, while the optic axes are kept immovably fixed on a single point."

We shall probably have to refer to a somewhat similar matter as we proceed; for our present purpose, however, it will not be necessary to touch further on these debated points.

* Reprinted by permission of the author.

In order to understand the principles of the stereoscope, it will on be necessary to assume that the nearer an object is to us the great convergence we must give to the optic axes in order to view this obje with both eyes; and, as a consequent upon this last, that if, to see a point in a subject, we are obliged to give a greater convergence to t optic axes than for the other points, we intuitively assume that point be nearest to us. We need hardly stop to prove this; a moment's co sideration will show how impossible it is it could be otherwise. No this being so, if we place a stereoscopic diagram of a truncated hexag in an ordinary stereoscope (fig. 1, plate A), we appear to be looking in a hollow pyramid; if we place it in a pseudoscope—*i.e.*, an instrume which enables us to view the right picture with the left eye, and the l with the right—it stands up like a solid body, just the reverse of t effect in the stereoscope. The reason is very simple. Take the fir case. Here the optical arrangement is such that we are enabled to vie the right picture with the right, and the left with the left, eye. Now, wh we direct our attention to the point $a\,a'$, we have to give a certain co vergence to our eyes to make that point a as seen by the right eye in t right picture coincide with the point a' as seen by the left eye in the l picture. Now, suppose we direct our attention to points $b\,b'$, these a actually further asunder on the diagram; consequently our eyes requi less convergence, and we at once assume that point to be *more* distar In the second instance, of course, the reverse is just the case, so that the first case the point $b\,b'$ appears to be far below the point $a\,a'$, and the second as much above.

Besides this power we have of judging of the distances of objects by t convergence of the optic axis, we have evidently other, though much le delicate, means of doing so.

If we shut one eye, we can still appreciate, to a slight extent, relati distances. How very much reduced, however, our power is in this respe will be evident from a trial of the old experiment of walking up to candle with one eye shut and trying to snuff the wick.

Much of this remaining power is probably due to the diameter of t pupil of the eye. If this be reduced by diaphragms, our sense of relief perception of form in three dimensions is much reduced, just as a ph tograph taken with a small aperture of lens has none of that roundne and relief that is admired so much in photographs taken with large-apertu lenses. This was pointed out by my father about twenty years since.

There still remains, even after shutting one eye and diaphragming t other down, some slight appreciation of distance, quite apart from i tuitive ideas of perspective light and shade, or such matters. This m partly be due to differences of focus, and also (to a larger extent, perha than we would imagine) to the fact that we are familiarised with m of the surrounding objects and their actual size, and are therefore in position to judge of their distance from their angular size. Some of th points may be useful further on in considering some forms of stereosco

Wheatstone Stereoscope.—The principle of the Wheatstone reflecti stereoscope is easily understood.

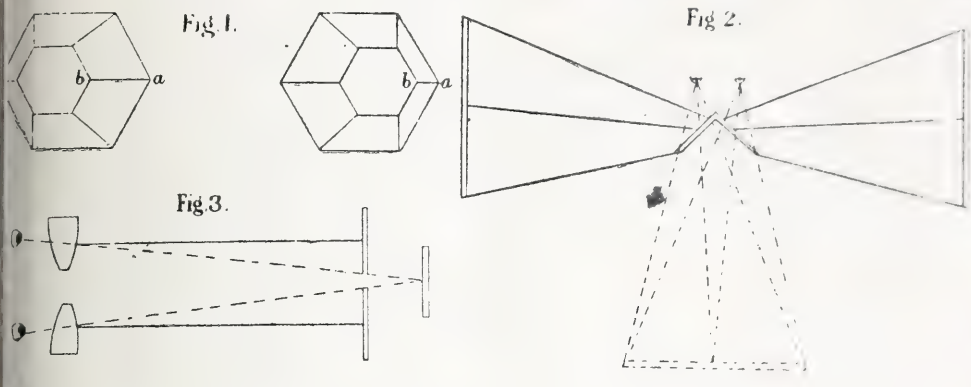
The pictures are placed (fig. 2, plate A), opposite and facing one anoth at about double the distance at which it is desired to view them. Mid between the pictures are placed a pair of reflectors, so inclined that right eye sees the right picture, and the left eye sees the left pict superposed on the image of the other. There is a difference of opin about the best position of the virtual images, whether they should superposed or side by side, but this I will refer to further on.

The Wheatstone stereoscope is theoretically and practically a m perfect instrument than that in ordinary use, but the disadvantage having to mount the two pictures on separate cardboards, and (con quently on this) the necessity of adjusting each pair of pictures careful caused this stereoscope to be completely rejected for the more convenie more portable, and handier, though by no means so perfect, instrume the Brewster lenticular stereoscope, so that in general use is termed (3, plate A).

In this stereoscope the pictures are mounted side by side on one pi of cardboard, and the optical arrangement consists in a pair of h convex lenses, or, what is equivalent to the same, whole lenses, moun at a greater distance apart than the eyes of an ordinarily constituted bei This arrangement (too well known to need description) enables the server, without trouble or strain, to cause the images to coalesce, a produces the stereoscopic effect, provided the instrument be well adop to the observer's eyes.

This may, perhaps, be the best place to say a few words on a mat about which there was some considerable amount of dispute some five six years ago. As two of those who took part in the dispute have si been called away, I do not propose to say more than is necessary to the matter right should any one have doubts.

It was argued very plausibly by one, whose profuse and continual writings on such subjects gave his dicta on these matters considerable and just weight, that no prism power at all was necessary or even desirable in the Brewster stereoscope, and that, inasmuch as the axes of our eyes were



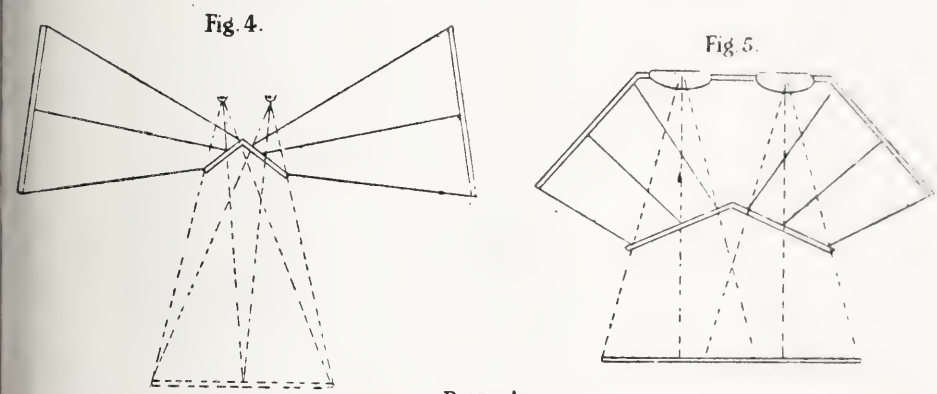


PLATE A.

parallel, or nearly so, in looking at some distant object in the landscape, no a truer representation of the object would be obtained if the axes of our eyes were parallel when looking at the photos. In fact, if they were so, we would have a true representation of the object, while, if we used such optical contrivances as would render the axes of the eyes convergent when looking through the stereoscope, we would have a representation, not of the object, but of a small model of the object.

It may be quite true that this arrangement would, in one sense, give a true and accurate representation of the object; but, in another sense, it gives quite the reverse, for, while to an inexperienced eye the view of the object itself is pleasant and free from all idea of strain, the view of the images seen this way in the stereoscope is most painful to ordinary uneducated eyes. The reason is obvious when we take up a book and proceed to read, having immediately before had our attention fixed on a distant object (in which case our optic axes had been parallel), we immediately, and without effort, see the type distinctly, the axes of our eyes have been instinctively adjusted before they had time to change from the landscape to the book. It was not that our eyes were adjusted after, and in consequence of, our glancing at the book; but the action of our will in causing our eyes to change their direction from the landscape to the book simultaneously caused a change in the relative direction of their axes. Probably the convergence of the axes of our eyes is influenced by two causes—firstly by an association between the necessary focussing action of the eyes and the muscles which regulate their convergence (for in almost all cases the focussing and the convergence are simultaneous actions); and, secondly, by an instinctive knowledge of the distance of the object apart from actual ocular demonstration. It may be argued that by supplying a sufficient amount of magnifying power the pencils entering the eye will be parallel, and therefore, the eyes having to focus on parallel rays should assume that convergence suitable to parallel rays, viz., parallelism; but for all that, when we take a stereoscope in our hands, we have an instinctive idea that the object that is in our hands and which we are about to examine is not at an infinite distance, and therefore our eyes naturally and involuntarily converge; it is easy to see, then, why, under these circumstances, a view through a stereoscope which involves a parallel condition of the axes is not the pleasantest.

No doubt, the old stereoscopes were made with a ridiculously large amount of prism power, but I consider that some of the modern ones are just as bad the other way, and the consequence is that I have found very many persons who have never seen at all with a stereoscope properly, or, if the pictures appeared after great exertion to coalesce, it was only by a painful effort.

The reason of this wide diversity of opinion as to the necessary convergence probably arises from the fact that it is a personal matter, and some persons have much more control over the muscles of their eyes than others; this is partly, too, the result of education of the eyes, and hence it is, probably, that stereoscopes are made generally with too little divergent power, the makers have got so accustomed to diverging their eyes, that probably they require little or no divergent power at all.

I can myself, without almost wishing it or thinking of it, take two stereoscopic pictures large or small, and, diverging my eyes, look at the left picture with the left eye, and right with the right, and now instantaneously change, and converging my eyes look at the right picture with the left eye, and the left picture with the right eye. I can (probably by long practice) converge and diverge my optic axes twenty times a minute, but because I can do this and thus do without a stereoscope at all, or with a bad one, this is no reason why we should not give the best possible help to those who are not so practised in the matter.

Now, I may here briefly mention a few of the disadvantages these stereoscopes labour under.

The disadvantages of the Wheatstone need hardly be touched upon.

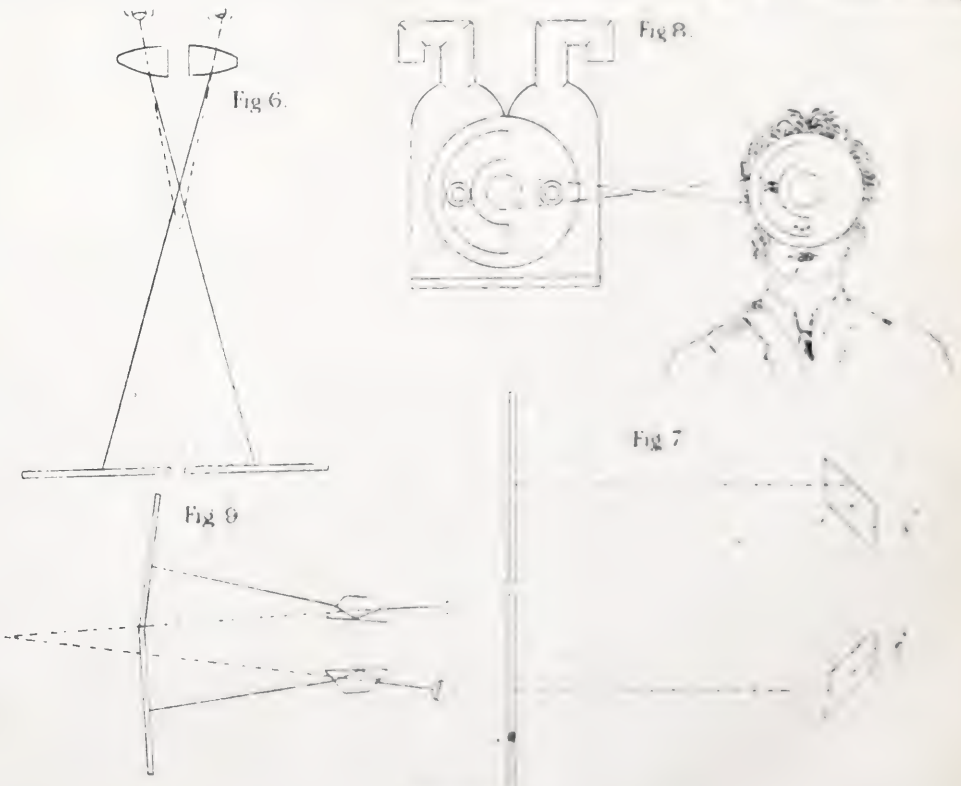


PLATE B.

Some of them have already been mentioned, and its use has been long since practically discontinued.

The disadvantages of the Brewster stereoscope are:—

1. Distortion of images to a certain extent.
2. Chromatic fringes on lateral objects.
3. Limit of its application to pictures whose breadth is not greater than the distance between the human eyes.

Fig. 1.

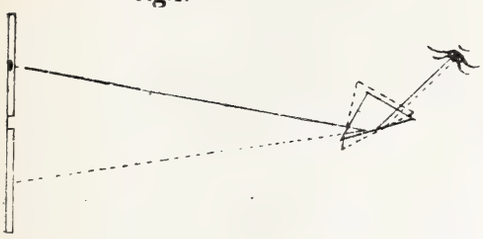


Fig. 2.

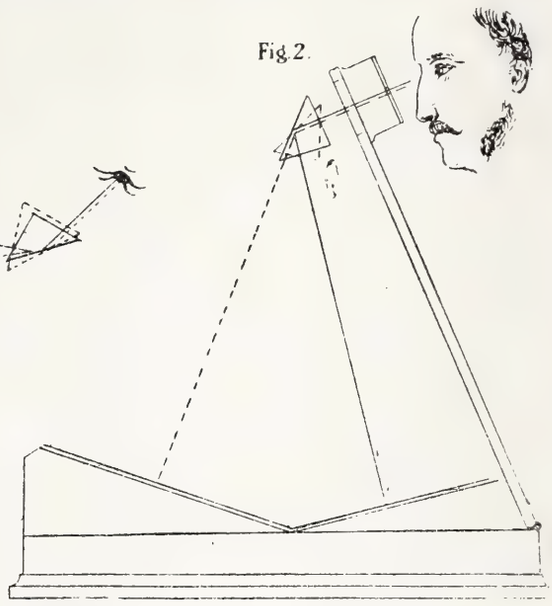


PLATE C.

4. As a consequence of the last, the pictures are almost always made a most unartistic shape (viz., square).

5. Many persons have a great difficulty in combining the images as seen in the Brewster stereoscope.

This probably arises from the fact that different individuals require different adjustments of the instrument, not only for focus (to suit long and short sight), but also in the amount of apparent displacement of the images necessary to make them overlap and combine, and also that persons differing from one another in the distances asunder of their eyes will, in the ordinary form of the Brewster stereoscope, have, of course, a different amount of displacing power supplied to them by the same instrument, according to whether they be looking more nearly through the centre of edge of the lenses. Consequently, if we wish to construct a stereoscope which shall be the best possible for any one individual, due regard must be paid to the particular angle of convergence that will best suit that individual, and the distances asunder of his eyes.

Again, the human eyes have a wonderful facility for altering the relative direction of their axes in a horizontal plane (by a mere effort of will); hence many people can see with a stereoscope not at all suited to their sight or without a stereoscope at all; but, if they do, it is with an effort which, if long continued, becomes painful.

Glancing back over this list of disadvantages, we can, I think, easily pick out that one which has caused this instrument to decline in favour so much as to be now considered almost old-fashioned. It is evidently No. 3—that of the limit of its adaptability to pictures no larger than the ordinary little $2\frac{3}{4}$ stereoscopes of which people are so sick and tired.

I shall now just mention, as far as possible, in this chronological order, a few of the modifications proposed in these forms of instruments.

About the year 1856 my father (the late Thomas Grubb, F.R.S.), finding great difficulty in lighting the two pictures of the Wheatstone stereoscope, altered the position of the pictures and angles of the reflectors till they assumed the position shown in fig. 4, plate A. This did not impair the perfection of the result, and had some considerable advantages as to lighting, &c.

In 1860, and again in 1873, Mr. Thomas Sutton brought out a stereoscope, shown in fig. 5, which appears to be just a carrying out of the same idea to a still greater extent.

In 1873 I mentioned to one of the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY a plan I had used for viewing large pictures stereoscopically by revising the prisms of an ordinary Brewster stereoscope (see fig. 6); this was published in the photographic journals, and caused much discussion.

It was, however, objected to on the ground that the high conveyance of the optic axes caused the picture to assume too much the appearance of a model. I had never put this forward as a perfect instrument; but, as soon as this discussion opened, I published another form, fig. 7, which appeared to me, excepting in the matter of expense, very unexceptional indeed.

The form I have to consider further on, however, seems to possess some advantages over this.

Two other forms of stereoscopes were introduced since the invention of the Brewster, but I have not been able to find any description of them.

One was introduced by M. Claudet many years ago, but more, I believe, as a curious experiment than as a practical instrument.

The other was called, I believe, "Swan's Crystal Cube," in which the observer, looking into a cube of glass, saw the object in relief. This was effected by attaching two stereoscopic pictures respectively to the back and one side of the cube, which was formed by two right-angled prisms laid together. In this way one picture (the back) was seen by transmission with one eye, and the other picture was totally reflected by the base of one of the prisms and seen by the other eye. This was, of course, more a scientific toy than a practical form of the instrument.

The first experiments I made were for the purpose of investigating the cause of the apparently wonderful stereoscopic effect which we get in looking at some of those coloured photographs of flowers ordinarily sold in the shops, when viewed with both eyes through a single magnifying lens, such as is supplied with the graphoscope. That it is a true stereoscopic effect is evident from the fact that the moment you shut one eye the effect is lost; but how a stereoscopic effect can be obtained from a single picture was more than I could at first understand. One single experiment, however, resolved it. Instead of one single large lens, I took two, each equal in focus to the lens of the graphoscope. On looking at the coloured photograph through these, keeping the eyes in the centres of each lens, no effect of relief was visible at all. On drawing the lenses closer together, so that the eyes looked through the outer edges of the lens, the red flowers stood up. On drawing the lenses asunder, so that the eyes looked through the inner edges of the lens, the reverse effect took place, and the red flowers appeared to sink below the paper.

Fig. 3.

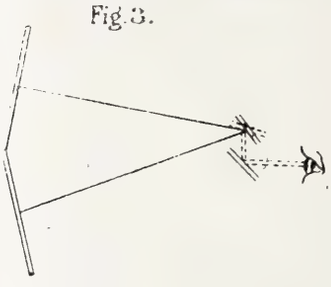


Fig. 4.

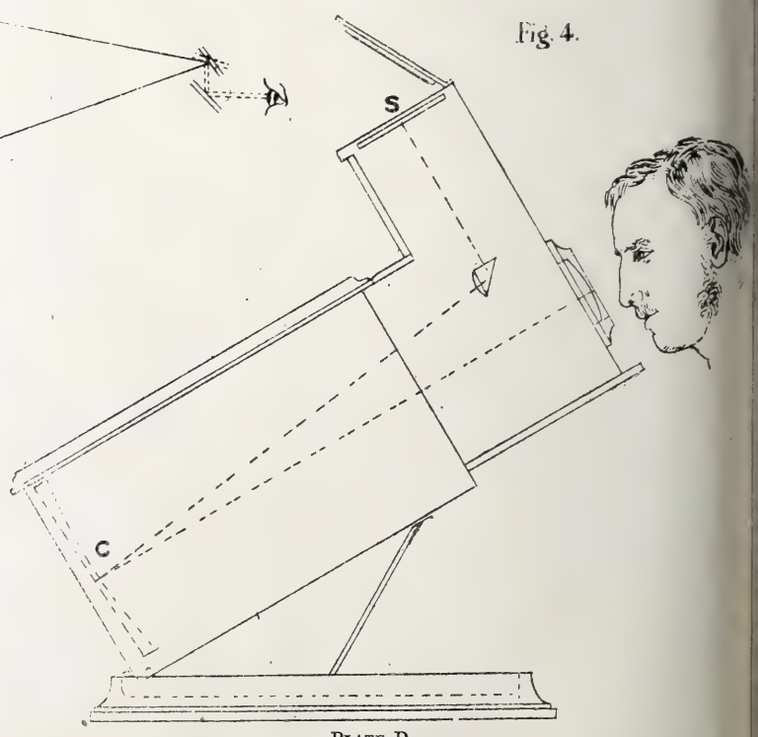


PLATE D.

The explanation is, therefore, quite clear. The edges of the lens act as prisms as well as lenses, and fringe everything with red on one side and blue on the other; in other words, the outline of the red flower

is a little extended on one side to the right eye, and on the other side to the left eye. Thus the two pictures we see are really dissimilar, and dissimilar just in such a manner as to cause the appearance of relief. I afterwards found that coloured children's picture books are most admirably adapted for the experiment; the blues and the reds can be made to appear to rise and fall alternately at pleasure, according to the manner they are looked at. If viewed by monochromatic light, the effect will, of course, not take place.

The next experiment tried was a kind of phœnakistoscope arrangement for the magic lantern, with a view to getting a stereoscopic effect on the screen (fig. 8, plate B). One-half of an ordinary stereoscopic picture was placed in one lantern and the other half in the other; both images were then thrown simultaneously on the screen superposed. They could, of course, be made to coincide in the centre, but not at the edge. Now, two revolving discs were arranged, one in front of the lantern and one in a convenient position for an observer to stand behind. The two were arranged so that one picture only was visible on the screen at once, but as the disc was rotated the images appeared alternately at any desired rate; the second disc, driven mechanically at an equal rate to the first, only allowed one eye at a time to view the screen. The result is that one eye sees, of course, one picture, and the other the other picture. When the discs are slowly revolved up to, say, four revolutions a second, a jerking action is visible; but, when the speed is increased to eight or ten a second, the image is seen perfectly steady and in full relief. I mention this more as an interesting experiment than as of any practical utility, though it is quite possible to conceive an arrangement by which this might be adapted for a number of spectators.

The next experiment had reference to using larger pictures than usual for the stereoscope. I found this could be done by employing a pair of reflecting prisms, such as Professor Zöllner proposed for reversing one-half the spectrum in his spectroscope (fig. 9, plate B). Using a pair of these prisms, and mounting the pictures side by side on one piece of cardboard, jointed in the middle, so that the pictures could be laid as in the diagram, this form answered fairly. The field, however, was limited in the horizontal direction, which is a decided objection.

The arrangement next tried was that of the two doubly reflecting prisms, as proposed in 1873 (fig. 7, plate B).

The next arrangement tried was altogether novel. In making various experiments it occurred to me that much of the difficulty in joining the pictures arose from that facility we have for altering the convergence of our optic axes in a horizontal direction; in fact, that there is no determinate angle of convergence, and, consequently, we generally hear persons who cannot join the pictures easily describe them as floating backwards and forwards over one another. It appeared to me, therefore, that if, instead of attempting to displace the pictures horizontally, we displaced them vertically by some simple optical contrivance, we should get rid of much of this difficulty. The result has justified my anticipations most fully, and is a stereoscope which I find can be made use of by persons who have the greatest difficulty in seeing with the ordinary construction. It has the great advantage of being practically unlimited in its application. It can be used for paper prints or transparencies, any size, up to even views thrown on the screen by the magic lantern. It can be made of an infinite variety of forms, and from the principles of its construction it is evident that, when once adjusted, it will be right for all persons, no matter what the distance between their eyes may be.

As to convergence of the axes, the necessary convergence, if the pictures be mounted exactly one over the other, is, of course, precisely the same as the convergence of the eyes would be looking at any object at the same distance without a stereoscope at all; and I am strongly of opinion that these are the easiest possible conditions for the majority of persons. However, any one can easily try this crucially for himself in this instrument.*

As to the various forms this stereoscope can be made in, their name is legion, but I will point out a few. 1. It may be made as a pair of prisms or reflectors attached to an ordinary graphoscope, and looked into at a convenient angle somewhat similar to that usually adopted by microscopists, as fig. 1, plate C. 2. It may be made somewhat of the form of the old optical pillar, the photographs being placed horizontally on their backs, and the images viewed by looking in horizontally (fig. 2, plate C). 3. It may be made with a pair of prisms, achromatic by preference, turned, of course, though 90° as respects the Brewster stereoscope, and this form can be made of the shape and character of any of the Brewster type. 4. If it be thought a disadvantage that the pictures should be reversed, as they must be in this or in any single reflecting telescope, a pair of prisms or reflectors can be used that will reflect the light twice, and thus erect the pictures again (fig. 3, plate D).

Now, as to the objections that will be urged against this stereoscope, it is as well to anticipate them. It will be said that if the pictures be mounted on the one card each picture cannot be viewed from its proper point of sight, and therefore we will not receive a correct impression of the subject. Well, my answer to this is, first, as to the vertical direction, that nothing is easier than to mount the pictures on two pieces of cardboard jointed together, and have the table of the stereoscope not flat, but of such form as will cause the folded cardboard to lie not quite open, just so much as will bring matters right in that direction (as in fig. 1, plate C); though I would remark that for views of such a proportion as I consider best suited to the stereoscope this is almost unnecessary.

As regards the other direction—viz., horizontally—the right eye is, of course, not opposite to, but about one and a quarter inches to the right of, the centre of the picture it views, and the left about one and a quarter inches to the left of the centre of the picture it views. This would be running matters to extremities to complain of, except in very small pictures; but I am of opinion, from careful trial, that it is easier on the eyes that it should be so, for our optical axes are then exactly in the condition they would be in looking without the stereoscope at an object at same distance.

One great charm of this stereoscope to the experimentalist is that all these experiments can be tried in it so readily. Another objection—that the pictures will be reversed—can be met by the adoption of the fourth form mentioned above; but I am by no means sure that this is an objection at all, for it would appear that in some of the more favoured carbon processes in vogue now trouble is found in transferring a second time, so as not to have the picture reversed. If this be so, it will only be necessary to omit this last retransfer to make the pictures right for this stereoscope.

The last form of stereoscope I have to bring before your notice is one peculiarly suited for transparent photographs. It will be easily understood from fig. 4, plate D. By a combination of prisms and lenses images of the right and left pictures of an ordinary stereoscopic slide (s) are formed superposed on the surface of a concave mirror (C). When the observer stands opposite the mirror at a certain distance, the pencils of light which form the right picture are reflected by the mirror into his left eye, and those which form the left picture are reflected into his right eye. The result is apparently an aërial image of the object in beautiful relief.

For transparencies of almost all subjects, but especially statuary, this form of stereoscope is most admirably suited; and the fact of not having to look through two apertures—combined with that of the pictures as seen with both eyes being actually superposed, and not side by side, and therefore that there can, by no possibility, be any difficulty of causing the images to coalesce—renders this form of instrument a great favourite with most observers.

SIR HOWARD GRUBB, F.R.S.

* While there is no doubt that this stereoscope completely meets the difficulty of the difference in distance between the eyes of various individuals, it may be argued that it does *not* meet the difficulty of the difference in convergence of the optic axes desirable to suit all sights; but the fact remains that people who have never seen properly with the ordinary stereoscope have no difficulty in seeing with this. The last instrument, however, completely meets the matter of convergence of the axes, as both pictures are (*without* optical means) seen superposed on one another.

ELECTRIC PRINTS WITH PHOTOGRAPHIC REAGENTS.

[Paper read before the Croydon Camera Club.]

PHOTOGRAPHY and electricity to the reflecting mind convey suggestive whispers of revelations of the deepest interest, of which you will be able to judge by these experiments. Not only do photography and electricity work together on the surface of the earth, but they are playing, and have played, their part in every leaf of stratified rock that has accumulated countless ages ago. In fact, they are constantly whispering throughout the wide, wide world to the sun and to the mind. It is very interesting to observe the steadiness with which the pile of evidence in support of one of nature's most beautiful laws, "the electro-magnetic theory of light," is coming forward day by day. It was Clerk Maxwell who brought forward the electro-magnetic theory of light; he is one of the chief of those who have contributed to the building up of the basis of modern physical thought; not only are some of the present advanced conditions of photography due to his labours, but to him we indirectly owe many comforts which benefit humanity. The first thing our senses distinctly appreciate is the material part of the universe, and, in the delight of tracing this through its wonderful changes, scientists at the end of last century scarcely saw farther than matter, whereas the present age recognises force and energy in such forms as light, heat, and electricity as being

quite as real as matter; and perhaps the next generation will be able to solve what it is that lies latent in our brains, which, when set in motion, records tunes and rhythm which we have heard years before, in fact, reproduce them exactly; often (I dare say many of you have noticed this), when two people are talking, one can sometimes tell what the other is going to say before he speaks; or what one has seen, if impressed mentally, can at any time be pictured or brought to our memory. The question is, What is this latent or inherent something that is within us? For myself I believe photography and electricity combined will eventually give us some clue towards solving this mystery, and probably these latent electric impressions which I am going to show you may open up a pathway for others to follow.

It was November 1888 (*Photographic News*, November 9, 1888) when I gave a demonstration before the Bath Photographic Society, and then showed that coins, &c., could be impressed without the aid of light on a bromide plate by means of electricity; since then I have tried hundreds of experiments, and a few of the successful ones I shall show you.

Now to the demonstrations. I take a piece of paper (some papers are much better than others), and, moistened with water only, so as to be able to conduct electricity, place it on a moist pad of blotting-paper or flannel, &c., which is connected with a flat piece of carbon, metal, or other conducting material, which has the positive pole of a continuous current attached to it (the current which supplies an ordinary sixteen candle-power incandescent lamp will do), then place a coin (it does not matter whether gold, silver, or copper—in fact, any metal will do) on the moist paper, and connect the negative pole of the current to it, pressing at the same time you connect the current. An electric impression results which can be developed at any time; no matter if you dry the paper by heat or let it dry spontaneously, the impression once made is permanent. You can bring out a faint, green-coloured image with a solution of sulphate of iron, and by subsequently moistening it with a ten per cent. solution of nitrate of silver you have a brilliant black impression; the impression can be fixed in a weak solution of hypo sulphate of soda, as you do a photographic print.

Here is a stylus—a pencil with a metal point—which I will connect to the negative pole of the current, and then write on the moist paper; you may leave out the moistened pad in this experiment, and may write or draw anything you please, as quickly as you wish, although others cannot tell what you have written or drawn unless you tell them; this can be developed in the same way as the first experiment, therefore you may have a permanent invisible record of drawings or writing which may have been sent to you, and messages and drawings may be transmitted from one place to another in secret; you may have many pieces of paper all in contact, and will find an electrical impression on each piece which can be developed, but each is less clear the farther you are from the negative pole; I am not so sure if this cannot be got over in time. Curious to say, we can produce these latent electrical impressions in the light, whereas with the photographic latent image we do everything in dark rooms.

Another curious phenomenon is, expose a photographic plate, film, or paper, then make an electrical impression; you will find on development the electric impression is there, while all round it is fogged; this proves that electricity does act differently to light on a photographic plate, although electricity is so near light. This I did before the Bath Photographic Society in 1888, and also showed the effect of a vacuum on a photographic plate, also the impressions of a coin not in contact with the film; but these experiments were made with the aid of an induction coil, and, curious to say, impressions made with the aid of an induction coil are not nearly so quickly done as these impressions I produce before you this evening with the current at 100 volts, which is usually the pressure of the current supplied to the houses, and costs under a penny an hour. I have had an instrument made by Mr. Braham which you can see here, whereby you may adjust the current from 100 volts to 1000 volts, but I find not so much difference between the two—in fact, it is preferable to work at 100 volts, or even lower.

I have tried the following different solutions, using ten grains to the ounce of water; of course, with stronger solutions you obtain the impressions darker and they flash up much more quickly, or you may obtain dark and quick impressions by the weak solutions, provided you keep the current on a little longer when in contact with the coin. If you develop the latent electric impression with silver and amidol, you obtain a dark-brown impression, pyro and sulphate of iron a violet impression, ortol a faint brown impression, hydroquinone a green impression, which can easily be made black with nitrate of silver, bichromate of potash, and nitrate of silver a red impression, but this reddened the paper all over in a little while; if you make an electrical impression on this reddened paper, you have a light impression upon a dark-red ground; these effects I shall have more to say about in some future paper. Rodinal with silver gives a brown impression. Glycin or metol would develop an electric latent image hardly at all. Nitrate of zinc, nitrate of copper, nitrate of uranium seem to obliterate the impressions, which is very curious and an exception to the rule. Another exception to the rule is, if you put a weak solution of phenol over the latent electrical impression, you cannot develop it with silver, but you can with sulphate of iron.

You may obtain a very good impression from a half-tone block by making an electrical impression and then developing, first with silver, then with iron. These impressions can be made on cheap coloured papers, or on ordinary brown paper, linen, and such substances. The impressions can be made on both sides of the material; also, by having many metals joined together, you can obtain very good results from all with one connexion. You can also bring out these latent electrical impressions with fumes of ammonia and with other vapours, some much better than others, if you connect the positive pole of the current (instead of the negative pole) to the coin. Now, I have been showing you developed electrical impressions, where the paper has only been moistened with water. Supposing we make electrical impressions upon paper that has been prepared. For instance, take an ordinary amidol developer—that is, amidol and sulphite of soda—and well moisten paper with it; now place it on the moistened pad and make an electrical impression with the negative pole in contact with the coin, or type, or metal block, and one of the most beautiful puzzling phenomena happens. First the impression is a very faint blue, which gradually obtains a darker hue until it is almost a blue-black; then, after a little while, the impression gradually changes to different colours, and finally the paper changes all over. You may fix the electrical impression before the paper changes in a weak solution of sulphuric acid, but you will find the impression faint and of a red colour. These changes seem to depend upon the curious energies of amidol; that is to say, action and reaction seem to take place every moment.

Nature has such abundance of these curious phenomena which we know nothing of at present; and, as our knowledge is merely relative to the phase of the time we live in, we can only hope, by patiently experimenting, to advance a little. It may be presumption on my part to formulate an hypothesis: but, if one could imagine a film millions of times thinner than the film of a soap bubble surrounding each molecule, capable of tremendous elasticity, one could better explain the phenomenon of light and electrical latent images, because we should have a grand position to work upon, whereby our imagination could be stretched a little farther than it is at present, and could better explain the molecular change by the *change* of its surroundings, even if it was a gaseous molecule, moving at the rate of 1000 or more feet per second.

I have found most photographic developers give very interesting results, but amidol is by far the most interesting from a scientific point of view. You may use it without soda sulphite, and obtain almost the same results, but you want the solution stronger. Now, if we prepare paper or linen with a weak solution of nitrate of silver, and make an electrical impression from coins, metal block, or type, we obtain a perfectly black impression, which may be fixed in the ordinary way with hyposulphate of soda. There is another way of preparing the paper by merely passing it moist through two rollers, one of the rollers being silver, or silver-plated, which has the positive pole of the electric current attached to it, and the other roller the negative pole attached to it. You will find this paper, although such a little silver is in it, is very good for electrical prints and photographs. You can also prepare paper with copper and iron, and obtain some very fair impressions. There are many other chemicals which give very fair results, but I have shown you quite enough to prove to you the importance of these electrical impressions. I may add we live in an atmosphere of mystery, which is extremely interesting to unravel, adding comfort and delight to all who experiment. I hope the few curious, and not unimportant, facts which I have brought before you this evening will encourage research into the action of those secret agents which exert so powerful an influence over matter.

W. Friese-Greene.

LIMELIGHT EXPERIENCES.

III.

There is little doubt but that, in the experience of most limelight lecturers, it will at times happen that engagements have to be undertaken in which the services of some strange operator have to be brought into requisition although such be much against the desire of the professional lecturer,

who, as a rule, knows only too well the comfort of having his own operator. In many country places the church lantern and the local lanternist, for various reasons of policy, have to be considered, and in the case of photographic societies, as a general rule, the society's lanternist lays claim to any function coming within the sphere of his society.

For many years I have made it a *sine quâ non*, in all my public engagements, to strictly adhere to a determination I was forced to adopt many years ago, viz., to have no one at the lamp but my own operator—in coming to this determination I was powerfully influenced by the utter inability of several operators, who, it was alleged, knew how to work a lamp perfectly well. I know that, from among our numerous photographic societies, there are many gentlemen that could be found who are quite capable of undertaking a limelight entertainment; but I know also, from bitter experience, that there are quite as many who aspire to this dignity, and who are just as incapable as a child when they have to face from seven hundred and fifty to a thousand of an audience. It is then they lose their heads somehow, and begin to be very shaky at the knees, like those who mount a public platform before a sea of faces for the first time. It is out of no want of respect for amateur lanternists that I pen these lines, but the result of sheer bitter experience that compels me to adhere to my fixed determination.

In limelight lecturing, an operator that is well known is of the very first moment, for, when one is working regularly with such, there is a degree of confidence ensured that is totally absent with strangers, and confidence in every little detail is the main factor in lecturing. As I look back over a period of many years of lecturing, I can confidently assert that any hitches that ever occurred were solely traceable to the shortcomings of an operator that was unknown to me, and I cannot recall any one serious hitch that ever happened so long as I was supported by the operator that I regularly engaged.

Then, again, another golden rule to follow is, Never under any circumstances omit to inspect and test personally the lamp at least some hours prior to the time of the meeting.

Having confidence in an operator seeing after things being all right is not enough; nothing but personal inspection is sufficient, and, so certain as this rule is neglected, so soon will collapse and fiasco, sooner or later, put in an appearance.

As I write, I can well remember the utter discomfiture of a local parson who had travelled some distance to give a lecture at Helensburgh, taking with him his curate as assistant, and the church lamp for the occasion; everything was right with the lamp, but, when the time came, where were the slides? The one depended on the other to bring them. I think I never witnessed such a wretched face when the chairman announced that, owing to some mistake in the arrangements, the lantern could not be employed. This little incident brings up another rule, Never, under any circumstances whatever, omit to personally bring and overlook your own slides, handing them to the operator just prior to going on the platform.

In support of my contention that a lecturer should insist upon his own operator, I may relate a breakdown that once occurred in my experience. On this occasion I had to put up with a young man that was slightly known to me, and who had a good reputation and not a little experience. I knew him to be quite steady and reliable, but there was something that I could not describe or account for at the time that made me very unwilling to depart from my regular rule. For a time all went well; but, just as I was beginning to think how nicely the young fellow was getting along and working into my hands, I was startled by a sudden dull thud and an anxious commotion in the vicinity of the lamp, several of the audience rising to their feet and rushing towards the lantern. There is nothing like keeping cool under any circumstances, but very soon it was intimated to me that the operator had taken a fit and was lying on the floor. I need hardly say a circumstance of this kind does not help a limelight lecturer.

On another occasion, against my will, I was persuaded by the committee of an institution where I was to lecture to allow their regular man to work the lamp. This operator I knew also to be quite well up in his work, for he had been so engaged for many years with one of the leading firms in Glasgow; but, unfortunately for my lecture, a circumstance transpired that I was in ignorance of until after the lecture had commenced, viz., the party in question had, a very few days prior to the meeting, started business on his own account, and, to fulfil his engagement with the Committee, he had to borrow a set of apparatus for this occasion. Now, as a rule, everything that is borrowed from other people in the way of limelight apparatus is, in my opinion, not of the very first order, and the truth of this assertion was soon seen on the occasion I am referring to. A screen had been borrowed at one place, a biunial at another, and regulators and jets at another, the result being that, notwithstanding the young fellow knew perfectly well how to work a lamp with which he was regularly acquainted, the scratch set of apparatus which he had scraped together was the cause of nearly complete failure. I could adduce many other similar experiences, all of which were solely traceable to the employment of strange operators.

Then, again, there are times at which a firm hand must be brought to bear upon even one's own regular operator, and not permit of his persuading any one against his will to run undue risks. I can call to mind a very funny episode that comes under this head of experiences. It was in connexion with the capabilities of a set of poles carrying the weight and strain of a sixteen-foot linen screen. Somehow I never felt comfortable when this screen was erected in the manner that was his custom to adopt, and so on one occasion, sure enough, just as I anticipated, snap went the centre of the top stick and down came screen like the scandalising of the peak of a yacht's mainsail in a gale of wind. This experience has made me form a very decided opinion regarding the manner in which screens should be erected.

It is well known that the getting up of a large screen in some situations is about the most anxious part of an operator's duties, and, once this part of the preparations has been effected, the rest is plain sailing. No doubt the employment of poles is a very convenient method to adopt, and their introduction has now become almost universal, simply because they do away at once with any anxiety in the matter of getting sufficient purchase by means of block and tackle at suitable staples or screw eyes in the roof and walls of the rooms or halls where limelight lectures are given.

Up to within certain limits, the employment of poles is as good a method as can be adopted; but I have formed a very strong opinion that, without special provision being made, no screen beyond twelve feet should ever be erected by the employment of frames composed of poles jointed together by means of brass tubes. I never knew of any collapse below this size, but I have been an eyewitness of instances where twelve, fourteen, and sixteen-foot screens have collapsed, through the sticks being too fragile to carry the strain.

A little consideration only is needed to understand how the sudden opening of a door in close proximity to a screw might introduce such a body of air as to powerfully affect the strain already placed upon the supports.

T. N. Armstrong.

ACETYLENE: A COUNTERBLAST.

A correspondent writes to *The English Mechanic*: "Several of your correspondents have lately been making inquiries about acetylene gas-lighting, and, as I have made experiments in regard to the subject, the conclusions arrived at may be useful to many of your readers besides myself.

"First, the gas stinks awfully if there is any leakage or bad management; but this is really an advantage, for you can tell at once if the plumber has not done his work in a correct manner. Second, in consequence of the high specific gravity of the gas, it seems to explode, when mixed with air and compressed, in a more violent manner than coal gas, and is therefore not fit to employ in ordinary gas engines. A mixture of 1 volume acetylene and 100 volumes air will easily ignite at a lower temperature than coal gas and air. Third, there are many generators before the public, but the best are those which work by a generator with a retort and water-pressure gas-holder connected to an ordinary rising gasometer, such as is used in coal-gas works. The chief difficulty is the liability of the generator to choke up the gas-delivery pipes; some of the *safety* machines are not safe on this point.

"When a water-tank gas pressure is used, if the gas space is not five or six times the capacity of the carbide-containing retort, the water overflows if the gas is turned off for twenty-four hours, and, as regards size, a gas space 10 in. to 12 in. high, and 12 in. diameter, will light a room brilliantly for one hour, and a rising gasometer, 20 in. diameter and 24 in. rise, gives eight hours' steady light with 00000 Bray's burner, and the acetylene obtained from 12 oz. to 16 oz. carbide of calcium. The carbide varies much in quality, and sometimes 10 oz. is sufficient. With the addition of a suitable generator of the automatic type, such a gasometer will easily supply four or five lights.

"Lastly, the burner is the burning question, as all kinds that I have tried choke up sooner or later. The effect is much sooner developed by turning the light down to save gas, and a burner with very small aperture will sometimes choke in eight hours. The trade burners are No. 00000, No. 0000, and No. 000. The 000 requires a pressure of 8 in. to 10 in. water, or it will give off a shower of soot all over the room. There is a smaller size made than any of the before-mentioned; but it is useless, and chokes directly. The best burner tried was one in which two jets of acetylene meet at an angle of 45°, the aperture of the jets being $\frac{1}{32}$in. distant from each other, and surrounded by a small tube to prevent the flame coming into contact with the orifices through which the gas issues. This burner gives a clear flame, but chokes up a little; yet, if care is taken not to turn the gas low down, the burner will work several months.

"Last of all, there is the question of cost. By experiment I find the cost for carbide of calcium to light one burner brilliantly in an ordinary room is one penny for three to four hours' light, equal to that given by a No. 6 or 7 Bray's burner. The rent of the generator and attendance, with the cost of the licence, five shillings a year for storage of carbide, is as much more, and the total cost of the light from each burner, with a small generator, is about one penny for two hours—or, say, fourpence for an average of eight hours per night. This estimate is based on invoices, and carbide weighed by the ounce, with the light timed and noted."

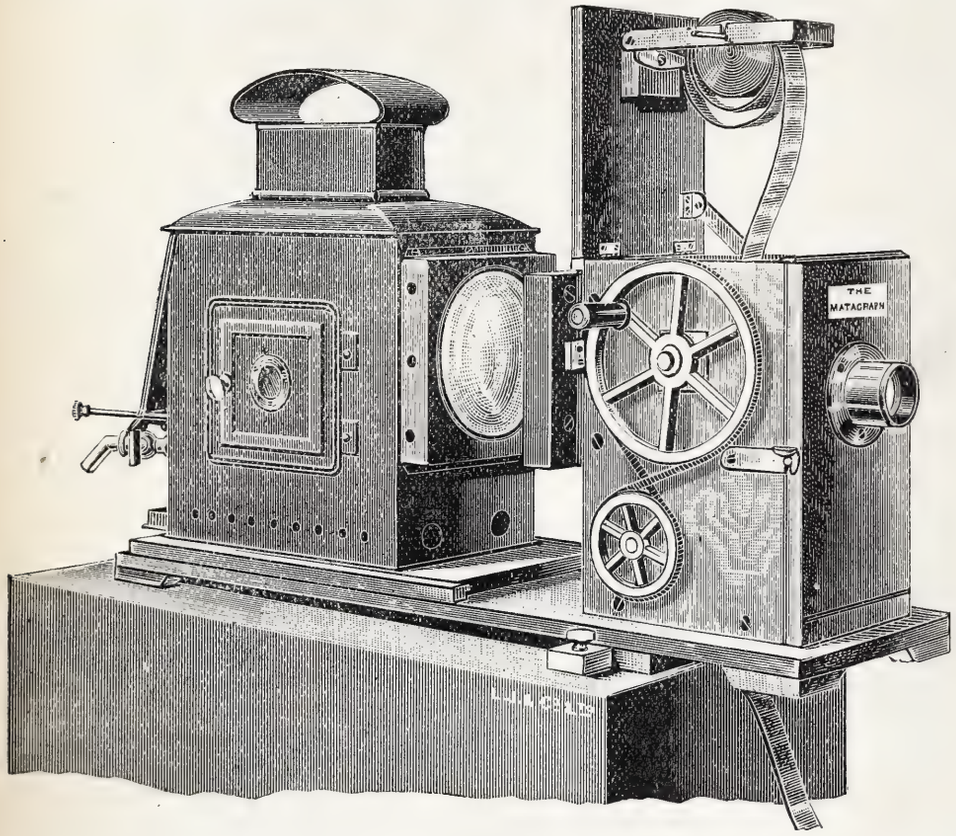
THE MATAGRAPH.

Levi, Jones, & Co., 29 Hoxton-square, Old-street, E.C.

The Matagraph has been designed after intimate experience with many of the earlier forms of the kinematograph. The objectionable "flicker" has been successfully dealt with, and, in use with films of the accurate gauge, the resultant picture is perfectly steady. The films can be changed and adjusted, and the picture projected on to the screen within fifteen seconds.

One other feature of the Matagraph is that the films suffer no injury by abrasion.

The simplest form of the instrument is that shown in the illustration. The Matagraph mechanism is fitted up on a polished walnut or mahogany case, which carries the projecting lens and alum tank; this is firmly fixed to a polished baseboard to match. The lantern

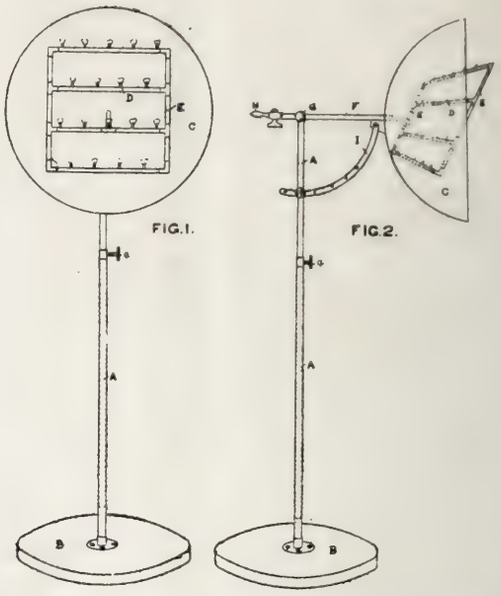


body is of Russian iron, with cowl and tray for jet, and fitted with 4-inch compound condenser. It is arranged so as to slide along the baseboard for adjustment. The lens is a "Petzval" combination of 2½-inch focus, and at 28 feet will project a picture 10 feet by 7 feet 6 inches.

The whole instrument is fitted into a stout case, with lock and key and handle, and T screws with bushes are sent to permit the Matagraph to be fixed on to the top of its case.

GASKELL AND REEVE'S ACETYLENE GASLIGHT APPARATUS.

This apparatus comprises the following parts, namely, a telescopic or other frame, A, supported on a suitable stable base, B; a reflector or diffuser, C, of concave or other shape; a series of burners, D, on a frame, E, arranged obliquely at a suitable angle, by which the necessary light is thrown on the object which it is desired to photograph. The frame, A, is so made that its height can be adjusted by slackening the set screw, *a*, and at the top there is a cross arm, F, pivoted or ball-and-socket-jointed at G to the frame, which carries the reflector or diffuser aforesaid, and which also carries the frame of burners and supplies gas thereto through the cock, H. This arm, F, with its burners and diffuser, is supported by means of a quadrant or arm, I, so that the arm, F, can be fixed horizontally or at any angle required, whereby the light may be diffused and directed in the required direction. The gas burners, D, are arranged in rows on cross pipes of a tubular frame, E, of pipes, which frame is preferably square, and this frame is by preference placed obliquely, so that the respective rows of gas jets are not directly underneath one another. By arranging them in this way the air has free access to the jets, and it is found that the light is steadier and less liable to flicker, and there is less liability to smoke, than would be the case if the burners were placed immediately underneath each other in a vertical plane. The reflector or diffuser is arranged to diffuse the light rather than reflect it in one given point. It is therefore painted white or white-leaded on its concave surface. The cross arm, F, aforesaid is provided



with a cock, H, for the attachment of a tube leading to the acetylene generator.

Microscopes for Schools.—The *School Board Chronicle* has published a letter it has received from a correspondent in which he makes the suggestion that it would be a great benefit to the children in the public elementary schools if there was a small and inexpensive microscope supplied for the use of each school. In support of his suggestion, he remarked that "any child who had seen the wonderful detail which is shown by this instrument in what to an ordinary observer with the naked eye seems an insignificant atom, like the egg of a butterfly, &c., would certainly remember it all his life." A microscope sufficiently good for the purpose could be purchased for about 30*s.*, and might be fairly considered to come within the range of ordinary school expenses. There are not many schools so poor that they could not afford this small addition to their recognised equipment.

Crystallisation of Salts.—Mr. J. Leadbeater gives instructions for the crystallisation of salts on glass sides which should be useful to any one who requires preparation for the lantern or micro-polariscope. Such salts as barium nitrate, potassium chlorate and oxalate, microcosmic salt, sodium oxalate and nitrate, zinc or copper acetate, iron sulphate, and uranium nitrate should be dissolved in hot water to make saturated solutions, and the addition of a little sugar tends to fix the crystals more firmly to the slides. For lantern slides beer may be used as a solvent instead of water, and the sugar can then be omitted. Phthalic acid, benzoic acid, and other compounds insoluble in water, must be dissolved in alcohol. The glass plate must be perfectly clean, and the solution may either be applied with a camel's-hair brush or poured on in the same way as collodion when used to coat photographic plates. After draining slightly, lay the slides perfectly flat for crystallisation to take place, taking care, of course, to protect them from dust. Photo-engravings, representing slides of potassium ferrocyanide and ferricyanide, ammonium chloride, magnesium sulphate, and borax illustrate the paper, and show that the process, by which presumably the slides have been prepared, yields satisfactory results.—*Spatula*, iv., 2.

One incident of the lying in state of the late Mr. Gladstone attracted the attention of those whose duty it was to keep a ceaseless vigil in Palace Yard last week. Armed with the necessary apparatus, and determined, if possible, to secure for the public benefit a realistic presentment of a scene without parallel in the history of this country, a photographic artist sought permission at the gates to take an impression of the crowds trooping into Westminster Hall with the view, as he explained, of producing hereafter an "animated picture." Apparently enterprise in this direction had not been foreseen, and the police officials to whom the application was made at first knew not whether it would be fitting to accede to it. Courteously, but firmly, the request was refused, and the would-be "cinematographer" was reluctantly compelled to submit to the inevitable.—*Daily Telegraph.*

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*July* 1, 1898

THE LANTERN RECORD.

CONTENTS.

	Page
LANTERN MEMS. By G. R. BAKER	49
A METHOD OF LOWERING THE VACUUM IN X-RAY TUBES. By JOHN HALL-EDWARDS, L.R.C.P., F.R.P.S., &c.	49
NEW EXPERIMENTS WITH LIPPMANN'S PROCESS	50
LIMELIGHT EXPERIENCES.—IV. By T. N. ARMSTRONG	51
RECENT IMPROVEMENT IN X-RAY TUBES. By H. LYMAN SAYEN	52
VACUUM ILLUMINATION	54
ACETYLENE NOTES	54
ANIMATED PHOTOGRAPHY AND THE BLACKWALL DISASTER	54
OPTICAL PROJECTION APPARATUS FOR ADVERTISING PURPOSES	55
THE RÖNTGEN RAYS AND COAL	56

LANTERN MEMS.

The exhibition of acetylene gas apparatus at the Imperial Institute should, if thoroughly followed up, have the effect of placing acetylene generators and the safe use of the gas on a satisfactory footing as far the public are concerned. At present the subject wears a doubtful aspect, and many who would like to avail themselves of the acetylene gas light for lantern purposes hesitate to do so because of the uncertainty existing as to proper design and the safety in use.

* * * * *

Visiting the Institute on a recent Saturday, I was disappointed to find the place so poorly patronised and the interesting galleries and pleasant gardens almost deserted. The exhibits of apparatus in the gallery are quite numerous and deserving of more than passing notice, but personally I was disappointed, as I expected to find more attention paid to the wants of lanternists. As it was, only three or four made any speciality of generators suitable for use for two hours or so, and of a portable nature.

* * * * *

These smaller exhibits do not, I believe, come under the conditions of the generators for house lighting, and therefore had not of necessity to be submitted for the official test for safety and suitability of use. If they had been, there is no doubt that lanternists would at once invest, for the light is such that it is particularly useful for small-size discs where house gas is not available. One would have liked to have seen the result of projection on the screen from this light, and then one could judge of the reputed 200 and 300 candle-power illuminant supposed to be obtained from the two and three nipple burners.

* * * * *

There were several alcoves or rooms fitted up with gasaliers burning acetylene gas and containing pictures and engravings hung on the wall, and, if one of these or several of a similar kind had been devoted to demonstrations by lanterns having acetylene gas jets, I think it would have been an attraction, and of practical utility, besides helping the exhibitors to make their special generators and fittings for lanternists more known. That there is already some fair demand is shown by the announcement of one firm that 1700 generators had been sold up to June 1898, and, as they seemed to lay themselves out more for small patterns, it is fair to assume a considerable number went to lanternists.

I hear of exhibitors being so satisfied with the acetylene light that for villages and small halls they do not take the lime light, and say they get good result with the new simple gas. Certainly to the eye the naked light looks remarkably brilliant, as shown in bicycle lamps one sees along the roads at night, and by the gas jets used for room illumination. If the Committee will only put the whole matter of generators on a satisfactory basis, and get over any difficulties with fire insurance companies and County Councils, then lanternists can avail themselves fully of the light.

* * * * *

The report of the Committee will be looked forward to with interest by all who have to rely on their own resources for illumination, and as it is generally admitted that the generators in use at the Imperial Institute are far in advance of those previously exhibited, the official stamp of approval should be of great use to the manufacturers and an assurance to the public. I see as a result of the use of the acetylene gas a valuable product is obtained that for certain chemical purposes will be very valuable, and may probably be of use for instrument-makers in producing a dead black. It is soot, that can be obtained by burning the gas, and is said to be freer from shine than any other. Opticians and photographers will appreciate a really dead black.

* * * * *

As an acetylene generator containing not more than two pounds of carbide of calcium may be used *inside* the house, it only remains for the portable generator to be certified as safe, and that no gas can escape from the generator into the room, for the lantern world to be satisfied with this light and avail themselves of it. I would advise all interested in illuminants for the optical lantern to pay a visit to the Imperial Institute while the Exhibition of Acetylene Gas Apparatus remains open, between the hours of 3 and 5.30, or 8 and 10 p.m.

G. R. Baker.

A METHOD OF LOWERING THE VACUUM IN X-RAY TUBES.

Many methods have from time to time been devised for lowering the vacuum in X-ray tubes. Some of these work very well for a time, but the vacuum eventually becomes so high that the tube is rendered useless until it is re-exhausted. I have recently adopted a method, however, which allows of my completely restoring the vacuum (in certain tubes). The method suggested itself to me on hearing from a maker that he often adopted the plan of heating the bulb to a point when the glass becomes softened; the external pressure would, of course, cause the softened glass to bulge inward, and as a necessity the vacuum is in like proportion reduced. This method acts well, granting that the operation is performed successfully, but the danger of going too far is so great that it is practically useless except in the hand of an expert glass-blower. It will be noticed that, in most X-ray tubes, the sealed tube through which the bulb was exhausted is left comparatively long, and all tubes might be left so with great advantage, as I shall now show. The tubes I have successfully experimented upon are of the focus pattern with two anti-cathode poles. The diameter of the bulb is 4½ in., and the total

length from terminal to terminal about 9 in. The tubes through which the bulbs were exhausted are situated behind the cathode pole, and are about 4 in. in length, being bent to a right angle near their centre. Over a Bunsen burner I gently warm the whole bulb, I then gradually heat the exhaust tube, bringing it nearer and nearer to the hottest portion of the flame, and at the same time gradually withdrawing it until only the sealed end is actually in the flame, this soon becomes red hot and commences to retract; it must be watched very carefully, and as soon as a small indent is visible it should be gradually withdrawn from the flame and allowed to slowly cool. A very slight indent is sufficient in most cases to entirely restore the vacuum. Fig. 1

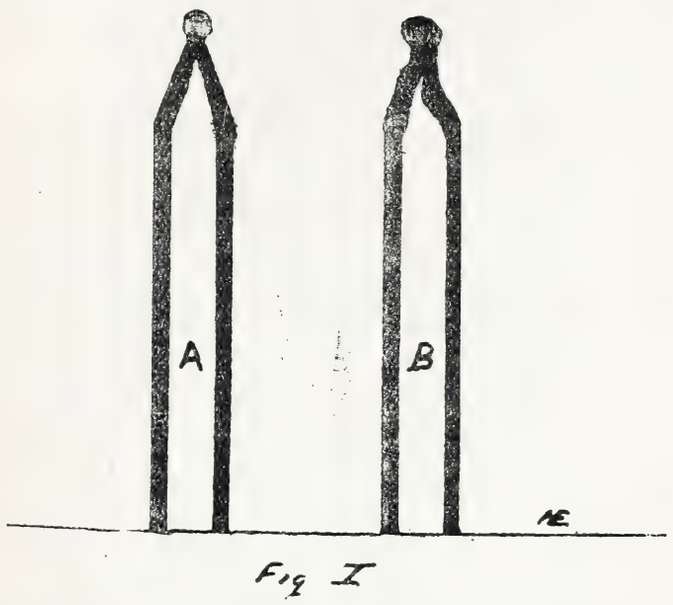


Fig I

shows a sketch of the exhaust tube of one of my bulbs (A) before, and (B) after treatment. Before experimenting with this tube an 11 in. spark would not pass without heating it to a dangerous extent; after treatment the vacuum was almost too low, but after using for half an hour it was in perfect condition.

This operation, simple as it seems, must be carried out with the greatest possible care. There are two sources of danger; in one case the exhaust tube, being made of unsuitable glasss, may crack; in the other, the glass may become too soft, may be drawn inwards with such force that a hole may be made, before it can be withdrawn from the flame. In either case, however, the tube will not be spoiled for re-exhaustion.

With some bulbs this method can be repeated several times, and, if the plan were generally adopted, makers could be instructed to use suitable glass, and to leave the exhaust tubes long enough for the purpose. JOHN HALL-EDWARDS, L.R.C.P., F.R.P.S., &c.

NEW EXPERIMENTS WITH LIPPMANN'S PROCESS.

DR. R. NEUHAUSS, of Berlin, has for the last few months been contributing to one of our German contemporaries a series of papers on his researches in interferential photography, and, whilst these notes are extremely interesting, they are somewhat too lengthy for *verbatim* translation. In Eder's *Jahrbuch* for 1898, however, he gives a summary of his results, of which the following is a translation :—

In the first place, the great thing to obviate, and one which is the worst enemy of the photographer who works Lippmann's process, is streaks. Albumen plates have less tendency to form streaks than gelatine-emulsion plates. With the latter they may be caused by draining the coated plate back into the coating vessel and thus obtaining a mixture of unequal temperature. Further, they may be caused when the plates are not carefully cleaned. The plates to be cleaned, after the removal of any adherent film, must lie for at least twelve hours in a mixture of equal parts of raw nitric acid and water. Then, just before coating, they should be polished with alcohol and ammonia. Moreover, the mercury ought not to be poured over the plate lying upright in the slide, or else star-shaped figures will show on the plate, which are caused partly by the chemical and partly by the mechanical action of the mercury as it rises. The best way is to use chemically pure mercury, which has been filtered every day before use through several thicknesses of chamois leather under air pressure. Streaks with a metallic lustre, which are caused by the adherence of particles of mercury to the film, are best removed by passing over the plate, immediately it is removed from the slide, a soft brush dipped in alcohol.

From comparative trials it was proved that whirling the plates after coating was only harmful. So much albumen or emulsion as will spontaneously run off should be allowed to do so. The insensitiveness of the plate becomes always greater with the increasing thinness of the film, brilliant colours cannot be obtained with very thin coating.

The spectrum can be obtained far more easily on albumen plates than on gelatine. Excellent results are obtained on albumen plates if neither bromide, nor iodide, nor chloride, be added to the albumen, but the pure albumen film be sensitised in the silver bath, and then treated with separate cyanine and erythrosine solutions. Somewhat greater sensitiveness is attained if some potassium bromide be added to the albumen, so that some silver bromide as well as silver albuminate be formed. The best developer for albumen plates is the pyro-ammonium carbonate and potassium-bromide developer. The plates must be developed as slowly as possible. The author tested duck's-egg albumen together with hen's-egg albumen, but found no advantage. The albumen from hens' eggs gave the best results when it was mixed with some ammonia and allowed to stand at least five or six weeks before being used. During this time the albumen becomes absolutely clear. It will then keep a long time.

Unfortunately, mixed colours cannot be obtained on albumen plates, as the image always appears to be covered over with red, yellow, or green. According to the author's experiments, the results with compound colours were considerably improved when the topmost film was removed, by careful treatment, with the hypo and ferridcyanide deducer. The experiments with albumen plates were continued in this direction.

As the author obtained very unsatisfactory results with gelatine emulsion plates in 1895, he tried in the first place to determine the cause of them. For this purpose various kinds of gelatine were tested. It was thus found that the best results were obtained by means of a gelatine obtained from Lautenschläger, 54, Oranienburger-strasse, Berlin, which has been specially introduced for industrial purposes. Perhaps the materials used for bleaching the gelatine play an important part.

The author determined that gelatine, which by itself gave no useful coloured pictures, gave considerably better results when a certain quantity of albumen was added to the finished emulsion. In order to make a mixture of this kind adhere to the glass, about five per cent. of sugar must be added. The sugar is removed in the washing of the plate after coating; it ought not, in any case, to remain in the film, or else the colours will not be obtained.

The development of the gelatine emulsion and the albumen and gelatine plates is best effected with the pyro-ammonia and potassium-bromide developer suggested by Lumière. In contradistinction to the albumen plates, development must be as quick as possible.

With gelatine plates the sensitiveness is increased to an extraordinary extent when the silver-nitrate solution is added to the gelatine about an hour before making the emulsion. There is then, however, a great tendency to red fog.

In the preparation of compound colours on gelatine or gelatine and albumen plates care should be exercised as to the choice of a suitable background when flowers, still life, &c., are to be taken. The objects show the best modelling in front of a background which is photographically absolutely inactive. The best results are obtained with a fine black-brown silk velvet. The best light is direct sunlight, softened by a screen of two thicknesses of finest white muslin. Then from five to fifteen minutes will be sufficient for each exposure. The filter to exclude the ultra-violet rays, which has been recommended on all hands, has, according to the author's experiences, not the value which is usually ascribed to it.

The great difficulty in taking compound colours consists in hitting the correct time of exposure. One-half over or under-exposure is sufficient to absolutely spoil the picture. Exposure meters are here of very little use.

It frequently happens that compound colours contain far too much green. The picture can then be considerably improved by immersion for a few seconds in a solution of mercuric chloride (1 : 1000), then rinsing and drying. With spectra treated in this way the violet appears much more distinctly. Purplish red, however, becomes brick red.

In only rare instances are the pictures improved by subsequent intensification, and only mercurial intensification, followed by sodium

sulphite, was of any use. Physical intensification proved to be uncommonly effective when the plate was looked through; the colours, however, were not improved. By reduction with the hypo-ferridcyanide bath every possible and unlooked-for changes of colour were caused. By treating the plates with a gold toning bath the colours became darker and less brilliant.

If a spectrum was completely bleached, which may be effected by mercuric chloride and cupric bromide, the film became as transparent as glass. After washing and drying, however, very good spectral colours were still visible. If such a plate was examined by transmitted light, the complementary colours were distinctly visible. With a plate which has not been bleached the complementary colours are invisible, only because they are smothered by the actual colour of the silver precipitate.

If two spectra are taken on the one plate so that the spectra cross one another, there will be, quite distinct at the place where they cross, Talbot's interference stripes, which run diagonally. With regard to this experiment the author introduced a variation; a finished and washed spectrum was reconverted into silver bromide by immersion in cupric bromide. After drying in the dark the plate was again laid in the mercury slide, and then exposed in the spectrograph, so that the new spectrum crossed the old spectrum. On development only the last exposed spectrum appeared. This is, of course, obvious, as only exposed silver bromide can be developed. The plate was now well washed but not fixed, and then exposed for a few seconds to direct sunlight. When the plate was again placed in the developer the original spectrum again developed. The final result was the original spectrum crossed by the second one, and on the back Talbot's interference stripes. Everything was exactly the same as when the two spectra were exposed one immediately after the other. It is worth noting, in this experiment, that in the region of a particular colour, for instance, blue, new colours, red and green, could be formed by the second exposure.

One of the main points to which the author directed his attention was the elucidation of the question as to whether in Lippmann's process Zenker's thin laminæ were actually present, and on what theory the formation of the colours is supposed to rest. It was essential therefore to prepare as fine a section of the film as possible. For this purpose a sheet of glass was coated with collodion, and then albumen poured over it. When the spectrum was obtained the film was stripped from the glass. Dr. E. Flatan, of the Anatomical Institute at Berlin, was good enough to undertake the preparation of the sections. The preparations furnished by him were distinguished by the greatest possible fineness. At the same time it was not possible to discover at first any laminæ. Only by repeated and most accurate survey of all the sections, and by the use of the most favourable source of light, could the laminæ be detected in a few of the most favourable places. The author prepared from these places several photo-micrographic negatives with a linear enlargement of 2000 times. In exposures of this kind great care has to be taken to prevent diffraction fringes, which could destroy any kind of lumination. Diffraction fringes appeared most strongly with oblique illumination and when working with a narrow illuminating cone.

In order to exclude any doubt, the work was done with full central illumination and fully opened condenser. In no negative taken by the author did there show the least sign of stripes beyond the section. Finally it must be noted that the distance of the laminæ represented in photo-micrographs corresponded exactly with the calculated distance of Zenker's laminæ. The section photographed by the author was from the red to the reddish-yellow zone of the spectrum. The half wave-length here varies from 0·00038 mm. to 0·00033 mm.

As the mean value of several measurements of various negatives, the distance of the laminæ, with an enlargement of 2000 times linear, was found to be 0.74 mm. This corresponds to an actual distance of the laminæ in the preparation itself of 0·00037 mm. It must be kept in view that the wave-length within the albumen film is slightly different to what it is in air, since the albumen has a different refractive index. In the section embedded in glycerine the distance of the laminæ is somewhat enlarged as the film swells in it. The shortening of the wave-length in the albumen film and the swelling of the film in the glycerine, according to the author's experiments, about balanced one another.

With all the sections collected by the author that half of the film which was next the collodion film was absolutely as bare as glass. Only the half which, during the exposure, was next the mercury possessed the grained silver precipitate. The action of the incident light wave reflected from the mercury was therefore not sufficiently strong enough to change the film throughout the whole of its thickness. Towards the middle of the film the silver precipitate began gradually to clear up, and then suddenly disappeared.

Only isolated silver particles were to be found where the film was in contact with the collodion. Here, on the separating surface of the two media, there was faint reflection. Within the zone of the silver precipitate there were to be found in the whole from five to six Zenker's laminæ.

The laminæ did not show a straight, but a wavelike, course. This was due to the surface of the film not being even, but, in consequence of the silver grain and the shrinking in drying, being crumpled. Since the mercury was in actual contact with the film all the Zenker's laminæ showed the wavelike course as the surface.

LIMELIGHT EXPERIENCES.

IV.

The utilisation of the front lens of a portrait conbination in lantern projection is a procedure well known to most lanternists, and at times such make very excellent long-focus objectives when used with a stop placed well in front on the concave side of the lens. In a previous article I referred to another method of providing a lens of increased focal length, whereby an ordinary portrait combination may be made to work at varying foci.

It is well known that the back combinations of portrait lenses are specially constructed to correct the aberrations of the front lens, and many imagine that such back combinations are only capable of working satisfactorily in conjunction with the particular lens suited to it in the front portion. In practice I have not found this to be the case, and by experimenting with various single lenses of the same diameter, but quite different foci, I can produce with the same back combination quite a wide range of focal lengths, when the full combination is placed together.

The rule by which any one is able to calculate approximately the focus of a combination of lenses is very easily understood and put into practice, and any one with the aid of a measuring tape can roughly estimate what the focal length of any set of lenses will be when mounted together in such manner as we are considering, viz., in the mounth of a portrait lens.

By unscrewing each component of the lens, with the aid of the measuring tape, let the image of a window be projected on, say, the wall of any suitable-size room, and when such image is reasonably sharp read off on the measuring tape the distance in inches the lens has to be held from the wall. When these factors are known, it is easy to calculate the focal length of such lenses when mounted and working together by the following rule: Multiply one lens by the length of the other, and divide this sum by the product of both lenses added together less the distance they are separated in the mounts.

For example, a lens is composed of front and back combinations that are separated three inches in the tube.

Focus of back combination 14 inches.
„ „ front „ 6 „
84

Divide by 27 (being the total of both lenses added together less the three inches of separation). 14)224(say 8¼ inches
216

The equivalent focus of such a combination would be nearly eight and a quarter inches, and were any one desirous of producing a lens of nearly one inch longer focus, to work in the same tube, by substituting a front lens of about twenty-two or twenty-one inches, such when mounted in the front cell would work out at very nearly such focal length. One or two extra single front lenses of varying foci should be obtained and *tested practically on the screen* with the back combination; by this means, at a somewhat nominal cost, a most useful range of foci is provided all of which can be utilised in the same tube.

In utilising various lenses in this form let it be understood they are intended for projection purposes only, and several should be tried until those that yield perfect results are hit upon.

The writer possesses several interchangeable front combinations that prove of great service in the lantern.

It has been frequently remarked that the most important and anxious part of a limelight display, especially as regards the operator's duties, lies in the erection of his screen, and this is, no doubt, quite true whenever strange places are being visited.

Armed, however, with three or four pulleys screwed into hard-wood hafts or handles, and a good supply of fine cord or fishing line, any operator, provided he takes plenty of time beforehand so as to be able to resolutely face any little obstacles that might present themselves, will invariably succeed in erecting a screen satisfactorily. There are but very few places now where limelight exhibitions have not been given, and every hall-keeper knows at least something relating to the most convenient means that can be provided. Personally, the erection of a screen by means of either poles or ropes where large sizes are being used gives me little concern, so long as I have my pulley blocks and Italian hemp cordage. The pulleys when set in handles as described, each of which handle has a round hole run through it by means of a brace, *can be tied*

to any suitable projection, even to the seats of a side gallery, or, if they are required to be screwed into any position aloft, the pulleys are unscrewed from their hafts and screwed wherever desired. A supply of pulleys and cordage almost entirely dispenses with the need of poles, and it requires no mention on my part to enable any one to imagine what this saving in weight alone means. My three pulleys go easily into a coat pocket (one is always carried as a spare one).

In the matter of gas fittings, I have known operators who make a rule of working with blow-through jets experience much trouble. This form of jet is, no doubt, most convenient under many circumstances, and I know one lanternist of wide experience who invariably uses it in preference to that of the mixed type. I fancy, however, his preference is based upon the use of such for dissolving and effect slides in double lanterns. A blow-through jet often causes a lot of trouble where the supply of gas is led from a distant part of the hall, and youngsters are only youngsters all the world over, and the old joke of pinching a tube has often to be contended with. All considered, there is but little economy in using the hydrogen gas from the main, for such frequently necessitates the special stopping-off (by means of short tubes of rubber) of a large number of jets that have no suitable stop cocks, as well as having to remove burners and other minor things that quite frequently cause irritation to a hall-keeper. I have known quite a scene arise from the mere removal of a special burner from a gas jet which the hall-keeper had carefully fitted in. The remedy for all this petty trouble and probable annoyance lies in the providing of both gases in separate cylinders; and, once a regular practice of working after this manner has been followed, an operator would never think of resorting to the other system, which requires long lengths of rubber tubing, that frequently permits of gas to escape, and gives rise to other annoyance.

The use of two cylinders held *in situ* near the lamp is a great convenience, and, when mixing jets are used, the best possible results are easily obtained. When cylinders were first introduced, several of the leading lanternists in the kingdom did not take kindly to their use, and clung tenaciously to their old gas bags and pressure boards, with the attendant inconvenience of making their own oxygen gas as required; and some can be still met with who have never lost their love for gas bags. Cylinders in the hands of inexperienced workers are, no doubt, somewhat tricky, and a good cylinder is often ruined, for the time being, by letting such out into the hands of lanternists who actually do not know properly how to turn valve spindles without either over-screwing or fracturing the same, or so manipulating the spindles as to cause a serious waste of gas; and there are still those who like to be satisfied by such ocular demonstration as gas bags afford of knowing that a supply of gas is going to hold out during an exhibition—a satisfaction that is denied when cylinders are being employed without special attachments of gauges, and which contains a limited amount of gas, and uneasiness is felt at some leaky regulator, or the prosiness of a lecturer who is going to spin out far too much time.

Cylinders may be said to have almost revolutionised the procedure in limelight working; and, although the making of a supply of oxygen, when *en tour* in olden time, was not looked upon with disfavour (and many a bagful I have made at a vestry fire, carrying chlorate mixture during the journey), and getting the hydrogen replenished from the main, as well as using a piece of gravestone for a weight, there is no doubt cylinders are a great boon, and have caused a great impetus in limelight working. They are, however, tricky where any one has to depend upon strange samples of such; but where private cylinders are always used, and care is bestowed in their manipulation, a greater amount of confidence is experienced, and it is wonderful how near any one can calculate to their contents lasting out. There is more economy in using large cylinders than those of smaller size, and somehow I have formed an opinion that their valve spindles are more carefully fitted; for any bother I have ever experienced has always been with smaller sizes. When first introduced, the want of a good method of regulating the pressure was sadly felt. Yet, strange to say, in the writer's opinion, the very first attachment he ever saw used for this purpose is still the most serviceable, and, in his opinion, has never been equalled by any of the forms of regulators since introduced. The attachment I refer to was made, I believe, on the suggestion of the late Matthew Edwards, senior partner at that time in the well-known firm of James White, and consisted of a very fine screw adjustment, almost similar to the pattern that has within recent years become so universally used. I can remember the satisfaction experienced at a limelight exhibition when this fine adjustment nozzle was screwed on to the cylinder and the supply of gas at high pressure was beautifully delivered to the jets by its means. Shortly after, the bellows form of regulator was introduced and flooded upon the market, followed shortly afterwards again by other forms of regulators, more or less efficient, and at reasonably cheap prices. Regulators, however, are not always the blessings many suppose, and they are liable to get out of order, as well as to limit the pressure they deliver the gas at to the jets, this pressure not being easily altered without some delay and special attention, more or less, to the apparatus.

The identical form of fine adjustment valve used by the late Mr. Matthew Edwards has recently come largely into use, but I think with a coarser pitch of screws that does not allow the gases being so nicely adjusted; there is no doubt, however, that with these fine adjustment valves attached to the cylinder nozzles the use of regulators will be largely discontinued, for there is no doubt the rubber so much in use in their construction is very liable to prove defective, and escapes of gas take place in consequence.

With fine adjustment valves no such serious escapes are possible, and they permit of an increase or decrease of pressure at any moment such is desired.

The application of these fine adjustments to the taps of the jets is a further recent improvement, but when the nozzles of the cylinders are placed *in situ* close to the lamp, and short lengths of tubing, say about two feet long, employed to connect the nozzles with the jets, all necessary manipulation can be as easily performed from the cylinders, so that in reality there is no need for any further fine adjustment on the jet taps.

Many of our best operators now use nothing but these fine adjustment valves for lantern as well as cinematographic work, and it looks as if the regulators deemed so indispensable for many years are a thing of the past.

Some operators who have experienced the evil effects of faulty regulators, have, in somewhat recent years, dispensed entirely with such, and use instead nothing but a plain tapered nozzle that screws into the cylinder without any fine adjustment. All regulation of gases being made by the ordinary cylinder key, this practice works very well in the case of where private cylinders are being regularly used, and the pressure from the valve spindles is thereby more under control by reason of regularly working with the same cylinders and knowing their peculiarities, some of which are found to be more easily adjusted than others.

All told, fine adjustment valves are a great comfort, and before long are sure to be in universal favour, especially in single lantern working. With many jets they permit of the very best amount of pressure being employed, allowing such pressure to be carried to the humming points so that the most is got out of the jets. With regulators set to a special cut-off pressure, there is no such facility, and many a good jet has been condemned as incapable of yielding a satisfactory light, simply because the regulator employed was starving the jet and not permitting of its being used to its utmost capacity. A good many jets of a bore whose capacity will pass six to seven feet of oxygen per hour when just at the humming point yield for lantern work magnificent all-round results; if greater intensity is desired, more gas must be passed by increasing the bore of the nipple, but for all practical purposes a jet passing six feet per hour will yield the most satisfactory results with the least trouble and attention.

Some jets are very troublesome and noisy. I like a humming cheery jet, for then I know I am right with my pressure and am working up to its best capacity, and some noisy jets are difficult to silence, although many a one I have cured with a darning needle roughened at the point with emery powder; others, again, have never yielded to such treatment, and have had to be handed on to some other fellow to try his 'prentice hand upon. A good mixing jet is a treasure, and should be carefully prized and cared for, it is the best friend an operator possesses; a bad one is only fit to be broken up as a nuisance.

My experience has clearly shown me that with double cylinders there is absolutely no danger in using mixing jets, when the gas from such is under approximately equal pressure and delivered to the jets by means of suitable rubber tubes. A moment's reflection will cause any one to see that, if by unequal pressure the hydrogen or oxygen be driven back, out goes the light, and since the introduction of cylinders I have never known of a serious accident that could be attributed to the performance of this form of jet. In writing in this strain I am not speaking of small snap-out explosions, caused by injudiciously turning on the oxygen too rapidly when lighting up, but of the class of more serious accidents caused by back suction, such as used to happen with gas bags when their weights were carelessly applied or a bag allowed to run too low. With cylinders there can be no back suction, and mixing jets are as safe as a blow-through form, in fact they are capable of being used even by experienced hands when the hydrogen is taken direct from the main and the oxygen used *at a low pressure*. Novices, however, should not attempt this.

Within recent years several new forms of jets have been introduced to which I hope to refer on a future occasion. T. N. Armstrong.

RECENT IMPROVEMENT IN X-RAY TUBES.

[Journal of the Franklin Institute.]

The most important considerations in the manufacture of Röntgen-ray apparatus are those influenced by the value of the apparatus to physicians and hospitals. Now that the scientific world has recovered from the suddenness of this discovery of æther-energy, which is so closely allied with light and electricity, and yet without experimental proof of the nature of its energy, investigation goes on with surer and even more rapid strides than it did immediately after Professor Röntgen's announcement.

Investigators, both physical and medical, have become specific in their

lines of research, and the large demand for apparatus has caused such competition among manufacturers that many useful improvements are the result. The manufacturers themselves, perhaps, do as much practical work in this direction as any one else. They know the faults of their own apparatus, and these deficiencies are ever before them in complaints from operators, so that it is quite a problem to furnish a good outfit capable of being easily managed by a physician or layman with satisfactory results for any length of time.

An induction coil or static machine will, with any reasonable care, last indefinitely. The manipulation of the dry plate is the same as in ordinary photography, requiring only a knowledge of developing, fixing, &c. The difficulties are chiefly met with, however, in the operation of the high vacuum tube, in which so many factors are to be considered in achieving satisfactory work. Up to the present time I do not believe that there has been discovered a more efficient generator of X rays than a piece of platinum bombarded by so-called "radiant matter."

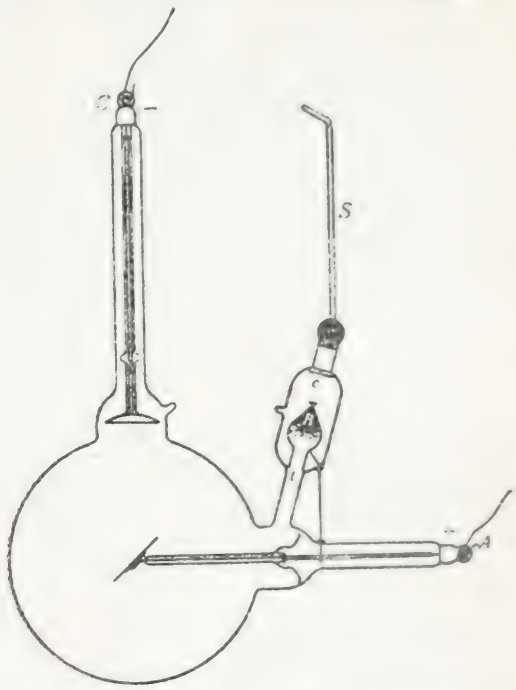
Here it may perhaps be interesting to indulge in a little speculation on "radiant matter." Faraday, who first used the expression, defines it thus: "If we can conceive a change as far beyond vapourisation as that is above fluidity, and then take into account also the proportional increased extent of alteration as the changes rise, we shall perhaps, if we can form any conception at all, not fall far short of 'radiant matter,' and, as in the last conversion many qualities were lost, so here many more would disappear." Dr. William Crookes, in 1876, made public his highly interesting experiments with tubes carried to such a degree of exhaustion that the gases therein were in the so-called "radiant" state. In his papers he calls attention to the fact that gases are composed of an almost infinite number of small particles or molecules, which are constantly moving in every direction with velocities of all conceivable magnitudes. Owing to the great number of these molecules it is impossible for them to move an appreciable distance before they collide with one of their fellows. If the pressure of the gas be diminished, the distance which the molecule can move is proportionately increased. This average distance he calls the mean free path of the molecule. If the pressure be so decreased that the mean free path is comparable with the dimensions of the containing vessel, the matter is then in the so-called "radiant state," and the molecules are free to bound forwards and backwards across the tube. These molecules radiate from a negatively-excited pole with enormous velocity, producing many phenomena wherever they strike. Crookes constructed a number of very ingenious tubes to show the novel and characteristic properties of radiant matter, and he assigned the following properties to it: Radiant matter exerts a powerful phosphorogenic action where it strikes. It proceeds in straight lines. When intercepted by solid matter it casts a shadow. It exerts strong mechanical action where it strikes. Radiant matter produces heat when its motion is arrested.

To show this last property he made a small tube containing a thin platinum plate placed in the focus of a converging stream of radiant matter. A weak current from the secondary of an induction coil is sufficient to heat the platinum red hot. Had Crookes gone a little further in his experiment, he would have found that not only heat and phosphorescence manifest themselves, but also that these molecular collisions gave rise to an æther disturbance of such a character as to excite phosphorescence not only inside the tube but also outside of it. It would also have been demonstrated that this disturbance radiates in straight lines, suffering no refraction, reflection, or any other of the phenomena incident to ordinary light, and that all substances are more or less transparent to it. In this way he would have antedated Professor Röntgen by more than thirty years.

Whether the X rays are simply the result of the enormously high temperature produced by the impact of the molecules, whether they are due to oscillations set up in the charges on the discharging atoms, or whether they arise from an entirely different cause, is yet to be determined.

The original tube used by Röntgen was similar in construction to one I now show you. In this the bombardment is on the glass at the spherical end of the tube. The efficient X rays resulting are few, because it is impossible to bombard the glass very hard without cracking or melting it; a considerable portion of the rays are absorbed in travelling through the thick glass at the end of the tube, and, to get a sharp picture, the light must be considerably cut off by a diaphragm. Practically all forms of tubes were tried by the early investigators, the one finally found most efficient was discovered at King's College, London, in 1892. It was the Crookes hot-platinum tube. This is the fundamental form of tube used by various makers throughout the world to-day, though with considerable modifications as to detail arrangement. It was not long, however, before a great difficulty manifested itself in the use of high-vacuum tubes for X-ray work, and that was the rise in vacuum subsequent to their constant use. Many attempts were made to remedy this defect, but they all lacked success from the very fact that the vacuum was in too fickle a state for the human hand to manage. The vacuum in a Röntgen-ray tube can vary only over very small limits, and, being also dependent on the temperature of the tube, it is in a very unstable position. Thus, if a tube starts to heat when running, the vacuum lowers and the tube takes more current, due to the increased conductivity of the gas therein, lowering the vacuum still more; a reversed condition of affairs takes place if the tube starts to cool. It will, therefore, be seen that it is very difficult and often impossible to keep the temperature of a tube constant, and to manage a non-automatic regulating device. The ideal regulating device should possess the following qualities:—

(1) It should act immediately.
(2) It should be independent of the temperature of the tube.
(3) It should maintain the desired vacuum unvaryingly.



C, cathode terminal; *A*, anode terminal; *S*, adjustable spark point; *c*, cathode auxiliary tube; *t*, communicating tube; *B*, potash bulb.

Having these difficulties in mind, and the qualities desired, I designed for Queen & Co. a tube, which I fully described before the Electrical Section of the Institute about a year ago. It is unnecessary in this connexion to do more than refer to the principles involved in its construction. Its operation depends upon two phenomena, viz., the variation of the electrical resistance of the gas in the tube due to different degrees of vacuum, and to the fact that certain salts will give off vapour on being warmed, reabsorbing it on cooling.

A reference to the figure will make the operation of the tube clear. A small bulb, containing a substance which gives off vapour on being heated and reabsorbs it as it cools, is directly connected to the main tube, and surrounded by an auxiliary tube, which is exhausted to a low Crookes vacuum. In the auxiliary tube the cathode is opposite the above-mentioned bulb, so that any discharge through it will heat this bulb. This cathode is connected in an adjustable spark point, which can be set at any desired distance from the cathode terminal of the main tube. In operation, the induction coil is connected as usual to the main bulb. On starting the coil, the vacuum of the main tube being high, its resistance is also high, and the current takes the path of least resistance through the auxiliary tube, thereby heating the substance in the small bulb This will continue for a few seconds, until a sufficient amount of gas has been evolved to bring down the resistance of the main tube. After this only an occasional spark will jump across the gap, sufficient to maintain the tube at the same vacuum. As the spark point is adjustable, the vacuum may be set high or low by varying the distances between it and the main tube.

Practical work has demonstrated that a tube must possess the following characteristics in order to secure efficient results:—

(1) The vacuum should be adjustable to permit the ready employment of the tube in various kinds of work.

In a radiograph of the hand it is desirable to use a low vacuum in order to secure good contrast between the bones and the flesh, while a high vacuum is necessary to locate foreign metallic bodies in the denser muscular or bony tissues.

(2) It should require a minimum amount of attention from the operator during the operation.

(3) It must be able to hold its vacuum continuously for an indefinite period.

(4) It must be able to carry a large current in order to generate powerful X rays, thereby consuming as little time as possible in making the exposure.

(5) It should have sharp definition, *i.e.*, the source of X rays should be as small as possible without interfering with the efficiency of the tube.

In designing the tube shown in the figure, and which I shall now put

in operation, all the foregoing points received careful consideration. The principle of self-regulation is identical with that first employed in the original design. This tube is made in two sizes, one with a larger bulb and heavier platinum suitable for powerful currents. In the larger tube the platinum is reinforced by welding an extra thickness underneath, the platinum being very thick immediately under the focal point of the cathode stream. The cathode is made of aluminium, hand-hammered to prevent rapid deterioration. It is ground and polished to a curve of a radius of one inch. It may seem curious, but it is a fact, that the rays focus at a point the distance of which from the cathode is dependent on the height of vacuum. After once having come to a focus, they seem to continue in the form of a pencil until they strike the platinum. The cathode rays do not cross each other at all. This is not true, however, for very low vacua, in which they do cross.

The small bulb containing the gas-producing substance is made with a conical side towards the bombarding cathode, in order that the heat shall be well and evenly distributed over its surface. This allows the substance to get the full benefit of the heat generated without the liability of the bulb cracking, due to an excessive current. The conical point of the bulb is protected by sealing in it a little piece of platinum wire welded to a piece of foil of the same material. H. Lyman Sayen.

VACUUM ILLUMINATION.

Modern electric lighting by means of arc and incandescent lamps is the outgrowth of discoveries made over a half century ago; and, while the progress in electrical matters made since the business began to assume a commercial character is little short of wonderful, it seems almost unaccountable, in the light of what is known, that the grand electrical awakening was so long delayed thinks *The Scientific American*.

Vacuum-tube electrical lighting is almost a parallel case. The vacuum tube itself is not a new thing; it has long been known that it could give considerable light, but it is only very recently that any one has had courage euough to undertake to reduce vacuum-tube lighting to a practical form and render it available for every-day uses.

At the Electrical Exhibition in this city [New York], was shown a Gothic chapel of fair size, furnished with pews, a pulpit, and a full-sized organ. It was carpeted and furnished with stained-glass windows and illuminated in a novel and attractive manner by a new and successful system of vacuum tube lighting invented by Mr. D. McFarlan Moore. Mr. Moore has been perfecting this system for some years. The exhibit embodies his improvements and gives an excellent idea of the practical value of this system. The windows are screened so as to exclude external light, thereby giving the observer the exact value of vacuum-tube illumination. The vacuum tubes are about two inches in diameter and of sufficient length to reach from the pilasters to the apex of the ceiling. They are bent to conform to the curvature of the Gothic arches and their upper ends abutted against straight tubes extending along the highest part of the ceiling, all being mounted in neat, specially designed fixtures. Over the arched front door of the chapel were arranged vacuum tubes, in the form of letters, which spelled out the legend Moore's Vacuum Tube Chapel. The light within was soft and diffusive, having the colour of daylight. The tubes were connected up in parallel, and the current used was the "kick" or extra current derived from simple coils without magnetic cores, and not from the secondary wires of an induction coil, as is generally supposed.

The secret of success lies in the use of a circuit breaker which completes and breaks the circuit 60,000 times a minute; but great rapidity in the breaks is not the only feature of the circuit-breaker. Mr. Moore has placed the entire circuit-breaking mechanism in a vacuum tube, in which a high vacuum tube is maintained. By this construction sparks are avoided and the instantaneous break depended upon for efficiency is secured.

The rapid circuit-breaker is operated by a Gramme ring surrounding the tube, and forming the field magnet of the motor which breaks the circuit, the armature being attached to the commutator of the circuit-breaker. The breaker is connected with the Edison three-wire system, a simple coil being inserted in each of the leads.

No perceptible heat is given out by the tubes, and it is believed that this is the nearest approach to the production of light without heat that has been made.

From what has been said it will be seen that this system of lighting is adapted to the present commercial circuits—a great point in its favor. This system in its present stage of development has an efficiency about equal to incandescent lamp lighting, but it is believed experiments now in progress will show an efficiency far in advance of that already secured.

ACETYLENE NOTES.

Acetylene gas furnishes lamp-black of a very superior quality. Its use for this purpose has been patented in France.

Arrangements have been made with a leading acetylene company for the public lighting of the burgh of Portsoy, in Banffshire, where over 1000 lights will be used. The cost of coal gas at Portsoy is said to be 8*s*. 4*d*. per 1000 cubic feet, and the company have agreed to supply acetylene at at a price which will be equivalent to about 3*s*. 4*d*. 1000 feet of coal gas. A special generating and purifying plant is being erected, and over four and a half miles of piping will be laid; and both street lamps, public buildings, and about 100 private residences will be lighted by the new illuminant. This will certainly be one of the most interesting experiments in public lighting of recent years, and those interested in the subject of lighting cannot do better than visit the Acetylene Gas Exhibition, now open at the Imperial Institute, where they will be able to see all the latest developments, both in generators and in burners, for using acetylene either on a large or on a small scale.

On the subject of the Storage of Calcium Carbide, "X." writes to the *English Mechanic*: "The *Berg Huetten und Maschinen Industrie*, of Strassburg, calls attention to the necessity of great care in connexion with this. If stored so as to be exposed to the action of damp air, or in any way in direct touch with water, it may give rise to a gas explosion, and in handling it great care is necessary, as, if manipulated with damp hands, serious and painful burns may take place; and in breaking up, if small particles should get into the eyes, painful burns, and even loss of eyesight, may be the result."

Carbide is packed for shipment in sealed tin cases, protected externally by wooden ones to prevent denting or piercing during handling or shipment, says the *Progressive Age*. As these cases cost above 15 dollars per ton of carbide, they add materially to the price of this material. To overcome this expense and trouble, Mr. John M. Bulkley, of Detroit, has devised a method of coating the lumps of carbide with a waterproof material, which prevents water or moisture from attacking the carbide, enabling it to be shipped loose, in bulk or in boxes. Before the carbide lumps are put into the generator, a space about two inches square is freed from this coating by breaking the lump or by scraping. The water attacks the carbide at the exposed spot, giving off gas and raising the temperature, the latter being sufficient to gradually remove the waterproof coating. The generation of gas is thus said to go on gradually instead of violently, as in the case when clear carbide is thrown into water. The inventor claims for the method: (1) Economy in the method of packing, shipping, and storage; (2) convenience and cleanliness in handling; (3) immunity from accidents liable to occur through contact with water when not in use; (4) freedom from odour; and (5) no deterioration and waste when in storage. The idea seems a good one; certainly the end striven for is desirable, and one that will tend to make acetylene popular by removing some valid objections. As to whether the method proposed is the most satisfactory, it remains to be demonstrated in practice.

ANIMATED PHOTOGRAPHY AND THE BLACKWALL DISASTER.

The following correspondence appeared in the *Daily Chronicle* of last week

We have a reference to the matter in our Ex Cathedrâ notes:—

"Having obtained from the Thames Ironworks and Shipbuilding Company, Limited, by the courtesy of Mr. A. F. Hills, the right to take animated photographs of the launching of H.M.S. *Albion*, and it having come to my knowledge that some one had taken an animated photograph of the poor sufferers struggling in the water, I wish to dissociate myself in the most emphatic manner from the producers of these photographs; and further, I have decided to suppress my films of the launch, although, if any entertainment is organized for the relief of the distress caused by the disaster, I shall be willing to give any assistance in my power by arranging an exhibition of any of the various animated photographs taken by myself, including the actual christening ceremony performed by H.R.H. the Duchess of York on the day of the launch.

"Birt Acres."

"It is with the deepest sorrow that I read that the scene of the tragedy of Blackwall was exhibited by means of the "living picture" apparatus before an audience at the Royal Music Hall, Holborn, on Wednesday evening (June 22). Surely so grave an insult on the best feelings of mankind ought not to pass unreprimanded.

"The only circumstance that could in the least have mitigated the offence of exhibiting these fatal pictures would have been a collection in aid of the survivors of the deceased. This does not appear to have been done. Yet even this could not justify it—except on the Jesuitical principle of doing evil that good may result. "Humanitarian."

"Sir,—The strictures of your correspondents respecting this appear to me, as the person who took the only picture of this terrible calamity, to be both unfair and unreasonable.

"Whilst animatographing the launching of H.M.S. *Albion* from a small steam launch, we were beckoned towards the fatal spot, almost before any one realised what had occurred; people were shouting 'man overboard.' We immediately went up and assisted twenty-five of the submerged persons on board, and took them at once to the dock head. The camera continued photographing, but no consideration of the result was allowed to interfere with the work of rescue. When I afterwards found that the touching and dreadful scene was recorded (and before the relief fund was started), I offered a gratuitous exhibition at a benefit performance at the Paragon, E., a collection to be made for the sufferers.

By permission of Mr. G. Adney Payne, it will be shown on Tuesday evening next, accordingly.

"I am not otherwise exhibiting the picture, but am sending it to local exhibitors throughout the country, and trust that the sympathy and interest thereby excited will result in additional subscriptions for the distressed families. "ROBT. W. PAUL."

OPTICAL PROJECTION APPARATUS FOR ADVERTISING PURPOSES.

THE drawings illustrate this invention. Fig. 1. is a front view of a box or case containing the several parts, the lower part of the front of the case being removed to show the parts within.

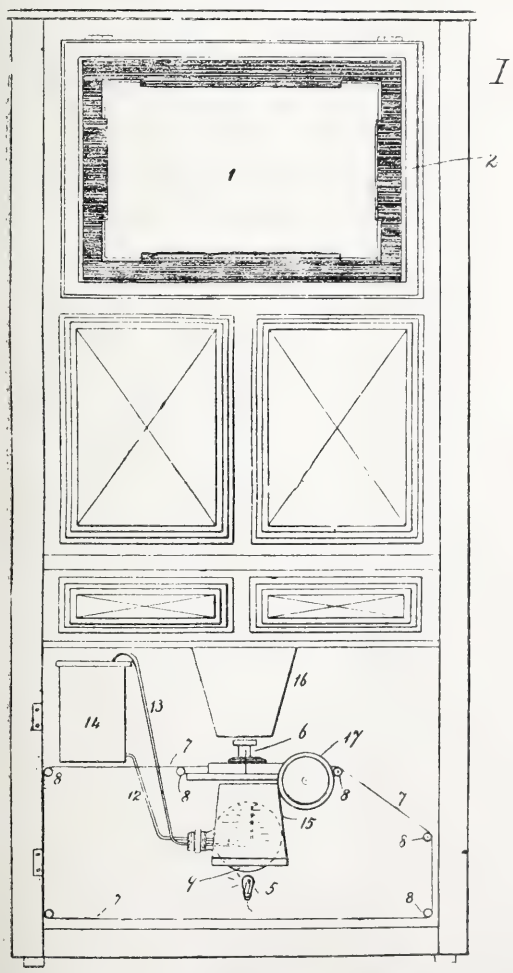
Fig. 2 is a transverse section of the upper part of the case.

Fig. 3 is a detached view of the automatic water cell.

Figs. 4, 5, 6, and 7 are detail views of the mechanism for converting the continuous movement of the film into an intermittent movement when desired, and of the mechanism for actuating the shutter when such is employed.

1 is the screen upon which the advertisements, pictures, or the like, are to be projected, and which may consist of a sheet of ground glass, linen, or other convenient material. The said screen is in this case mounted in a hinged frame, 2, so that, when desired, access may be had to the contents of the case behind the said screen; 3 is a mirror placed at a suitable angle for the reflection of the upwardly projected images upon the screen, 1, as is diagrammatically represented by the dotted line, 4, 4; 5 represents the source of light shown diagrammatically in fig. 2, and represented by an incandescent electric lamp in fig. 1; 6 is the lens or case of lenses through which projection takes place.

The images, which may be advertisements, designs, pictures, or the

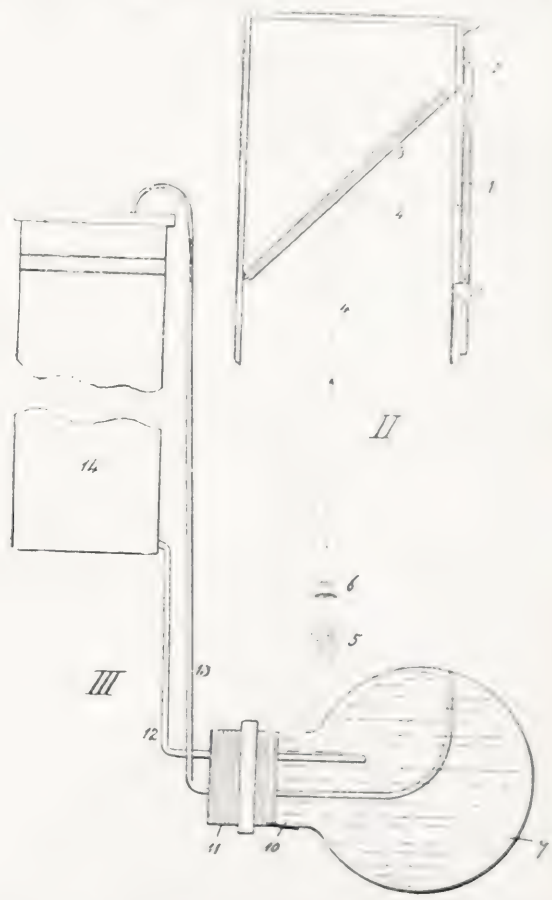


like, are shown in fig. 1 as carried by the continuous band, 7, which travels over the pulleys or rollers, 8. Between the source of light and the lens is arranged a condensing water cell, of such construction that the formation of a bubble, which would interfere with the projection of the light or with the image, is avoided. This device, termed the automatic condensing cell, is separately illustrated in fig. 3, and it is an important feature of the invention. It consists of a bulb of glass, 9, of globular or other shape suitable for optical projection, and contains water, alum solution, or other solution employed in ordinary water cells. The said bulb is conveniently made with a neck, 10, adapted to receive a cork or stopper, 11. Through the said cork or stopper pass the two glass tubes, 12 and 13, which communicate with the bottom and the top respectively of a tank or reservoir containing a similar liquid, preferably water, to that within the bulb. By means of the said tubes, 12 and 13, a circulation of the liquid takes place between the bulb, 9, and the tank or reservoir, 14, so as to prevent the formation of a bubble at the upper part of the bulb when the liquid contents become heated by the source of light employed.

15, 16 are shields of sheet iron or the like bent to the shape of truncated cones.

Referring to fig. 1, it will be seen that the light from the incandescent lamp, 5, passes through the condensing water cell, 9, on to the picture upon that part of the band, 7, usually a strip of celluloid, which is directly under the lens box, 6, whence it is projected vertically upwards to the mirror, 3, from which it is reflected laterally on to the screen, 1.

It is obvious that, when the band, 7, is not moving, the advertisement or picture which is under the lens box, 6, has its image permanently displayed on the screen, 1. If the said band, 7, travel continuously, and no shutter be employed, it is obvious that a continuously moving image or series of images is thrown upon the screen. If, on the other



hand, the band travel intermittently, successive images are thrown upon the screen, and, if a shutter be suitably employed, the said images are not seen to pass on to the screen and off again.

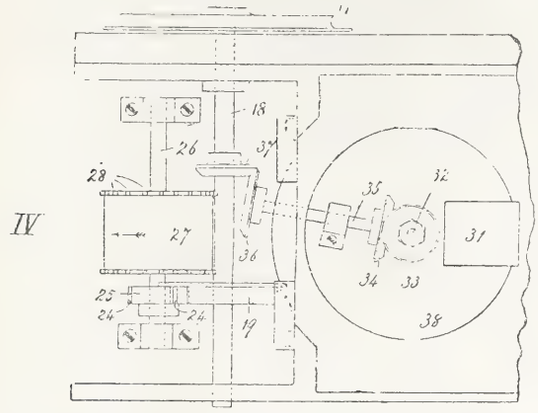
If it be desired to show the same image permanently on the screen, the band is left unmoved.

Should it be desired to show a continuous series of images moving across the field of the screen, no shutter is employed, and the band may be continuously driven by any convenient form of motor, as, for example, by an electro-motor, conveniently attached or geared to one of the rollers, 8. One convenient method of continuously driving such band would be by passing a belt or strap from the driving pulley of the motor over the strap wheel or pulley, 17, which is mounted upon the spindle of a roller over which the band, 7, passes. Such roller may have teeth engaging in rows of slots in the band 7, as is commonly employed in kinetoscopes.

When it is desired to show images intermittently, one may conveniently employ the devices now to be described, and which are illustrated in figs. 4, 5, and 6.

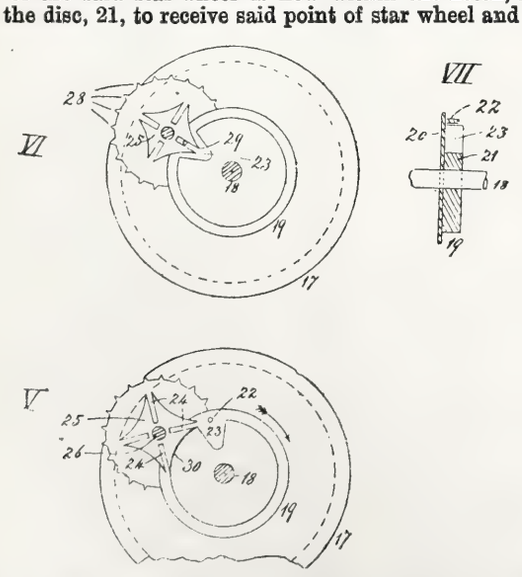
In these figures, 17 is the pulley driven by a strap from the motor, and which is fast on the shaft, 18. Said shaft, 18, also carries wheel, 19, shown in section in fig. 7. Wheel, 19, consists of two discs, 20, 21, placed side by side, which discs may, when desired, be integral with one another. The larger of these discs, 20, bears the driving pin, 22, and the smaller one, 21, has a notch, 23, cut in it. Said pin, 22, is designed to engage in the cuts, 24, of the star wheel, 25, which is mounted fast on

the spindle, 26, upon which spindle is also mounted the drum, 27, over which passes the band or film of celluloid bearing the advertisements or pictures. This drum has teeth, 28, at its periphery, which engage in orifices or perforations along each margin of the band or film, so that, when drum, 27, moves, the film is drawn along through a distance



depending upon the amount of angular movement of the said drum each time it is actuated. Said amount of angular movement is determined by the distance through which the film has to travel in order to replace one advertisement or picture by another, or, in other words, bring the next advertisement or picture into the field of projection.

The continuous rotary movement of the strap wheel, 17, is converted into an intermittent angular movement of the drum, 27. The wheel, 19, being mounted on the same shaft, 18, as the strap wheel, 17, rotates continuously with it, but it does not cause any angular movement of the star wheel, 25, except whilst pin, 22, is within one of the cuts, 24, of said star wheel, as, for example, is shown in fig. 6. During the greater part of its rotation there is no engagement between star wheel, 25, and wheel, 19, as pin, 22, is free from said star wheel. In fig. 5 it will be seen that the star-wheel and wheel, 19, are free from engagement, but the pin, 22, has just left one of the cuts, 24, of the star wheel. When wheel 19, has rotated in the direction of the arrow shown in fig. 5 through a further angular distance of about two hundred and eighty degrees, said pin will engage in the next cut of the star wheel and will move the said star wheel, and with it the drum, 27, through a definite angular distance, until pin, 22, has again left the cut as shown in fig. 5. In fig. 6 the parts are shown in the position occupied when half of the said angular distance has been travelled by the star wheel, and it will be seen that the point, 29, of the said star wheel is now within the notch, 23, which is cut out of the disc, 21, to receive said point of star wheel and enable said



star wheel to move angularly. It will also be seen that each angular movement of the said star wheel extends through an angular distance of ninety degrees. By making the sides, 30, of the star wheel of a curve to correspond with the periphery of the disc, 21, it will be seen that the star wheel is always maintained in the proper position for the pin, 32, to enter the cuts, 24. From this it will be seen that with each complete revolution of the wheel, 19, the drum, 18, moves through a given angular distance, and that the band or film bearing the advertisements or pictures is pulled in the direction of the arrow shown in fig. 4 through the predetermined angular distance necessary to replace the advertisements or pictures successively at the opening, 31, through which the rays of light are projected.

It is frequently deemed desirable to shut off the light, during the short period of time during which the band is pulled across the opening, 31, by the angular movement of the drum, 27, or, in other words, whilst the advertisement or picture is being changed. This may, for example, be effected in the following manner: Upon the arbor, 32, is mounted a sector-shaped shutter, which, for clearness, I have omitted from the drawing. Upon said arbor, 32, is mounted the horizontal bevel wheel, 33, meshing with the vertical bevel wheel, 34, on whose shaft, 35, is also mounted the vertical bevel wheel, 36, which latter meshes with the vertical bevel-wheel, 37, fixed on the shaft, 18. By this means the rotation of the strap wheel, 17, is transmitted to arbor, 32, and the shutter caused to revolve in the circular box, 38. The gearing is so selected as to bring the shutter opposite the orifice, 31, at the required period, whilst the advertisements or pictures are being changed.

It will thus be seen that the rays of light from the lamp, 5, first traverse the automatic condensing cell, then the orifice, 31, then the lens box, 6, and then passes upwards until it is deflected by the mirror, 3, on to the screen, 1, so that the advertisements or pictures upon that part of the band or film which is covering the orifice, 31, for the time being is thrown upon the screen, 1, and there exhibited in enlarged form.

The reservoir, 14, should be of sufficient size, and the tubes, 12, 13, of sufficient gauge to keep the bulb, 9, charged with cool or sufficiently cool water. If an ordinary water cell were used, it would be impracticable to employ a vertical projection, and still have a sufficiently bright light, as the water in said cell would soon boil away.

THE RÖNTGEN RAYS AND COAL.

In a note recently communicated to the Paris Académie des Sciences, M. Couriot suggests that the X rays may prove as efficient in showing the intimate structure or siliceous skeleton of our coals as they are in defining the calcareous skeletons of animals. He states that, by means of a powerful Crookes tube and a fluorescent screen, it is easy to determine the purity of a fuel. Carbon in all its forms is exceedingly transparent to the rays, while silica and silicate are opaque; and on placing a lump of coal between the tube and the screen, all the intimate details of the slag and clinker forming portions of the fuel at once appear. M. Couriot has tested in this way anthracite, coal, lignite, peat, coke, and block fuel. The finest particles of silicate, though quite invisible to the eye, show up at once on the screen as dark spots or bands upon a bright ground. The differences in the quality of a series of coals can be traced step by step, showing at once the variations in the purity of the fuel. The conglomerate structure of block fuel is clearly exhibited, while with coke the particles of iron sulphide are indicated by black spots on the fluorescent image. Carbon is so transparent that it is unnecessary that the samples should be regular blocks, as rough lumps, the sides of which usually follow the natural plans of cleavage of the coal, serve perfectly well. M. Couriot has taken radiographs with specimens 1½ in. to 2 in. thick, the coil used having a spark 10 in. long, and the exposure being five minutes.

Officials of the United States lighthouse service have been recently carrying out a series of experiments on Staten Island with a phenomenally powerful electric lamp. It is said to be powerful enough to be seen 100 miles away, if placed at a sufficient eminence to avoid the usual horizon line; but at the Navesink Islands, just south of Sandy Hook, where its erection is to take place, it will be visible to mariners fifty miles at sea, which is considered far enough for all practical purposes, and its light will be cast for the most part far above the masts of vessels anywhere near the coast. This light has a two-range lens, 9 ft. in diameter. Behind the lens is an arc light of special construction that requires carbons 1½ inches and 2 inches in diameter. This light is supplied with an alternating current of 55 volts and 100 ampères. Each emergent beam is calculated to be of fully 90,000,000 c.p. The lens is revolved by clockwork that derives its motive power from a 100 lb. weight. It is to flash every five seconds, a revolution being made every ten seconds. The whole weight of the light rests upon a foundation of mercury contained in a circular tank abont 2 ft. deep, the object being to allow of the turning to give the flash every five seconds with the least possible friction.

The lighthouse on Armish Rock, in the Hebrides, is about 500 feet from the shore. To avoid having an attendant on the rock, the light is produced on the shore and projected across the water upon a mirror in the lighthouse, the mirror reflecting the light in the desired direction. —*Der Westfale.*

The animatograph which has been taken of the Pope in the Vatican gardens on Friday last, ought to be an interesting historical document. He was photographed in the little chaise which he always uses for his airing in the shady groves that surround the "Villino." The chamberlain is seated by his side, and the pontifical carriage is preceded and followed by four of the guardia nobile in their picturesque uniform under the command of Count Pecci, the Pope's nephew. Another film represents the Pope as he gets out for his customary stroll on descending from the vehicle, and this includes the chief members of his personal suite and the great functionaries of the Vatican. Another interesting film is that of the Kaiser on his yacht.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*August* 5, 1898

THE LANTERN RECORD.

CONTENTS

	Page
LANTERN MEMS. By G. R. BAKER	57
LIMELIGHT EXPERIENCES.—V. By T. N. ARMSTRONG	58
HAND-CAMERA DEVELOPMENTS. By J. PIKE	59
HOW TO PHOTOGRAPH THROUGH A FLY'S EYE. By FRED. W. SAXBY	59
SWEETSER'S IMPROVEMENTS IN OPTICAL LANTERNS	61
STEREOSCOPIC ANIMATED PHOTOGRAPHY	62
NEVE'S APPARATUS FOR TAKING AND EXHIBITING ANIMATED PICTURES	62
ELECTRIC LIGHT AND THE NERVES	62
TEN YEARS OF PROGRESS	63
THE SURINAM LANTERN FLY	63
THE PERCEPTION OF COLOUR	63
ACETYLENE NOTES	63

LANTERN MEMS.

While the Conventioners have been enjoying the technical opportunities of the Glasgow visit and the social functions in connexion with same, I have been leading the life our forefathers led, and dwelling in tents. Although surrounded by optical instruments, I have also been (perforce) studying nature—for strong light from sunshine, wind, and rain could not be shut out in our canvas city at Bisley—and since then on the splendid health-giving Curragh. To say I have not thought of lanterns would not be in accordance with fact, for I had on my mind all the time what I should say in my next "Mems," the reason being that, circumstances having taken me far from the madding crowd (and some people say that lanternists are next door to maddening), I have had little opportunity of knowing anything fresh about lantern matters.

* * * * *

As the only thing at Bisley that appeals to photographers who desire to get lantern pictures, I have in mind a very clever invention that was shown at one of the Royal Society's *soirées* in an early stage of its development. It is a miniature gas cylinder for producing aerated fluids, and consists of a steel globule charged with carbonic acid gas. This, when used with a specially strongly made bottle capable of standing a pressure of forty atmospheres, or more, is capable of aerating water, &c., and producing, when suitable tabloids are dropped in the bottle, lithia, Vichy, soda water, &c., by simply screwing down the fitting connected with the stopper, and so piercing the globule and allowing the gas to pass down a tube to the bottom of the bottle and pass up through the fluid.

* * * * *

Boiled or distilled water, beer that is somewhat flat, and wine of a still order, can be made respectively into aerated water, bottled beer, and sparkling wine. Only those who are far removed from civilisation can appreciate the luxury of an aerated water drink when they have hitherto had insipid water, and the accounts of the benefits to explorers and soldiers on service of such a drink go home at once to a practical mind, for the difficulties of transport prevent ordinary bottled aerated waters being taken as part of the *impedimenta* of an expedition.

* * * * * *

All those who contemplate a journey in strange lands, camping out on rivers and moors, or who must travel in out-of-the-way places, should make themselves acquainted with the "sparklets" and special stoppered bottles issued by the Aerators, Lim., Broad-street-avenue, London, E.C.

* * * * * *

In Ireland time seems to be of no account, at all events I have just lost a train to Killarney, because the refreshment-room clock on the station is twenty minutes slow, and the people move as if there was no occasion to do work to-day that can be done to-morrow. However, as they are a hospitable and jovial people, and withal have a soul for wit, I will forgive them, as it enables me to finish writing my "Mems" here at Cork, instead of Killarney, which might make it a great rush for the printers to set it up in time for publication.

* * * * *

I have just been viewing the City of Cork, with the idea of finding a good site to take a panoramic view of the beautiful distant hills and the principal buildings in position below them. It was a more difficult task than I imagined when I set out to walk up to the high ground above the station, for the view is shut in by houses built on the brow of the hill. Patience and perseverance will reward the photographer if he goes up the steps outside the railway and turns south, going up the road to near the summit, and, when 100 yards or so past the Montenotte Seminary, turns sharp round, and at a wall opposite some stables on the Montenotte he will get a lovely view, and have for a foreground a garden almost ideal in its picturesque aspect. The wall itself is suitable for climbing, as there is a kind of stepping-stone, and, when I put a query to the groom near by as to the place being frequented by photographers, he at once replied, "Yes."

* * * * *

Morning time is apparently best for getting negatives in Cork to make lantern slides by, as the landscape alluded to and the principal buildings face east. Visitors to Ireland, coming south from Dublin, will find many places of interest, and as I stopped one night at Kildare, and another at Tipperary, I can say I saw plenty of opportunities for picture-making. The Sunday morning assembly of the Kildare "aristocracy" at church was a novel sight, with one or two dozen donkey-carts and barrows tethered to the churchyard railings; and the way these donkeys can trot was exemplified by a good-humoured race in the evening between a milkman's donkey-cart and our jaunting car on a return journey along the road from the Galtee Mountains. On this, the Banshe Road, is a magnificent and extensive bank of rhododendrons, which in early summer are worth miles of travel to see.

* * * * *

The picturesque nature of these mountains, as they were partly hidden by travelling clouds, the lovely heather, pines, &c., was something to remember, and it was only that prior arrangements for Killarney had been made that prevented my staying on and enjoying some of the trout-fishing that is abundant here, with my relative who is residing near. So far, I have been charmed with my Irish

experiences, and after the mild climate of the Surrey ranges at Bisley, the bracing air of the Curragh and Limerick have been most agreeable. Amateur photographers and others in search of pictures and health cannot do better than come this way. Those who take to racing matters will be interested, for the celebrated racehorse and Derby winner, "Galtee More," was reared near here, and was named after the locality.

* * * * *

It speaks well for the new pattern of pocket folding Kodak that many people are satisfied to carry it instead of more elaborate forms, and, although I hold no brief for the Eastman Company, I feel it is only fair to say that, from an experience of three months or so, I am delighted with it, and the results obtained are such that good lantern slides can be made from them, and any specially successful pictures enlarged up to whole-plate. I would advise amateurs using it—certainly in the British Isles—to keep to the large stop; in fact, my experience of work done by four-fifths of the community is that you cannot put too simple an apparatus in their hands, and generally focussing cameras and movable stops are a mistake. With the professional photographer it is, of course, another matter.

G. R. Baker.

LIMELIGHT EXPERIENCES.

V.

With the adoption of compressed gas in cylinders in lieu of the old gas-bag system came an almost complete revolution in the form of jets, for experimentalists soon discovered, with the great increase of pressure at command, quite a new power was placed in the hands of limelight operators, and that, instead of a light equal to about 600 candle power being the extreme limit, as in days of yore with the old gas-bag system, the pressure from cylinders enabled larger bores to be employed, and this has led on to what we now see in such jets as those of the injector type.

In this form of jet, and those somewhat similar in construction, the gases mix at a much greater distance from the burning point or nipple, and, as a result, a quieter radiant is produced than with the old form of jet, where the gases were mixed in a chamber often not more than an inch from the burning point. The idea of mixing the gases some distance from the burning-point is not new, however, for an Edinburgh optician was known to advocate this many years ago, and there are those in the West of Scotland who can recall the old form of ram's horn jet, where a sort of twisted tube led from the mixing chamber to the burning point, the length of such tube probably being, when straightened out, somewhere about ten inches. It was claimed at the time that the distance the mixed gas travelled from the mixing chamber was essential to a complete admixture of the gases, and led in a most marked degree to an avoidance of small pop-out explosions so common with the form of jet where the gases were led into and mixed in a chamber within a distance of one inch from the burning point. It is an old saying that there is nothing new under the sun. One thing is certain, that this twisted tube form of jet has within recent years been largely adopted by our best opticians and those operators who know the comfort of working with a silent light. The shape of these jets resemble a ram's horn, such being necessary on account of having to provide for the jet being placed sufficiently near the condenser. There is no doubt the distance at which the gases are mixed from the burning point does in practice play an important part in limelight working, and this is being recognised in several of the newer forms of jets that have been placed upon the market. The need for the most powerful radiant that can be acquired is seen in the jet recently designed more especially for cinematographic projection. These jets run away with a fearful amount of gas, and when employed to their fullest capacity are quite unnecessary for ordinary lantern work; the heat they give off is extreme, and they are dreadfully destructive on condensers.

A jet capable of yielding a 1200 candle-power light requires an entirely different construction in the form of lamp that such should be used in, and, if these high-power jets are in the future to supplant the good old 600 or 700 candle-power light, then we shall have to use much longer focus condensers so as to enable the light being placed at a safe distance from the back combination of the condenser; and, if these changes be carried out, our condensers will not only be longer in focus, but likewise greater in diameter, and such will require to be mounted in longer cells so as to permit of the slides being placed at further distances in front. It has always been recognised that so long as a condenser was large enough to cover a slide when the same was almost close up against the front combination, that there was no need for larger diameters being employed, and very probably in theory such arguments are quite sound, and can be substantiated by the law of optics. But theory is one thing and practice another, and it is just here where the well-known saying holds good that an ounce of practice is worth a ton of theory, for the great heat is a factor that theory does not take into consideration, and the more gas we burn the more heat we generate, and we must burn gas if we want increased light; therefore, with these modern high-power jets, longer focus and larger diameter condensers must be used, and the slides placed at an increased distance in front, if the value of the entire cone of light issuing through the condenser is to be utilised.

There has been for many years a steady inclination on the part of lamp-makers to curtail the size of the shells in lime-light apparatus, until the thing has been ridiculously over-done. But few modern single lanterns with all their brass fittings, which look so nice upon an optician's counter, are of any practical use when required to be used with a modern high-power mixing jet. This cutting and carving has, no doubt, been prompted by economy, but in the near future all such toys will be quite out of date, and larger shells with longer bodies are certain to come more into use. The old saying, that no lamp is of any value that is not furnished with an efficient system of ventilation, has been entirely ignored by lamp-makers during recent years; the one idea seems to be, how small can they produce a lamp, and how showy can it be made with brass work and fittings? These shells are excellent friends to the makers of condensers, and I know one obstinate individual who seldom gets up steam but breaks a new condenser, the heat from his little toy lamp being unbearable. The maker who first boldly stands out and designs a good, honest, large, single lamp, having an abundance of air space, and fits the same with condensers specially suitable for use with these high-power modern jets, up to say one thousand candle-power light, will not be long in finding out that there is an appreciative public willing to adopt such.

Some may say, But for home use and under many other conditions there is no need for such high power radiants being employed, and that for any ordinary household or small schoolroom the lamps in use at the present time are quite efficient, and work well enough with a blow-through jet. Well, I am no believer in this safety, so-called form of jet, and I cannot remember one single instance where I have seen such in use in which quite as much safety would have been secured with compressed gases in cylinders, and a moderate mixing form of jet, *with this addition a very much better light and one more easily under control.* A blow-through jet in my opinion is quite out of date, and but few amateur lanternists are capable of taking the most out of such, while a professional seldom thinks of ever using one. It takes a very clever operator to get anything like even a three hundred and fifty candle power light out of an ordinary blow-through jet, and then they give off a large hydrogen flame that burns the lamp to bits in no time if the shell is of small dimensions. As to their economy, I believe this is very much overrated, and with the lengths of tubing generally required to lead the hydrogen from a distance, they are not nearly so free of smell as where mixing jets are used from cylinders. In any case the newer form of injector jets will replace the old form of blow-through, but we live in progressive times as far as lime-light projection is concerned, and judging from what the compressed gas cylinder has done already, there is no knowing what may be in store in the way of jets before long. One thing, however, is certain, that the shells of our lamps must be specially constructed to permit of these high-power radiants being employed, and it is quite possible that, if the full benefit of such is to be acquired, such shells must be provided with cooling tanks, for many amateur workers are beginning to find to their cost that the destruction of a modern jet will work in a short time on a gelatine slide, especially if such be in any degree damp is very great indeed. Some lanternists argue that dissolving cannot be done effectually with the mixing form of jet; this is nothing but sheer ignorance. A new lamp just from the maker's hand, with all its burnishing and brass bedstead adornments, very likely will give an operator some trouble, but no experienced lanternist, or at least any one having regularly worked with mixing jets, would ever expect a brand-new double lamp with jets unknown to him to work straight away without more or less trouble, for it takes a little patience to get a biunial into working trim, as some alterations very likely may be needed in the passage ways of the dissolver and other parts, but to say mixing jets are not suitable for double lamps is ridiculous. This idea, no doubt, has arisen from the pop-out explosions that happen frequently when faulty dissolvers are used (and some dissolvers are quite useless, and never can be made to work well, no matter how much doctoring they receive). A good one is a treasure, and should be prized as such. Many ardent lanternists for a time in their experience look upon these biunials as essentially necessary for a first-class lantern display, and when any dissolving effects are desired, a double or triple lantern is essential, but with the marked improvement in lantern-slide making and photography generally that has taken place during recent years, the public are getting to appreciate single-slide working, especially where the transparencies in themselves render effective scenes such as we see now coming under the category of nocturnal photography, and when a good dissolving carrier is employed a first-rate display follows. With single lamps and dissolving carriers a better light is generally maintained and less heat generated. It is not always an easy matter to get both the top and bottom jets to work to the same power, one light generally being better than another. With single lamps there is far less trouble, and where only plain slides are concerned a double lamp is quite superfluous.

T. N. Armstrong.

HAND-CAMERA DEVELOPMENTS.

The average amateur, once well versed in the art and mystery of photography as applied to the stand camera, can go but little out of the well-worn groove which leads to pictures of the kind now known and recognised by the generic term, the "usual" thing, or, with fair luck, may achieve something even better. He may resuscitate his camera after an interval of twelve months and make a fresh and successful start, provided the camera is a good one, well seasoned and calculated to bear the stresses and strains of our more or less deceptive climate; provided also that use is made of fresh and newly made solutions, and not forgetting that dry plates are liable to deteriorate and that the dark-room illumination may not be quite so perfect as it once was. Let him remember these few points and he will not stray far away from what may be reasonably termed decent results.

On the other hand, the snap-shottist must be continually at work if he is to in any degree keep up his form as an artist of the living and moving panorama of our times and manners; the keenness and alertness necessary and the "developing" skill are of all things likely to fall behind if not kept in fairly constant practice.

Incidentally, I may mention that extraordinary results are to be obtained by inattention to certain little rules which govern the practice of all serious photographing tourists and others; it seems absurd to have to advise people, who presumably have reached years of discretion, with regard to "exposed plates;" we don't expect *every one* to label each plate and keep an accurate list, numbered, tabulated, indexed, and posted up as to their exposures; but we should at the least see to it that such plates are parcelled up and labelled in such a way as to give a clue to their identity. Now, what are we to say of a man so careless in this respect as to expose a plate, or series of plates, three times on different subjects? This appears hard of belief, but two days ago I had in my hands a plate which showed very clearly the jetty at Yarmouth, with Edinburgh Castle as a sky-line, and something—a dim, shadowy outline—which may represent the portrait of a lady! Of course, knowing the far-reaching effects of certain ardent Scotch spirits, one would not have been altogether surprised to find the Forth Bridge mixed up with the Scott Memorial and a bit of the Canongate; but, as it is, the perpetrator of the negative referred to can find no adequate, reasonable and satisfactory explanation of the fact plainly set forth that he exposed certain plates at Yarmouth, wrapped them up, and forgot them, and repeated this performance on two subsequent occasions.

Barring, however, little personal failings, such as indicated in the last paragraph, the amateur will find little difficulty, as a rule, in keeping up to a certain standard of work. It is in my experience the snap-shot man who finds it most necessary to rub up his experience, and take as it were a preliminary canter before setting down to the old pace.

It is in the development of exposed plates that we require to exercise a considerable degree of care and judgment, otherwise the proportion of our successful shots will be ludicrously small. Fresh plates, bearing in mind the undoubted pre-eminence of certain brands over others (equally good in their own way and up to a point) for instantaneous work, and not omitting to investigate the trustworthiness or otherwise of our dark room illumination, and we are at least in a fair way to get some good results.

Presuming now that we have a few dozens of exposed plates to develope, it is just as well to at once realise the fact, that if they are to be developed properly and to get the best results, they are not to be done hurriedly. I very seldom use flat dishes now for developing, finding the *troughs* grooved for six plates much safer and more convenient. It is a good plan to safeguard against frilling by giving each plate before development an *edging* of enamel collodion; this should be applied by means of a small camel-hair brush to the extent of an eighth of inch all round the plate, or, in place of the enamel collodion, a thin solution of rubber in benzole may be used. For development: Pyro solutions had better be discarded for the time, a developer made up with glycin, hydrokinone, or metol, with sulphite of soda and washing soda being substituted; the maker's formulæ will often suffice, if sufficiently diluted, and with the additional precaution of a small extra dose of bromide; the following developers will afford a little choice, but I have a preference for the glycin solution:—

	Amidol	20 grains.
	Sulphite soda	200 ,,
	Bromide potash	10 ,,
	Water	10 ounces.

For use one part to five parts water.

Or	Glycin	25 grains.
	Sulphite soda	50 ,,
	Potash carbonate	100 ,,
	Water	5 ounces.

For use one part to five parts water.

Or	Metol	60 grains.
	Hydroquinone	30 ,,
	Sulphite of soda	1 ounce.
	Washing soda	1 ,,
	Water	15 ounces.
	Bromide potash	10 grains.

For use one part to five parts water. (The above is practically the Journal formula.)

I have never quite succeeded in getting rid of "spots" when using a flat dish unassisted by a rocking arrangement, the plates remaining *well covered* with solution for, in some cases, nearly an hour; therefore I have adopted the *trough*, and with great satisfaction. Take the glycin developer, for example. This is made, as will be seen, one-fifth the normal strength; the trough is filled with it and the plates inserted. Having ascertained that the wetted plates are free of air-bells, the trough is covered up and left undisturbed for twenty minutes or so; a further examination is made, and progress noted. Another fifteen minutes ought to finish the average exposure: if not enough, transfer to a second trough of fresh solution made rather stronger, and the chances are they will come up first rate at the end of a second quarter-hour. In any case, with a developer which does not discolour or oxidise quickly, and examining progress in a perfectly safe light, there is neither danger nor hurry. I often find the negatives much improved if they are kept soaking in plain water for a couple of hours previously to fixing—they put on a certain amount of density, and in any case are none the worse for the treatment. J. Pike.

HOW TO PHOTOGRAPH THROUGH A FLY'S EYE.

[*Knowledge.*]

In order to perform this delicate and interesting experiment a photo-micrographic apparatus will be required, and the operator should have some experience in the mounting of microscopic specimens. The object of the experiment is to obtain a multiple photograph of the subject, the images of which are to be formed by the lenticular facettes of an insect's compound eye. With few exceptions insects possess two of these eyes, one on either side of the head. The outer covering, known as the cornea, no longer functions as a single lens, but is subdivided into a multitude of extremely small closely packed facettes, of usually hexagonal contour and convex surface. They are in some instances so numerous as to occupy nearly the whole of the head.

A section through the eye of the drone-fly, *Eristalis tenax*, gives a general idea of the structure of this organ. The cornea, hyaline in shape, is a modification of the tough exo-skeleton of the insect, and, like it, consists of chitine. Behind, and in the centre of each facet, is a cone of transparent gelatinous matter, with its base towards the cornea; this cone, which functions as a crystalline lens, terminates at its apex in a nervous filament. The filaments so produced converge as they proceed, and finally fuse into an optic nerve which connects them with the great nerve ganglion or brain. Each lens with its nervous filament is isolated from those adjacent by the opaque pigment with which the intervening space is filled, so that no light passes into the eye except at that point directly under the centre of each facet. The pigment matter is variously coloured, and is the source of that sparkling appearance often seen in the eyes of living insects when viewed by reflected light.

We are at present concerned, however, with the cornea and its tiny lenses, through which we are to obtain our photograph. Each lens is a compound of two plano-convex lenses, united at their plane surfaces. The corneal mass does not follow any definite curve throughout, being considerably flatter in the middle than at the margin. In some of the larger dragon-flies parts of the eye may be found nearly flat, and on that account will serve our purpose the best. Having secured a specimen of the common dragon-fly, *Libellula depressa*, we can proceed to dissect off the cornea First remove the head, and imbed it in a cell of melted beeswax, so as to obtain a firm hold, leaving one eye exposed. Take a two-edged scalpel, and with the point of it make a series of stabs along the margin of the cornea, going all round. The entire mass, like a little dish with a quantity of pigment matter in it, can then be lifted off. Next melt the beeswax, remove the head, and float the separated cornea, with its contents uppermost, upon the still fluid wax and allow the latter to set. Pare a quill to the shape of a J pen, making the point slightly rounded and thin, and with it scrape out the contents of the eye; the cornea, being extremely tough, is not liable to injury from the point of the quill. Procure a small camel's-hair pencil, cut down the hairs until only an eighth of a inch long, and, having charged the stump with turpentine, proceed to twirl it about in the "dish," so as to remove the last trace of pigment. Examine under a pocket lens, and, if clean, melt out the cornea, and with a pair of fine scissors trim off the turned-up edge of the "dish," retaining only the flattest part of the bottom. Soak in turpentine until any wax that adheres is dissolved, and you have the lenses for your camera—but the disc is not flat. Select the thinnest cover glass you can get, clean thoroughly, and place it upon the hot-plate as for an ordinary balsam mount. Melt a quantity of the oldest and hardest Canada balsam obtainable, and upon the point of a needle apply a small bead of it, not larger than a pin's head, to the centre of the cover glass. By the aid of the fine forceps and the warm air, drive off the turpentine from the piece of cornea, and then place it upon the cover glass, concave side down, with its centre over the bead of balsam. Cut out a small disc of note paper, rather less in diameter than the "object" you are mounting, and place it centrally over the disc of cornea. Have a three-by-one glass slip handy, support one end of it upon the hot-plate, and allow the other to press upon the object, with

the disc of paper in between. Proceed to load the middle of the three by one slip with coins sufficient to flatten the piece of cornea. As soon as this takes place the bead of balsam under it will spread out and make its appearance round the margin of the object.

When this can be seen through the slip, remove the spirit lamp and allow the whole to cool. The under side of the flattened cornea will then be cemented to the cover glass and the facettes will be simple plano-convex lenses, since their inner convexities, being imbedded in the balsam, will cease to exert their optical properties to any appreciable extent. The mount, resting upon a three-by-one slip, can now be examined under the microscope. Put in a half-inch objective, and, if it has a screw collar, adjust for an "uncovered" object. Use a low-power eyepiece of about three diameters and an Abbé condenser. Stop down the aperture and bring the cornea into sharp focus. By a solid cone of transmitted light an hexagonal figure will be seen forming the boundary of each facette. A number of hairs appear upon the eyes of some insects, and it is in the angles of these hexagons that the hairs have their origin. It will require some nicety of illumination, however, to disclose the "lens" in each of these divisions; the solid cone of light as usually transmitted by the condenser fails to reveal them. Remove the limiting diaphragm from the back of the condenser and insert in its place a patch stop that will give dark-ground illumination with the objective employed, having previously stopped out half the annulus with a strip of black paper. Use the plane mirror, and, with the condenser in focus, this semi-annular beam of light will fall obliquely upon the object, and the "eyelenses" will appear in bold relief (fig. 1).

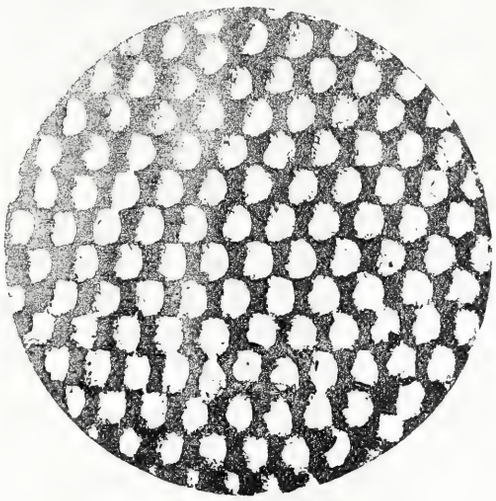


Fig 1.—Group of "eyelenses" ready for the camera.

To prepare the mount for the microscope, select a three-by-one slip of wood, through the centre of which a small hole has been bored. Lay the cover glass with the object face downwards over the hole and fasten with a punched gummed label, after the manner of a French paper-mounted slide. Fix the slip firmly in the stage of the microscope. The cornea, being under the cover glass, is protected from injury, and the facets, facing the condenser, are in the right position for our experiment.

Next incline the microscope to a a horizontal position, and fix it in its place upon the baseboard of the camera. Correct the objective to the thickness of the cover glass, remove the mirror, and the diaphragms and stops from the substage condenser. Place a microscope lamp about ten inches from the condenser, with its flame in the optic axis of the apparatus and the bull's-eye turned aside. Withdraw the camera *pro tem.*, and proceed to focus up the middle of the object. When the field is full of sharply defined hexagons, and an image of the lamp flame is seen in the middle of the field, the centering may be regarded as correct. Upon the next move depends the success of the experiment. Rack down the substage condenser until its front is about half an inch from the object, and then proceed very slowly, by means of the coarse adjustment, to rack the body tube of the microscope back from the object. The hexagons will go out of focus, and nothing can be seen. Continue the backward movement a little farther, and a number of points of light will appear, disposed in rows across the field. Focus with the fine adjustment until sharply defined, and it will be seen these points of light are inverted images of the lamp flame, each one formed by a "lens" in the cornea. By racking the Abbé a little nearer to the stage the image in each facet will be seen to increase in size, and *vice versâ*. The focus of the objective remains fairly constant for all positions of the condenser, provided this latter is not too near. Tracing the path of light (fig. 2) we fine an image of the radiant is formed in the principal focus of the condenser at A, which, being at a considerable distance from the cornea, is practically in the indefinite (anterior) focus of the "eye lenses," B. An image is again formed in the principal (posterior) focus of each "eye lens," at C, and when this plane, C, is in the focus of the objective the observer at the microscope can see an image of the radiant through each facet in the field. The corneal convexities, however, are not all of the same diameter and radius, so that, where a number will yield a sharp outline of the radiant, others will produce a blurred and indistinct image; but, as the area covered by a half-inch object is very small, there should be little difficulty in finding a group of facets of similar focus. The subject to be photographed may now be considered; it should be either self-luminous or white. If the former, a window with open landscape beyond will answer, but, on account of its large size, must be relatively more distant from the instrument. By



Fig. 2.—The "eyelenses," B, act as telescopes. Aerial focus at A and C

artificial light, opaque figures pasted on a ground-glass screen illuminated from behind may be tried, but the most satisfactory photographs are those of white subjects by reflected light, such as a bust or statuette. For the purpose of my experiment, I have chosen a small chalk bust of Her Majesty the Queen, and is it not appropriate that the noblest and greatest monarch the world has ever seen should be the subject of a photograph through the most infinitesimal lens known to science? Remove the lamp, and in its stead place the object to be photographed in the optic axis of the apparatus, and, say, eighteen inches distant from the condenser; the exact distance will depend upon the amount of subject it is intended to include. It will now be necessary to bring to bear upon the subject all the available illuminating power at our disposal. Two Welsbach gas lights, being easily obtained, will do. Place one on either side of the subject in such a manner that their combined rays shall play upon the surface to be photographed. Two curved pieces of new tinplate, placed between the burners and the camera, will improve the illumination, and prevent any direct light from entering the condenser. Both burners and reflectors should be as near the object as possible, but must not trespass upon the subjective field. Examine through the microscope, using the substage pinion freely, until an image of suitable size and definition is seen in each facette. Attach the camera and fine focussing rod, and see that all is light-tight; the bellows may be stretched twelve to eighteen inches. In spite of the large amount of light reflected from the subject, the rays transmitted by the facettes will be extremely faint, owing to their minuteness. They rarely exceed one-thousandth part of an inch in diameter, and it will be found impossible to project through them an image visible upon the ground-glass screen, though the latter be most finely obscured. But the photo-micrographer will have more refined methods at his disposal to meet the greater delicacy of his work. Having removed the obscured screen from the frame, insert in its place a piece of plain glass of the same size; a spoiled negative from which the film has been stripped will answer excellently. A focussing eyeglass will now be required, and it must be so adjusted that, when resting upon the plain glass screen, the furthermost surface of the latter is in focus; this is best accomplished by applying with the finger scales from a moth's wing, or other minute particles upon that surface. Having arranged the eyeglass to our satisfaction, we can return the plain screen to the camera and proceed to focus the subject. To do so, the operator must retire a little from the eyeglass, so that its lens is seen to be full of light; this will occur when his eye and the screen are equidistant from the lens and in its principal focus. The writer uses a glass in which both distances are determined by a tube. But the images which appeared to the observer at the eyepiece of the microscope will not be in focus at the screen. We have lengthened the major conjugate focus of our apparatus, and must therefore shorten the minor. By means of the fine adjustment rod, cause the objective to approach the object, keeping a sharp look-out for images through the focussing glass. It is not by any means easy to determine the exact point at which the images are best defined, and probably many "ins and outs" will be tried before a satisfactory focus is established. Presuming the objective to be of the usual achromatic type corrected for an optical focus, an isochromatic plate—the most rapid obtainable—should be employed, as the plates so designated are extra sensitive to the yellow or visual rays within the C and E lines of the spectrum. Exposure will depend, among other things, upon the desired size of the images and consequent camera stretch, and may be as much as, or more than, three hours. I shall not here enter into details of development; that formula with which the operator has had most experience is the best. Although the first plate *may* prove a success, it is advisable not to remove any of the apparatus until a satisfactory negative has been obtained.

In the distribution of visual organs, nature has been most lavish to the insects, and we are filled with astonishment when we reflect that from a dragon-fly's head we could obtain twenty-five thousand perfect lenses, so minute that a million of them would not cover a square inch of surface, and yet each be capable of yielding a recognisable photograph. Had nature provided man with eyes in similar profusion, how much more could he have seen of her wisdom?

Fred. W. Saxby.

SWEETSER'S IMPROVEMENTS IN OPTICAL LANTERNS.

An important feature of this invention is the construction whereby the jet, the condenser, and the objective are carried on one frame, which is capable of swinging as on a pivot, so that the optical and illuminative portion of the lantern can be tilted as a whole, for the purpose of adjusting the position of the disc on the screen, without necessitating the tilting of the base of the lantern. When tilting the optical and illuminative portion of the lantern as above indicated, the position of the jet with respect to the condenser and objective remains unchanged, so that the adjustment of these parts is not deranged by such tilting movement. The objective is mounted on tubular arms, which can be moved readily to and fro for focussing purposes independently of the other portion of the lantern.

Another feature is the utilisation of the base of the lantern as a carburetter or saturator. For this purpose the said base is made hollow, and packed with some absorbent material, charged with ether or a suitable hydrocarbon, for carburetting the oxygen gas passed through it, which is a substitute for the hydrogen in the oxyhydrogen light.

A further feature is the provision of a cover or hood made of fireclay or other refractory material, for enclosing the light, and so dispensing with the box usually provided for that purpose. This hood is mounted on the mixing chamber of the jet, which is suitably shaped to receive it, and, by preventing the radiation of the heat, it increases the efficiency of the lime jet.

Fig. 1 is a side view, partly in section.

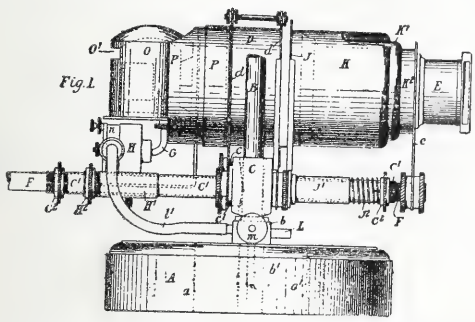
Fig. 2 is a plan, and

Fig. 3 is a rear end view of the lantern.

Fig. 4 is a horizontal section on the line x, x, and

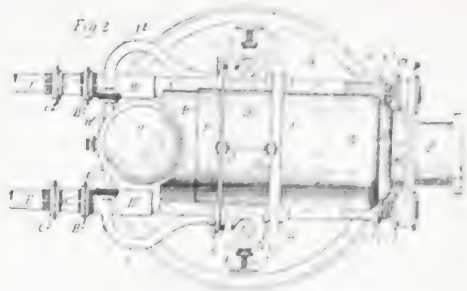
Fig. 5 is a vertical section on the line, y, y, of fig. 3, illustrating certain details.

A is the base of the lantern, made preferably of sheet metal, and hollow, to permit of being packed with a suitable absorbent material, which is intended to be charged with ether or a light hydrocarbon, to serve the purpose of a saturator. Usually a portion only of the base, as indicated by the dotted lines a, a (fig. 1), need be utilised for the saturator. a^1 is the neck through which the absorbent material and the ether or hydrocarbon



are introduced, the same being closed by a cap when the base is charged. In some instances a separate and removable saturator may be enclosed in the hollow base, A. Secured to the base are two pillars, B, B, which carry the optical portion of the lantern, the latter being constructed with sleeves, C, C, that are threaded on the pillars, B, and rest with their rounded lower ends upon the blocks, b, b. For greater strength the blocks, b, b, are passed down through the base, and secure them to the bottom base plate as well as to the top. The holes in the sleeves, C, are not cylindrical, but are elongated in one direction at the top and bottom, or, in other words, they are coned from the centre towards the ends, as indicated by the dotted lines (fig. 1), so that the sleeves can rock forward and backward on the pillars. Screws, c, c^1, are provided to control the rocking movement, and to lock the sleeves in any desired position. The condenser, D, is carried by plates, d, d, that are secured to the sleeves, C, and the objective, E, is carried by a plate, e, which is secured to the forward ends of the two tubular arms, F, F, which can slide freely through horizontal tubes, c^1, carried by the sleeves, C. The tubular arms can be lengthened by additional pieces screwed therein. The objective is focussed by seizing the rear ends of the tubular arms, F, and sliding them backwards or forwards in the tubes, c^1. The focussing can be done usually with sufficient accuracy and speed by simply sliding the arms, F, as indicated, but, if desired, a rack-and-pinion or screw device of the usual kind may be added to facilitate the final adjustment of the objective. The jet, G, projects from the front of a mixing chamber, H, which is carried by a pair of sleeves, H^1, that are constructed to slide upon the tubes, c^1. It will thus be seen that the whole of the optical and illuminative part of the lantern is carried by the sleeves, C, which, as above stated, are capable of a rocking movement in a vertical plane. By this means the axis of the lantern can be tilted very conveniently, and the images or discs from two or more lanterns thereby easily and quickly registered on the screen. Usually the forward end of the lantern is made heaviest, and the tilting is effected by turning the upper screws, c. When the desired adjustment has been effected, the sleeves, C, are locked by means of the lower screws, c^1.

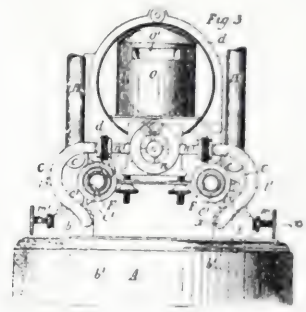
The ends of the tubes, c^1, are split longitudinally, and are screw-threaded and fitted with nuts, c^2, by which the tightness of the tubular



arms can be regulated so as to control the ease with which the said arms can slide through the tubes. Similarly the sleeves, H^1, are slit and fitted with nuts, H^2, to control their tightness on the tubes, c^1.

The plate, J, for cramping the lantern-slide carrier in its place is carried by sleeves, J^1, that can slide freely on the forward ends of the tubes, c^1, their position being controlled by springs, J^2, which keep the cramp pressed rearwardly against the slide-carrier. The space between the plate, J, and the objective may be left open, or it may be enclosed by a light frame covered with opaque material, or it may be enclosed by telescopic tubes, K, K^1, K^2. The tube, K, is fixed at its rear end to the plate, J, and the tube, K^2, is fixed at its forward end to the plate, e, that carries the objective, and the middle tube, K^1, is supported by the other two tubes. These tubes fit loosely in each other. In case there are more than three such tubes, the middle ones are provided with a plate, such as e, for supporting them on the arms, F, F.

The oxygen enters by the tube, L, secured in the block, b, on the right side of the lantern. A portion of the gas escapes by the passage, l (fig. 4), and thence by the flexible tube, l^1, passes to the mixing chamber, H, and the remainder of the gas passes down the passage, b^1 (figs. 1, 4, and 5, in the block, b), and enters the saturator. Thence it escapes by a similar







passage in the block, b, at the other side of the apparatus, and is conducted by the flexible tube, l^2, to the mixing chamber. In its passage through the saturator this portion of the oxygen takes up the volatile hydrocarbon with which the absorbent material therein is saturated, and becomes charged with the vapour, so that after mixing in the chamber, H, with the oxygen entering by the tube, l^1, it produces the heat suitable for generating the desired brilliant light. The proportions of oxygen gas passing direct to the mixing chambers and out of the saturator are regulated by cocks, m, m^1, which are provided to control the respective passages. Instead of connecting the flexible tubes, l^1, l^2, directly to the mixing chamber, Mr. Sweetser prefers to connect them to the hollow radial arms, n^1, of a plug, n, which is centered at the rear of the mixing chamber, and communicates with said chamber by suitable passages in their adjoining faces. By turning or tilting the plug, as indicated by the dotted lines in fig. 3, the communication with the mixing chamber is cut off, except for a small bypass provided to keep the light in, and full communication is established again on turning the plug back to its normal position. This device forms a very convenient form of cut-off or dissolver. The mixing chamber is constructed to receive a fire-clay cover or hood, O, for enclosing the jet and the limelight illuminant. This cover is perforated at o^1, to allow of the escape of the heat and fumes from the jet, and is open at the front to allow the light to pass to the condenser. P, P, are telescopic screens to confine the light between the condenser and the hood, O, and thus prevent diffusion in the room, while at the same time allowing the products of combustion to escape freely without settling on the condenser lens. A similar screen may be placed for the same purpose at the back of the fireclay lime cover.

The pillars, B, are shown broken. They may be extended by suitable pieces, that screw on and off, to receive two or more lanterns constructed as above described, and so forming a biunial or a triple lantern. The pillars, B, and their extension pieces are made hollow, and communicate at their lower ends with the passages in the blocks, b, b, as shown in fig. 5, and thus serve to convey the gases to the upper lantern or lanterns.

STEREOSCOPIC ANIMATED PHOTOGRAPHY.

Mr. Eugen Sandow has patented an invention for the production and exhibition of pictures of objects which appear to the spectator to move, and it is designed to enhance the realistic effect of such pictures.

It consists principally in so modifying the apparatus by which the pictures are exhibited, and in so taking and mounting the pictures, that two images are seen simultaneously and produce the effect of an ordinary stereoscopic picture, these pictures being, however, caused to succeed each other so rapidly by any known means that not only is the stereoscopic effect produced, but also the effect of motion of the object or objects on view.

The photographs are taken in a stereoscopic camera arranged to take a series of quickly succeeding instantaneous views of the object or objects to be exhibited.

These photographs may be taken on two films simultaneously. He prefers, however, to take the photographs in pairs upon a single continuous film, and in this case he also proposes to use a third lens between the two lenses which take the stereoscopic pictures, the camera being so formed as to take on the same film a third set of views of the same moving object or objects, suitable for exhibition as a single set of ordinary "living" pictures by any well-known means. In this manner he not only obtains the advantages of absolutely correct correspondence of each pair of stereoscopic pictures, but he utilises the space (which would otherwise be useless) between the two negatives of each pair of pictures.

The apparatus by which the double series of stereoscopic pictures are exhibited may be similar to that by which ordinary living pictures are now shown (to be viewed directly through a sight opening or openings), but modified, of course, so that the pictures are arranged to be seen directly in rapid succession through a pair of stereoscopic viewing lenses.

Mr. Sandow's claims are for producing a double series of pictures of a moving object or objects, and so mounting the same behind stereoscopic viewing lenses, that the pictures can be made to succeed each other rapidly, so that the combined action of the said lenses and the motion of the pictures shall produce the effect of an object or objects in relief as well as in motion; also for taking three series of photographic negatives of an object or objects in motion upon a single film, two to be used for producing a double series for a stereoscopic living picture, and one a single series or set for an ordinary "living" picture.

NEVE'S APPARATUS FOR TAKING AND EXHIBITING ANIMATED PICTURES.

Mr. C. R. Neve uses two rolls of film or transparencies, portions of which are exposed or exhibited alternately, and, by means of a shutter dissolved one into the other, thus giving a continuous animated picture.

Fig. 1 of the drawings is a sectional elevation; fig. 2 is a front elevation.

In carrying the invention into practice, he uses two rolls of sensitive film or transparencies, A, which unwind from rollers independently from

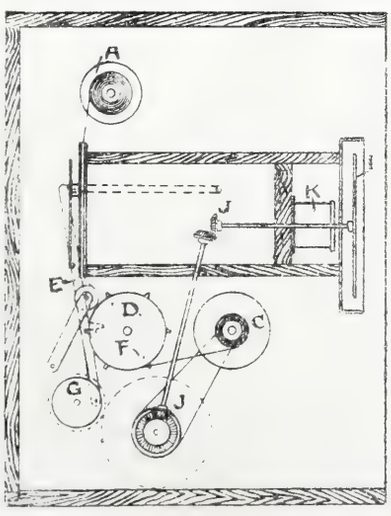


Fig. 1

a fixed bar or spindle, B (fig. 2). The two rolls are rewound on to the other rollers, C, after each, pressing against and moving with two larger rollers, D (fig. 1), having projections which engage in perforations previously made in the film. These larger rollers, D (fig. 1), are made to rotate alternately to the extent of the width of each picture, by means of two radial tappet levers, E (fig. 1), which have projections that engage pins, F (fig. 1), at the sides of the two larger rollers, D (fig. 1), before mentioned. The radial tappet levers, E (fig. 1), are attached to discs, G (fig. 1), on either side of a spindle, connected by small cog-wheels to another spindle which is revolved by hand or other power.

A rotatory shutter or dissolver, I, works from the driving spindle by means of bevel wheels, J (fig. 2), for the purposes of shutting off light

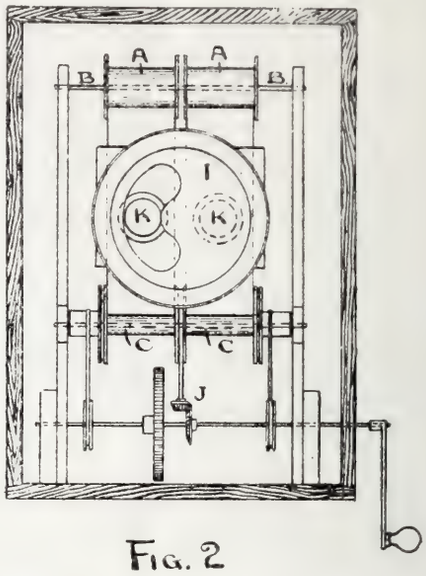


Fig. 2

from the roll of film which may be in motion, and exposing or exhibiting the side which is momentarily stationary.

A pair of lenses, K, are fixed at their focal length each directly in front of one of the bands of film or transparencies.

For exhibiting, Mr. Neve arranges a pair of condensers behind the transparencies and suitable illumination such as is used in the production of dissolving views.

ELECTRIC LIGHT AND THE NERVES.

According to a New York correspondent, the electric light has brought a new terror to mankind. The incandescent lamp, with the bulb hanging over every desk, found in every office, every workshop, every public building, at our elbows, over our heads, carries in its rays, according to the belief of many well-known physicians, the germs which shall slowly, imperceptibly affect the mind.

Every electrician, from Edison and Tesla downwards, knows that the ultra-violet ray, which we laymen know as the X ray (?), enters infinitesimally into the composition of the incandescent light. The proportion of violet rays is of the minutest, but in this incandescent light, hanging over the desk or the bench at an altitude of a few inches above the worker's head, there is sufficient of the violet rays to gradually destroy the nerves of the scalp, and thus lay the foundation of nervous disorders and resultant insanity.

The man of the business desk, the mechanic, the professional man, suffering from nervous headache, may suppose the trouble to be intercranial, when, as a matter of fact, the scalp nerves, both numerous and delicate, being exposed for many hours each day to the rays of the electric lamp, have been weakened, and finally destroyed. More than a decade has passed since the electric light first came into universal use. In these ten years the scope of action has increased exactly five hundredfold. Of just how many professional men—book-keepers, type-writers, and others—have been driven to insanity and death under the gentle, penetrating influence of the violet ray there is no clear record, although many physicians hold that at least fifteen per cent. of the total number of cases of nervous prostration recorded each year may be attributed to this cause.

Dr. Alfred C. Crain, a physician who has obtained a wide professional reputation in his treatment of nervous disorders, is responsible for the discovery of the newest among the causes of insanity.

"There is insanity in the ordinary incandescent light," says Dr. Crain, "as there is gold in the water of the ocean, and the germ of many nervous disorders masquerades as the violet ray.

"I have arrived at this conclusion only after long study of the subject and after minute painstaking collection of the necessary data. Of what these data consist," said the doctor, "I am not prepared to tell. I feel that my discoveries should first be disclosed to the medical press, and then to my professional brethren.

"When the electric light first replaced oil and gas," continued the doctor, "a number of experiments were made with the view of proving that the light had no effect upon the brain or upon the eyes. But these experiments were not sufficiently extended. It was impossible to form any conclusion regarding the cumulative effect of certain of the component rays of this light.

"As physicians administer minute quantities of drugs to counteract the effects of organic disease, so the violet rays absorbed by the nerves of the scalp will continually destroy them. That the X ray does destroy animal tissues was long ago established."

In conclusion, Dr. Crain cited two of the test cases that had fallen within his own experience. A young girl, undergoing a course of study with a view to entering Vassar College, was seized with severe headaches and nervous depression. Dr. Crain, treating the case as one of ordinary calibre, prescribed complete rest, and incidentally administered tonics. The patient's condition grew steadily worse. Dr. Crain finally discovered that the girl had been in the habit of reading at her desk with an ordinary incandescent drop light that hung within a few inches of her forehead.

"Stop the use of the light," said Dr. Crain, "and the headaches vanished.

A second case cited by Dr. Crain was that of a newspaper artist attacked by neurasthenia. The substitution of a student's lamp for the powerful bulb light provided by the management of the newspaper removed the trouble.

Mr. Cyrus Edson, admittedly one of the first medical authorities of the world on the properties and qualities of the violet rays, accepts Dr. Crain's view in a modified form.

"The cumulative effect of the X ray upon the nerves," said Dr. Edson, "has never been scientifically observed. I had a case, however, in which I suggested to the patient, a public official in the City Chamberlain's Department, that he should alter the arrangement of lights at his desk in order to be relieved from headache. I know that the X ray will destroy the animal tissues. There are many established cases in which the hair, beard, and eyelashes fall out from its effects, and the effect of the X ray is identical with that of great heat. Undoubtedly, the subject is worth serious consideration, because, while the X ray itself may not directly penetrate through the scalp to the brain, it is reasonable to suppose that it may affect the nerves of the scalp, and a nervous disorder frequently degenerates into complete mental collapse. The whole subject should be threshed out as being an important and integral part of inquiry as to the effects of modern civilisation and modern appliances upon the growing proportion of mental and physical disorders."

Dr. Robert Stafford Newton, the criminologist of the District Attorney's Office, recalls cases in which elevator men had complained of headaches while riding in cars in which incandescent lights were used. With the removal of the lights the headaches disappeared. Dr. Crain, Dr. Edson, and several medical experts on nervous diseases have been busily making extensive experiments in this new field of investigation, and startling results may presently be expected.

TEN YEARS OF PROGRESS.

Something New under the Sun.

It is the fashion in certain quarters, says a writer in *La Nature*, to speak in disparaging terms of science and its improvements. M. Berthelot, the eminent chemist, has eloquently exposed the injustice of these estimates, but they are most effectually refuted by enumerating the leading scientific achievements which have shed lustre upon the closing years of our century. Let us suppose that some ordinary mortal had fallen into a deep sleep just after the closing of the Exposition of 1889, less than nine years ago, and therefore knew nothing of the advances made since then, up to the date of the next great international celebration. The following would be the principal objects of his admiration and study:—

1. The bicycle, which is revolutionising our manners, and of which he could have seen only a few specimens, and these but clumsy contrivances compared with the little queen of our day. 2. The automobile carriage, driven by petroleum or electricity, whose promise is perhaps even greater than that of the bicycle. 3. Electric railways, almost unknown in 1889, but which will completely change the working methods on our great trunk lines in the next century. 4. Polyphase currents, which enable us to transmit and distribute the motive forces of nature to any distance. 5. The Laval turbine, a new process—from the industrial view point—for utilising high pressure steam. 6. The internal-combustion motor of M. Diesel, the most economical means as yet devised of transforming heat into work. 7. Calcium carbide, which generates acetylene, one of the illuminants of the next century. 8. The cinematograph, over which our capacity of wonder has fairly exhausted itself. 9. The Röntgen rays, which are revolutionising the healing art. To these nine new discoveries, or great inventions, whose results are secure, and are daily availed of, for our profit or pleasure, we may add: 10. Liquid air, for industrial purposes. 11. Colour photography, in which the surprising results recently obtained by MM. Lumière have just been laid before the Academy of Sciences. 12. Wireless telegraphy, an invention full of promise. 13. Cold light, produced by luminescence of rarefied gases traversed by the electric current. 14. High frequency currents, with which Tesla and d'Arsonval have performed such wonderful experiments

In less than ten years, merely within the domain of mechanics and physics, we have here fourteen new sensational discoveries, to be added to the already long list.

THE SURINAM LANTERN FLY.

The following correspondence recently appeared in a daily contemporary:—

"I find the following amongst the 'Scientific Notes' in the *English Mechanic*, and am curious to know if this is known in this colony. Possibly Mr. Quelch will be able to enlighten your readers. 'The lantern fly of Surinam, Dutch Guiana, has two sets of eyes, so as to catch the light from all directions. Its light is like that of the ordinary firefly, but is much more brilliant.' Curious."

"As an answer to your correspondent 'Curious,' will you kindly allow me to say that the insect referred to appears to be the peculiar Hemipteron known as Fulgora, which was described by Madame Merian in her work on the Insects of Surinam, and whose light was said by her to greatly exceed that of the common fireflies, though it has since been denied that the insects are at all luminous. Instead of being allied to the various other forms of so-called fireflies—which are in reality fire beetles—the lantern fly is closely allied to the Cicadas, locally known as 'six-o'clock bees,' but is rendered very peculiar in appearance owing to their elongated, swollen, sack-like protuberance in front of the head, which is said to give forth the brilliant light. They certainly possess simple eyes as well as the compound pair; but in this they are like the great bulk of the insect class. The lantern flies are distributed over the Guianas, and the Indians here state that they give forth light. A young English collector, too, once assured me that a specimen in his collection had been caught by him up the Camooni Creek, the bright light having attracted his attention. On the other hand, other collectors have stated that they secured living specimens which never emitted any light. From this it would appear that the luminosity is not constant nor regular; and it may be that it is only manifested during periods of sexual excitement. No living forms have ever come under my notice, though occasionally, while travelling in the interior, the intense brilliance of the larger forms of the common 'three-lights' firefly has often deceived me, and led me into the chase of an imaginary lantern fly. Dead specimens can be seen in the museum. J. J. Quelch."

THE PERCEPTION OF COLOUR.

At the recent Annual General Meeting of the Victoria Institute, Sir G. G. Stokes, Bart., F.R.S. (President) delivered the address, and took for his subject, "The Perception of Colour." He observed that all scientific men recognised the imperfection of their knowledge with regard to the perception of colour. Something had been done experimentally, partly by way of establishing certain laws as to the direct perception of colour, and partly by way of investigating other perceptions which might guide them by analogy towards forming some conception of the requirements demanded in our bodily organization for the perception of colour. The subject lay on the borderland between physics and physiology; but, so far as his own knowledge extended, it seemed to him that there was one theory which had by far the greatest amount of probability. This was the one known as the "Young-Helmholtz" theory. It was now universally admitted that light consisted of vibrations. They sometimes said that colours harmonised; but there was absolutely no phenomenon known in light answering to the sensation of harmony in sound. It had long been suspected that in light there was a kind of triplicity, that the three kinds of light would give all the sensations of colour by mixing them together. Some had speculated on the possibility of there being an objective quality in light answering to redness, greenness, or blueness, or whatever trio of colours might be taken; but there was absolutely nothing objectively in light that they knew of which answered to redness as such, yellowness as such, or blueness as such. Dr. Young believed there were three primary sensations of colour, and that they were called up simultaneously when any colour was presented, but in different proportions according to the nature of the colour. Those primary sensations were red, green, and violet. Those might be taken as the three standards of colour, because, by their mixtures, the other colours could be most closely reproduced. The theory was taken up by Helmholtz, and was now known as the "Young-Helmholtz" theory. Under this theory three classes of nerves were brought into play, and what scientific men had now to explain was how it was that the stimulation of these nerves produced the three different sensations which he had spoken of as primary. Helmholtz had advanced the theory that it was due to some photo-chemical action, and possibly there might be something in that suggestion; but, at any rate, the subject was a very difficult and speculative one; but it led to some interesting contemplations. One thing they could not fail to be strongly impressed with was the wonderful complexity of that marvellous organ, the eye and its retina, and the proof which, to his mind, it gave of design in its construction.

ACETYLENE NOTES.

The Berlin Patent Office has nullified Bullier's calcium carbide patent, and, in view of the constantly growing importance of acetylene, it is worth while to review the facts of the case. Bullier was Moissan's special demonstrator, and the patent was granted in 1894 for the only practical

process of producing calcium carbide in the electric furnace. This German patent of the French chemist became the property of the Neuhausen Aluminium Company, and, as they made difficulties over granting licences, it was a stumbling-block in the way of the development of the acetylene industry in Germany. Hence, now that it is swept out of the way, carbide will quickly become cheap in the Fatherland.

As a matter of fact, it is astonishing that the German patent was ever granted or that the Frenchman Bullier should have claimed the invention. Wilson, an American, obtained English and American patents in 1893 for the production of calcium carbide exactly in the same manner, and even his patents were not unassailable, seeing that a German chemist, Professors Borchers, had made the first communication of the method of producing calcium carbide ten years before. The German Patent Office accorded the patent to Bullier for crystallised carbide, but Lord Kelvin affirms that the calcium carbide sent to him by Wilson in 1892 was in perfect crystals.

The susceptibility of carbide of calcium to the action of water renders it very important that it should be very carefully packed. It is usually put up in metal cases, and these have themselves to be protected from damage during transit by stout wooden boxes. An American has now hit upon the plan of waterproofing the carbide with a kind of varnish, so that it may be carried loose in bulk. If the waterproofed pieces are broken before use, unprotected surfaces will be exposed and acetylene can be generated. The idea is very good. There would be no difficulty in applying the varnish, unless the carbide-maker insisted on his men putting it on with brushes.

The Acetylene Exhibition at Berlin, which was originally planned for Cannstadt, near Stuttgart, took place at Berlin on the Kurfürstendamm recently, in connexion with an acetylene conference. Acetylene generators were exhibited by thirty firms, but most of them were not shown in operation, owing to the strict regulations enforced by the police. The generators in action had each to be shown in a special compartment not accessible to the general public, behind a strong wall. This was not in itself calculated to inspire the citizens of Berlin with a very happy idea of the safety of the new illuminant. Progress could be recognised in the exhibits, but as yet there does not appear to be any special type which is the favourite. Acetylene-purifiers proved to be necessary adjuncts. Among the impurities of acetylene less thought of in general is phosphuretted hydrogen. In spite of purifying, the hall every evening was foggy with fine dust of the phosphoric acid. Next year the meeting will be held at Budapest.

The National Board of Fire Underwriters of New York at its recent annual meeting, approved a set of rules for governing the acetylene gas hazard, because of the attempts to introduce acetylene gas as an illuminant in various parts of the country. These rules are based upon a special investigation of the gas by Professor Henry Morton, of the Stevens Institute of Technology, undertaken at the request of the National Board. The special sub-committee of the Board, in its report upon the work of Professor Morton, stated that there was a growing demand from department stores and other general stores, where bicycles or bicycle sundries are dealt in, for permits to keep and sell calcium carbide and portable lamps for its use. Acetylene gas is produced by the action of calcium carbide on water, and is rapidly coming into use for illuminating purposes. Various bodies of insurance men have attempted to control the conditions of its installation, on account of its great instability and tendency to cause destructive explosions. The rules adopted by the National Board last week for its regulation will now be referred to the several associations throughout the country, with the hope of obtaining a uniform standard. The more important of these new requirements for the installation and use of acetylene gas are as follows: The generating and gas-holding apparatus, when installed for lighting buildings in the closely built-up portions of towns and cities, must be situated in an outside, fireproof, and well-ventilated building. All generating apparatus should be in charge of persons properly instructed in their management. No artificial light should be used inside of the building in which the gas is generated, and no heat except steam. Bicycle and other portable lamps, in which acetylene gas is generated and supplied direct to burners, should not be approved until such lamps are so constructed that they will cease to generate gas immediately upon the extinguishment of the flame. The storage of liquid acetylene in any building, or the use of liquid acetylene gas, should be absolutely prohibited. In regard to the construction of the generator and gasholder, it is recommended that only wrought iron or steel, capable of resisting an internal pressure of twenty pounds to the square inch, should be used, and under no circumstances should copper or any alloy containing copper, such as brass or bronze, be employed, since acetylene sometimes forms a compound with copper with great violence when heated or struck. It is also recommended that the generator be so designed that it can be supplied with calcium carbide, and the residuum withdrawn without the escape of gas or the admission of air, in order to ensure the prevention of dangerous explosive admixtures of air with the gas in the generator.

Letang and Serpollet have devised a means of making the evolution of acetylene from calcium carbide and water more regular, by preventing the usual clogging of undecomposed portions of the carbide by the lime resulting from previous action of the water, and which is virtually insoluble. This they do by steeping the carbide in a concentrated solution of glucose and then drying it. When the carbide is subsequently exposed to the action of water a soluble saccharate of calcium is formed and the clogging is obviated. It is found in practice that if the water comes into contact with the glucosed carbide in excess, from ten to twelve per cent. of the sugar is a sufficient quantity to add.

In a paper presented to the Académie des Sciences, M. P. Janet gives the results of his researches upon the temperature of incandescent filaments. The experiments were made on four lamps of ten candle power at sixty-five volts. The results showed temperatures of 1720, 1610, 1620, 1630° C.

"In an escape caused by a tap being left on," says a recent writer, "the average coal-gas burner will pass at least 5 cubic feet per hour, during which time an acetylene burner would only pass ½ ft. of gas, while if the escape were caused by a hole in the pipe, the amount of gas escaping would depend upon the specific gravity of the gas; the specific gravity of coal-gas is ·4, that of acetylene is ·9, thus the proportionate amount of gas escaping under similar conditions would be two (2) volumes of acetylene to 3 of coal-gas. It will thus be seen that while, if the escape is caused by a tap being left on, the comparison is overwhelmingly in favour of acetylene, if it is caused by a hole in the pipe the two are practically equal. This is without taking into consideration the odour of acetylene, which makes no mistake about giving warning of any escape."

Professor Küttner, of Tübingen, has, says the *Lancet*, been making some interesting experiments with the Röntgen rays at the Constantinople Hospital. In his report, just issued, he says that, while the apparatus proved of service when applied with the screen, it was rarely possible to take a satisfactory photograph on account of the difficulty of bringing the patients into the proper position. The former method proved often the only way to ascertain the site of a projectile which had entered the body and had remained there. This was applicable to all parts of the body except the stomach and head. A bullet in the brain, for instance, showed very indistinctly. Professor Küttner says it is noteworthy that splinters of bullets and of bone which had penetrated into the soft parts of the body could not be distinguished from each other. Also, he says, it was proved that the opinion that deep-lying masses of pus could be located was erroneous. Injuries to the central nervous system, the spinal cord, and the peripheral nerves were solely ascertainable by the aid of the Röntgen rays. It was impossible to do this before. Futhermore, it could be seen whether a bone was totally or only partially severed—a matter of great importance as far as therapeutics are concerned. For shot wounds in the extremities he recommends that a photograph be taken. His conclusion is that the Röntgen rays are of great importance for medical aid in war, but only for fixed hospitals, such as reserve hospitals and those installed in fortresses, while for moving field hospitals their application is very limited.

According to a Magdeburg firm which uses the chimneys having holes near the bottom, with 500 of its incandescent gaslights, only one out of this number was found broken at the end of forty hours. It is claimed that an increase in light of twenty five to sixty per cent. is obtained by the use of these chimneys, the advantage lying in the fact that the air drawn through these openings impinges directly upon the mantle, carrying away the products of combustion and supplying fresh air for combustion at the same time. With the most improved burners, which mix with the gas sufficient air for combustion, it is difficult to see what advantage the addition of more air would have, but there may be some advantage in freeing the outside of the mantle from consumed gases. The Jena chimneys are well known, and those having holes near the bottom have been in use over a year. But a new design has just been produced and described by Dr. Schott, of Jena, in *Jour. für Gasbeleuchtung* (June 25). It consists in a wide flaring top globe, which fits upon a closed gallery. A wide chimney fits into this, coming down as far as the burner top, and being about two and one-half times the length of the mantle; the outside globe reaches above the mantle about half a mantle length. Between the globe and chimney is a wide air space, down which the air passes, part going up inside the chimney and part going down to the Bunsen shutter. By this means the chimney is kept cooler, and the air is heated before burning. Tests made with a burner and gas under a 1·4-inch pressure, and burning 3·75 cubic feet per hour, gave for a chimney drawing air through the gallery 77 candles; with the draught holes in the chimney, 88 candles were secured; while, with the new globe and chimney arrangements described, 92 candles were obtained. There is claimed for this new arrangement a greater yield of light, greater resistance against the influence of wind, less danger of breaking mantles by replacing chimneys after cleaning, short length and small price of new "hanging chimney," and absence of any striking back on the part of the Bunsen burner upon lighting. These are pretty wide claims, and are probably somewhat offset by breakages caused by heating or rattling of glass on glass, by loss of light in passing through two thicknesses of soiled glass, and also by the necessary increase in the weight of the apparatus. Other considerations will suggest themselves at once on an inspection of the design.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*September* 2, 1898

THE LANTERN RECORD.

CONTENTS.

	Page
LANTERN NOTES AND NEWS	65
LANTERN MEMS. By G. R. BAKER	66
THE CINEMATOGRAPH ACCIDENT	67
ON THE RELATIVE POWER OF LANTERN ILLUMINANTS	67
A NEW WAY OF PREPARING OXYGEN	67
CINEMATOGRAPHY ON A CRUISER	68
THE RÖNTGEN RAYS IN MILITARY SURGERY	68
FOSTER'S "TWIN-LENS" CAMERA	69
THE SEARCHLIGHT IN NAVAL WARFARE	69
JUNGK'S CAMERA STAND	69
MANDL'S PORTABLE DEVELOPING BOX	70
NEWTON'S LONG-RANGE ELECTRIC LANTERN	71
NEWTON'S "UNIVERSAL" SCIENCE LANTERN	71
THE STEREOSCOPE AND STEREOSCOPIC PHOTOGRAPHY	71

LANTERN NOTES AND NEWS.

Messrs. Newton & Co., of 3, Fleet-street, E.C., are just issuing a new supplementary catalogue of lantern slides and lanterns. It has mention of many novelties in lantern and cinematographic projection apparatus, while among the sets of lantern slides there are specially prepared series illustrating such themes as *Gloucester; Famous Artists and their Work; English History; The Duke of Wellington; The British Army; Westminster Abbey; Bacteriology*, &c.

* * * * *

The illuminating power of oil gas can be practically doubled by mixing it with about twenty per cent. of acetylene gas and compressing to twenty atmospheres. These are the conditions under which it is burned on the German State railways.

* * * * *

M. A. Mouneyrat has found that a mixture of acetylene and chlorine, exposed to diffused light, always combines to form acetylene tetrachloride without explosion, in the absence of free oxygen or any gas that might produce oxygen. If, however, such a gas be present, an explosion occurs, which the author attributes to the formation of acetylene monochloride, which takes fire directly it comes in contact with air.

* * * * *

Sir William Crookes has shown that various gems and minerals glow with a beautiful tinted phosphorescence in the cathode rays of his vacuum tubes, and M. Leconteur and Mr. A. C. Cossor applied this fact to the examination of precious stones and minerals of uncertain constitution. A large number of gems of various kinds, shown under the rays, were quite altered in colour by the phosphorescence. Four large Burmese rubies, for example, weighing twenty-two and a half carats, glowed a fiery red. Singalese rubies were easily told from Siamese by the phosphorescence. Diamonds became a light blue or green; moonstone gleamed like moonlight just after the rays were withdrawn from it; American dolomite was red; tungstate of calcium, a turquoise blue; sea shells, a rich golden yellow and light blue, and so on. Questionable stones can thus be tested without injury to the gem. Moreover, the method is applicable to toxicology in the case of alkaloids, and will be useful in medical jurisprudence.

* * * * *

Chatelier and Boudouard, as a result of some interesting experiments with the incandescent light, have arrived at some important conclusions. It appears that the high degree of luminosity attained by the mantle is not due, as some suppose, to a specially high temperature, say, 2000° C. This, however, did not require much experiment to establish. It is obvious that the temperature of the mantle must be slightly (if ever so little) below that of the flame which heats the mantle. The flames used in incandescent lamps never reach 2000° C., and the real temperature is the same as that of the free carbon particles to which an ordinary luminous flame owes its light-giving power, namely, about 1600° C. or 1700° C. Another theory, says a contemporary, is that mantles possess a peculiarly high emissive power. The real explanation seems to be that the emissive power of the mantle is, so to speak, to a great extent concentrated at the luminous part of the spectrum, and that they radiate heat badly. It is curious that the luminosity of the mantle is greater than that of either thoria or ceria. "This we can only explain by supposing that the two oxides are in a state of actual chemical combination in the mantle. We have called attention in a previous issue to the importance of the presence of ceria in the mantle, although it only forms one per cent. of it, against the ninety-nine per cent. made up by the thoria."

* * * * *

What is described as a simple method of restoring the illuminating power of mantles was recently reported by Franck to the Polytechnic Society, at Berlin. As is well known, the mantles relax in illuminating power after they have been in use for some time. This luminosity may be restored to a certain degree by blowing out the mantle from the inside during the burning, which can be accomplished with the aid of a small glass or paper tube. The President of the said Society stated that he had personally tried this medium and had found it effective and, in consequence, recommendable. In order to facilitate the carrying out of the process, the German Incandescent Gaslight Company manufactures a tube, mounted in a rubber ball, which is very convenient for the said purpose.

* * * * *

To lessen the risk of explosion with acetylene, it has been proposed to make the gas, in its way to the burners, pass through certain small chambers filled with glass wool. In this way the gas is purified from mechanical impurities by filtration before reaching the burner. The glass wool also fulfils another useful purpose, it will effectually prevent the flame of the burner from striking back, even if by some mischance the pipes should happen to contain an explosive mixture of acetylene and air.

* * * * *

Nernst, of Goettingen, has invented an incandescent electric light in which the filament is of the same material as that used for the mantles of the incandescent gas light. The production of the necessary temperature requires a smaller current with the new filament than with the carbonised filaments already in use, and there is no need to have the filament in a vacuum.

According to M. Bergmann, graphite can be obtained by heating to 150° Cent., and under a pressure of five atmospheres, acetylene gas with oxygenated water. The same result is obtained by bringing calcium carbide in contact with water and treating the mass with diluted hydrochloric acid.

* * * * *

The officers and men taking part in the autumn manœuvres will, during their sojourn on Salisbury Plain, enjoy the comfort of excellent lighting arrangements of a novel character. Liptons, Ltd., to whom has been intrusted the responsibility of the commissariat department, are having the marquees, stores, and canteens supplied with acetylene gas, and upwards of one hundred "Incanto" generators are being used for the purpose.

* * * * *

By request of the Duke of York, the officers and crew of her Majesty's ship *Crescent* were provided with a pleasant entertainment last week, his Royal Highness honouring the proceedings with his presence. A number of cinematograph pictures had been taken on board the ship and in the Channel Squadron. These, together with some other films, were shown to the ship's company. The machine was fixed up on the jetty, alongside which the *Crescent* lies, and the ship's band was told off to play during the entertainment, which the Duke witnessed from the bridge. A magic-lantern show, made up of photographs taken by one of the crew during his Royal Highness's cruise, was also given. These displayed his Royal Highness at his daily routine on the ship, and also several incidents in which the Duchess and Prince Edward of York figure. [See .68].

LANTERN MEMS.

With September here and the end of summer approaching, lanternists have to think of their arrangements for the long evenings and get their apparatus in order. Those who were wise and spent a little time on the metal work before putting the lantern away will find themselves repaid now, but I fear all owners of apparatus are not as careful as they ought to be in matters of this kind. Three good bi-unial lanterns I have seen lately verify this, and the sight of one of them really gave me a shock, for it was one of the most expensive kind, and originally finished in the best manner, so as not only to combine all practical modern improvements, but to be a really handsome apparatus that should please the eye as well.

* * * * *

A little care, the frequent use of a leather to wipe off finger marks from lacquered parts of brasswork, a little oil put on steel parts, and the apparatus kept in a dry place, should have preserved the working parts and prevented the sad deterioration in appearance. Nearly all good lanterns can be taken to pieces readily and cleaned, but, if the owner has not the time to spare to do this, he should send his apparatus to the maker at the end of the season and have it overhauled before storing it for the summer. Certainly the presence of a large quantity of lime dust in the body of the lantern and the general appearance of such apparatus as I have recently seen point to a state of things that could easily be remedied by an occasional dusting and a little care.

* * * * *

What shall be my illuminant this year? is the question that each lanternist will naturally ask himself, and the answer will, to a great extent, depend on his location. If accessible, the electric current should be utilised, for with an electric arc lamp the most perfect definition of projections is obtained, and the light can be of moderate or great intensity to suit the size of the room, whether in a private dwelling or a public hall. The current each year is becoming more and more available, by the extended laying of cables and the multiplication of generating stations, and the simplicity of the arc regulators or lamps, and the method of controlling the current by resistances, of a convenient form, leaves little to be desired from a lanternist's point of view, especially as the resultant light is so perfect on the screen, viz., steady, bright, and completely under control. Moreover, it is always ready, for it is a case of simply switching on the current and making contact with the carbons or striking on the arc as it is called.

* * * *

Suppose the lanternist is not so fortunate to be near an electrical main supply, or the happy possessor of an electric-light installation of his own, the simplest light for him for brilliantly lighted discs of moderate size (ten to fifteen feet diameter) is the injector principle of limelight jet. Here only one gas (oxygen) is required under pressure, the house gas being used for hydrogen direct from the ordinary gas pipes, or gas brackets, after unscrewing the burners. This form of jet has now stood the test of two seasons, and can be said to be quite satisfactory, giving, with a normal pressure of house gas, an illumination of over 500 candle power. For the very best results the automatic regulator attached to the gas cylinders should be fitted with a specially strong spring, so as to get the necessary forcing power, and a modified pattern of regulator has been made for this purpose.

* * * * *

For small-size disc and testing purposes at home the incandescent gas lamp is a most useful light, also for enlarging, and those who already have apparatus for public exhibitions cannot do better than have a convenient incandescent gas lantern as an independent apparatus, and keep it ready to use at any time. A lantern like this at hand, with a small screen to roll up and down like a map, and the optical lantern can be often used with the minimum of trouble, give a great amount of pleasure to friends, and be of assistance in viewing one's own pictures or selecting new ones to add to the collection of slides.

* * * * *

The acetylene light will be again in evidence for lanterns in small halls and village schools and where no ordinary house gas is available, but lanternists should be careful to purchase only certified or tested apparatus, and should, if possible, receive instruction personally from some one well acquainted with the apparatus so as to understand thoroughly the precautions necessary to ensure perfectly safe use. A well-known operator only recently remarked to me that it is a wonder there are not more accidents at lantern entertainments than there are, considering the happy-go-lucky, if not careless, manner some operators go to work, and, when one thinks of the results of a panic, it behoves all who have the interest of the lantern at heart to do all in their power to impress this fact home; for care, patience, calmness, and forethought bring success, while rush and carelessness may mean disaster.

* * * * *

The daily papers every now and then have some account of a panic at a cinematograph or other show, but it is seldom one can get a technical or even clear explanation of the cause of the accident that led to the panic. First accounts will represent that the apparatus exploded; next that a paraffin lamp dropped down from its support and set fire to the apparatus; then that the limelight apparatus failed, a leaky joint took fire, and another account says that the films somehow took fire, and 300*l.* worth were destroyed. If this latter were the case, it would be a great loss to the exhibitor or owner of apparatus, but he would hardly be entitled to much sympathy for having "all his films in one basket." The County Council, who are always making fresh regulations about the use of limelight and cinematographs at places under their control, certainly would not, if they knew it, permit such a thing, and, to preserve one's fire insurance policy, the films must go into a metal box after passing through the apparatus, and, even in private houses, a pail of water and blanket must be in readiness, in case of anything unforeseen happening, to put out any ignition at once.

* * * * *

It is to be hoped that some users of the cinematograph cameras have succeeded during the summer in obtaining good subjects, and of which users of this class of apparatus may shortly have a choice for projection purposes. There must have been plenty of opportunities of taking really interesting events and studies of an amusing kind, so that the list of films of the "questionable" order may not, under

any circumstances, have to be drawn upon. I trust it will not be with the cinematograph like it was with the stereoscope, a degeneration due to the publication of subjects of a suggestive kind. Laxity soon means tabooing, and it will never do for the projection of animated photographs to be unpopular in the sense of the term that it can be no longer appreciated by a cultivated audience.

G. R. Baker.

THE CINEMATOGRAPH ACCIDENT.

In our last issue we gave a report, from a daily contemporary, of a cinematograph fire at Penge. The origin of the accident as given there is not quite correct. The operator at the time says that the accident in all probability arose from a piece of incandescent lime falling into a tin box of celluloid films; and, of course, there was a blaze up, and as a consequence, a panic. Fortunately, on this occasion, it was but of short duration and the injuries sustained were, by the audience, only a few scratches and abrasions in the scramble to get out, and by the operator, William Cunard, a few burns about the face, hands, and arms, which were dressed by the firemen, who quickly arrived on the scene. Some of the reports of the accident that have appeared in the "Evenings" have been curious. Here is one on the courage of a fireman: "Close by he discovered gas issuing from a steel tube, and, pluckily holding his thumb over the aperture until the supply was turned off, prevented any chance of another outbreak."

It is bad for the future of cinematography that, since the lamentable catastrophe in Paris, if any slight accident happen, the report upon it in the lay press always appears under the most sensational heading the writers can invent to scare the public, and with always a pathetic reference to the Paris affair and what might have happened on the "present occasion but for," &c. We have heard of cinematograph films that are not inflammable, though not of their being in practical use. Some time ago, in reference to this subject, we pointed out that the gelatine on the film arrested the combustibility of the celluloid if it were in sufficient thickness. Now, if the thin film of celluloid were coated on the back with gelatine, the same as it is on the front, it would be practically incombustible, as the gelatine would fizzle up and protect the celluloid. We have a film of this kind by us that was put into the market a few years ago which is coated on both sides with emulsion, and, when a match is applied to it, it with difficulty takes fire, then the gelatine frizzles up and puts it out. It is quite impossible to keep it alight. It might be worth consideration, on the part of manufacturers of cinematograph films, whether it would not be well to render them practically incombustible by coating the back of the film with plain gelatine or other fire-resisting material.

ON THE RELATIVE POWER OF LANTERN ILLUMINANTS.

Those who are contemplating fitting up an enlarging apparatus for the coming winter season, and who have to choose between the numerous artificial sources of illumination now available—oil, incandescent gas, acetylene, oxyhydrogen, and other forms of limelight and incandescent, and arc electric light—will welcome a statement of quantitative measurements of the relative power of these various illuminants. The data to which we allude are the results of experiments recently made by Monsieur A. Molteni, and communicated to the *Société française de Photographie*. The present abstract-translation is from our contemporary the *Photo-Gazette*. Monsieur Molteni points out that photometric observations of the naked illuminants are deceptive when forming an estimate of their relative power, when used in a lantern, because, when employed in conjunction with an optical system of condensers and objective, the area of the source of light is a most important factor, since the larger this area is the smaller is the proportion of total light gathered up by the condensers. It should be borne in mind that only those rays starting fairly contiguously to the axis of the optical system are utilised, and that, in the case of a source of light ten cm. in height, only those emanating from two to three cm. around the centre are actually used. Hence the efficiency of small but brilliant sources of light such as the electric arc or the oxyhydrogen lime light. A further reason for advocating a highly intense and small light is the effect of the size of the illuminant on the projected image. An ideal illuminant is one consisting of light concentrated at a mathematical point, a condition of things which is realised by the arc light more nearly than by any other light.

M. Molteni's experiments were made with an ordinary lantern, in the stage of which was inserted a screen with an opening seven cm. square, similar to the masks used in mounting lantern transparencies. The distance of the lantern from the screen was so adjusted that the side of the enlarged image of the square measured one metre. The enlarged image was received on the Bunsen grease spot (commonly used in photometry), the surface of which, remote from the lantern, was illuminated by a lamp carefully standardised by means of a "Carcel" standard, burning forty-two grammes of oil per hour. [The "Carcel" lamp is the standard of light in general use in France. It is equal to ten English standard sperm candles.—Translator.] The distance of the standard lamp from the screen was adjusted so as to obtain equality of illumination on each side, and the relative intensity of the various lights was calculated from the distances thus obtained. It will, of course, be understood that during the various trials the lantern was not moved from the position necessary to give an enlargement of one metre square. The following are the results obtained:—

Multiple wick oil lamps	1
Welsbach burner (No. 2) without reflector	1
Acetylene—	
1 burner without reflector	1·06
2 burners, without reflectors	1·70
3 " " "	3·20
4 " " "	4·10
5 " " "	4·50
Limelight—	
Oxycalcium (alcohol and oxygen)	5·80
Oxyhydrogen (coal gas and oxygen)	16·60
Oxyether (gasoline and oxygen)	18·50
Electric (continuous current)—	
Ordinary incandescent lamp 32 c.p. (?)	·68
" " (vertical) 50 c.p. (?)	·93
" " (horizontal) 50 c.p. (?)	·93
Focus lamp, 100 c.p.	3·82
Arc lamp, 7 ampères	39·03
" 10 "	75·61
" 12 "	86·50
" 15 "	117·61
" 20 "	160·80

The above results might, of course, have been expressed in terms of the Carcel unit, but the author is of the opinion that the table is likely to be more useful in the form in which an ordinary multiple wick oil lamp is taken as an approximate unit, since every one who has had the merest experience in lantern matters will be able to attach a tangible value to the figures when thus expressed; as, for instance, that the oxyhydrogen light is from sixteen to eighteen times more powerful than the paraffin lamp or an arc light of seven ampères about twice the power of the oxyhydrogen light. In the case of incandescent gas and acetylene a metal reflector increased the illumination about one-fifth, and a reflector of polished glass about one-third. It will be noticed that the incandescent electric lamp (which was of the usual long filament type) gives the same value, whether its position be vertical or horizontal. These lamps behave like luminous sources of large dimensions (*vide supra*), and only two to three cm. of an eight to ten cm. filament lamp are available for illumination. The experiments were made with a lantern of modern type, similar to those usually found in commerce, but the fact that increased efficiency can be extracted from a light by a suitable optical system was not lost sight of. By altering the condenser and objective used throughout the experiments, but keeping the same oxyhydrogen jet, the relative efficiency was increased from 16·6 to 19·5.

A NEW WAY OF PREPARING OXYGEN.

A contemporary states that a rival to the Brin process in the commercial production of oxygen has arisen in the Garuti method of obtaining that gas by the electrolysis of water. It has been known for a very long time that a powerful electric current will decompose water into its elements, the hydrogen appearing at the cathode and the oxygen at the anode, but, until the late developments in the direction of obtaining currents cheaply took place, the cost of such a method of obtaining the constituent gases of water was totally prohibitory.

Now, however, that an electrical horse-power can be got (when water power is available) for one three-hundredth part of what it costs when derived from a primary battery, the preparation of oxygen from water by electricity on a large scale has come within the sphere of practical politics, taking the word politics in its widest meaning, and the manufacture is already conducted on commercial lines in Switzerland, Italy, and Belgium. One advantage of the process is that it gives hydrogen, a valuable fuel, as well as oxygen.

The chief difficulty which had to be met was the tendency on the part of the two gases to mix, and also to recombine to some extent. This difficulty was heightened by the necessity of having numerous electrodes close together, so as to distribute the current as much as possible through the electrolyte and so to decompose it as rapidly as might be. The problem was to interpose diaphragms which would isolate each electrode sufficiently to prevent any mingling of the oxygen and hydrogen, but which would yet offer no appreciable resistance to the passage of the current or to the circulation of the electrolyte. This is done in the process invented by M. Garuti by using diaphragms of steel, each

perforated with a large number of minute holes. It is found that, while these diaphragms effectually prevent the bubbles of oxygen from coming into contact with those of hydrogen, they do so without adding any appreciable amount to the internal resistance of the electrolytic cell. The electrodes themselves are of steel.

The oxygen-evolving interdiaphragmal spaces communicate with a common receiver, and the spaces between diaphragms which contain a cathode communicate with a separate one in which the hydrogen is collected by itself.

The electrolyte is a dilute solution of caustic alkali. It is well known that in laboratory practice sulphuric acid is used to give the necessary conducting power. Whether the oxygen and hydrogen come direct from the water, or whether they come from the acid or alkali used which is then constantly reformed by the water present is immaterial from a commercial point of view. Whichever happens, the relative yields of the two gases, viz., twice as much hydrogen as oxygen, by volume, are exactly the same as if pure water were employed. In deciding what caustic alkali should be made use of, the conflicting claims of caustic soda and caustic potash had to be considered. The former is much the cheaper of the two, but the latter is the better conductor, so that less of it has to be used for any given quantity of water. The greater cheapness of sodium hydroxide, however, outweighs this, and it consequently gets the situation.

The gases are got in a very pure state. The average composition of the gas collected as oxygen is ninety-seven per cent. of that gas and three per cent. of hydrogen, while the stock accumulated in the hydrogen receiver consists of ninety-nine per cent. of the lighter gas and one per cent. of the heavier. Either mixture can be freed from its minor constituent by passing it through a red-hot tube. This causes the aforesaid minor constituent to combine with some of the other gas, forming steam, which can be removed from the residual gas by condensation.

A 90 horse-power engine, producing a current of 350 ampères at 150 volts will produce about 140 cubic feet of oxygen per hour, and the power expended on that output is about 50 kilowatts. When steam is the motive power, the cost of producing the oxygen is about 1*d* for 5 cubic feet, but, when water power is available, 25 cubic feet can be got for 1*d*. These estimates, however, only deal with the cost of producing the electrical power, although this is, of course, the chief item in the working expenses of the factory.

CINEMATOGRAPHY ON A CRUISER.

Another link was last week added to the chain of pleasant recollections which the *Crescent's* ship's company will carry through life of their brief cruise under the command of the Duke of York, when, by request of His Royal Highness, Messrs. West & Son, of Southsea, gave a cinematograph exhibition for the amusement of the officers and crew of the Duke's ship. The instrument was fixed upon the Boat-house Jetty, alongside which the *Crescent* is lying. the sheet upon which the pictures were thrown being so placed that they could be seen from the ship. Those who desired to come on the jetty were free to do so; but the greater number of the crew followed the example of their captain and stayed inboard.

The Duke and his officers looked on from the bridge, whilst the men climbed into the boats, up to the spar deck, and on all other points whence a good view could be obtained. Had it been possible to photograph the scene, Messrs. West would have had a very picturesque film for one of their future exhibitions. His Royal Highness dined in the ward-room, and it was just after dinner—shortly before nine o'clock—that the entertainment began.

First came a capital picture showing the *Crescent* leaving Portsmouth Harbour, but one of the most popular was that which showed the ship's company marching round the quarter-deck. So good was this that the features of the men were clearly distinguishable, and the picture was greeted with roars of delight. Another very taking thing was also a scene on board the *Crescent*. It showed 1st Class P.O. Stubbs and A.B. Allen, reputed to be the two best dancers in the Navy, exhibiting their skill to a crowd of their messmates on the upper deck. Whilst the pictures were being shown the ship's band played selections, which, in this instance at least, added considerably to the realism of the picture. Later, Musician Siedenstücker was shown dancing a hornpipe, and to this there was a violin acompaniment. Other pictures showed torpedo explosions, sailors at field-gun drill and single-stick exercises. There was a remarkably good view of the boats of the Channel Squadron pulling round the fleet, and the spectators grew quite excited as the crews swept past them. The Channel Squadron was shown getting under weigh, and the crew of the *Majestic* at quarters. There were several pictures illustrating recent yacht races in the Solent, and one of the dockyard men pouring out of the main gate at noon on Saturday. Others showed the *St. Vincent* boys at sail drill.

All the subjects were entirely new ones, and the cinematograph itself was an improved one used for the first time. It is the invention of Mr. Adams, who is connected with Messrs. West & Son, and reproduces the movements of the figures with great steadiness and a lifelike accuracy. Interspersed with the moving pictures was an exhibition of magic-lantern slides. These were reproductions of a fine series of photographs that had been taken during the cruise just ended by C.P.O. MacGregor. Not only did these illustrate scenes on board the ship in which the Duchess of York and little Prince Edward figured conspicuously, but likewise many of the places at which the *Crescent* has touched. The entertainment was greatly appreciated by the crew, who gave vent to their delight in an impromptu dance on the jetty after the affair was over. Londoners ere long will probably have the opportunity of seeing the enterta nment.

Messrs. West & Son and C.P.O. MacGregor subsequently h[illegible]ad the honour of visiting Osborne and exhibiting to Her Majesty the Queen and members of the Royal family the same series of animated photographs and lantern slides.

Her Majesty sat in the drawing-room, and the pictures were thrown upon a screen fixed up in the doorway, the lanterns being operated from the dining-room. The exhibition lasted just over twenty minutes, and the Duke of York explained the various pictures to the Queen as they were projected on the sheet. First were given four lantern slides of scenes on board the ship, then came an animated photograph. This order was observed throughout, and during the short time that the exhibition lasted considerably over fifty pictures were shown to Her Majesty, who was very pleased with them. In one or two little Prince Edward was shown, and there were several in which the Duke and Duchess figured. Most of the cinematograph films that were exhibited to the crew of the *Crescent* last week were shown, and all the lantern slides, in addition to a great many others.

At the close of the exhibition Her Majesty, through the Duke of York, informed Mr. West that she had been greatly pleased with all the pictures shown her that night.

THE RÖNTGEN RAYS IN MILITARY SURGERY.

On Monday, August 29, the *Daily News* published the following interesting letter from Dr. Hall-Edwards: "Sir,—It is satisfactory to note from the intresting article (in your to-day's issue) by your Special Correspondent with the Nile Expedition, that every effort is being made to render the Medical Department as efficient as possible, and that at last the X-ray apparatus is to be put to full use. From the various questions asked in Parliament as to the arrangements made at the battle of the Atbara, there can be little doubt but that some of the charges made against the Medical Department were well founded, and there can be no question that the answers given (at any rate, relating to the use of the X-ray apparatus) were most unsatisfactory. As one of the first to apply Röntgen's discovery to practical surgery in this country, and as a constant worker both in hospital and private practice since, I have no hesitation in saying that the proper and complete application of the X rays to military surgery must prove one, if not the greatest, advance of the century. Many people appear to imagine that, if the position of a bullet be found, it must necessarily follow that the bullet be extracted. Facts, however, point to the reverse, for the certain knowledge that a bullet is located in a position where it is not likely to produce harm, must give the surgeon every confidence in deciding that its removal is unnecessary.

"Your correspondent says: 'The antiseptic principle, which is the mainspring of modern surgery, is of necessity violated in every essential each time that a dressing must be changed or an investigation made.' Here, again, the application of the X rays proves most useful, for the bullet can be located without removing any dressing; moreover, the use of the unsatisfactory, and frequently not too-well sterilised, probe can be entirely done away with. As a death-dealing instrument a dirty and unskilfully used probe has few equals, and many lives will be saved by rendering its use unnecessary. Even in skilful hands the probe has an inherent desire to go somewhere, and in seven cases out of ten it wanders away from the track of the bullet, and the surgeon is misled. On the other hand, the diagnosis made by the X rays is absolute and certain, whilst the surgeon is relieved of all anxiety.

"In the answers to the questions asked in Parliament some time since it was stated that the X-ray apparatus would be used in the field when the transport difficulties had been overcome. Curiously enough the same answer was given to me through Sir Benjamin Stone two years previously. During the brief time which has elapsed since Röntgen's discovery was made public, much has been done towards perfecting the apparatus for producing radiographs. There, however, remains an immense field for further research. The coil (one of the chief pieces of apparatus necessary) is even at its best a most imperfect instrument, and is only capable of producing sixty per cent. of the energy which it should do if completely efficient. Of these instruments many have been specially designed for field work (mostly of German origin), but the best as yet introduced is capable of being greatly improved. The same thing might also be said of the Crookes tubes. The chief difficulty in applying the X rays to military surgery undoubtedly lies in the transport of the source of electricity; but, inasmuch as no trouble or expense has been spared in designing powerful searchlights for field purposes, there can be little difficulty in overcoming this small obstacle. Considering the large sums of money which are yearly expended in making experiments upon instruments for dealing death and destruction, the small amount which

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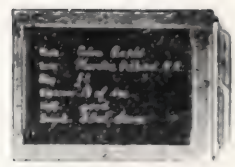
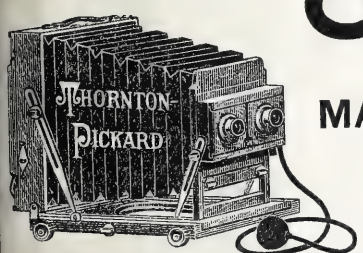
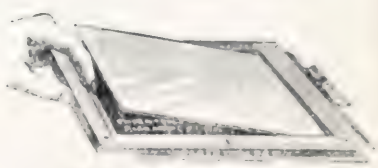


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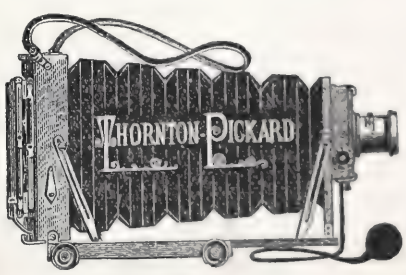
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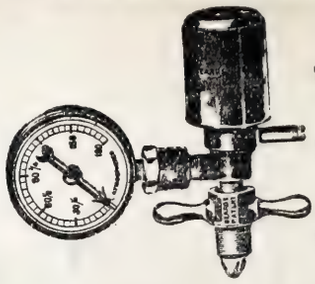
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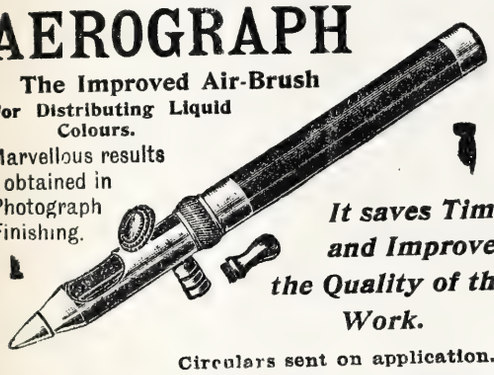
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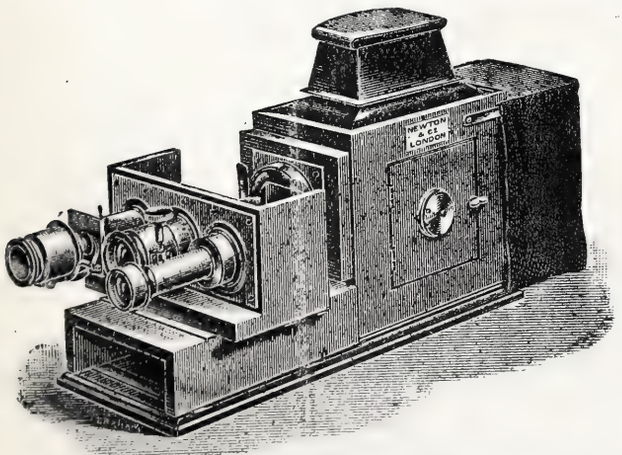
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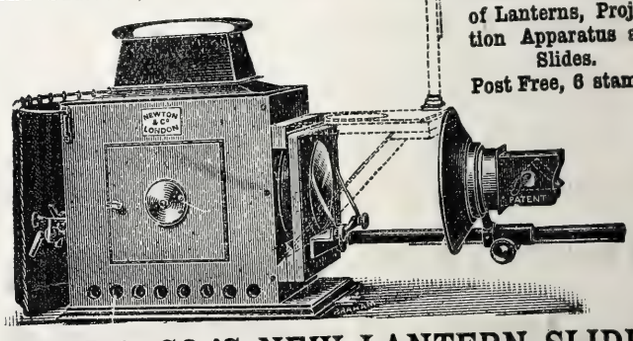
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would be required for experimenting with the intention of producing perfect instruments and methods for locating bullets would be a mere trifle. I would therefore suggest that our War Department establish an X-ray laboratory, and appoint a capable man at its head, and necessary assistants for the purpose of perfecting the apparatus and methods which experience shall prove to be the best for work in the field.

"Experiments in this branch of science are costly, and many who are willing to undertake them are for this reason debarred from investigation; hence such a department is likely to render a great public service in addition to that which must necessarily accrue to military surgery. Many arguments have been put forward against the endowment of research; but, inasmuch as it has practically proved a success in the perfecting of instruments of war, there is no reason why it should not produce good results in the saving of life and suffering. War is ever a loathsome thing, but, as long as it is a necessity, it is to be hoped that no efforts will be spared to, as far as possible, relieve the pain and suffering of those who risk their lives and limbs in their country's service."

FOSTER'S "TWIN-LENS" CAMERA.

Messrs. Foster so construct the camera as to dispense with one of the lenses, and, by a subdivision of the framing of the camera, render it available as an ordinary single-lens hand camera.

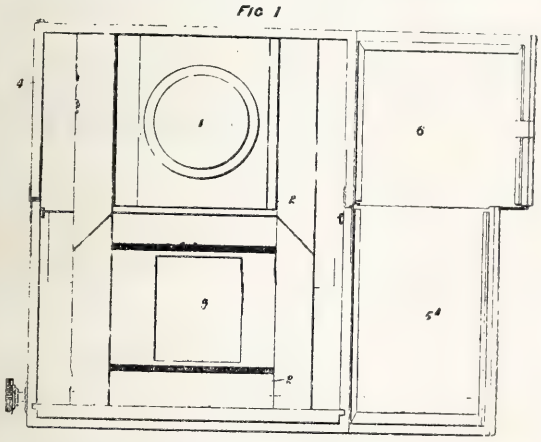
Fig. 1 is a front elevation.

Fig. 2 is a side elevation, part of the frame being broken away to show the interior.

Fig. 3 is a side view of the upper part of the camera, which forms a single hand or ordinary camera.

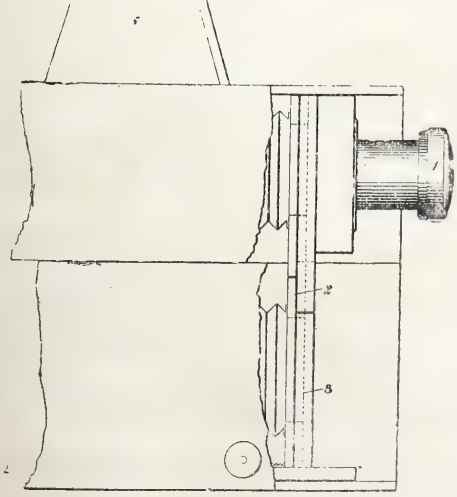
Messrs. Foster mount a single lens, 1, in a slide, 2, so as to be

FIG. 1



movable and available for purposes of focussing when in the position shown by figs. 1 and 2, and afterwards by moving the lens, 1, along its slide, 2, opposite the sensitive-plate aperture, 3, the same lens, 1, is

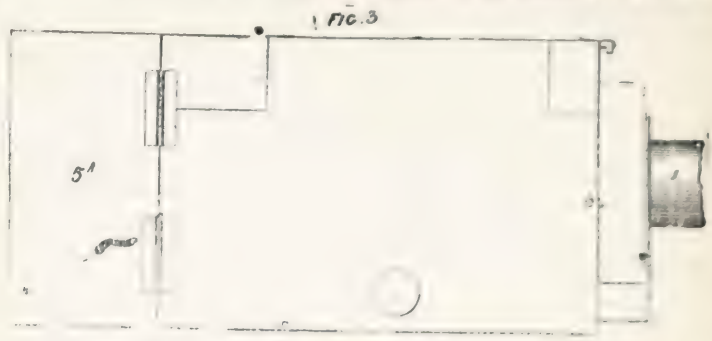
FIG. 2



available for taking the photograph. 5 is the ordinary focussing hood, as used in double focussing cameras.

The upper part or half, 4, of the camera is removable, and the slide, 2, also being removed, the remaining portion of the framing and the one

FIG. 3



lens, 1, constitute a single-lens hand or ordinary camera, as shown by fig. 3. 5^a and 6 are doors for the upper and lower parts of the camera, and these doors are shown partly open.

THE SEARCHLIGHT IN NAVAL WARFARE.

Included in Admiral Sampson's report of the operations of his fleet in destroying Cervera's squadron at Santiago are a number of orders and memoranda issued by him during the Santiago blockade. The following shows the important part played by the searchlights of the fleet while on blockade duty:—

U.S. Flagship *New York*, First Rate, off Santiago de Cuba
Cuba, June 8, 1898.

During the dark hours of the night searchlights will be used as follows:—

The *Iowa*, *Oregon*, and the *Massachusetts*, will take turns of two hours each, *i.e.* from dark to 8 p.m., and from 8 to 10 p.m., &c., in keeping one searchlight directly on the harbour entrance, maintaining carefully during that time their blockading positions. Should a vessel's lights fail, the next in order will at once take up the duty.

The picket launch and vidette stationed south of the Morro will move to one side or the other sufficiently to get clear of the beam of light.

The vessels on each flank, the *Brooklyn* and the *Texas* on the western side, the *New York* and *New Orleans* on the eastern side, will take two-hour turns in using one searchlight from time to time on the coast line, swing it towards the Morro, but avoiding the illumination of the flanking videttes on the inside line. The light should never be turned off more than five minutes at a time. From time to time the horizon outside will be swept.

Attention is called to bad and careless handling of searchlights. Last night some of the lights were kept high in the air, and were again swept rapidly from side to side. Under such circumstances a searchlight is worse than useless.

The beams must be directed to the horizon, and must be moved very steadily and slowly. Not less than three minutes should be employed in sweeping through an arc of 90°.

The best way to discover a torpedo boat is by its smoke, and even this will not be seen unless the light is very well handled.

Very respectfully,
W. T. SAMPSON,
Rear Admiral U.S. Navy, Commander-in-Chief U.S. Naval Force,
North Atlantic Station.

JUNGK'S CAMERA STAND.

The essential feature of this stand consists in that the feet are movable and are connected to a movable slide by means of which the feet can be moved longitudinally to and fro, the feet being guided in this motion by means of a plate or disc with holes through which the feet pass, so that their proper relative position is always maintained. During such sliding motion of the feet they are situated parallel to each other, but, when for the purpose of using the stand the feet are slid outward to their full extent, they are spread or moved apart into angular positions, this effect being obtained by a relative turning motion between the slide carrying the feet and the plate or disc through which these slide.

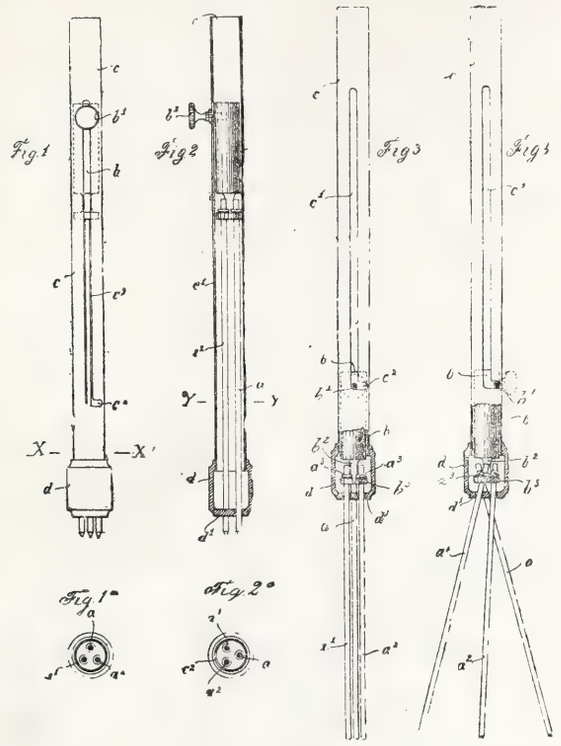
Fig. 1 shows an elevation, and fig. 2 a longitudinal section of the stand with the feet withdrawn when not in use; figs. 1_A and 2_A show cross sections respectively at x x and y y (figs. 1 and 2). Fig. 3 shows the stand with the feet protruded, and fig. 4 shows the same with the feet protruded and spread.

In this construction the feet, a a^1 a^2, together with the piston-like slide, b, carrying them, are situated within a tube, c, the lower end of which carries a cap, d, the end face of which constitutes the guide plate, d^1, for the feet.

The tube, c, is provided with a longitudinal slot, c^1, through which passes a thumbscrew, b^1, screwing into the slide, b, by means of which

the feet and slide can be secured in the withdrawn position, and also in the protruded and spread position for use.

In figs. 1 and 2 the feet are shown in the withdrawn position, when not



in use; in fig. 4 they are shown protruded and spread, while in fig. 3 they are in the intermediate position, in which the feet are protruded to the full extent, but not spread. Figs. 3 and 4 show clearly how the connexion of the upper ends of the feet, a a^1 a^2, to the slide, b, is effected; the latter has at the lower end a stem, b^2, carrying a disc, b^3, having holes through which the ends of the feet pass loosely. The latter are provided above the disc, b^3, with small collars, a^3, which prevent the ends of the feet from dropping through the disc, b^3.

As shown at figs. 1 and 3, the longitudinal slot, c^1, of the tube, c, has a lateral extension, c^2. Into this extension the setting screw, b^1, is turned as soon as it has reached the lower end of the straight slot, as shown at fig. 4.

By such lateral motion of the screw, b^1, a corresponding turning motion of the piston slide, b, is effected, and consequently the holes in b^3 are shifted partially round relative to the holes in d^1; by this relative motion the feet are moved into the oblique or spread position shown at fig. 4. In figs. 3 and 4 the lower ends of the feet are shown broken off for want of space, and consequently the full extent of spread of the ends of the feet is not shown. The feet are spread sufficiently far apart to enable the stand to be used in practice for the various purposes first above mentioned.

MANDL'S PORTARLE DEVELOPING BOX.

THE idea of Mr. J. Mandl, of Buda-Pest, is to construct a photographic developing box or dark room of a portable character, into which the plates can be placed by hand, and in which, by a funnel, the developing fluid can be poured and spread equally, and, after the removal of the fluid by a draw-off tap, the usual washing liquid can be poured in for washing purposes as often as necessary.

Fig. 1, perspective elevation from the bag-sleeve-fitting end. Fig. 2, an end elevation with the bag sleeve removed, and with the sliding shutter partially withdrawn. Fig. 3, part transverse section.

The developing box or dark room apparatus is composed of a rectangular-shaped metal or other material casing, A, with a glass bottom, two glass sides, B, and a glass top, C, or celluloid or mica can be substituted for glass, if desired, and metal closed ends, D, one of which has a mouth, E, for the insertion of the plates to be developed in single order, said mouth being furnished with a sliding shutter, F, to isolate each inserted plate from a series.

The other end of the box is provided with screw nozzles, one for a filling funnel, G, and the other for a draw-off tap, H, the funnel having a shield plate or partition, I, for preventing inrush of the fluid and the entrance of light.

The box has preferably an affixable lid or cover, J, to hold the top glass, C, and has an edge flange, K, all round, to which a flexible and collapsible sighting bag, L, is secured. Said bag can, when extended, be kept up by folding legs, M, which otherwise bear on the bag, L, to retain it in a collapsed condition for neatness when closed.

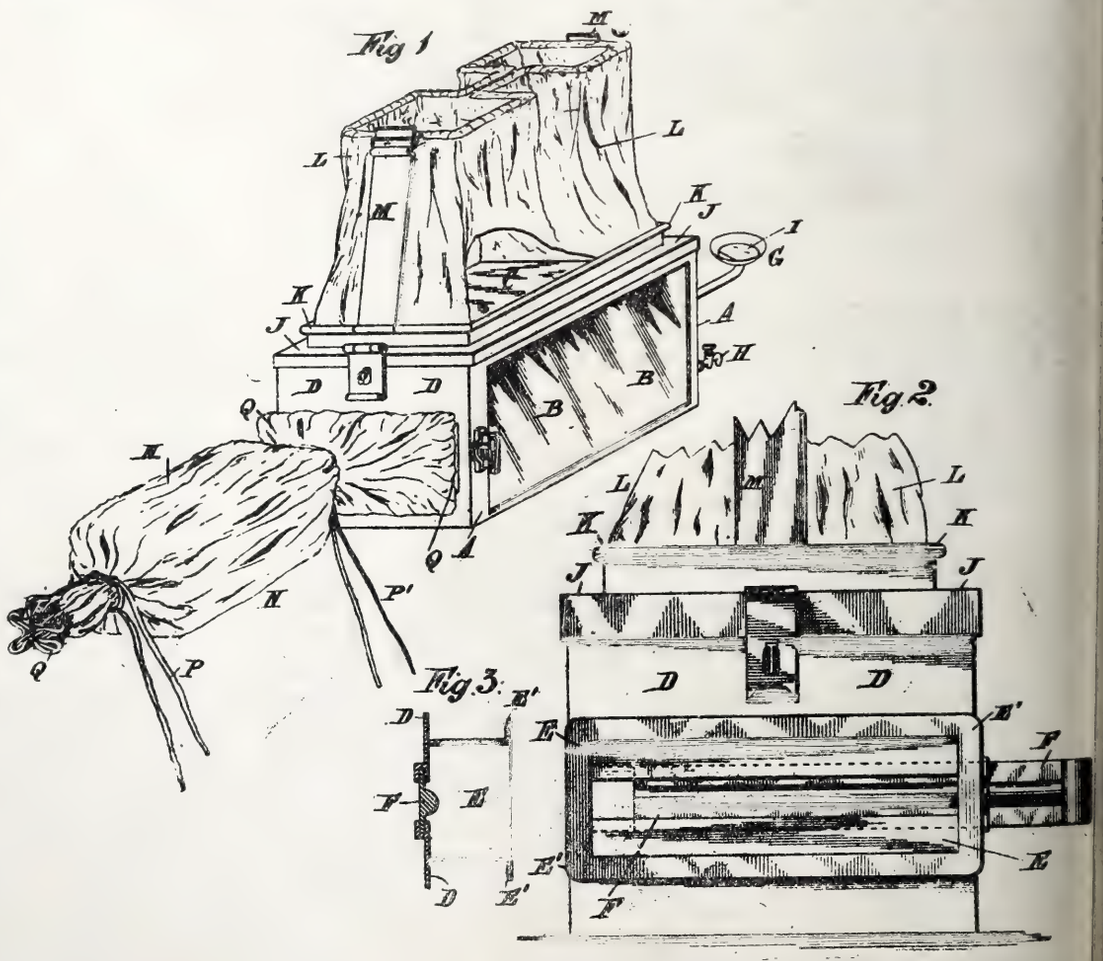
A long sleeve bag, N, is intended to be used, which can be connected temporarily to the camera, for the removal of the plates to its interior.

The sleeve bag, N, has a couple of drawn cords, P, P^1, and elastic webbing ends, Q, Q, for embracing the back of the camera to enable the plates to be withdrawn. The opposite end of the bag, N, after removal from the camera, can, by its elastic web, Q, be stretched over lips, E^1, of the mouth, E, of the developing box, A, and then the hand of the operator can push the plates singly into the box, A, and close the shutter, F.

The cords, P, P^1, when drawn tight, prevent the entrance of light to the undeveloped plates placed within the body of the sleeve bag; the elastic web ends, Q, Q, fit the arm of the operator while manipulating the plates.

In practice, first secure the bag at the larger opening to the kodak, or other camera. Pass one hand through the other opening and take the cases out of the camera and leave them over one another between the two cords in the sleeve bag, tighten both cords, whereupon the hand may be removed from the bag.

When it is desired to develop the pictures, stretch the other end of the sleeve bag over the lips, E^1 E^1, of the developing box or shutter, insert the hand into the opposite end of the bag, and loosen the cords to enable a plate to be caught hold of and passed into the box. Then close the slide



and take off the sack. Pour through the funnel about 100 grammes of the developing liquid in a continuous stream, slightly shaking the box to prevent streaks forming. Any addition must also be poured through the funnel

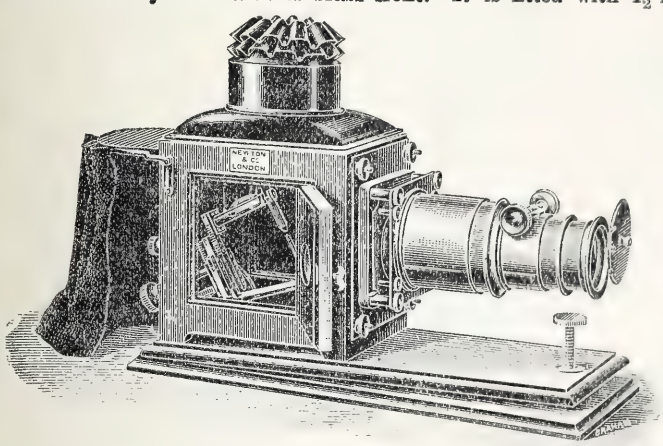
The progress of the development may be observed through the glasses in the sighting hood and through the sides of the box. When the development is completed, draw off the liquid through the outlet cock, H, pour water in through the inlet funnel, G, and let this out also when the plate has been washed sufficiently.

The plate can be fixed by passing the fixing solution through the funnel, and draw same off with repeated fillings of water to wash all out by the tap.

NEWTON'S LONG-RANGE ELECTRIC LANTERN.

Newton & Co., 3 Fleet-street, E.C.

This recently introduced lantern of Messrs. Newton has a mahogany metal-bound body with a solid brass front. It is fitted with 4½-inch

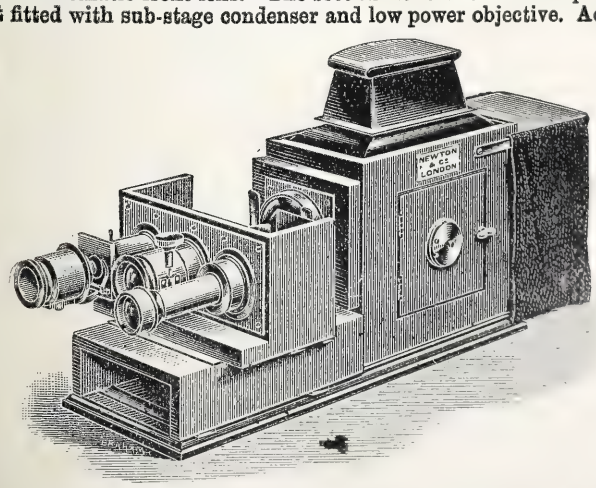


condensers and extra large front lenses, 3½ inches in diameter, of 8, 9, 10, 12, 14, or 18 inches focus in a sliding tube. Tilting arrangements are fitted to the base of the lantern, which also has Messrs. Newton's Universal Hand-feed Arc lamp. The lantern has been primarily designed for showing slides in large halls where electric current is available.

NEWTON'S "UNIVERSAL" SCIENCE LANTERN.

Newton & Co., 3, Fleet-street, E.C.

This lantern has been devised with a view to producing an instrument which shall be capable of showing, with a minimum of trouble and re-arrangement, most of the experiments required by science lecturers. It is fitted with three fronts, any one of which can be exchanged for any other in one second of time. The first front is for showing ordinary slides and diagrams, and comprises 4-inch condenser and 6-inch best double achromatic front lens. The second front is a microscopic attachment fitted with sub-stage condenser and low power objective. Additional



higher powers can be supplied, and polarising prisms fitted if required. The third front is for spectroscopic work, and is fitted with slit, direct-vision prism, and achromatic focussing lens, which project a brilliant spectrum on the screen without the necessity of placing the lantern at an angle. A comparison prism is also fitted, by which, at the same time, an image is projected on the screen of any solution, or coloured glass, or gelatine of which the absorption spectrum is being shown. These three fronts can be removed and a photo-chromoscope or a vertical attachment, or an elbow polariscope, or a cinematograph, or any other front, substituted in five seconds. The condenser is mounted on a hinge, and can be removed or put in position instantly. Either lime light or the electric arc can be used in this lantern.

THE STEREOSCOPE AND STEREOSCOPIC PHOTOGRAPHY.

[The following excellent little paper on stereography was recently contributed to our contemporary *The Australasian Photographic Review*. It so admirably synopsises the principles and practice of this beautiful branch of work that we make no apology for its reproduction. Our only regret is that the author's name was not appended to it.—Ed. *B. J. P.*]

Principle, Historical.—In the year 1838 Sir Charles Wheatstone read a paper before the Royal Society of Britain, in which he described an instrument for uniting two dissimilar pictures of solid bodies, and which he described as a stereoscope, the first time on record that this word was used. It consisted of a reflecting stereoscope, in which the observer looked into two plane vertical mirrors, one being opposite each eye, inclined to each other at an angle, the drawings were fixed to two upright planes, each one facing a mirror. This was previous to the advent of photography, which was not discovered by Daguerre until a year later. The stereoscope shown was very cumbersome, and the inventor suggested the use of prisms, and in 1849 Sir David Brewster invented the lenticular stereoscope, which was something on the same lines as the present familiar American article.

Binocular Vision.—In looking at a picture taken with a single lens, or a painting, you have to depend on light and shade to get an impression of solidity, and when the picture is very good, it is remarked that the effect is stereoscopic; but this cannot be, as no very perfect judgment of distance can be formed unless the picture is taken with two lenses and seen through the stereoscope. Suppose a man with one eye looked at a landscape, he would have a very imperfect idea of length and breadth, but two eyes are necessary to form a judgment of depth and thickness. In looking at anything in nature, the right eye sees more of the right-hand side of the object than the left does, and *vice versâ*, so that two eyes take in more of any object than one can possibly do. For example, close your left eye and hold up a finger in a line with and covering some object, then close the right eye and open the left, and the finger will appear to move to the right, fully exposing the object formerly covered; then, by looking with both eyes, the finger will appear to stand out in relief. Each eye sees a different image, that is, a different perspective of the same object.

No picture so nearly represents natural vision as a stereo view. It is the most beautiful, truthful, and realistic of any kind of photograph; that is, because it contains two separate pictures as seen by the right and left eye. These pictures coalesce and appear as one, the brain being unconscious that the eye really sees two pictures.

Some years ago an article appeared in one of the English journals by a prominent amateur (who ought to have known better), stating that good stereoscopic views could be made from a quarter-plate negative by making two prints and trimming them slightly different and mounting them side by side, but the two pictures being alike would appear flat and without stereoscopic effect.

I remember on one occasion, at a club outing in the Botanical Gardens, Melbourne, I was the only amateur with a stereo camera. We had the usual attendance of small boys to criticise and give advice, which they did pretty impartially. That touching song, "Up came Johnny with his Camera," was not published at that time, or, no doubt, we would have had that too; but one of them noticed my outfit, and called the others' attention to it with the remark, "I say, here's a fellow got one with two eyes." Now, that just explained the position. I was taking pictures which, when produced (properly mounted) in the stereoscope, would look as I saw them with my two eyes, minus the colours.

Position.—It is an easy matter to choose a position from which to take a stereo picture, as that which pleases the eye in nature will look equally well as a picture when seen through the stereoscope. You need not worry about objects being too close in the foreground. For instance, the branches of a tree close up to the camera will be no detriment, provided distant objects can be seen through them.

Singular Stereo Effect.—A very curious effect is produced when a dead tree is photographed from the butt, the camera pointing upwards, or of the roof of an interior. It is altogether unmeaning until the stereoscope with its picture is pointed upwards, when the subject is at once recognised.

Lenses.—Lenses in general use for their small size and sharp focus give hard results. Sharpness is desirable, but the evil of hardness must be overcome in development. Over-expose slightly, so as to get out all detail in the shadows without too dense high lights—a pretty negative will not give a good stereo print—a flat-looking print viewed in the hand will not be of much account, but put it in the stereoscope and the difference will be surprising. If you intend going in for stereo work and wish to do it economically, a pair of five inch single lenses will be the best all-round lens for landscape work; if you intend doing interior and architectural work, a pair of four inch rapid rectilinear would be the best; the single lens gives a more brilliant image on the ground glass with greater depth of focus, but is slower than the rapid rectilinear, which latter is useful for very rapid work.

Shutters.—For time exposures only, the very best shutter is the ordinary flap shutter, but for time and instantaneous work the Thornton-Pickard shutter is perfection; if with adjustable centres so much the better.

Negatives.—For negatives the best plates to use are chromatic plates,

backed, as if a plate shows signs of halation it has a very bad look in the stereoscope; in fact, backed plates are best for all photographic work.

When you have your negative (which must not be dense) there are two or three ways in which it can be utilised. The first is to print straight out, cut, and transpose; the next is to cut your negative and transpose the parts and print straight out; another way is to cut through the film on each half of the negative, using a cutting shape; detach the films with hydrofluoric acid and water, and remount in proper position on another glass, when it can be printed from straight out, and mounted as an ordinary print. Another way is to use a stereo-duplicon, which is placed on the front of a single lens. It is fitted with two apertures lined with reflectors, which throws a right and left picture on to the plate, each picture in its right position when printed requiring no transposing.

Cutting Prints.—In cutting the prints it is necessary to have a true base-line. Place the cutting frame on the same object in the immediate foreground of each picture, and cut off the waste portion, then trim it by a parallel line at the top. Now take the small cutting shape $2\frac{5}{8}$ inches wide, and trim your left-hand picture. In trimming the other half more care is required; the distance between an object in the foreground of one picture and the same object in the other, should not exceed $2\frac{3}{4}$ inches—$2\frac{5}{8}$ inches is better. The distance between objects in the foreground is less than objects in the distance. A small portion of the mount, say $\frac{1}{16}$ inch, should show between each picture; the height of the picture is immaterial. Before trimming the prints a short line should be marked on the back in the centre with a pencil, which will indicate which is right and left, as in mounting this line will not come together again, but part be on the end of each picture.

Mounting.—Of all the sins that can be laid at the door of the stereoscopic photographer the greatest is bad mounting. I once purchased a lot of stereo pictures made by a noted Continental firm, and on looking at them in the stereoscope, found that seven out of ten were incorrectly mounted—some as to right and left, and others with an uneven base-line. Stereo prints should be trimmed so that when mounted they appear as if projected beyond the mount, seen as a landscape would appear through a window, and in this case the right eye sees more of the left-hand side of the picture than the left does, and *vice versa;* therefore the right-hand picture should have less of the picture showing on the right-hand side than on the right hand side of the left-hand picture, and *vice versâ*. If mounted with more of the picture showing on right-hand side of right-hand picture when seen in stereoscope, it will appear to stand out in advance of the card, which is incorrect.

Camera.—The best all-round camera is a half-plate square bellows with movable divisions, so that either stereo or single pictures can be taken at will. The half-plate is always obtainable, therefore it is advisable to use it; but the size I use is $6\frac{1}{2} \times 4\frac{1}{4}$, half a whole-plate, and even with that size there is plenty of the picture to be thrown away in the trimming. I use a whole-plate camera and cut plates in half when I want to do stereo work: in fact, my whole-plate camera is fitted for stereo work.

Transparencies.—To use the transparency printing frame, place negative in frame, film side up, and put it so that it is hard up against the end of the frame, showing half the negative through an aperture in the centre; the transparency plate will be put on the negative and placed hard up against the other end of frame. Close frame and expose to gaslight, take into dark room and reverse, giving exactly the same expo sure to other half. On development, it will be found that pictures are correct as to right and left. As a rule, transparencies are too thin and under-exposed; they should be considerably denser than a good lantern slide. The picture must be exposed long enough to get out all the detail there is in the negative, there must be very little black and white, the transparency must be full of gradation.

Camera.—In the copying camera the negative is placed in the groove face outwards, upside down, and focussed sharply on the ground glass of the camera which took the original negative. The camera is fixed to a baseboard and the space between same and negative holder is covered with dark cloth to exclude light. The pictures, as seen on ground glass, will be in their proper position as to right and left, and will not need transposing. There is no comparison in beauty between a stereoscopic print and transparency, and, if copied through the camera, the transparency is easier made than the print. Prints made on P.O.P. and mounted in optical contact behind glass give pictures without grain, and are not much inferior to transparencies.

Cause of Decadence of the Stereoscope.—The principal cause is that from want of knowledge prints are incorrectly mounted, also insufficient care is taken in developing the negative, soft results not being obtained, consequently the picture presents a snowy appearance, although the picture is taken in midsummer.

Judging from numerous inquiries I have from time to time received, there is no doubt that stereoscopic workers are on the increase, and it is quite right that it should be so—it is the most beautiful and truthful form of photography. Salem Scudder said the apparatus can't lie; as far as stereo work is concerned I'm with him. In conclusion, if there is any one present who thinks of going in for stereo photography and finds any difficulty at any stage and would communicate with me, I would at the earliest opportunity give the required information. I am an enthusiast in photography, and am always willing at any time to give any information in my power to any brother amateurs.

The late Dr. John Hopkinson, whose terrible death in the Alps was recently recorded, was one of the most distinguished of modern electricians. It is not too much to say that the deceased gentleman, more than any other man, placed the manufacture of electrical machinery and appliances upon a really scientific basis, in place of the somewhat rough-and-ready methods which were practised in the earlier days of the industry. Dr. Hopkinson was under fifty years of age, having been born at Manchester in 1849. He was educated first at Lindow-grove School and afterwards at Queenwood College. When he was sixteen, he went to Owens College, Manchester, of which his brother, Dr. Alfred Hopkinson, Q.C., is now principal, having resigned his seat in Parliament for the Cricklade division of Wiltshire in order to take up the post. From Owens College Mr. Hopkinson proceeded to Trinity College, Cambridge. There he had a highly distinguished career, coming out finally, in 1871, as Senior Wrangler and First Smith's Prizeman. During his residence at Cambridge he also graduated at London University, taking the D.Sc. degree in his twenty-first year. Dr. Hopkinson's academic distinctions were but a prelude to those of a more enduring character, which he was destined to secure as a practical engineer. His first business experience was obtained as engineer to Messrs. Chance & Co., of Birmingham, whom he joined in 1872. During the six years which he spent in their employment Dr. Hopkinson, among other optical work, devised many important improvements in the optical arrangements for diffusing the rays, notably the "group flashing apparatus," which remains to-day the best thing of its kind. In 1878 Dr. Hopkinson removed to London and set up in practice at Westminster as a consulting engineer. One of his early works was the well-known Southend Pier electric tramway, which was constructed from his designs. From the time of his establishment in the metropolis he devoted himself largely if not exclusively to electrical machinery, and was responsible for the plans of the electric lighting of the city of Manchester. Perhaps Dr. Hopkinson's best-known achievement was his invention of the three-wire system of distributing the electric current. Dr. Hopkinson was elected a member of the Royal Society in 1878, was President of the Institution of Electrical Engineers in 1890, and read many papers before those two bodies. He was also one of the founders of the Military Corps of Electrical Engineers, in which he held the rank of major.

Osmium Filaments for Incandescent Lamps.—Considerable interest is being shown in the new filament which has been announced by Dr. von Welsbach, the inventor of a system of incandescent gaslight. This he appears to have found in a filament of osmium, one of the rare metals, which, besides being the densest of all metals, is the most refractory, being infusible at any except the highest attainable temperatures. Osmium is found native as an alloy in certain ores of platinum and iridium. It is a hard, bluish-grey metal, with an atomic weight of 191·1, and the enormous specific gravity of 22·477, being the heaviest substance known. Its tetroxide has a strong odour of chlorine, from which circumstance its name was originally derived. But the property which must have suggested osmium as the material of the new electrical filament was its practical infusibility, its known resistance to temperatures in which platinum and iridium volatilise and disappear. It is well known that the intensity of the light emitted by an incandescent substance increases rapidly with its absolute temperature. By heating osmium in a vacuum with an electrical current strong enough to volatilise platinum, it is said to attain a luminosity hitherto almost unknown, emitting a white light of agreeable quality and colour, but of great intensity. So far as can be inferred from what has been published, the experiments of Dr. von Welsbach go quite beyond the employment of a naked osmium filament, and include coating the metal with a refractory oxide like thoria. It has long been known that a platinum wire or filament, through which a sufficiently strong current is passed, attains a white heat and then suddenly melts. If, however, the filament be coated with a highly refractory oxide like thoria, the temperature required to melt it is greatly increased, for the reason that part of the electrical energy is withdrawn from the metal to its oxide coating, and is radiated in the forms of light and heat.

Professor Re, of Palermo, arrives at the conclusion that the Röntgen rays consist of electric waves of infinite wave-length, or practically so. This explains the great diffusivity, the absence of interference phenomena, the luminescence, the passage round obstacles, the manner of reflection, the absence of refraction, the photographic action. The theory admits the possibility of polarisation, but is weak in regard to the differences between different Röntgen radiations in respect of their penetrative powers.

Iridescent Clouds.—Mr. E. Armitage, writing to *Nature* from Hereford, says: "It is quite unnecessary to be at 6000 feet altitude to observe iridescent clouds, for we do so frequently here during the summer months, at about 350 feet above sea level. They appear generally about an hour before sunset, and cease at sunset, and we always look out for them when seeing the suitable kind of delicate cirrus cloud in fine wavy fleecy streaks in the sky near the sun at the right hour, and are generally rewarded by the sight of the exquisite rose and green ripples of nacreous brilliancy, affording a striking contrast to the ordinary sunset colouring."

MONTHLY SUPPLEMENT

) THE "BRITISH JOURNAL OF PHOTOGRAPHY."] [*October 7*, 1898

THE LANTERN RECORD.

CONTENTS.

	Page
TERN NOTES AND NEWS	73
TERN MEMS. By G. R. BAKER	73
EOSCOPIC LANTERN PROJEC- N	74
LIGHT EXPERIENCES.—VI. By . ARMSTRONG	75
SPECTROSCOPE IN ECLIPSE IK. By E. W. MAUNDER	76
ERN ENTERTAINMENTS	77
BACH'S NEW ELECTRIC INCAN- CENT LAMPS. By W.	77
LANTERN NIGHTS AT THE PHOTO- GRAPHIC EXHIBITION	78
NOVELTIES IN LANTERN APPARATUS	78
TRANSPARENCIES AND LANTERN SLIDES	79
PARSONAGE'S LANTERNS FOR ADVER- TISING PURPOSES	79
STENDER'S IMPROVEMENTS IN NEGATIVE ENLARGING CAMERAS, AND CAMERAS FOR PRINTING FROM NEGATIVES OR TRANS- PARENCIES	79

LANTERN NOTES AND NEWS.

CECIL M. HEPWORTH recently gave his animated photograph tainment before the Aintree Photographic Society and at other s in and around Liverpool, and met with considerable success. result might have been quite anticipated, for Mr. Hepworth is ster of projection-entertainment work and has fully profited by dvantage he has had of assisting his father, Mr. T. C. Hepworth, of the very best lantern lecturers that we have. Before us is eatly printed synopsis of Mr. C. M. Hepworth's cinematograph antern entertainment for the current season. The subjects in- "A Scamper on the Continent," "Tommy Atkins and his k," "A Country Ramble," "The Storm," "The Great Fire," &c. Mr. Hepworth's address is 120, Belgrave-road, S.W., e applications and terms for dates should be addressed.

* * * * *

ESSRS. HENRY T. LEACH & Co., 3, Turl-street, Oxford, have us their list of slides of pictorial subjects. The series includes le characters and events of the seventeenth and eighteenth ries, the history of the crusades, the nineteenth century, ing, history of Paris, and the sixteenth-century crusades.

* * * * *

E soot of the acetylene flame represents a valuable product, ially for the colour industry. When acetylene gas is burned a smoking flame, three to four times as large a quantity of soot ained as from the same quantity of mineral oil. The acetylene s very light, and exhibits an absolutely black colour, without nge of brown. Besides, all tarry admixtures, and other sub- es contained in lamp black, &c., are absent from the soot. It is ulky, and will be specially adapted for India ink, as well as lours used in printing and lithography. A recent French t issued to E. Hubon gives three methods for the production colour. According to the first, the acetylene gas is kept in a ylinder under two atmospheres' pressure, and is then ignited h an electric spark or a glowing platinum wire by way of ion. The final pressure of the resulting hydrogen does not l twelve atmospheres, so that the danger of an explosion is led if steel cylinders of corresponding strength are employed. nethod has the advantage that the theoretic yield of carbon is ed from the acetylene, the product being of the greatest purity.

A NUMBER of interesting facts concerning illuminated buoys are brought together in a recent number of the *Times*. From this description it appears that Mr. J. Pintsch was the first to successfully construct a buoy to show a light at night. The light is produced by gas, which is stored in a compressed state in the body of the buoy, and passed up to the burner through a small pipe, controlled by an ingenious automatic regulator, which causes the gas to be emitted at a low and uniform pressure. Stored up in the buoy in a compressed state, the pressure being equivalent to that of about five atmospheres, and passing out very slowly, the gas will last some two or three months, burning always by day and by night. Coal gas cannot be used for this purpose, because compression robs it of more than half of its illuminating power, while in the case of oil gas the loss is so slight that it is practically immaterial. The light itself is surrounded by a small lenticular arrangement, intended to enhance the illuminating power, enclosed in a glass lantern fixed about eight or ten feet above the sea level, and in clear weather is visible five miles. At first it was found desirable to use only a fixed light, but more recent experience has shown that it is possible, by suitable mechanism, to show a quick-flashing light and an occulting light, these variations being extended by the use of coloured glass.

* * * * *

MESSRS. NEWTON, of 3 Fleet-street, E.C., have sent us their supplementary list of lantern slides, &c. In addition to particulars of their latest introductions in the way of projection apparatus, &c., there are about fifty new sets of slides included, some of them of especial interest just now, such as the Spanish-American War, Gordon and Khartoum, Life of Gladstone, the British Army, and many others.

LANTERN MEMS.

CINEMATOGRAPHS in the streets and public places, such as market squares, seem to be quite the rage, and, judging by one I saw in a town in Kent, are paying well. The travelling van was elaborately got up with ornamental fittings—bright metal bars, and elaborate gas globes and burners. These latter were supplied by the acetylene gas generator, and served to make the show attractive and draw the audience. It was also an assistance in emphasising the announcement of the showman that these were the finest animated photographs ever exhibited, and "only one penny to see them."

* * * * *

OF course the peep-holes around the machine were soon filled up by heads, and at a respectful distance I watched the proceedings. Three films were shown for the small fee charged, which was duly collected when the first film was well under way. The cinematograph was of a simple type, and controlled from the end of the boxed-in arrangement on wheels. The illuminant was a double acetylene gas burner in an optical lantern. Being curious to know what sort of result was obtained, and being in a town where I

was not likely to be known, I took an opportunity at the next "exhibition" to get at one of the peep-holes near the end of the machine and close to the operator, so as to obtain a favourable view of the projection, and see how it was done.

* * * * *

THE illumination was very fair, and the result, if the films had been good, was passable enough. But those films! One ought not to expect much for one penny, I suppose, but the splashes of light and defects due to the films being damaged neutralised the attractiveness of the exterior of the machine. I suppose they were films bought up cheap, after having had, I should say, a *very* long life in the halls or at a travelling orthodox show, for they were, no doubt, worn out, and ought to have been decently buried as *dead*. The titles given to the films by the showman were such as to bring up waverers and rouse their curiosity, so as to cause them to part with the humble penny without reluctance. How many were satisfied with what they saw it was difficult to judge; certainly not many expressed themselves audibly.

* * * * *

IN order to show the working of another form of cinematograph, the English representatives of the Micrograph Company have started showing projections in a shop in Fleet-street, where the public are admitted for one penny. The place is darkened and curtains screen the daylight from the door. A fairly bright picture of three feet or so across is obtained by means of an incandescent gaslight lantern, but, at the time of my visit, the operator did not arrange the speed of turning to suit the picture of the first film shown, which represented a number of troops passing through a street in Berlin, and so the men, instead of appearing to march naturally, were moving their legs so quickly that the motion was most peculiar, and the effect on the senses irritating. With the next film shown, the speed suited very well, for the subject, *A Swimming Lesson*, was such that the movement of the boys in the water was typical of the capers cut by youngsters when in a swimming bath. I mention this point of speed, as I have before noticed, even in halls, the same want of control of the film, or error of judgment, on the part of the operator, if the machine was capable of taking the film through at a slower rate. High gearing of the driving part of the machinery may have all to answer for in this matter.

* * * * *

THE price of the machine alluded to is very moderate, and, as the size of the picture was sufficient for twenty or thirty people to see if the place had been suitably arranged for them, it follows that the simpler illuminants can be pressed into the service for parlour use; and we may expect on the market, before very long, apparatus that the general public will buy for their own use. It only wants one of the animated photograph film-makers who have a number of subjects to produce a cheap series, of moderate length and good work, that can be retailed at 1*l.* each. This could be done with a fair margin of profit for both producer and seller with subjects that had already had sufficient sale to have paid for the initial expense of producing the original negative.

* * * * *

THE correspondence respecting stereoscopic projection, lately appearing in THE BRITISH JOURNAL OF PHOTOGRAPHY, opens up interesting subject-matter, and, although single picture-projection cannot be called stereoscopic, yet, given certain bold objects in foreground or a suitable colouring, the effect of "relief" can be obtained, especially if the point of view is suitably chosen. In the graphoscope one has an example of the wonderful way in which coloured photographs of flowers "stand out" on being viewed through the large double convex lens, especially if the head is at some little distance from the lens.

* * * * *

THEN, again, take an ordinary picture as one sees it at the Royal Academy or National Gallery, and, when standing away from it a distance at least one and a half times its width, view it through a low-power opera glass. Many of the subjects have such bold re that the effect approximates to that of the stereoscope, but it is stereoscopic in the accepted sense of the word, certainly as fa scientific men understand it. As an example of the difference in effect, I have before me as I write a plaque with honeysuc painted on it by hand, and close beside it a vase containing d grass. On looking at the first through an opera glass the flow stand out wonderfully from the dark background, and, when at s a distance that only the plaque is seen and not the wall on whic hangs, the realism is marvellously enhanced.

* * * * *

WITH the dried grass one has the positive depth that you get the stereoscope with all the various planes and the shadows betw each successful position, which cannot be obtained no matter beautiful the single photograph may be as regards light and sh and prominence of foreground objects, or how beautifully a pic may be painted by an artist. Hence stereoscopic projection, w perfectly accomplished, must have the same effect as one gets Brewster's stereoscope, or as one sees by binocular vision in natu

* * * * *

THE approximation to this result is sometimes obtained in lan slides of beautiful interiors, statuary, &c., and artistically colo hand paintings, and especially if the picture on screen is vie through an opera glass or through the hands held to form a tu As an example of the very fine effect so produced, I remember, two or three years ago, looking at Landseer's *Monarch of the* at a little distance through an opera glass, and the effect was so that one could fancy that the coat of the animal was not pain but real fur. Mr. Anderton and Mr. Freshwater have gone a way towards realising perfect stereoscopic lantern projection, b is still left to the inventor to produce an apparatus that shall th on the screen such results that will appear to the audience as pe and brilliant stereoscopically as the single projections are now a good optical lantern.

G. R. BAK

STEREOSCOPIC LANTERN PROJECTION.

MR. T. W. BARBER sends us a further communication, in the cour which he says:—

"Your correspondent, Mr. R. B. Hughes, whose pity for me fear, wholly misplaced, trots out again the ancient experime shutting one eye, and then trying to do offhand with one eye *that we have been accustomed, for perhaps fifty years, to do with two* reach and touch without hesitation some near object such as a tu A person with two eyes, of course, occasionally fails, but I tried it a friend who lost the sight of one eye some years ago, and, of cour promptly gripped the whisky every time. But what this has to d stereoscopy beyond being an experiment in the estimation of dis under difficulties I fail to see.

"As yet no one has attempted any answer to my numerous obje

"I have said that the whole theory is based on the fallacy tha views of an object from different standpoints are necessary to pr stereoscopic vision. It follows from this (if the theory is correct) tha objects are much more in relief than distant ones, and very distant entirely wanting in relief; also that, as the eyes are separated horizo and not vertically, the sense of roundness must be in the hori direction, the right eye (it is said) seing farther round to the righ the left to the left than the other. I have already pointed out also with cylindrical and symmetrical objects standing vertically, in all views from any direction must be identically the same, double can, in this theory, add nothing to single vision.

"But, let us bring this down from the airy generality of theory dead level of a few figures. I stand 10 feet from a lamp-post 4 diameter, my eyes being 2½ inches apart. Then, by a simple c tion, one eye sees further round the post than the other by $\frac{3}{3}$ circumference of 4 inches = ·016 inches, or about $\frac{2}{64}$ inch. N us stand 100 feet from the post, and the calculation becomes $\frac{3}{3}$ the circumference, or an amount less than the thickness of a sh paper! It follows, further, from this theory that the larger the the further round it we can see and the more stereoscopic it appear, and yet large objects are not more stereoscopic than small I can see, for instance, a wire ¼ inch diameter 40 feet distant pe solid and round, though the parallax is reduced in its case to a f too small to record in figures. This looks like a *reductio ad absur*

"But, I inquire, How does horizontal separation of the eyes ass estimating vertical solidity? Suppose we lay the lamp-post

ground; the eyes then ought to be separated vertically to appreciate its roundness. What scientific ground have we for the statement that such double vision is either necessary or that it gives, as alleged, stereoscopic relief at all? In other words, how can two views, flat in themselves, from points of view separated by such infinitesimal angles, convert a flat view into a solid one?

"'You say in your note appended to my last letter, 'I appear to think that an ordinary photograph is stereoscopic to one-eye vision.' Certainly it is, with the difference I noted, that one eye sees only half the light of two and consequently only half as clearly; precisely the same difference, in fact, as seeing by twilight and by daylight, and it is in this sense I spoke of *f*-16 and *f*-8.

"But just here comes in the crux of the whole question. If objects appear—as is, in fact, admitted—in relief *at all* to one eye, then I say the whole case is given away and the binocular theory is false. That they do so appear all writers admit, and try to explain by talking of 'true and pseudo stereoscopy,' 'varying contraction of the pupil of the eye,' and so on, which may account for the effects of distance to some extent, but cannot account for the considerable relief seen by one eye in nature."

LIMELIGHT EXPERIENCES.

VI.

In a previous article reference was made to the great advance in the candle power of jets with the introduction of high-pressure cylinders in lieu of the old gas-bag system.

For many years with the latter the bore of the nipples was practically limited, for, with ordinary pressure on the bag, *i.e.*, a pressure of six or seven inches of water, it was in practice found that the limits of maximum opening were somewhere about the one-tenth of an inch, and any attempt to go beyond this only resulted in the snapping out of the jet; but with a medium pressure of, say, six to seven inches of water, a jet furnished with a bore of one-twentieth to one twenty-fifth of an inch was capable of yielding the most intense light, which, by the most careful photometric tests, was ascertained to be from 675 to 750 candle power, and for a long time this intensity was looked upon as the extreme limit to which a well-made high-pressure jet could be made to work satisfactorily in limelight projection. With a modern, or what some term a cinematographic, jet, used in conjunction with gas under high pressure, the bores of the nipples are enlarged, with a corresponding increase to the light intensity, as much as 2000 candle power being claimed for some of these new-pattern jets. These extremely powerful burners are, however, of no great practical value for showing ordinary lantern slides, and in the writer's recent experience circumstances have so transpired where, in limelight lecturing which followed immediately upon a cinematographic display, the same jet being utilised for both purposes, the pressure had to be materially reduced for the projection of ordinary lantern transparencies to their best advantage, and it was very questionable if any actual benefit was derived beyond a 750 candle-power intensity with a fifteen-foot screen or disc. For single-lantern working these powerful jets are, in the writer's opinion, best manipulated without any attachments in the shape of automatic regulators, for the utmost control over them is easily maintained with the aid of fine adjustment taps, or even by adopting carefully selected cylinders, the valves of which are capable of being manipulated by the ordinary lever key, all that is necessary being the well-known tapered nozzle, which screws on to the valve of the cylinder, and allows the rubber tubing to be securely attached to the exit pipe from the cylinder.

In discarding the use of automatic regulators for these high-pressure jets there is one rule that must never be forgotten, viz., never turn on the gas at the cylinder without having previously opened the taps on the jets, or, what is better still, cut off the taps entirely from the tubes on the jets, and work without any, and then there will be no blowing off or bursting of tubes between the cylinder and jets, doing all the regulation of gases direct from the nozzle of the cylinders, which may conveniently be placed at, say, about two and a half feet from the jets. By this means, with a little care, the most perfect adjustment of the light may be obtained, and, once secured, the same will run along for hours without need of any alteration, for there will be nothing to intercept or interrupt the continuous flow of gas once the same is properly adjusted.

In carrying out this manner of working, nothing but the best sample of rubber tubing should be employed, and several of our leading operators now follow out this plan, and quite dispense with taps on the jets for the regulation of pressure, which, by experience, they find is best conducted at the only proper point, viz., the nozzle of the cylinders, when high-pressure working is being performed. A couple of good fine adjustment taps screwed into the nozzles of the cylinders will, however, be found of great value in cases where strange cylinders have to be manipulated, and it is well to have such at hand. Some operators, however, of much experience prefer to do without even these adjuncts, and regulate by means of the ordinary lever key, getting the most perfect adjustment of gases, and hence most brilliant light.

In all cases, where an operator is working with new or untried apparatus it is of the most vital importance that the same should be thoroughly tested beforehand; these remarks refer to everything connected with limelight projection, and, so surely as this matter be neglected, so certainly will failure follow sooner or later. During the last fifteen years there have been some very important advances made in connexion with limelight apparatus and projection, and what might be termed an up-to-date outfit for that period would very probably be looked upon as somewhat antiquated at the present day. The advance made in photography has, no doubt, something to do with this, for certainly it is the case that, when twenty years ago we had one lamp, or lecture set in operation, we have now a hundred; for, somehow or other, every photographer is supposed to know something about lantern projection, and a little knowledge is sometimes a dangerous thing.

The most of those, however, who at the present time profess to know all about limelight projection may be safely said to have never erected a twenty-feet screen in their lives, and, were they asked to provide for a lecture in one of our large halls, where the lamp had to be manipulated from the back of the audience, or at a considerable distance from the screen, would be powerless to accomplish such with the modern lamps and lenses they possess or which they have the control over. A modern limelight outfit, such as we see advertised in nearly every photographic journal or almanac at the moderate cost of a few pounds, including lamp, jets, condenser, and objectives, is, no doubt, in many instances marvellously good value for the money, and the wonder is how such can be sold at the price. Such outfits, however, are more particularly provided for what may be termed short-distance working, *i.e.*, such apparatus is not specially designed for long-distance projection.

To yield a twenty-feet disc at, say, a distance of seventy-five to eighty feet from the screen, an objective of twelve-inch focus is required, and as a rule such long-focus lenses are not supplied with—nor, in fact, are they ever intended to form part of—such an outfit as we are referring to. One of the chief essentials to the employment of long-focus objectives lies in the class of condenser that is required, and it is just here where most of these modern outfits fail. With most lanterns intended for what has been termed short-distance working, only one condenser is supplied, and such will generally be found to be composed of a double plano-convex form four or four and a half inches in diameter, with a focus of from three and a half to four inches when measured from the centre of the combination. Such a condenser is capable of doing much useful work when used in conjunction with objectives the focal lengths of which do not exceed eight inches, for, with the radiant situated at a distance of about three inches from the back of the condensing lens all the light from a point, say, equal to three-quarters of an inch at the lime cylinder, is easily converged within the limits of such objectives up to eight or eight and a half inches in advance of the front lens of the condenser. Beyond this, however, such a combination of lenses, *i.e.*, condenser and objectives, will begin to lose their light, and such a condenser will not work to the best advantage at a distance of twelve to thirteen inches in advance, or at such a point as it is necessary for a long-focus objective to be situated in long-distance working. Hence, for really pretentious work long-focus condensers and objectives are required, and it is just here where these cheap modern outfits fall short. A loss of light in long-distance working is a serious matter, and such is best prevented by what is termed an exact balance of the optical system of the lantern, *i.e.*, the condenser employed must be capable of feeding the objective to its best capacity; so that, in long-distance working, a variety of condensers and objectives is desirable, for it nearly always happens that some arbitrary or fixed standpoint for the lamp has to be utilised, and when such provision is made, and a powerful radiant placed in the lamp, *i.e.*, one capable of yielding not less than a fair and honest 750 candle-power intensity, a twenty-feet disc will be most brilliantly lighted, and a large audience derive the greatest amount of satisfaction from the display. Another very important point in connexion with the projection of large pictures on a screen is that a suitable space be provided between the screen and the audience, for very often the front benches comprise the reserved or high-price seats in a lecture or entertainment, and an invariable rule should be made that under no circumstances should the distance of the front seats be less than the diameter of the disc. A twenty-feet picture is comfortably viewed at twenty feet distance, but not at closer quarters, and this rule will be found to hold good with all sizes of discs, the smaller the picture the nearer they may be approached, and *vice versâ*. This is just where long-distance working shines over shorter-distance projection. The common practice of yielding large discs with short-focus objectives used at distances often close up to the screen is not to be recommended, especially in large halls. Circumstances may arise, such as in private dwelling-houses containing some fairly large apartment, where some licence has to be taken in this matter, but, in the writer's opinion, whenever space allows, it is preferable to provide large discs by means of long-focus lenses employed at greater distances from the screen, and, where the conditions are such as to limit the space an operator has to work in, it is better to reduce the size of the disc, which never should be greater than a fourth of the longest side of the apartment. Some imagine that long-distance working means a loss of light, and hence less brilliant picture on the screen. This does not necessarily follow, for, with longer-focus condensers, more powerful radiants can be utilised than is possible with short-focus condensers,

where the heat is often so destructive on the back lenses when working so close up as, say, at about three inches from the back lens. True, in damp, foggy weather, some absorption of light from the atmosphere will occur when projecting from a long distance, but this is compensated for in the use of a more powerful radiant.

It has been previously remarked that, in cases where large-sized discs are being projected, it is safer to discard the use of frames or squares composed of wooden poles for the erection of the screen. In nine cases out of ten it will be found that with large-sized screens, unless they are very carefully stretched, the tilting forward at the top, so necessary to cause the sheet to lie at the same plane as the elevation of the lamp, will cause a serious risk for the poles to snap under the strain necessary to prevent the bellying forward of the centre of the sheet; hence the use of wire or strong ropes as a runner along the top of the screen where large sizes are being employed; when such is provided and tightened up with the aid of pulleys, all the belly in a large sheet is easily stretched out and the sheet made drum-tight.

For sheets up to twelve feet these poles are most useful and convenient, and offer no serious cause for alarm in regard to collapsing, but for all larger sizes a stretch of tested wire is the best to employ, and a large sheet is easily run into position on the same when such is supplied with rings. T. N. Armstrong.

THE SPECTROSCOPE IN ECLIPSE WORK.

[From the *Observatory*.]

There is often a fashion in astronomical instruments as well as in things more mundane. Some able observer will work out a form to suit his own purposes, and accomplish much by its use; but no one else at once follows in his steps. His instrument falls then into disuse, but ere long some other astronomer arises who finds the now discredited weapon just what he needs, and it comes into vogue a second time. Of such vicissitudes the "object-glass prism," or as, when employed for photographic registration, it is now commonly called, the "prismatic camera," offers a good example. Used by Fraunhofer in the earliest days of "celestial chemistry," for his grand pioneer work, temporarily revived by Secchi and Respighi, it met with almost total neglect until Pickering applied it to stellar spectrography. Here its magnificent success inaugurated quite a new era in our study of stellar physics. And now, most recently of all, Lockyer has applied it again to solar eclipse work, and it has proved itself in that connexion by far the most powerful of all our weapons of research.

Its simplicity of structure gives it the initial advantage of great economy of light. It has a further enormous advantage over the slit spectroscope in grasping the phenomenon of an eclipse in its entirety; it is not restricted to the exiguous slice included between the jaws of a slit. It escapes the confusion caused in the slit spectrum by diffused and scattered light. It chronicles in minutest detail the distribution over chromosphere, prominences, and corona of the gases represented by the bright lines of the spectrum. It is, indeed, not theoretically suitable for the determination of wave-lengths, but, practically, little uncertainty attaches to its use for this purpose. It is possible, by giving a suitable inclination to the plate, to obtain a practically perfect focus throughout the entire range of the spectrum—an impossibility in the slit spectroscope, unless used with an absolutely achromatic light-gatherer, as, *e.g.*, a reflector. It has but one important drawback, it does not differentiate between a real irregularity of shape in a prominence and an apparent deformation due to motion in the line of sight.

Whenever, therefore, there is a question of which form of spectroscope is to be used in an eclipse, and circumstances forbid more than one being employed, there can be no question that the prismatic camera has the first claim. The slit spectroscope may well be brought forward as a subsidiary weapon of attack. Displacement work is its specialty; its use in wave-length determination is more direct than the prismatic camera, and in the clearing up of one of the most difficult and delicate of eclipse inquiries—whether a particular gas exists only at a given height above the sun, or extends from that height right down to its surface—it is of service for presenting the evidence in a somewhat different form. Employed without a primary telescope or condensing lens to form an image on the slit (as an integrating spectroscope, that is to say), it is useful as registering not the relative intensity of particular rays, but their relative total light, a most important additional information.

Besides these three forms (the prismatic camera, the slit spectroscope used with a telescope as an analyser, the slit spectroscope used without a telescope as an integrator), there is a fourth form, an analysing spectroscope used without a slit, the image of the eclipse being formed in the common focus of the condensing telescope and collimator. This gives a spectrum like that of the prismatic camera in form, and though not so economical of light, and only giving a true focus for a limited time range of rays, has an occasional field of usefulness.

The chief interest of the spectroscopic results from the recent and preceding eclipses attaches to the spectrum of the "flash," the beautiful phenomenon shown just at the beginning of totality, when the rapidly narrowing strip of continuous spectrum is invaded by a constellation of bright points, which shine for a moment as a crowded series of bright little coloured arcs after the continuous spectrum has gone, and disappear in their turn a second and a half or so later. The same phenomenon, but in the opposite order, is seen, of course, at the end of totality.

There is no doubt as to the meaning of this short-lived but most beautiful spectacle. It represents a region of glowing gases extending to a height of about 700 miles above the solar surface. That much is clear; the debatable point is the relation of these gases to the dark lines which we find in the spectrum of the solar disc.

Until recently most astronomers have been content to follow the opinion of the first observer of the "flash," Professor Young, who considered that these innumerable bright lines corresponded substantially to the Fraunhofer lines, and were in effect there reversible, and the "flash" has often been spoken of in consequence as the spectrum of "the reversing layer."

Lockyer, however, has called this conclusion in question, and gives it as his opinion that there is no "reversing layer" at all in the strict sense of the word, but that the absorption of which the Fraunhofer lines are the evidence takes place at a variety of levels above the solar surface, and that the Fraunhofer spectrum is the integration of the absorption exercised by a great number of distinct strata.

This opinion is intimately connected with his theory that the majority of the terrestrial elements which we recognise in the sun are dissociated at the temperature of the photosphere. The two rival theories are indicated by him in his *Chemistry of the Heavens*, chapter xxii., with admirable clearness. The old view affirms the existence of terrestrial elements in the sun's atmosphere, and their thinning out in the order of vapour density as we rise above the surface, all being represented in the lowest strata, which, as the regions where the absorption giving rise to the Fraunhofer lines chiefly takes place, may aptly be called "the reversing layer." Lockyer's hypothesis assumes the terrestrial elements, in the main, to exist only in the higher, cooler regions of the sun's atmosphere; which atmosphere is not composed of substances which thin out as we recede from the sun, but "of true strata, like the skin of an onion, each different in composition from the one either above or below," and in the lower strata "we have not elementary substances of high atomic weight, but those constituents of the elementary bodies which can resist the greater heat of these regions."

It is clear that the two views allow of some latitude of definition. No one ever supposed that the whole of the Fraunhofer absorption took place within the 700 miles' depth of the "flash" to the absolute exclusion of all other strata. Under both hypotheses, under any hypothesis, the Fraunhofer lines are the integration of the effects of *all* the strata through which we look at the sun. But the composition of the strata is a different matter, and the old and Lockyerian theories turn on the question whether the successive strata are simply functions of the "thinning-out" process, or are of actually different composition.

Here comes in the immense value of the negatives of the spectrum of the "flash." They give us clearly and distinctly the spectra of the various regions of the solar atmosphere, the height attained by any bright line being clearly indicated in three distinct ways, by the angular extension of the arc over which it is traced, by the height required in a lunar mountain to cover it, and by the time the moon's limb takes to blot it out. But the answer to the question, "Does this particular line represent a gas existing at this height alone, or one extending from this height right down to the photosphere?" is one which only the most minute and detailed examination of each line will answer, and not by any means always clearly then.

But there is one way in which we can easily distinguish between the two theories. In both the Fraunhofer spectrum is the integration of the absorption of all the strata through which we look at the photosphere. But on the old view the main absorption takes place in the lowest strata, they most nearly correspond to the total effect; they form what may be fairly, if a little inexactly, called the "reversing layer." In Lockyer's view the exactly opposite condition prevails. In the lowest strata we have a few intensely heated primary gases, by analogy giving, in all probability, spectra of extreme simplicity, and hardly entering into the composition of the Fraunhofer spectrum at all, gases, like helium for which the emission balances the absorption. But in the highest strata we find these primary gases entering into combination with each other to form numerous secondary substances of more complicated spectra, lower temperature, and greater absorption. Just as, on the other hypothesis, the lower we go the nearer we get to a complete representation of the Fraunhofer spectrum, and we find the closest approximation to a "reversing layer" at the base of the solar atmosphere; so, in Lockyer's view, the higher we go the nearer we get to that complete representation, and we find our "reversing layer" at the summit of the solar atmosphere. In Lockyer's own words on the old hypothesis, "the spectrum of the base of the solar atmosphere should most resemble the ordinary Fraunhofer spectrum;" on the new hypothesis, "the spectrum of the base should least resemble the Fraunhofer spectrum."

Of course, though our instrumental limitations oblige us to treat the whole of the 700 miles' depth of the "flash" as a unity, it is clear that it must cover a most enormous range of temperature, pressure, and constitution. We cannot, on either hypothesis, push our way right down to the true basal stratum of the sun's atmosphere. All we can do, then, with our spectrographs of the "flash," is to ask "Which way does the tendency run?" "Are the lowest strata, so far as we can observe them

most like or least like the Fraunhofer spectrum?" If the first, then the dissociation theory is wrong; if the second, it has established its claim.

There is no question, there can be no question, of obtaining a bright-line spectrum which should correspond to the Fraunhofer spectrum like a positive to a negative. The suggestion that this is the point at issue shows a very crude idea of the conditions of the case. We are obliged, observationally, to treat 700 miles' depth of atmosphere at the sun as an homogeneous integer; but we know it cannot be so in reality. Its lowest seven miles would certainly show much individuality if we could observe their spectrum. And, again, we have much to learn about the exact nature of the correspondence between the bright-line spectrum of a gas and of the dark lines which it would show as an absorbing agent. The relative intensities of the dark lines of a given element as seen in the Fraunhofer spectrum show many differences from the relative intensities of the bright lines obtained in our laboratories. This fact has been used as a very sheet-anchor of the dissociation theory, but to resort offhand to such an explanation is to evade inquiry rather than to pursue it. One thing, however, clearly results from the number and character of the splendid spectrographs of the "flash" obtained in the recent eclipse; we are now in a far better position for comparing the spectra of solar and terrestrial substances than we could have been by the study of the Fraunhofer spectrum of the disc itself for years, for we can now bring into comparison the bright line emission spectra of the one with those of the other, uncomplicated by any questions of reversal and absorption.

E. W. Maunder.

LANTERN ENTERTAINMENTS.

Even in remote Australia the unsatisfactory way in which lantern entertainments are managed, especially among photographic societies, is acknowledged, for our contemporary, the *Australian Photographic Journal*, remarks in its last number:—

"It seems to us that in many instances lantern evenings are not what they might be. If we read or hear that in one lantern evening upwards of 200 slides were displayed, and if we take two hours as the limit of time during which an audience can follow and appreciate a lecture or a display of lantern slides, we find that five projections must take place in three minutes. In the case of a lantern entertainment pure and simple this has often been done. The pictures were thrown on the screen hurriedly, without the slightest explanation accompanying them. In many instances matters are hurried 'to get them through,' and the audience does not even get so much as the title of the views. One picture follows the other in rapid and dazzling succession, and there is certainly no time left for the public to study the subject on the screen.

"We suppose that lantern evenings are arranged with a view either to entertain or to display slides with regard to their photographic qualities. In both cases instruction is also meant to be imparted to the audience. We fail to see how that can be achieved by the system in vogue now. We understand why, in many cases, the lantern evenings are not so well patronised as they might be; the average man, who has once seen such displays and who has profited very little by them by the way of pleasure or instruction, finds he can spend his time more usefully and agreeably elsewhere.

"How different would it be if each projection were accompanied by sufficient explanatory remarks, starting either from the entertaining or instructive point of view! The monotony of the evening would at once be broken, and the interest of the audience would be incited to a greater degree. The projecting of slides on the screen in many instances now seems to be more or less the final aim, if we are to judge from the hastened course followed from beginning to end of the display.

"Can that not be altered to a more suitable proceeding? We hold that lantern evenings ought to be carefully prepared beforehand; that the descriptive material ought to accompany every slide which is intended to be displayed during the evening. Certainly it will be a new burden from which the great majority of members of a club will shrink, but the proverb justly says, 'What's worth doing is worth well doing;' and from this point of view lantern demonstrations ought to be organized, and we believe the council of a society will always find itself backed up in that direction by the more ambitious members. The final aim of the lantern demonstration is to entertain, to instruct, and to please, and, if this scope is kept in view, the lantern evenings, once for all, will be of far greater attraction and utility than they generally now are. Views of general interest, such as those of the buried city of Pompeii, of Athens, of our great cities and sights, of nature's wonders, &c., merit more explanation than only to read a title, and a short chat on the subject on the screen will command the full attention of the audience. But this also alludes to the many slides of local interest, and the maker of a slide certainly ought to be able to give some information on his work and matters connected therewith.

"For Australasia, which, comparatively, is still so little known, another point might still obtain more consideration than what it has. Our societies and amateurs might contribute very much to a better knowledge of the various parts of the country if they would organize a proper system of lantern evenings for that purpose. Some of the more enthusiastic workers have already made praiseworthy efforts; but there is no system in it yet. The material ought to be collected and well made up. This would be a meritorious task for each individual photographic society, and we expect they would have the full support of the administration of the traffic companies and of the public of the country. Such well-directed efforts, if persistently kept in view, would benefit the public, photographic societies, and individual members, and, if judiciously carried out, would not fail to give to the advancement of photography another popular impulse.

"Collections of slides got up with that aim would again be of the greatest value for imparting a good amount of knowledge of our country in the public schools, by intuition, for which purpose evenings might be arranged by the teachers, and certainly such a course, if adopted and followed by our societies, would give them an increased importance, and their activity would, doubtless, have, as a well-merited reward, the popular sympathies of all classes of the community."

WELSBACH'S NEW ELECTRIC INCANDESCENT LAMPS.

[*Journal of the Franklin Institute.*]

There have been many rumours afloat of late respecting the latest inventions of Dr. Auer von Welsbach, which are directed towards the improvement of the electric glow lamp in respect both of duration of service and light efficiency. In both these directions it must be admitted there is room for substantial betterment, and Dr. Welsbach will deserve well of the public and will reap a substantial reward should he succeed in realising the expectations he has raised.

The publication of certain patents recently granted to Dr. Welsbach suffices to give a general outline of the direction in which he is working.

The patents here alluded to describe two kinds of glow bodies for use in incandescent electric lamps. The first is a fine filament of osmium of a peculiar form. Osmium is one of the metals of the platinum group, generally found in nature in the form of flat irregular grains, associated with iridium in the mineral called osmiridium. It may be obtained in the pure state by a chemical method of separation, in which advantage is taken of the fact that the tetroxide, which is readily formed by heating the metal in the air, is a volatile compound. It must be prepared, however, with great care, because of the extremely poisonous character of its fumes.

The second glow body described is one formed of thoria and earth-metal oxide, which is already largely employed in the preparation of the well-known Welsbach incandescent gas mantles.

Referring to the osmium filament, the basis of its selection as the substitute for the carbon filament is the claim made by the inventor that it does not volatilise at the highest attainable temperature when confined in a vacuum or surrounded by a reducing atmosphere.

A serious difficulty with the carbon filament in the ordinary electric glow lamp is the rapid darkening of the glass by the deposit on the inner surface of the glass bulb of carbon volatilised by the heat of the current, or mechanically worn off by its passage. From this cause the light emission of the common electric glow lamps is rapidly reduced, and it occasionally happens that they must be discarded long before the filament itself is broken. It is principally to avoid this defect of the carbon filament that Welsbach has had recourse to osmium. The present difficulties attending the production of his osmium filaments, however, are so great that it appears gravely doubtful if the method can be made commercially valuable.

The fact that it is impracticable to fuse osmium (and on this great infusibility its value for Welsbach's purpose depends) makes it impossible to obtain it in any other form than that of a powder which cannot be united into a solid mass by pressure and then drawn into wire. It becomes necessary, then, to obtain the osmium filament by indirect means, and for this purpose Welsbach deposits it on a fine platinum wire maintained in an atmosphere of hydro-carbon vapour mingled with water vapour (*sic*); and, the platinum wire being heated to incandescence in this atmosphere by the electric current, small quantities of the vapours of osmium tetroxide are blown in from time to time. The result is that a thin layer of metallic osmium is deposited on the platinum wire. This operation, it would seem from the published account, is a slow and exceedingly delicate one, for the deposited film must be quite uniform to answer the purpose, since any irregularity in the deposit would affect the uniformity of its resistance and yield a light more brilliant in spots. Another method of obtaining the deposit is described, which consists in drawing the fine platinum wire through the solution of an osmium salt, and then glowing it in a vacuum. To obtain the film in the required condition by this method, only an infinitely thick layer must be formed at a single operation, so that it must be repeated many times (100 times at least) to obtain the needful uniformity in the superposed layers. Neither of these methods, therefore, seems to present much promise of success on the commercial scale.

A more practical method suggested is to use vegetable or animal fibres as the foundation for the osmium coating. A liquid pulp is made by mixing the finely comminuted osmium oxide and the fibres with sugar solution or other organic cementing material, and, after drying and cutting into the required shape for the lamp, it is glowed slightly in an atmosphere of reducing gas. By this and slightly modified methods a

carbon skeleton is formed, carrying a certain quantity of unconsolidated osmium. These methods appear practical; but it will be observed that the resulting filament is not a pure osmium filament, but one consisting largely of carbon, and hence open to the same objections as the common carbon incandescent lamps, besides being vastly more costly.

The second proposal of Welsbach is the thoria filament.

This substance, as above remarked, is one of the rare earths largely used in the manufacture of the Welsbach gas mantles, and is known to possess light-emitting qualities of a high order.

To obtain this filament the inventor employs an extremely thin platinum wire (0·02 millimetres in diameter) approximately as thin as a single fibre of the silk cocoon, and draws this successively through elastic cheeks which are kept moistened with a solution of salt of thorium. After each drawing the wire is glowed, and the operation must be repeated, as in the one above described, many times, in order that the resulting coating shall have the necessary permanency.

The resulting thread, then, is a platinum core, surrounded by a dense incrustation of thoria. The heat-resisting qualities of the incrusting oxide are said to be so great that the platinum wire within may be melted without affecting it, while the amount of heat radiated from the brilliantly luminous thoria is comparatively small. With the current intensity employed for ordinary illumination, however, the platinum core is not melted, the explanation being that the greater part of the heat energy imparted to the platinum is transformed by the fire-proof incrusting material into light; the intense power of the coating to emit light withdraws and transforms much of the heat of the metallic conductor into light.

The above description gives merely an outline of the several methods set forth in Welsbach's recent patents. In view of the great expectations raised by the reports of his remarkable laboratory work, it must be confessed that the outcome is a disappointment. While the methods proposed are ingenious, they seem to be altogether too delicate to be capable of being commercially applied, and they are undoubtedly so costly as to place serious competition with the cheap electric glow lamp, with which we are familiar, out of the question. W.

LANTERN NIGHTS AT THE PHOTOGRAPHIC EXHIBITION.

During the course of the Exhibition there will be displays by means of the optical lantern, every Monday, Wednesday, and Saturday evening, as below:—

Saturday, October 8, to be subsequently announced.

Monday, October 10, slides sent in by Mr. H. Sandland, *Zoological and Domestic Animals, and Miscellaneous.*

Wednesday, October 12, slides sent in by Mr. H. Nelson King, *The Royal Palaces of England.*

Saturday, October 15, slides sent in by Mr. and Mrs. Welford, *The Cumberland Fells.*

Monday, October 17, to be subsequently announced.

Wednesday, October 19, slides sent in by Mr. T. M. Brownrigg.

Saturday, October 22, slides sent in by Mr. C. H. Oakden, *Architectural Views.*

Monday, October 24, slides sent in by Mr. Henry Little, *Algiers, Constantine, Biskra, Tunis, and Carthage.*

Wednesday, October 26, slides sent in by Mr. S. J. Beckett, *Norway.*

Saturday, October 29, slides sent in by Mr. E. Dockree, *Here and There;* and Mr. J. Cooper, Ashton, *A Glimpse of Northern Italy.*

Monday, October 31, to be subsequently announced.

Wednesday, November 2, slides sent in by Mrs. Main.

Saturday, November 5, slides sent in by Mr. Edgar G. Lee, *Studies of North Country Life and Scenery.*

Monday, November 7, slides sent in by Mr. Chas. Reid, *Animal Subjects.*

Wednesday, November 9, slides sent in by Mr. I. Abrahams, *Views in the Holy Land.*

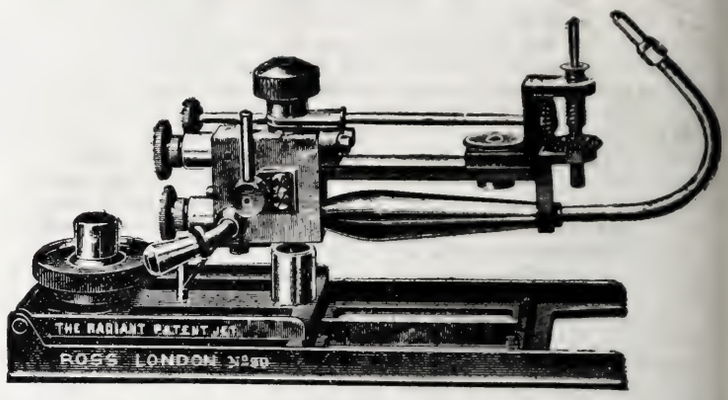
Saturday, November 12, to be subsequently announced.

NOVELTIES IN LANTERN APPARATUS.

Ross, Limited, 111, New Bond-street, W.

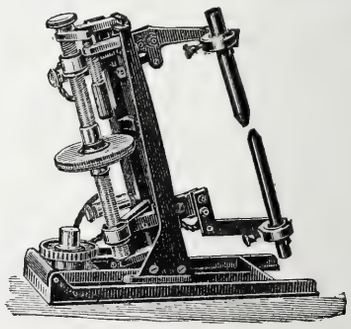
Appropriately at the commencement of that season of the year when apparatus for projection work of various kinds is in the greatest demand, Messrs. Ross, Limited, are introducing some decidedly novel adjuncts to the optical lantern, and last week at the Company's premises in New Bond-street, where a room with current laid on has been set apart for the purpose of giving demonstrations with apparatus of this character, we had an opportunity of seeing how the jet, lamps, and lanterns behaved when subjected to actual use. To this branch of photographic-apparatus manufacture Messrs. Ross have for some time past given close attention, and we are sure, from an inspection of the productions that are the latest outcome of this comparatively new departure of the Company, that Ross projection apparatus will secure very high recognition for a degree of refinement of construction and sweetness of movement such as we have not hitherto seen excelled in scientific instruments of this kind.

The "Radiant" Jet.—This jet gives a very powerful light, and at the same time struck us as being one of the most "silent" jets we have listened to. The steadiness of the illuminant was also to be remarked. These results in large measure depend upon the principle adopted in



mixing the gases, a series of irregularly apertured plates placed at regular distances occupying the chamber, whence the gases pass into a reservoir and a small narrow passage. The latter plan, it is claimed, regulates any inequality of pressure due to the regulators. The jet is very compact, and the nipple is of a new shape. It is claimed that the leading advantage of the jet is that the luminous area or "spot" is smaller than usual in proportion to the power of the jet, but that the *intensity* is greater, with a smaller consumption of gas. The mechanical arrangements include screw-down valves, "cut-off," and vertical and lateral motions. Certainly our inspection showed us that the jet has every movement that the lanternist is likely to require, and that these movements are ideally easy and simple. Test slides cast on the screen proved at once that the light given by the jet is exceedingly powerful, and in general it behaved admirably, even when pitted against an electric lamp.

The "Eclipse" Arc Lamp.—The penetrative power of the light given by this lamp was practically proved to be very great, and for cinematograph and other projection purposes its adaptability was made perfectly obvious. The movements for centering and otherwise controlling the light have been well thought out, and in actual use nothing could be simpler than the way in which that control can be obtained by the operator. The leading features of the lamp's construction may be thus summarised: The body or frame of the lamp is built from the base and set at that angle which allows of the greatest amount of light being got through the condensers, whether it be used with direct or alternating current; this frame also acts both as a screen from the light, and a shield



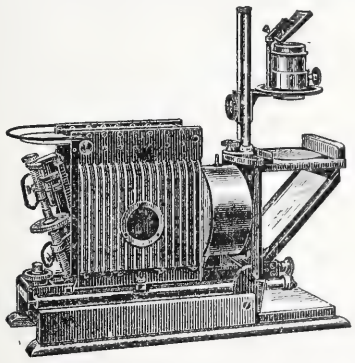
from the heat and mess of the carbons. The large milled head seen projecting from the base controls the cross motion of the lamp, and enables the light to be brought to the optical centre from either side. Turning the long and narrow milled head, situated towards the top of the lamp, causes the light to be brought central vertically. The small milled head at the extreme top enables the arms to be rapidly worked to and fro, while the very large milled head about the centre of the lamp is the slow motion for feeding the carbons as they consume away. The small lever, seen just over the bottom arm, is for striking the arc quickly and thus preventing a heavy strain being put on the fuses, and their consequent destruction and loss of time while they are renewed. The lamp can be fitted to any lantern capable of standing the great heat; metal ones are recommended in preference to wooden ones for obvious reasons. For perfection, precision of movement, and excellence, the "Eclipse" Arc Lamp would be difficult to surpass.

The No. 1 Model Limelight Lantern.—Certainly this is about the most compact and portable lantern that we remember to have seen. Roughly speaking, the diameter of the condenser is about the maximum diameter of the lantern body, in the construction of which the principle of an ordinary table lamp is followed. Not an inch of space appears to

have been wasted. Although of metal, the body radiates comparatively little heat, and, as the adjustments for the light are beneath the lamp, it is not necessary for the hand to come into contact with it. The chimney, a small one, is set obliquely, and the lantern is substantially built throughout. Its great portability at once attracts the eye, and in actual use its convenience and efficiency were conclusively shown. We shall be surprised if the No. 1 Model is not highly popular.

Messrs. Ross are also introducing a series of lanterns for enlarging purposes, which are constructed so as to afford a very wide range of adjustment. The sliding tubes are of quite unusual length, and are mounted in such a manner that no variations in temperature will affect their smooth working. This is a point of great importance, as nothing can be more tiresome than to work with an instrument which is stiff and jerky in its movements, and the construction adopted is the best method at present devised by which this defect can be avoided. The condensers are of the highest quality, and are mounted in an entirely new manner. The body will allow of any form of light being adapted, and it is fitted with an arrangement by which it can be lifted and fixed so, thus giving a light in the room when required, which is often a convenience.

Finally, there is a new metal body lantern for high-power jets or arc lamps. It has an inner body of stout black brass plates, and an outer



body of aluminium, with large air space intervening. This new arrangement can be fitted to any of the Company's projection, science, or enlarging lanterns. The illustration shows the system arranged for vertical projection, but it is easily adaptable for ordinary projection or enlarging work.

TRANSPARENCIES AND LANTERN SLIDES.

Mr. H. W. Hales, in *The Professional Photographer*, gives the following piece of advice on this subject to professional photographers: "There are few more pleasing things to the photographic artist than a really fine transparency, or even a good lantern slide, and it is to call the attention of the fraternity to this apparently neglected branch of the business that these few lines have been written. There are, undoubtedly, many places where quite a business might be done in this line if the matter was gone about in the right way. There are many visitors to studios and galleries who seldom see a really good transparency, and a portrait or landscape of this kind that is really fine I believe would frequently result in an order if called to their attention. One thing that has probably prevented many photographers from making more transparencies is the idea that special plates, or chemicals, are required for them. This is the case, however, to only a limited extent, and, while I believe the best possible results can only be had by the use of a slow plate and metol developer, still very beautiful effects can be obtained by the ordinary gallery dry plate and an old oxalate developer that has been standing some time. In making by contact in the printing frame, and by artificial light, care should be taken that the exposure is not too long, especially if a fast plate is used. Develop slowly, and try to get considerable density, especially if they are to be hung against glass windows. For lantern slides much less density is required, but, instead, all the detail you can get. A very nice way of mounting and hanging transparencies is to use the ordinary lantern-slide binders, or strips for binding the edges, and a very pretty effect can be had by putting four light brass rings over the four corners after it is bound, and connecting them together by pieces of light brass chain. Another piece of chain is then attached to the two top rings, and this is used to hang the transparency from, the same as a picture cord to an oil painting. Quite a number of variations will readily suggest themselves to the practical worker, and it may not only be a pleasant experiment to himself, but perhaps also a benefit to his pocket-book. Optical lanterns are now being so much used that it seems to the writer as if the lantern-slide branch of the business must grow very largely, and those who start early ought certainly to reap the benefit. As regards the quality of lantern slides from dry plates, the writer has no hesitation in saying that they can be made fully equal to the wet-collodion process. If, however, they are made on a large scale, the collodion process would be the cheaper of the two."

PARSONAGE'S LANTERNS FOR ADVERTISING PURPOSES.

This is a magic lantern, so arranged that it will adapt itself to all kinds of uses, such as lectures, theatres, advertising, &c.

The existing lanterns, having a windmill motion, bring the slides too close to the light, the heat from the light melting the films of the slides.

Fig. 1 is a plan.

Fig. 2 a side elevation.

Mr. Parsonage says: "I construct my slide-holders, A, in such a manner that, by hinging them together, they form an endless band. In the accompanying drawings I have shown my invention with sixteen slides, each slide being about six inches square; but I do not limit myself to any special number or size. These slides I place in a horizontal position in a square frame, which forms the endless band before mentioned. I have four square boxes, B, pivoted at B^1, and one of the boxes, B, I extend the rod or shaft, C, longer than the others, to which I fasten a toothed wheel, which engages with other similar wheels till they reach the clockwork or other motion which I may use. D is the clock arrangement, D^1 weights of the clockwork, D^2 the pendulum, E the lantern, F the blocks for supporting or steadying the endless band of slide-holders, A, or I could have rollers instead fixed on the table, G, for holding the apparatus.

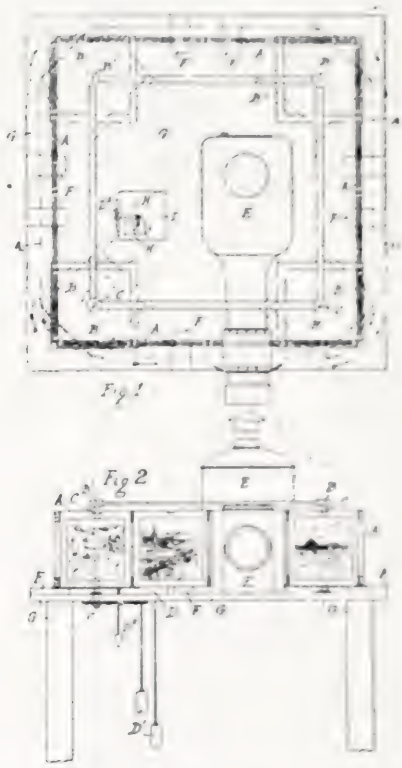


Fig. 1

Fig 2

"The mode of action is as follows:—

"I start my apparatus by any suitable mechanism that may be regulated to stop for about eight seconds, to allow each slide to remain before the lens. This arrangement can be worked by any mechanism, either clockwork, motive power, electricity, or the like. By setting this motion working, the clock going for twenty-four hours, the operator can leave the lantern and attend to any other business, or change the slides during the stops of about eight seconds; thus, the whole working arrangement being automatic and moving in a horizontal position will prevent the lantern slides from dropping out, and also keep the slides a sufficient distance from the heat generated from the light by having an open space by the lens of the lantern, and so guarded that the light will not go any way other than through the lens."

STENDER'S IMPROVEMENTS IN NEGATIVE ENLARGING CAMERAS, AND CAMERAS FOR PRINTING FROM NEGATIVES OR TRANSPARENCIES.

Mr. Stender provides means whereby the photographer will find it to his advantage to only take small negatives, so that, when a satisfactory proof is obtained, the person having the photograph taken may elect the size of the photograph desired, and then a large plate of the desired size, the image in perfect proportion and equal in quality to the small negative, may be readily secured from the small negative, and without the neces-

sity of using more than one large plate. By this means the expense of large photographs is so reduced as to bring such photographs within the reach of those in moderate circumstances, and the photographs will be superior to any photographs from direct-taken large negatives.

He says: By this invention the operator is enabled to print from a negative and to produce therefrom, without great skill or care, bromides or other prints on highly sensitive paper of the highest artistic type and photographic perfection.

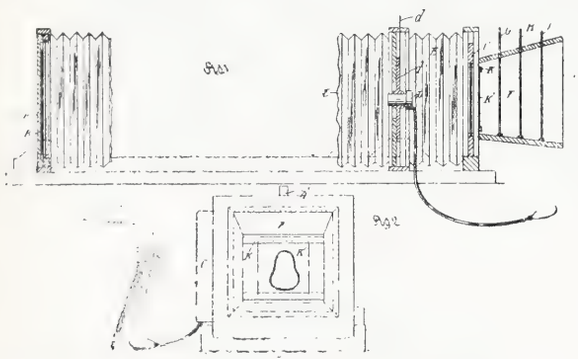
An object of the invention is to provide means by which to correct the printing qualities of an under or over-timed pyro or colour-stained negative, or of a transparency, in case it is defective in the plastic appearance of the objects photographed, so as to produce from a defective negative, which otherwise cannot be utilised, enlargements or prints of the highest degree of perfection.

Fig. 1 is a fragmental sectional view, illustrating a camera embodying the invention.

Fig. 2 is a front elevation of the same, the coloured screens being removed from the light-diffusing chamber.

A represents a plate-holder, within which may be arranged the sensitive plate, B, which is to form the large negative.

C is a negative or transparency-holder, which is arranged in the front end of the camera, and is adjustable transverse the camera, and D is a lens arranged between the holder, A, and the holder, C. The usual bellows connexion, E, is arranged between the plate-holders and the lens



to allow adjustment of the various parts relative to each other. The lens is mounted in a frame, *d*, which is vertically adjustable, and is operated by means of the projecting tongue, d^1. Thus, by adjusting the lens vertically and adjusting the transparency-holder transversely, the image may be thrown on any desired portion of the plate in the plate-holder.

In front of the negative or transparency-holder, C, is the light-diffusing chamber, F. Within this light-diffusing chamber are arranged screens, G, H, and I, of different colours, white, red, yellow, and blue, by preference the screens, G and I, being white, and the screen, H, being of some suitable tint of red, yellow, or blue, the reason of which will be hereinafter explained.

The principal difficulty in enlarging negatives heretofore has been the tendency of the enlarged negative to take flat, that is to say, there are no half-tones in the enlarged negative.

This invention shows that, when a transparency is deficient in respect to the plastic appearance of the objects photographed, by tinting the light passing through the transparency to suit the quality thereof, the transparency can be filled out or rounded so that the image thrown upon the ground glass will appear as clear and distinct as though the person were looking directly at the objects photographed. The explanation of this is as follows:—

The three colours, red, yellow, and blue, properly combined, will produce all possible shades and effects. The whiter the light which acts upon a light-sensitive plate the quicker it will make its impression. Red and yellow lights will not act upon the sensitive plate at all if they are intensified to a certain extent. Blue light, on the other hand, acts in the other direction; it destroys the action of the orange, or non-actinic, light upon a plate. A blue screen inserted in the light-diffusing apparatus in front of the camera will assist a too contrasty or yellow-stained negative in its printing quality by changing its colour. On the contrary, a yellow, red, or orange screen, thus inserted, will materially arrest the too-quick printing quality of a too-flat, too-thin, or too-transparent negative. If the small negative is perfect, white screens are sufficient.

In using this improved camera, first make a small positive or transparency from a small negative by contact printing in the large plate-holder, the diffused light causing all the delicate tones and half-tones of the negative to be reproduced in the transparency. Then this transparency is placed within the transparency or negative-holder, C, and slipped into the front of the camera, as shown in fig. 1.

The operator then adjusts the lens and plate-holder to give the image the desired size upon a plate in the plate-holder. The coloured screens, G, H, and I, are arranged in the light-diffusing chamber in such series that they will tint the light passing through the transparency to suit the printing quality of the transparency. If the transparency is thin, insert a yellow, red, or orange screen, thus arresting the too-quick printing quality of the transparency. If the transparency is thick, or yellow-stained, insert a blue or white screen. If a different light is needed to bring out the full strength of the transparency, the coloured screens may be arranged to give the desired tint of light. Everything being in readiness, the plate-holder, A, having a sensitive plate, B, therein, is arranged in position in the camera as shown in fig. 1, and the impression is taken. The impression may be taken either by short or long exposure just as the transparency may require it, the light which passes into the camera being tinted to bring out the full strength of the transparency. By passing the light through the various screens, it is immaterial to what light the camera is exposed. It may be placed where the sunlight can strike a portion only of the front screen, or it may be placed entirely in the shade or entirely in the sunlight. If it be placed so that a shadow will rest on the upper portion only of the screen and the sunlight on the lower portion thereof, the light is reflected from the first screen to the second, and from the second to the third, by this time becoming so evenly diffused, that in looking through the camera one cannot distinguish which portion of the front screen is exposed to the strong light.

Another important feature of this invention is that the operator is enabled to vignette negatives or prints in any desired shape and without having any sharp line to ruin the print or negative. This improvement consists in arranging in front of the negative or transparency-holder, C, and between it and the screen, a vignette-holder, K, within which may be arranged a vignette, K^1, shown in fig. 2. This vignette is thus arranged in front of the transparency, and the diffused light which comes through the various screens passes through the opening in the vignette without casting any uneven shadow upon any portion of the plate; the central portion of the plate will take strong and clear, but the other portions of the plate will take fainter and fainter, the outer portions thereof being entirely obliterated, thus producing upon bromides the vignette which it has heretofore been necessary to produce by continually moving a vignette between the negative and the paper, in order to prevent sharp lines.

In producing the transparency, the operator can judge of the printing quality of the negative and can tint the light to suit the negative. That is to say, if the negative is so thin that the lights and shades when printed with a white light will print almost equally quickly by inserting a yellow, red, or orange screen, the printing quality is materially changed. This is for the reason that, through the thin places of the negative, the actinic and non-actinic rays of light pass through the negative with almost equal facility. Upon the contrary, where the negative is thicker, both the actinic and non-actinic rays are arrested in their course, and the tint is consequently intensified at these points to such an extent that the printing proceeds much slower in proportion than does the printing of the thinner portions of the negative.

In practical experience the proportionate printing qualities of the lights and shades may, by a proper regulation of the tints of the light used in printing, be varied if necessary, so that, where the thin portions of the negative in printing quality can be compared to one, the thick portions of the negative will in proportion thereof be as five. Any intermediate proportions may be secured by a proper tinting of the printing light. If a white light is used, the printing qualities of the thick and thin portions of the negative always maintain the same proportions relative to each other without reference to the intensity of the light used, and for this reason a camera employing only white screens is capable of only limited use. The use of the other coloured screens gives a range which enables the operator to secure perfect prints from negatives which cannot otherwise possibly be utilised.

In ordinary practice the inner and outer screens, G and I, are preferably white, and the middle screen, H, is tinted to the colour and intensity deemed requisite for the work at hand.

THE acetylene position is summed up thus by an electrical contemporary:—Electricians have cut a pretty little switch for their own backs. They have named it acetylene, Not that there is any possibility of the one light displacing the other, but the small initial cost of acetylene will, undoubtedly, often delay, and sometimes prevent altogether, the laying down of electrical installations. There is no doubt that, where carriage of coal is enormous, and water power impossible, acetylene will be a most useful illuminant. When rationally understood it is a co-labourer, not a competitor, with electric light. There is also an important use for acetylene as a twenty per cent. mixture with oil gas for railway work. The mixture has been adopted on the German State railways, and possibly this will be the way in which electrical energy in the future will help to light such railways as will not be propelled by electricity.

MESSRS. NEWTON & Co., 3, Fleet-street, E.C., have just published a new set of lantern slides, "Gordon and Khartoum," with a lecture of sixty slides, bringing matters right up to date.

ON Monday last an interesting Exhibition of optical, mathematical, and scientific instruments was opened at the Mansion House by the Lord Mayor. It closes on Saturday next.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*November* 4, 1898.

THE LANTERN RECORD.

CONTENTS

	Page
NOTES AND NEWS	81
LANTERN MEMS. By G. R. BAKER	82
LIMELIGHT EXPERIENCES.—VII. By T. N. ARMSTRONG	8
CINEMATOGRAPH ACCIDENTS	84
COMMERCIAL SLIDES: EXPOSURE AND DEVELOPMENT. By J. PIKE	84
TONING AND TINTING LANTERN SLIDES	85
THE "BIRTAC"	86
REMEDY FOR DIFFICULTIES IN BURNING ACETYLENE GAS	86
THE ACETYLENE GAS HAZARD. By L. J. KROM	87
ACETYLENE NOTES. By G. E. BROWN	87
OUR EDITORIAL TABLE	88

NOTES AND NEWS.

The National Incandescent Gas Society of Florence have instituted a competition for an unbreakable incandescent mantle. It will be open to persons of all nationalities till December 31 next. The prize of 50,000 lire (about 2000*l.*) will be awarded after a month's trial in the open air. The mantle must not break on falling to the ground from the height of one metre, but it may be put out of shape. It must not be fusible in the oxyhydrogen flame. It will be required to have an illuminating power of 250 Hefner candles (about 206 English candles) when supplied with gas at a pressure of one inch, and to be applicable with gas at lower pressure, and its luminosity must not diminish in a marked degree after 2000 hours' burning. Its maximum consumption is to be 150 litres (5·3 cubic feet) of gas per hour, and its price is not to exceed about eighteen pence English. The shape and construction of the mantle may be the same as in the Auer mantle. If the mantle furnishes the above-named amount of light without requiring a glass chimney, the price will be raised to 60,000 lire, and to 100,000 lire if the gas can be lighted automatically by simple contact with it.

* * * * *

A well-known London dealer in mummies is reported to be making good use of the X rays in order to prevent the Egyptians from swindling him with "fake" mummies. There are certain internal marks beneath the cloth in which mummies are wrapped, which are unfailing tests as to their genuineness, and these, it is said, the X rays readily detect.

* * * * *

Recently Mr. J. Lizars, of Glasgow, had the opportunity of photographing several subjects at the Braemar Gatherings. These subjects are, Highland Dancing, the March Past of the Clans, and the arrival of the Queen, all of which have turned out most successfully, and are being shown nightly throughout Scotland. On Wednesday evening, the 26th ult., he had the honour, by Royal command, of exhibiting the cinematograph before the Court at Balmoral Castle. The programme consisted of scenes such as Braemar Gatherings, Railway Scenes, Turn-out of the London Fire Brigade, Bull-fight, Butterfly Dance, Naval and Military Scenes, Coronation of the Queen of Holland, and a few burlesque. Between the cinematograph pictures, dissolving effects and animal studies specially prepared for the occasion were shown. At the conclusion of the exhibition, H.I.M. the Empress Frederick and H.R.H. Princess Henry of Battenberg expressed their entire pleasure and satisfaction with the programme submitted.

* * * * *

If we were asked to name the ablest and most experienced lantern lecturer of our acquaintance, we should not look beyond Mr. T. C. Hepworth, F.C.S., who has been before the public for a considerable number of years, and who to a unique practical knowledge of photography and many other scientific and non-scientific subjects adds the rare art of being able to discourse upon them in a lucid and engaging style. Mr. Hepworth's presence on the platform of a public hall is a guarantee that his audience will be both instructed and entertained; and it is no wonder that his services are in constant request during the winter months in all parts of the country. He is a sure "draw" anywhere. The complete prospectus and syllabus of his lectures is before us. The subjects, which are illustrated by lantern slides from Mr. Hepworth's own negatives, include the following:—Photography up to Date, Under the X Rays, Footprints of Charles Dickens, The English Lake Country, A Corner of Normandy, Follies of Fashion, Curiosities of Photography, Pearls and Precious Stones, The History of Caricature, Old and New London, Our Microscopic Friends and Foes, Voyages in the Air, The Evolution of an Illustrated Newspaper, Now and Then, or, Sixty Years of Progress in Britain, Hampstead Heath (Historical and Picturesque). Mr. Hepworth's address is 10, Lyulas-road, Balham Hill, London, S.W., and he will be pleased to send a prospectus of his lectures on application.

* * * * *

A daily contemporary remarks that once again, and within a few weeks, has the biograph at the Palace Theatre accomplished a remarkable photographic feat. At the beginning of last month a picture of the 1st Grenadier Guards, marching from the station to their barracks, was shown within eight hours of the gallant troops' arrival at Waterloo. On Thursday evening, October 27, two views of the Sirdar's home-coming were depicted. The first was taken on board the boat at Calais, and presents Sir Herbert Kitchener stepping down the gangway. After shaking hands with the captain, he stands watching the other passengers who follow. The other picture is at Dover. There is seen the open space along which the Sirdar, accompanied by the Mayor and those who had come to welcome him, were walking. In each instance admirable full-face and side portraits of the gallant General have been obtained. So clear and distinct are the photographs that every expression on the Sirdar's face is plainly visible. When it is remembered that before

the films could be touched it was necessary to bring them to London, the difficulty in getting them ready for the same evening will be fully appreciated.

* * * * *

THE Exhibition of the Royal Photographic Society closes on Saturday, November 12. The remaining lantern nights are as follows:—Saturday, November 5, slides sent in by Mr. Edgar G. Lee, *Studies of North Country Life and Scenery*. Monday, November 7, slides sent in by Mr. Chas. Reid, *Animal Subjects*. Wednesday, November 9, slides sent in by Mr. I. Abrahams, *Views in the Holy Land*. Saturday, November 12, to be subsequently announced. At the technical meeting to be held at 12 Hanover-square, W., on Tuesday evening, November 22, there will be a display of lantern apparatus, by Messrs. Ross, Limited.

* * * * *

IN regard to the production of acetylene gas from calcium carbide in France, there are no official statistics bearing upon the annual output of calcium carbide, so that the amount furnished yearly by the different manufacturers has to be estimated, says the American Consul at Havre. These estimates vary from 1000 to 5000 tons per year from each factory. There are ten factories at present engaged in the manufacture of carbide of calcium in France. Two are at La Bathie, and one each at Séchilienne, Froges, Chapareillan, Lancey, Notre Dame de Briançon, St. Béron, Bellegarde, and Crampagna. Four factories are under construction. They will be situated at St. Etienne de Maurienne, Epierre, Serres, and Chute du Giffre. They will be able to produce, when running at their full capacity, from 2500 to 3000 tons per year. The wholesale price of carbide of calcium in France is from 350 to 400 f. ($67·55 to $77·20) per ton, exclusive of cost of packing. The cost of packing is 4·50 f. (87 c.) per iron drum containing 50 kilos. (110 lbs.), 6 f. ($1·19) per drum of 100 kilos. The carbide of calcium manufactured in France is guaranteed to give 300 cubic litres of gas per kilo. The output is constantly increasing, and the supply is fully equal to the demand. The retail price of the article is from 55 f. to 60 f. per 100 kilos. ($10·20 to $11·58), not including packing. There are two villages in France completely lighted by acetylene by the Société Franco-Espagnole du Gaz Acétylène, of 81, Rue St. Lazare, Paris. They are Alzonne, in the department of Aude, a town of 1500 inhabitants, and Saurat-par-Tarascon, in the department of Ariège, a place of 3024 inhabitants.

LANTERN MEMS.

THE Spectacle-makers Company held an Exhibition of Optical Instruments at the Mansion House recently, which was quite representative in its way, and, for the purpose of identifying the craft with the Company of whom the Lord Mayor was Master, no doubt fulfilled the aims of the promoters; but whether the opticians who exhibited have benefited at all, from a trade point of view, is very questionable.

* * * * *

LIKE many other exhibitions of a technical character, an enormous amount of energy has been displayed by the promoters and active members of the Committee; but, behind it all, one cannot help feeling there is "an axe to grind," and personal considerations, in all probability, come in as motives much more than appears on the surface. I suppose this sort of thing is not confined to exhibition work, but pervades most affairs of life, for there is very little disinterestedness in man.

* * * * *

REGARDING the exhibits at the Mansion House, lanterns and projection apparatus were well represented, Messrs. Newton showing electrical microscopes, direct projecting polariscopes, Ives's photochromoscopes, and general optica instruments. Mr. J. H. Steward had specimens of his triple lanterns, the Davenport arc lamp, resistances, and an assortment of English-made binocular field glasses and military optical instruments. Messrs. Ross, Limited, had examples of their photographic lenses, new projection and enlarging lanterns, limelight jets, arc lamps, telescopes, field glasses, microscopes, &c.; while Messrs. Watson exhibited lanterns for University extension work, apparatus for animated photography, and lantern slides. Mr. E. G. Wood's show-case contained biunial and single lanterns, and various forms of limelight jets; and Mr. R. G. Mason had a collection of his combined lantern and table microscopes. Dallmeyer, Limited, showed specimens of their well-known photographic lenses, and also lenses in the various stages of manufacture.

* * * * *

IT is almost impossible to enumerate all the interesting items in the thirty-seven exhibits, but those of Mr. R. W. Paul with his animatograph, Mr. Walter Tyler with his collection of single and double lanterns, and Mr. Matthews with various types of portable optical lanterns and apparatus, must not be omitted, together with aluminium and other lanterns and apparatus shown by Mr. C. Baker, for they all helped to form part of the Exhibition which had the most interest for lanternists. Nearly all the well-known houses above mentioned had on show a general collection of optical instruments as well.

* * * * *

AS one walked through the Exhibition, one could not help thinking of the marvellous advances that have been made in projection apparatus during the past twenty years, the general design, the utilisation of improved illuminants, and the convenience of manipulation brought about by the details of construction and mechanical adjustments, which leaves little to be desired in modern apparatus. Certainly any one in earnest who desired to purchase an optical lantern, or any accessory, would be difficult to please if he could not select from the exhibits that which would answer his purpose or formulate the details of specification so as to have it made to order. The examples generally did credit to British optical work.

* * * * *

THE Sunday League has filled a void in providing intellectual recreation for Sunday evenings, and generally supply what they announce; but exception must be taken on two occasions, one this year and one last, when a *lecture* on animated photographs was announced. The exhibitor or person in charge of the apparatus simply says, on coming on to the platform, "No doubt you would like more pictures and less talk," or something to that effect, and "so we will at once get on with the exhibition." I know on both occasions that several people went to the particular hall to *hear the lecture*, and hoped to be enlightened as to how it was done, and consequently were disappointed at these very brief remarks, they, having seen animated pictures on many previous occasions, did not go primarily for that purpose. I would suggest that the Committee take care in future not to call an exhibition a lecture.

* * * * *

IT is curious how limited is the knowledge of some men that work the lime light, and have done so for many years, in theatres, and yet they very often think they are competent to take charge of expensive and intricate apparatus, such as biunial and triple lanterns and cinematographs, without help and very little instruction. I heard of one case the other day where a man had been used to theatre lime lights for nearly twenty years and yet did not know there was such a thing as a "cut off" for a jet or a screw-down valve for the fine adjustment of the gases.

* * * * *

THIS want of up-to-date knowledge may account for some of the accidents that occur in the working of cinematographs and kindred

apparatus; and those who are responsible for the entertainment provided should satisfy themselves that the operator is a capable man and understands his apparatus. Recently at a hall the films and certain portions of the woodwork of lantern and cabinet surroundings caught fire, and only the presence of mind of the manager and fireman attached to the premises prevented a panic. The operators in this case may have known everything that one could reasonably be expected to know, but the explanation of the outbreak of the fire is certainly not very clear to a technical mind.

* * * * *

While getting ready, the plush curtains surrounding the apparatus were supposed to have fallen down, and, coming in contact with the carbon of the arc lamp, became ignited and set fire to them, and from that caught the film. As only those in the cabinet containing the apparatus could know exactly what took place, the fire brigade and insurance people had to take the version of the affair and draw their own conclusions. That it was not quite satisfactory to their minds may be judged from the fact that this particular item of the entertainment was withdrawn a few nights afterwards.

* * * * *

There are many rules and regulations laid down by the County Council for the conduct of lantern exhibitions in places over which they have control, and these, like the sanitary regulations, are always altering; but, if I am correctly informed, the inspectors, who enter the places of entertainment and pay for their seats like ordinary members of the audience, judge more by the competency of the operator, his methods of working, and the coolness displayed in the general conduct of the operations, rather than to the minute details of conditions which, although safeguards, are not so important as efficiency in manipulation, which can only come by experience on the part of the operator, with constant practice and the use of properly constructed apparatus. G. R. Baker.

LIMELIGHT EXPERIENCES.

VII.

Perhaps there is no more annoying circumstance in connexion with limelight lecturing than the deterioration to limes caused by exposure to the atmosphere or damp. From time to time numerous attempts have been made to find a reliable substitute for the lime cylinder so commonly in use, but, somehow or other, without any great success, and so the old-fashioned lime still reigns supreme in lantern work. Of the many makeshifts in lieu of the common lime cylinder there is no need to speak; it is, however, very lucky for every lantern operator that, when face to face with this annoying circumstance, he need not actually despair or throw up the exhibition for lack of a supply of sound limes or a substitute. In giving my experience in connexion with this detail of limelight working, I am far from wishing any reader to imagine that I advocate anything but the most perfect care being taken to provide for every precaution against damp affecting a box or bottle of limes, for no one knows better the importance of having a radiant that can be depended upon. Still, "the best-laid schemes of mice and men gang aft aglee," and when you want a sound lime you want it badly, or something else that will do nearly as well in an emergency.

Since the introduction of the modern high-pressure jet there is no doubt but an improvement in the quality of limes has taken place, and the increased inclination to adopt single-lantern working has likewise tended more towards the use of harder limes than was previously the case where dissolving effects were the aim. No lime, however, that the writer has ever been brought in contact with has been proof against damp, or could be said to be unslakeable. Although there have been improvements in the mode of hermetically sealing them from contact with the atmosphere, hard or soft, they all slake, and a slaked lime, as every one knows, is worthless. Of the many substitutes that can be brought into requisition during an emergency, or where an efficient stand-by, in case of accident, has not been provided, perhaps the simplest of all resources is that of a common clay tobacco pipe, and the one that has the deepest bowl will prove the most useful. The writer has been face to face with circumstances where a new or unused tobacco clay pipe has saved an audience from disappointment, and, by the exercise of care, has enabled a fair radiant to be maintained. A tobacco clay pipe, having its stem nipped off close to the bowl, is easily slipped on the lime pin, and, in a few seconds, it will have adjusted itself, and keep in fairly good register when being turned upon the pin. Some qualities of clay pipes will be found to withstand the blast wonderfully well, and, when careful attention is given to see that the glaze which will form after a short time does no injury by projecting the lime forward, a fairly good and steady light can be relied upon. This old-fashioned dodge is mentioned first by the writer simply because of the certainty of such being procured in any locality. There is, however, another form of substitute for slaked limes that is far and away ahead of the tobacco pipe, and which, when provided and carried *absolutely as a stand-by only*, confers a great comfort to any one engaged in limelight projection. For many years the suitability of marble has been well known to every operator of experience, and many a limelight entertainment has been given with such without the audience knowing that marble in lieu of lime was being used upon the lime pin. To derive the full benefit, however, of marble in case of a breakdown to limes, it is wise to invariably make a rule of keeping a few cylinders of marble, in every way similar in shape and form to a specially prepared lime, *i.e.*, the shape should be cylindrical, its length about one and a half inches by nearly an inch in breadth. Years ago I experienced the value and relief to my mind of having a few such pieces of marble specially prepared for me by a marble-cutter. These can be obtained undrilled from any regular worker who is in the habit of cutting marble, and the drilling of the hole for the lime pin I accomplish myself, without much trouble, by means of an ordinary brace and drilling bit one-eighth of an inch in size. This size of drill will give a hole that will suit any jet. In using marble as a substitute, the one great difficulty, *at first*, appeared to me to lie in the being able to attach an unshaped lump on the lime pin or platform. At first I used flat slabs, or nearly so, attached with platinum wire around the pin, but there was always more or less bother to keep the marble in fairly good position by this means. No sooner, however, had I used marble for the purpose than I was forcibly impressed with its great value as a substitute in case of a break down to a stock of limes; and so I determined to get a few cylinders of white marble turned by a practical worker. The boring by means of a common brace and drill is quite within the power of any one desirous of a ten minutes' healthy physical exertion; but what a comfort to have two or three of these marble cylinders in your trowsers pocket as a stand-by in the event of slaked limes. As to the light obtainable, I do not say it is superior to that obtainable from a lime cylinder in good condition, but I do say it is of better quality as far as purity of colour is concerned, and it would take a very close scrutiny to find out that, as a radiant, it was in any way inferior. These marble cylinders need not be very expensive when they are bored by oneself in the manner I have practised for some years, and I can assure my readers a few of them always on hand conduces to great relief of mind.

In using such, care ought to be observed that the marble is well heated before a brisk fire previous to being used. When the combined gases are turned on, the light will take slightly longer to reach its maximum than is the case with a soft lime, but this is merely a matter of a few seconds of time.

I have known instances also, where sufficient time permitted, in which an excellent substitute was provided by crushing a lump of white marble and pulverising the same in a metal mortar until a very fine powder was obtained; this powder is then mixed into a paste by means of thin gum water. A strip of paper nearly two inches wide is then rolled round a stick as wide as the lime cylinder; the paper by this means provides a mould when the ends are glued, and it is left open at both top and bottom. The paper mould is then stood on end on a flat board having a sheet of blotting-paper on its surface. The marble paste is then run into the paper mould, and in a few minutes the same will become set, the blotting-paper absorbing some of the moisture at the bottom, whilst the top of the mould will contain the water unabsorbed by the marble powder, which will rise to the top, and may be drawn off with a soft rag or pad of blotting paper. When set, a small stick or wooden pin, slightly larger than the lime pin, is pushed through the centre of the now setting or hardening marble powder; this pin must be pushed right through from end to end, or until it touches the board upon which the paper mould rests.

This done, the small board is lifted bodily, with the paper mould and marble powder, and placed in a hot oven; any ordinary kitchen oven will do nicely. In about twenty minutes it will have become quite hardened, and permit of the wooden pin being withdrawn and the paper mould being cut or torn from around the sides of what will now be a marble cylinder; and, by leaving this in the oven for some hours, it will become as hard as stone, and in this condition makes an excellent substitute for a slaked lime. This is an expedient that may be resorted to with the absolute certainty of success, and marble cylinders so prepared will yield a light in no way inferior to that of a lime cylinder; but such, of course, cannot be used a second time.

The only difficulty lies in getting the hole for the lime pin straight down the cylinder; but after the first trial this will be overcome. The marble powder seems to set much after the manner of plaster of Paris, and any one will be surprised at the degree of hardness that these powder cylinders will assume when the powder is merely bound together with a little gum water. Next to the actual marble itself, shaped as previously stated, the marble-powder dodge stands the blast particularly well, and will never fail to work satisfactorily when a blow-through jet is used or a mixing jet of not too great pressure.

There are other substitutes, such as the shaping of a block of lime-

stone; but the marble will answer all purposes, and one or two cylinders of such ought to be found in every lecturer's kit, *but as a stand-by only*.

Another source of annoyance lies in the cracking of condensers during a lecture or entertainment. Some shells or bodies of lanterns are far more liable to injure condensers than others, and this the writer has repeatedly noticed for many years past. In one instance where a course of lectures was being given nightly in a large city, it was almost a nightly occurrence with the lantern that was in use, and on one night no less than three condensers came to grief. An inquiry into the particulars of this circumstance elicited the information that the condensers were of too short a focal length. Two six-inch plano-convex or meniscus lenses when worked together will require the jets to be somewhere about three inches behind the back combination, and this distance is insufficient when high-pressed jets are being used. Condensers, of course, are required to work in accordance with the focal length of objective that is being employed; but, wherever a long focal objective is used, and a short focal condenser tried to do duty along with the same, the light or jet has in consequence to be placed nearer the condenser, and in nine cases out of ten condensers are destroyed simply through an error in judgment in employing them of too short a focal length for the objective that is in use. A condenser which requires the jet being placed at about four and a half inches behind the back combination will rarely come to grief, even with a powerful jet. Some writers argue that, by using short focal condensers, a larger angle of light is taken up; theoretically this is quite true, but in practice the employment of as long a focal length of condenser will prove the most economical, and it takes a very smart man to say the light from the use of such is in any way deficient. T. N. Armstrong.

CINEMATOGRAPH ACCIDENTS.

In our last issue we gave a report of what took place at the meeting of the London County Council last week with regard to cinematograph entertainments in places under the control of the Council. At the last meeting of the Photographic Club, we are told, the action of the Council was somewhat criticised, as throwing obstacles in the way of entertainers; but Mr. Birt Acres would go still further. His suggestion is that no one should be allowed to exhibit a cinematograph at a public entertainment unless he held some sort of a certificate of competency, and as thoroughly understanding the nature of the material and the apparatus he had to deal with. If some such regulation as this were in force, we should not, we imagine, read of three accidents in a single week. Crass ignorance of the character of the materials dealt with has been conducive to a large proportion of the accidents that have happened. The catastrophe in Paris is a case in point, and so have been many others in this country. Carelessness, downright carelessness, accounts for many more. Fancy an amateur exhibitor manipulating the apparatus with a lighted cigarette in his mouth and a basket of loose films in front of him! Yet such a case was quoted the other night.

There is very little question that if those who give public entertainments with the cinematograph had to be licensed, and the licence were only granted to those who could show that they were competent to hold one, we should hear of fewer accidents, and there would also be less necessity for County Council restrictions, which at present are so irksome to the proprietors of public halls, &c. There is no question that there is an element of danger in cinematograph entertainments, but it becomes *nil* in the hands of competent and careful manipulators, and to those only should the exhibitions be intrusted.

Cinematographs and Insurance.—Apropos of the late cinematograph accidents, and the prominence given to them in the daily press, a correspondent in the *Standard* one day last week called attention to the question of insurance. He says: "I think it well to remind owners of property that their fire policies are invalidated by the use of such apparatus on premises already insured, unless notice be given to the insurance companies, and the use of the machines allowed by them." He further adds: "There is undoubtedly great danger attending the use of cinematographs, and unless certain rules, obtainable from their insurance companies, be observed, I am afraid many besides myself will be anxious." Of course, the insurance company's rules apply equally to private houses and public buildings.

Some time ago it will be remembered that we gave prominence to the fact that the conditions of a policy must be strictly observed or serious consequences may follow. At that time one of the members of the Photographic Club, well versed in legal matters, had explained at a recent meeting that if the conditions of a policy were once violated, even if no accident resulted therefrom, the policy became void, and that even if subsequent premiums were paid upon it, it was still void and the insurance company would not be responsible for any claim afterwards made upon it if they chose to repudiate it; for a policy once voided was always void. The only course, if the conditions of a policy had been infringed, was to obtain a new one. This has no special reference to cinematographs, but applies equally to all violations. We again call attention to this matter, for we know that photographers frequently infringe, often unwittingly, the conditions of their policies. However, insurance companies do not often raise quibbles unless they have good reason to, and rarely in a *bonâ-fide* claim. But there is the law on the subject, and insurers will do well to take note of it.

COMMERCIAL SLIDES: EXPOSURE AND DEVELOPMENT.

So important is it from the business point of view to keep to the smallest limit the percentage of failures, that any little contrivance to facilitate operations, or method of working, which shall tend to minimise the risk of failure from badly timed exposures, and so on, must always be of interest.

Practically, with the present fine array of developing agents at our disposal, the risk should be small, but from what I hear and see, the percentage of failures is much larger than would be believed. One estimable operator with whom I am acquainted, and who does business in by no means a small way, estimates that only about fifty per cent. of the slides made are passable, while only two out of twelve are up to that peculiar standard known as "exhibition form."

The photographer who "lays himself out" for lantern-slide making, particularly in our educational centres, very soon works himself in with a reliable, useful, and profitable set of clients; but it is necessary before starting to make slides for other people to use, that he should at least know something about slide projection, in so far as the technical efficiency of the slide for the purpose intended, is concerned.

It is necessary to know what a "good" slide should be like, and it may be useful to know also the quality of the illuminant designed to be used in the projection of the pictures; in the most cases, however, the operator will endeavour to get the quality of slide most likely to show up well in the limelight lantern. The slide, therefore, must be clean and sharp, well defined, of good quality as regards gradation, neither too soft nor too strong; just as a properly exposed and developed, plucky, and bright-looking negative gives a pleasing picture on albumen or printing-out paper, so should a "slide," if printed by contact, result in a print showing neither dead black nor absolute white. We want a result somewhat soft, yet plucky; and nothing but experience, not only with the best brands of lantern plates and developers, but with the optical lantern itself, will give us the requisite qualifications to determine such matters.

A reference may be permitted to the preliminaries. However addicted one may be to experimental developing and so on, it is best to put aside the practice at these times, therefore plates of the brand we know best, and chemicals tried and reliable should only be employed. The usual routine may be put as follows: A customer puts in an appearance with sundry books, and prints, and photographs, and wants a set of slides made. Now, without some rule and method, this may mean a great waste of time and material. There will be possibly five or six dozen of negatives to be made from subjects of considerable variety, and none of which is precisely the size of its neighbour. Firstly, the greatest care must be paid to the camera, and dark slide, and focus screen to ensure their accurate register. This once properly done serves to infinity. Then we parcel out the subjects to be copied, so that all those of approximately similar size and shape are done together to save a lot of shifting of apparatus and rough refocussing. I make a rule to start with the book illustrations, if any. These being the most troublesome are best tackled when the body and mind of the operator are freshest. Each man must do his copying as he is enabled by reason of his surroundings. As a rule the studio will be the best place, if available. Any room with a top and side light, with whitewashed walls, will be an excellent place to make copies in. For plates, any well-known make of medium rapidity will do. It is beneficial to the eye and a welcome change to develop three or four plates after making a few exposures; one turns with greater zest and a clearer vision to the remainder of the batch. Very careful working at this stage may save a lot of time later on. Let each print be accurately adjusted and focussed, the exposure fairly well gauged, and the rest is plain sailing. For development use a pyro-sulphite and ammonia developer of the "Paget" class, in fact, the "Paget" formula is the best of its class, and for all purposes where pyro-ammonia is admissible. Make the solution rather under the normal strength (diluting with water), and let the ammonia solutions be freshly prepared; this is very important. Develop out fully to save the trouble of intensifying, but discretion will have to be exercised at all points. Sometimes the plate will develop a little veil at an earlier stage than desirable or usual, when it should be removed. Such a plate, properly fixed, cleared, and intensified, may often be brought into line with the remainder of the series and yield a satisfactory negative. From a variety of prints or subjects it is possible to get a set of negatives fairly even in tone and gradation. Of course, there will be some better than others as regards quality, but in the main, remembering that a copy will often be relatively better than the original, we ought to have a very fair series of negatives, The value of a developer such as pyro-sulphite, fresh ammonia solution.

and both solutions frequently renewed, will be found in the even, clean, and healthy colour of the series. The plates developed, fixed, and finished off, will require to be carefully inspected and touched up previously to making slides from them. An hour or two spent in cleaning, spotting, blocking out an occasional sky, and so on, will again mean better net results.

A little "dodge" I often make use of when making a series of negatives of the kind above referred to is to interpose between the lens and the object a circular or oval mask, which should be neatly cut out of cardboard; this vignettes out or masks out a lot of extraneous matter, which otherwise would have to be blocked out or covered over when finishing the slide. This mask should be dead white or black; if the former, the slides when finished should be, of course, nearly bare glass all round the subject.

For the purpose of simplifying the labour of exposing a number of lantern plates some contrivance must be fixed up, the chief aim of which shall be to ensure a constant light, a regular, not necessarily fixed, exposure frame, so that we can repeat an exposure at the same distance from the same constant illuminant.

I think I have tried all the known methods, and certainly all the known illuminants, and I prefer a gas burner to a measured length of magnesium ribbon and an electric light to either. Of course, where such a light is available, that is to say, laid on from mains, it would doubtless always be used; but, if not, something can be done with accumulators. My experience of these batteries is altogether favourable, not only for use to provide a pleasant dark-room light, but as an occasional illuminant in the "wee sma' hours." My method of fitting up the light is as follows, premising that the dark room is amply provided with the requisite for good and satisfactory working—plenty of space and light.

At a convenient point near the work-bench I have made an aperture which is first closed by means of a quarter-plate printing frame; such a frame serves at all times to fill the gap. Outside, at a distance of twelve inches, is a bracket on which is mounted a ten c.p. lamp; a cone-shaped reflector serves to concentrate the light upon the work in hand. The lamp is served from an accumulator, which is charged to give a brilliant light for thirty or thirty-five hours at least. A switch is put in the circuit close to the frame inside the dark room. Now, I find it to be the easiest and most accurate method of exposing the lantern plate to, with the frame properly fitted and placed, switch on the light, time the exposure, switch off, refill the frame, and repeat the performance, altering only where and when required the number of seconds; at ten seconds each, which is more than ample with the ordinary lantern-bromide plate, the cost comes to about five hundred exposures for a penny! This easily beats magnesium, and is ahead of the gas account; not quite so cheap as daylight, but more certain. The great advantages are the certain value of the light (provided, of course, that the battery is worked well within its powers), the fixed distance, and the saving of physical labour. I certainly find it an advantage for work of the kind mentioned, where the exposures will only slightly vary, to keep a constant distance; indeed, even with the thin negative, ordinarily exposed at a distance from the source of light, it is better—the results are better—to give a brief exposure to a light of perfect actinic power than a longer exposure to a feeble glim.

In the way of lantern plates, those of Messrs. Thomas or Mawson & Swan might, I think, be employed; certainly when making a set of commercial slides where uniformity is wanted and you want to economise time, and to feel fairly confident of getting results, then the plates mentioned are used one or other of them by the writer. For the development of these plates (the Thomas in particular) I recommend amidol—one wants a serviceable, business-like colour or tone; we can get colour if we want it, but my experience is that customers do not appreciate to the extent they should one's efforts to get variety of colour; the honest and well-intentioned endeavour to make the colour fit the subject meets with only scant encouragement, and of a surety they are not prepared to pay for what they are inclined to look upon as extras, either in the form of pleasing colour or artistic cloud effects. However, if amid a series of lecture slides where diagrams, &c., are the main feature, there happen to be anything in the nature of landscape or the like, I think we may venture on a little warmer tone than usual; this is a point naturally which the operator must settle for himself; the cold tone is the usual thing for purely lecture or college slides.

The amidol developer is powerful and reliable; we may employ the single solutions, viz.:—

Amidol	1 drachm.
Sodium sulphite	10 drachms.
Water	6 ounces.

Having at hand a 10 per cent. solution of potassium bromide for use if required, which is seldom, further dilution with water (the normal developing strength, being one part to three parts) will suffice to safeguard the plate. Let the solution be freshly made (a moderate discoloration does no harm, though it is better perhaps to remove it by shaking the solution with powdered charcoal and filtering), and use a fresh mixing for every eight slides, otherwise the tones will be getting too grey. If we hit upon the right exposure there will rarely be any need for the mercury intensifier; the tone will be rich and pleasing if the exposure has not been overdone, and the development has been carried to a full extent. With care there should really be no absolute failures.

We have other available solutions, of course, which may be preferred to amidol. A metol hydroquinone solution is to be preferred, I think, to one containing only metol. Ortol acts very well, glycin is a safe developer, while our old friend ferrous oxalate gives the regulation cold tone.

With the developers enumerated, metol, amidol, ortol, &c. (and a reference to the ALMANAC will give the formulæ), use the acid fixing bath, *i.e.*, dissolve,

Sodium sulphite	2½ ounces.
In water	2½ pints.

And add—

Sulphuric acid	½ ounce.

Then add—

Hypo soda	10 ounces.

Dissolve and strain through wool.

After fixation in the above bath, and a wash of half an hour's duration, a very brief immersion in a simple bath of acidulated water may be permitted, water 99, acid hydrochloric 1 part, after which, and a thorough washing, intensification with mercury may follow, if required.

Intensification will mean as a rule warmth of tone and will signify, generally, over-exposure. This should be avoided as far as can be done, as it implies longer time in the developer, which has to be kept below the normal strength, hence there comes the risk of fog, and veil, and frilling.

J. PIKE.

TONING AND TINTING LANTERN SLIDES.

WEDNESDAY, October 26.—The Croydon Camera Club is so noted for its lantern shows that it is not at all surprising to find much interest was evoked by a series of demonstrations given on above dates to show how slides may, after development, be varied in colour to suit the subject. To begin with,—

The President reminded the audience how, in certain cases, slides which lacked for nothing but vigour received it by using most of the methods to be explained. On the other hand, a slide which showed perfection of vigour when developed would become over-dense if subsequently toned. Hence, from the first, the need to develop a slide with an eye to after-treatment in the toning, which is almost always an intensifying agent. How to make a black image brown, blue, blue and brown, and terra cotta, by ringing the changes on uranium nitrate and iron salts, was first dwelt upon and illustrated with examples. But chief interest in Mr. Maclean's demonstrations and remarks centered in his explaining and showing how, by bleaching the slide with nitrate of lead, and subsequently treating the bleached image with various reagents, a remarkable series of tints and tones were quickly available. Thus, with a row of little developing dishes all ready, slides were immersed in the different solutions, and quickly came out warm brown, bright blue, blue-green, and brown-pink.

The resulting colours or hues were capable of infinite modification by varying the strengths of the baths and by varying the amount of "bleaching" awarded to a plate. A practical difficulty sometimes met with is that of estimating by ocular inspection what will be the colour effect upon the screen. The difference between the appearance in the hand and when shown by the lantern is sometimes quite considerable.

The most successful of the different baths shown in action were the following:—

BLEACHING SOLUTION.

Nitrate of lead	½ ounce.
Ferricyanide of potassium	½ "
Water	6 ounces.

After bleaching, well rinse and soak for one or two minutes in—

Chlorate of potassium	120 grains.
Water	6 ounces.

Rinse and, for blue and blue-green tones, place in—

Perchloride of iron	120 grains.
Water	6 ounces.

The above proportion of the iron salt may be varied with advantage to suit special circumstances of colour and density.

A very pleasant brown-pink series of tones is obtainable by using, instead of the iron solution, a ten per cent. solution of chloride of copper. In this the toning proceeds steadily and not too quickly.

The other baths used were either better known or less pleasing in result than the foregoing.

Mr. A. E. Isaac followed by explaining the mercurial toning and intensifying procedure. His advice followed the usual routine, and was made clear by the toning of slides by slight mercurial bleaching, and also by full bleaching, followed, in the last case, by sodium sulphite.

The need to use boiled, or distilled, water was emphasised, and that the resulting tones varied with the developer used in making the slide, metol or rodinal being, for several reasons, considered better than pyro.

Mr. S. H. Wratten explained and illustrated the availability of the gold and sulphocyanide toning bath.

Gold chloride	1 grain,
Sulphocyanide ammonium	15 grains,
Water	5 ounces,

was his formula. Slides so treated were made more brilliant, the reinforcement of shadow vigour being very notable. The change in colour was from brown to black. Toning might take from one to ten minutes, according to the object in view. The method was advised to restore slides whose shadows had become somewhat weak by senile decay. All the above experimental slides, and also others in illustration of toning, were put through the lantern, and points of interest or of information explained by the three demonstrators, Messrs. Maclean, Isaac, and Wratten, to whom the assemblage awarded the Club's thanks.

THE "BIRTAC."

At the Photographic Club on October 26 there was a large gathering to see and hear about Mr. Birt Acres's latest apparatus for animated photography called the "Birtac." Without wishing to run down what is known as "ordinary" photography, Mr. Acres advanced his opinion that the destiny of animated photography was to far outstrip the former and older branch of work—an opinion in which he had the most implicit faith. Reminding his audience that he was the first to show animated pictures in England, namely, at the Royal Photographic Society, he proceeded to review the difficulties which hedged around the earlier attempts at the construction and successful working of apparatus to this end. Amongst those most serious was the want of special machinery to accurately cut and perforate the celluloid films, the importance of which is obvious where the magnification of such small images to anything up to twenty feet is concerned.

The future of animated photography he maintained lay with the photographer and not with the showman. He believed there was something more in it than a music-hall attraction, and he hoped to see the day when, instead of sending along a *carte* or cabinet of one's self, one would be able to forward a film to one's friends which, placed in a standard projecting machine, would reproduce him in a more lifelike manner than the still, dull representation of present times.

The instrument he had with him he believed to be capable of producing something in this way in a fairly satisfactory manner. To an audience which, like the present, was used to the best of lantern pictures, and the utmost in point of illumination, it would be well to explain that nothing in the way of electrical brilliancy was to come. The apparatus was essentially one suited to drawing-room displays of small proportions, designed for a disc not greatly exceeding two or three feet, and depending upon the usual supply of house gas for its illuminant. The films were of a length of twenty feet, giving 640 separate scenes per picture in size about one-fourth the area of the animated picture of the usual type.

A serious question, in Mr. Acres's opinion, in connexion with animated photography was that of risk. At music halls it was a continuous cry for something big, and, to meet demands for pictures up to twenty feet, it was, of course, important to get extremely powerful illumination, which was accompanied by a great deal of very unwelcome heat. He claimed absolute freedom from danger in the present machine, which could hardly be the cause of an accident even in the hands of the most inexperienced. Incidentally he mentioned that he had made considerable progress in the production of an absolutely uninflammable film.

As regards the construction of the machine, it was designed with the object of combining in one apparatus the taking camera and projecting device. In the first case, the lens, which is a Ross of about one and a half inch equivalent focus, working at *f*-2, is screwed on outside; in the latter it is attached to the interior of the box. The shutter is constructed on an adjustable principle, suited on the one hand for taking the photographs, and on the other for projecting purposes. The film is put up in a circular cardboard box, and is perforated on one side only. One end is pulled through an aperture in the box and threaded through the machine, being attached to, and received upon, a spool connected with the driving crank. Attached to the end of the film is a length of black paper, which is wound over it when exposed, and protects it from light during the changing of the film.

Mr. Acres next showed the operations of printing a positive from the negative film, a slow transparency emulsion being employed. For this purpose a printing machine was used, in which the unexposed film and the negative were brought into intimate contact at the point of exposure, the light of a table-lamp being used for the actual printing, while the handle was slowly turned and the whole length of film exposed. In the light of a dark-room lamp the exposed film was closely wound upon a frame measuring about 12×10, and carrying the full twenty feet with ease. For the standard-size film, a frame four times these dimensions would be needed. Mr. Acres employs an upright developing dish so as to minimise the oxidation of the developer, which is a dilute, slow-acting pyro developer, whose proportions are about one ounce of pyro to a thousand of water. After fixing and washing, the film is immersed in glycerine, spirit, and water, in the proportion of one, two, and three respectively, to prevent the film from becoming so dry as to peel from the celluloid. It is then varnished as a protection against the inevitable wear occasioned in projecting the picture. An exhibition of some of the results by the machine was then given, the pictures being very well received.

The complete apparatus consists of the camera and mechanism, Ross lens, spools, and gas lantern for use with the new form of Welsbach light, all that is necessary for taking and showing the pictures, at a price of ten guineas. The printing machine costs another two guineas, and the films, in twenty-feet lengths, 2*s*. 6*d*.

With reference to the foregoing demonstration, Mr. Birt Acres writes us:—

"I was very much disappointed to find that there was practically no pressure of gas when I was giving an exhibition of my new projection machine before the Photographic Club at Anderton's Hotel last Wednesday evening, and that consequently such good results were not obtained as I have previously secured whilst experimenting at home. However, as good generally comes out of evil, I have invented a machine which automatically provides this pressure, and affords a light superior to limelight. With this I am able to throw a brilliant image on the screen, of six-feet dimensions, with my little machine, and so obviate any difficulty which might have arisen, owing to future purchasers having as faulty gas arrangements as at the hotel above mentioned."

We have since had the opportunity of being present at a private demonstration of the "Birtac," as the new machine is to be called. The light to which Mr. Birt Acres alludes is exceedingly intense and well under control, and for the purpose of projecting the small-sized pictures up to a diameter of disc of from three to four feet answers admirably. It is a simple and efficient illuminant for the projection of small-sized screen images in the home, and, used in conjunction with the "Birtac," places practical animated photography within the reach of all. There should be a great future before the "Birtac."

REMEDY FOR DIFFICULTIES IN BURNING ACETYLENE GAS.

Professor Vivian B. Lewes lately contributed an interesting paper on this general subject to the Society of Chemical Industry. In this communication he deals at some length with the difficulty which exists in finding a suitable burner in which to consume the gas, and throws much light upon the cause of the difficulty. All who have had experience with acetylene are familiar with the fact that there is a persistent disposition to the deposition of soot in the burner tip, which, in the course of a short time, causes the clogging of the tip, followed by the distortion of the flame and pronounced smoking. Numerous efforts have been made to do away with this objectionable feature, but thus far with only partial success. Among the remedies that have been proved most satisfactory is the Naphey burner and its various imitations, but these have proved to be by no means infallible, and the difficulty appears to be as far from solution as ever.

Professor Lewes has studied the character of this soot deposit, and offers some explanations of its nature and cause which point to the proper remedial measures.

It has been generally supposed that the soot deposit noticed in the burner slit or tip consuming acetylene was due to the dissociation of the gas from over-heating at the nipple, the decomposition resulting in the separation of carbon. Professor Lewes believes this is not the true explanation of the origin of this deposit.

On breaking open the steatite tip of such a burner, he found a carbonaceous deposit extending for a considerable distance into the body of the steatite, and this he holds to be evidence of the fact that the deposit has been caused by the deposition of a liquid hydrocarbon, which has soaked into the steatite and been carbonised there. He calls attention to the fact that the same trouble is experienced, to some extent, with carburetted water gas when, owing to insufficient temperature in the cracking and super-heating chambers, the carburetted gas contains vapours instead of permanent gaseous products. His observations lead him to the belief that the trouble in the case of acetylene arises from a similar cause, namely, the presence in the gas of condensible hydrocarbons, the origin of which he explains as follows:—

"When acetylene has been made in a generator at an undue temperature, it carries with it benzine vapour, which, as it commences to condense, assumes a vesicular form (like smoke or tar vapour), and, on coming to the extremely minute holes which form the apertures of the burner, the mechanical scrubbing which it encounters causes the breaking up of the vesicles and the deposition of the benzine and other hydrocarbons held in suspension in the gas, which soak into the steatite and carbonise. The presence of finely divided carbon has a great effect in determining the decomposition of acetylene itself, so that a rapid growth of carbon takes place at the burner, and no ordinary cleaning from the exterior will ever make the nipple fit for constant use again."

The remedy for the trouble, Professor Lewes believes, must be sought for in the improvement of the automatic acetylene generators in service.

with the object in view of avoiding undue heating in the process of generating the gas. If proper attention is paid to this point, not only will the sooting of the burner be largely avoided, but there will also be obtained an appreciable increase in the yield of the gas from the carbide. His conclusions are expressed in the following terms: "It will be found with experience that the prevention of smoking in a burner will be effected quite as much by attention to the temperature in the generator as to the burner itself, and, where a generator is in use which gives over-heating, a well-arranged scrubbing apparatus, that would get rid of the benzine in the gas, would be found a distinct advantage in stopping burner troubles."

The practical hints herein given by Professor Lewes should prove of the utmost value to those who are engaged in the manufacture of acetylene machines, and the users of the gas.

THE ACETYLENE GAS HAZARD.

[*Scientific American.*]

It is but perfectly natural that, after such explosions and casualties, resulting in loss of life and property, which have occurred from time to time in the manufacture and subsequent manipulation of acetylene gas, both in this country and abroad, the insurance companies and the public at large should be a little anxious to establish some fixed form of regulation which will ensure safety to all concerned in future operations on this line.

It is, however, to be deplored that at the present stage of investigation of the manufacture and use of acetylene, the proposed legislation should be so strenuous and at the same time impose impossible conditions, as is set forth in the set of rules approved by the National Board of Fire Underwriters, at its recent annual meeting.

It has been conclusively proved that in no single instance have any of these explosions taken place at the hands of other than so-called experts; and, moreover, these explosions have all been the results of work conducted on experimental basis; and, in all but one instance (explosion at Wilmington, Del.), these disasters have taken place as the result of attempts to liquefy the gas and to control it under pressure; and in each and every case said disasters have taken place solely through either carelessness or gross ignorance on the part of the operators. Of course, as is well known, acetylene will combine with air in certain proportions to form mixtures which are extremely explosive under certain conditions, but even these mixtures, when intelligently handled, are not dangerous, and in properly constructed apparatus explosions cannot occur.

The most dangerous form of acetylene is its liquid state, when it requires a pressure of 600 pounds per square inch to keep it in its normal condition. These points were very strongly brought out at the investigation following the explosion in Jersey City, December 4, 1897, as published in the *Progressive Age* of May 2, 1898.

As per Dr. Henry Morton's testimony at the above-mentioned inquiry, acetylene in its native and quiescent state is no more dangerous than our our ordinary illuminating gas, which, indeed, contains a certain amount of acetylene.

Some of the most distinguished and expert chemists of all time have experimented with this gas, and such men as Berthelot, Le Chatelier, Moissan, and Pictet have all arrived at the same conclusion, and this independent of each other, that gaseous acetylene at atmosphere pressure is absolutely harmless as regards spontaneous decomposition and subsequent explosion.

The dangerous qualities are not developed in the slightest particular until the gas is compressed or liquefied, in which condition, when subjected to a rise in temperature, it becomes an exceedingly dangerous compound, owing to its great liability to decompose.

As regards the wholesale generation and liquefaction of acetylene, strong measures should be taken to bring these operations within the safety limit, and the proposed legislation on this point should by all means be adopted.

In such small amounts of acetylene as are generated in a bicycle lamp, or, in fact, in any lamp having a portable generator and operating at atmospheric pressure, no dangerous conditions can, under any circumstances, occur.

Regarding the paragraph in the proposed insurance regulations which relates to the construction of the lamp, it is sufficient to state that it is an utter impossibility to so construct a portable generator that it will not disengage gas for some little time after the water has been turned off. Any lamp that has been constructed with this principle in view would be absolutely worthless as a continual light-giver, and at the same time would become a dangerons instrument.

The proviso is, in my opinion, ridiculous in its entirety, and, if enforced, would practically mean the complete prohibition of the manufacture of all kinds of portable generator lamps.

Regarding the regulation restricting the material of which the lamps should be constructed, there seems to be a misunderstanding among scientists on this point.

It is asserted by many experimenters that acetylene, upon coming in contact with metallic copper, will form a compound which is highly explosive when heated or struck; while, on the other hand, there are an equal number who claim the contrary.

The result of my experiments in this direction are as follows: A copper tube four feet in length, four inches in diameter, was thoroughly pickled and cleaned. This tube was filled with the gas taken direct from a generator without being cleaned or purified in any manner, and the tube was then hermetically sealed and allowed to lie on its side for two months. It was then opened, and the compound formed was scraped off and dried, and then tested for explosibility, with the result that it was found to be perfectly harmless.

My second experiment was to pass the gas through, first, water, then through a lead-salt solution, thence through a quantity of calcic chloride, in order to dry it, and then through a saturated ammonia solution of cuprous chloride. When free acetylene was observed to be issuing from the escape tube of the last bottle, the experiment was taken to be concluded; the precipitate formed was then filtered and dried at 100° Fahr. This compound was found to be extremely explosive when confined.

From these experiments I draw the following conclusions:—

First. Acetylene in contact with a metallic surface of either pure copper or of any alloy containing copper does form a compound which is not explosive or at all dangerous.

Second. When acetylene gas, in a free state, is brought in contact with copper held in solution in an alkaline form, a chemical reaction takes place, whereby the true acetylide of copper is formed, which is explosive in a dry form when confined; or, in other words, there must be opportunity for cuprous oxide to form before we can have the acetylide.

Third. That the compound formed in experiment No. 1 is different in its physical deportment from that formed in experiment No. 2, and, although it appears to have the same chemical construction, it really is not the acetylide of copper.

Regarding the last paragraph of the recommendations, "It is also recommended that the generator be so designed that it can be supplied with calcium carbide, and the residuum withdrawn without the escape of gas or the admission of air, in order to ensure the prevention of dangerous explosive admixtures of air with the gas in the generator," it is not at all clear in my mind how such an arrangement can be designed without making a complicated and expensive form of generator. L. J. Knom.

ACETYLENE NOTES.

At the Swindon Great Western Railway Engineering Society, the other evening (October 24), Mr. H. Fowler, gas manager in the Lancashire and Yorkshire Railway Works, was lecturing on "Acetylene and Calcium Carbide," and, while the major portion of his remarks had more interest for gas engineers than for photographers some very few items of information are worth recording. Mr. Fowler brought forward figures to show that the only prospect of obtaining cheap carbide was by the employment of electrical power obtained from such a cheap source as falling water. One electric horse-power hour would produce ·3 pounds of carbide, and whilst the cost of this quantity of electrical energy per annum (per day of twenty-four hours) was 4*l.* at Foyers and 1*l.* 9*s.* at Geneva, it would cost (according to Kennedy) 9*l.* if raised by means of coal and steam. The efficiency of the gas was stated at from 240 to 278 candles per 5 cubic feet per hour, but the type of burner had a good deal to do with obtaining the most economical results. An injector burner in which air was admitted to the gas by minute apertures before the acetylene issued to the flame was one of the best types as regards preventing smoky flames. Mr. Fowler dealt very thoroughly with the various types of generators, which he classified according to the now well-known system. The two important points to be realised in a good generator were, first, that the water should not have access to the whole mass of carbide, to be drawn off when the evolution of the gas became too great; and, secondly, the gas should not be allowed to become heated in the process of generation. The reasons for these *desiderata* were, in the first case, that the lime which is produced by the reaction of the water on the carbide retains water which it afterwards gives up to the carbide, with consequent undue evolution of gas; and, in the second, that an elevation of temperature is liable to cause the polymerisation of the acetylene into other compounds of very inferior illuminating power, the loss from this cause, so it was stated by a subsequent speaker, having in the case of some generators been estimated at as much as twenty per cent. The lecturer mentioned the fact that acetylene can be burnt in an ordinary Bunsen burner if the aperture for the egress of the gas be considerably reduced; the flame is much hotter than that of ordinary coal gas, and has been found useful in laboratory operations.

With regard to this latter point, the idea suggests itself whether this hot flame might not be utilised for illuminating purposes by suspending an inverted thimble of, say, platinum gauze in the flame, the small incandescent area of which might prove of service as an illuminant in the optical lantern.

A trade congress of those interested in the production of carbide and acetylene was recently held at Frankfort-on-Main. It is refreshing to notice with what energy and tact the Germans place any new commercial

enterprise on a good footing. Take the case of acetylene, for example. No sooner does the industry promise to take a place in the chemical trade of the country than the far-seeing Teuton gathers together his friends and neighbours and organizes a congress, whereat the *fachmänner* do assemble and thrash out the various questions, scientific, technical, and commercial, by which their industry is likely to be advanced or hindered along the road. The various aspects of the trade are dealt with by those engaged in the special departments, and there can be no doubt that individual firms, as well as the trade generally, are benefited by assemblages of this kind. No doubt the proceedings of the Congress will be published *in extenso* later, but for the present particulars I am indebted to the *Chemiker Zeitung* of October 22.

One of the subjects most interesting to photographers was that of the purification of acetylene, dealt with by Dr. Paul Wolff, of Berlin. Dr. Wolff gives the average of a number of analyses of crude acetylene made from American and Swiss carbide. The results are as follows:—

	American.	Swiss.
Acetylene	98·87	99·87
Hydrogen phosphide	·04	·02
Hydrogen sulphide	·02	—
Ammonia	·06	·04

The casual observer may perhaps regard the proportion of impurity as so small as to be disregarded, but this is a mistake. The hydrogen phosphide, recalling the white rings of smoke of our chemical student days, is, for several reasons a dangerous and objectionable constituent of the gas. In the first place, it is liable to spontaneous combustion. Then, when the gas is burnt in the ordinary way, the phosphorus is converted into phosphoric acid, which will soon make itself visible (if the gas is burnt in a confined space) as grey fumes, which have a far from agreeable action on the respiratory organs, whilst metal surfaces are attacked by the acid when it condenses on them. Hence the proper purification of the gas is a point of importance to the lanternist, but more particularly to the photographer who uses it in his studio.

The removal of hydrogen phosphide is not an easy matter. Raoul Pictet bubbled the gas first through concentrated calcium-chloride solution cooled to −20° C., and then through concentrated sulphuric acid cooled to −40° C. This process was satisfactory in use, but, like such other methods as the action of bromine or strong nitric acid is hardly likely to prove of practical everyday utility. The most promising results are held out by acid metallic solutions, the use of which has been patented by Dr. Albert Frank, of Charlottenberg. The best result is given by one part of copper chloride dissolved in eight parts of hydrochloric acid. The very acid character of this reagent need not be a deterrent to its use, as acid-proof apparatus can be obtained, made in enamel iron by Dietrich & Co., of Niederbronn, but, if intended for house installations, the plan advocated by Dr. Frank is to soak kieselgühr in the above reagent, and to place the mixture in a chamber through which the gas is allowed to stream. Dr. Wolff, however, recommended (as suggested by Redner) the employment of a mixture of chloride of lime and a chromate, which he states to retain its activity twice as long as Dr. Frank's reagent.

The storage and transport of carbide is a point of increasing interest in view of the restrictions of railway and insurance companies. Herr H. Herzfield, in a short paper on this subject, stated that the legislature held the entirely erroneous view that the carbide must be handled as a compressed gas, and care should therefore be exercised to avoid all high pressure. The practice adopted in some countries of soldering up cases of carbide should not be countenanced, and some other method of closing the case (which shall equally exclude water) adopted. The author demonstrated the safety closure for carbide cases of the acetylene works of Augsburg-oberhausen, which stood the test remarkably well. A simple and cheap safety valve came into action on the inner pressure rising to one metre of water, so that there was no danger of explosion during transit, even if the cases were placed in the wet.

G. E. Brown.

Our Editorial Table.

The Magic Lantern Journal Almanac and Annual.

Edited by J. Hay Taylor. London: Published at 9, Carthusian-street, E.C.

Mr. Taylor has succeeded in bringing together over fifty useful articles relating to lantern work. Of especial value is one extending to about twenty-five pages treating of lantern polariscopy, by Mr. H. G. Madan. Among the other authors will be found many recognised authorities on optical projection work. Copious formulæ, a review of novelties, diary spaces, and other features combine to make this annual of distinct use to lanternists—a large and continually increasing class.

How to Make Lantern Slides.

By S. L. Coulthurst. London: Dawbarn & Ward, 6, Farringdon-avenue, E.C.

Mr. Coulthurst is well qualified by considerable practical knowledge of transparency making for the lantern to write this little book. Confining itself to gelatine plates for the work, it takes the photographer by easy stages over the whole field of lantern-slide production. It is written throughout in terse language, and the many hints and formulæ given are of great value. The contact and reduction methods are dealt with; while development, clouds, blocking, masking, and binding come in for treatment. It is a useful little book.

Catalogue Received.

Archer & Sons, 41 to 49, Lord-street, Liverpool.

Messrs. Archer's catalogue occupies over one hundred pages. It is full of illustrated particulars of lantern and cinematographic apparatus, and should be in the possession of all interested in optical projection work, to whom we can recommend it, as it is very complete and comprehensive.

The "largest thermometer in the world" is, according to an American paper, that now being erected at Winchester, Mass., for Colonel Knight. "It is seventy feet in length, and with it will be measured the temperature of the body of the earth. This giant instrument is sunk to its own depth in a great shaft dug into the earth. It will register the degree of heat of the earth at a depth of seventy feet, and will open an excellent opportunity for scientific men to observe the changing moods of the great mother of all life. The principles upon which this mammoth instrument is constructed are the same as those which govern the making of smaller instruments. Alcohol will be used, and careful comparisons will be made between the large thermometer and others, which will be pygmies beside it. The largest thermometer ever made previous to that now being constructed for Colonel Knight was that built by Forbes, measuring nearly forty feet in length. This instrument was considered one of the curiosities of science, but now the Winchester tube steps into first place. The data, it is expected, gathered from observations with this instrument will be of unusual value to science."

Advantage is being taken of the fact that gelatoid (gelatine mixed with formaldehyde) is practically unbreakable in making goggles of it to protect the eyes of artisans engaged in grinding and other operations which make small particles of stone, wood, or metal, fly about.

A Popular Error.—Under the title of "In Dead Eyes," an evening contemporary recently made a statement which, says the *Lancet*, carries its own confutation with it. It is to the effect that a physician and enthusiastic photographer, being desirous of testing the amount of truth in the theory that dead eyes retain complete images, had carefully examined the eyes of hundreds of dead people, and, though he had never seen anything like a distinct picture mirrored, he had certainly distinctly traced both letters and objects on the iris of the eye, and that, when the photographic test was applied, these images became visible. In one case a capital letter of peculiar form was shown, which could be traced to a Testament held in the hand shortly before death. In another case a numeral was distinctly pictured, which was traced to a clock face in the room. The article in question continues: "The chief scientific paper of France only the other day gave full particulars of a case where a woman who died in one of the hospitals had two numbers, 10 and 45, mirrored in the iris of her eyes." These absurd stories originate in the well-known experiments of Kühne on the visual purple of the retina, in the course of which he showed that, by making special arrangements, the cross bars of a window focussed on the *retina* could be brought into relief. The enthusiastic photographer, if he be not misquoted, ought to have known that no well-defined images of the external world are cast upon the iris, and none, therefore, could be preserved. The surface of the iris is far too uneven to act as a mirror. Moreover, as no arrangements were made to prevent the further action of light after death, the would, if formed, be certainly obliterated, as the image on a photographic plate would be if permanently exposed. The only mode in which a image impressed on the retina could be rendered visible would be to adopt the method of Kühne—viz., by exposing the eye, previously kept in the dark for a minute or two, to an illuminated object, then extirpating it, opening it, and immediately plunging it into a solution of alum. The image develops in the course of twenty-four hours.

Judging by the large attendance of members and friends at the weekly meeting of the Kingston-on-Thames and District Photographic Society on the 26th ult., the popularity of lantern evenings would appear to be by no means on the wane. On this occasion some prize slides were thrown upon the screen. With one or two exceptions, the slides can scarcely be considered up to the average of previous years. Undoubtedly the gems of the collection are those hailing from across the "herring pond," and Kingstonians were not slow to recognise the merits of Mr. Fraser's after-dark studies in the streets of New York City. The hon. lanternist, Mr. East, ever anxious to do his work thoroughly, came to the meeting armed with a series of tinted glasses, which he introduced with most pleasing effect in some of the marine and sunset subjects. The improvement was particularly marked in the case of one or two under-exposed slides with excessive contrasts of light and slide. One point which failed to escape notice was the shape of the mats used by the competitors. Oval and cushioned cornered masks of commerce would appear to die a hard death, but let us hope the time may yet come when all slide makers, prize winners included, will recognise the fact that their work would look far better would they only take the trouble to cut their own mats with rectangular corners, and of a shape best calculated to suit the particular slides they are intended for.

MONTHLY SUPPLEMENT

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THE LANTERN RECORD.

CONTENTS

	Page
OTES AND NEWS	89
ANTERN MEMS. By G. R. BAKER	89
CETYLENE FOR PORTRAITURE	90
IMELIGHT EXPERIENCES.—VIII. By T. N. ARMSTRONG	90
OMMERCIAL SLIDES: COLOUR AND FINISH. By J. PIKE	91
HE CHEMISTRY OF LIGHT	92
ORY OF A NEMATOGRAPH	92
A NEW DEPARTURE IN SPECTROSCOPES. By T. THORP	93
THE LIGHT OF THE FIREFLY	94
BARBER'S APPARATUS FOR EXHIBITING CYCLORAMIC VIEWS	94
PAPER ADVERTISEMENT TRANSPARENCIES	95
ARC LIGHT FOR USE UNDER WATER	95
OUR EDITORIAL TABLE	95

NOTES AND NEWS.

HE report of Tracinski, in the *Zeitschrift für Beleuchtungswesen* pril 30), gives the result of investigations in connexion with the eration of the Zerener arc welding process, which is now coming o use quite largely. The operator wears a pair of spectacles of rk, smoked glass, besides which he looks through a pane of deep l glass, which is connected with the apparatus. The action of the ht is sufficiently reduced by this means, says the *Progressive Age*. e tried using the red glass alone, but it affected the eyes for some ne after. The workmen who were using this apparatus continuy at first experienced pain in the eyes at night, but later on this appeared; the sight, however, was not affected. He concludes t no permanent ill effects are produced if proper precautions are ken and if the operator becomes gradually accustomed to the rk. It is a mistake to have a new operator work a whole day th the arc, as he should begin with a few hours a day until his s have been accustomed to it. Only those who have healthy mal eyes should attempt this work.

* * * * *

OSMIUM threads, which are to take the place of the platinum wire, give an exceedingly bright light when the electric current passes ough them, have been prepared by Dr. Auer von Welsbach. The nufacture of these incandescent light tubes consists in covering a copper wire with osmium metal and annealing the wire at the ghest temperatures. The copper evaporates, while the coating of ium remains unchanged in the shape of a hollow thread.

* * * * *

A METHOD has been proposed to prevent an over-production of ylene gas after the water supply is shut off from a generator. s after-generation is often inconvenient, especially in portable ps. It is especially adapted to those forms of apparatus in which water rises up to the carbide and is pushed back by gas pressure. method as proposed is to saturate the carbide with a concened solution of glucose, which, when no water is present, is posed to unite with the lime on the surface of the carbide, ing a sucrate of lime, which forms a moisture-proof coat and s generation.

WE are always pleased to have the opportunity of inspecting commercially prepared lantern slides, and Mr. John Stabb, of 152, Kensington Park-road, Bayswater, W., has taken advantage of our readiness in this direction by submitting to us half a dozen specimens of the work he is constantly turning out. The subjects are English Cathedral interiors. They are from negatives that have been well exposed, and the included fields of which have been excellently chosen. As lantern slides they are bright and brilliant, full of detail in the shadows, and capable of showing a soft and beautiful image on projection.

* * * * *

MESSRS. WALKER & CO., 19, Bridge-street, Aberdeen, were to appear with their cinematograph at the Queen's Hall, London, on Saturday next; but owing to the strict London County Council regulations, they cannot get their own special lantern effects, which add such a charm to these exhibitions. They have, however, been engaged to give three of their complete exhibitions at the Polytechnic, Regent-street, on Saturday afternoon, at two, three and four o'clock. The pipe and drum band of Her Majesty's Scots Guards is to play to the Highland pictures.

LANTERN MEMS.

OH, ye County Council! If ever a poor soul was worried in an arbitrary manner, and without apparent rhyme or reason, surely it is the cinematograph operator. First of all, when he appeared, or desired to appear, in public, he had to fulfil certain conditions regarding the gas cylinders and method of using gas, the kind of tubing employed, and possess an apparatus for projecting animated photographs that was well constructed and which protected the films from accidentally becoming ignited or the body of the lantern from firing.

* * * * *

THIS he endeavoured to do by placing his order with a good maker and carefully mastering all the requirements as set forth in the paper which emanated from Spring Gardens. His films were protected during exhibition by a water trough, they were either automatically rolled up on a spool after showing or fell into a metal box with closed cover, and the body of the lantern was made of Russian iron or some other metal. So far so good, for the public should be protected. Now it is announced that this will not do, but the lantern must be of a non-conducting material, such as wood, asbestos-lined, and a lining of iron inside that, with an air space between; the films must go into a canister-top box outside the delivering and receiving spools, and the operator, apparatus, and gas supply must be enclosed in a fireproof hut or iron enclosure.

* * * * *

AT a recent exhibition given at St. James's Hall these conditions were, at the eleventh hour, sprung upon the organizers of the entertainment, having for its object the advancement of the Navy League

and the consequence was that, notwithstanding almost superhuman efforts, the preparations could not be completed in time to be ready and have a rehearsal before the advertised time of opening on the first evening. The result was a signal failure, not only in the projection of ordinary photographs, which an outsider had a difficulty in accounting for, but also with regard to the centreing of the light for the cinematograph, which had to be done in the presence of the audience.

* * * * *

I FELT keenly for the position of the lecturer and sorry for the operator, especially when the second part of the display of photographs was abandoned altogether, and the audience had to be contented with the cinematograph scenes only. As the audience was one of the best I have seen at a lantern entertainment, and similar to what was gathered to receive Dr. Nansen last year in the same hall, it was all the more galling to those concerned. To show it need not have been so, if preparations had not been unduly flustered by these irritating conditions imposed at the last minute, was proved by the subsequent exhibitions being such that the audience simply rose with enthusiasm. Indeed, it was an object-lesson in the difference of meaning of the words, "failure" and "success."

* * * * *

THE views by West & Son, of Southsea, are well known for their beauty and go, and, although I have seen thousands of slides on the screen in my time, I can fairly say I never enjoyed an entertainment of photographs more, and felt more enthusiasm, than when witnessing the cinematograph projections of the yachts racing, Her Majesty's ships getting under way, and the wonderful effect of the new style of torpedo boat, the *Turbinia*, going through the water at about forty miles an hour, the registered speed being thirty-five knots. Certainly Mr. West is to be congratulated on the success of his marine photography and his animated pictures of naval life, and, if properly worked as an entertainment throughout the country, should prove a source of considerable profit to the organizers, and useful to the naval authorities in making the Navy still more popular.

* * * * *

MANY amateur photographers at the present time will be contemplating making bromide enlargements from negatives taken during the summer holidays, and as most of these negatives have been made with a view to produce good prints in processes requiring a strong negative, they will find the enlargement generally of the "soot and whitewash" order. If, however, a piece of blue glass is interposed between the light and condenser, the half-tones in the resulting enlargement will be more pronounced, and consequently the picture far more artistic. If the glass is thus placed, there is no need for it to be optically worked, as it would if placed on the stage or in front of the objective.

* * * * *

FOR small negatives, such as those taken by the pocket-folding Kodaks, and portions of quarter-plate negatives not exceeding three inches square, the ordinary optical lantern answers very well for making enlargements, providing the lantern is screened by box or curtain, so that no direct light falls on the bromide paper beyond that coming from the lantern front; a little diffused light from the back is not of much moment. It will be necessary to have a black metal or cardboard stop inserted between the lenses if they are of the regular combination form, or in front of the racked jacket, or rather a little way inside it, with a single achromatic lens, to get the necessary sharpness. I mention this little matter, as some amateurs are not aware that they can use ordinary optical lanterns for enlarging purposes.

* * * * *

THE possibility of getting gas in a liquid state for commercial purposes is within measurable distance, for at Brin's oxygen works, for some time past, experiments in liquefying atmospheric air, oxygen and hydrogen, have been in progress, and the results are understood to be most satisfactory. I hope shortly to give full particulars of some of these operations. Certainly, beyond being interesting, there is an industry likely to be developed in this that will surprise many who have not followed closely the researches of Professor Dewar, Dr. Hampson, and others. For some time past, at Aldershot, for balloon purposes, hydrogen gas has been produced from water by electrolysis, and the oxygen also liberated in the process has been to a great extent wasted. Probably at some not very distant date this will not be so, and the two volumes of oxygen to one of hydrogen duly utilised, by some commercial works on the lines of those of the Government Ballooning Department.

G. R. BAKER.

ACETYLENE FOR PORTRAITURE.

DR. OSCAR MÜNSTERBERG recently gave a demonstration of taking portraits by acetylene, and in the course of the preliminary remarks he gave the following table of the consumption of ordinary house gas and acetylene to match the normal Hefner candle:—

House gas, bat's-wing burner	.....	11·5 litres.
,, Argand ,,	.....	10 ,,
,, Siemens ,,	.....	5 ,,
,, Incandescent ,,	.....	2 ,,
Acetylene	.....	0·7 ,,

From the spectrum of acetylene it is the nearest to sunlight in giving a better optical effect of colours, and he gives the following table of the various lights in all cases, the amount of colour in sunlight being taken as equal to 1.

Spectrum Colour.	Electric Light.		Coal Gas.		Acetylene.	
	Incandescent.	Arc.	Ordinary Burner.	Incandescent.	Alone.	With3 e cent. ofai
Red	1·48	2·09	4·07	0·37	1·83	1·03
Yellow	1·0	1·0	1·0	0·9	1·02	1·02
Green	0·62	0·99	0·47	4·3	0·76	0·71
Blue	0·91	0·57	1·27	0·74	1·94	1·46
Violet	0·17	1·03	6·15	0·83	1·07	1·07
Ultra-violet ...	...	1·21	...	...	...	...

LIMELIGHT EXPERIENCES.

VIII.

IN single-lantern working especially, a most annoying circumstance is the sudden breakdown of a jet that has all along been giving entire satisfaction. One fruitful source of such trouble lies in the wear and tear of the burner or nipple of the jet.

The first indication of something being wrong will most likely be noticed in the sudden hissing of a jet that has always hitherto worked absolutely silent under its full pressure; this hissing very probably may put in an appearance in the middle of a lecture, and, as a natural consequence, the first step on an operator's part is to immediately reduce the pressure of the gases, for it is almost certain to this cause will be attributed the noise the jet is making. When, however, a jet has been nicely adjusted, and the gases are being regulated by means of fine adjustment valves on the nozzles of the cylinders, any sudden increase of pressure at the nipple of the jet becomes an impossibility, for, indeed, any alteration in the pressure must tend in the other direction, seeing the longer the cylinder is being used in an open condition, the less pressure must follow; therefore any sudden lowering of the supply of gases will be found to at once cut off the light, and then the trouble begins in earnest, for it means a certain interruption of the lecture, or whatever other form the entertainment may possess, and any attempt to relight and adjust the pressure of the gases will only result in a renewal of the objectionable hissing, quite likely in a more aggravated form. Over and over again in my experience has this happened, and in every case the fault was found to lie in the nipple of the jet being honeycombed or burned away. The worst of this trouble would appear to lie in the suddenness of such breakdowns; burners that were carefully examined previous to the commencement of a lecture and judged to be in good condition have within half an hour become quite useless. The remedy for a breakdown of this description lies in carrying a supply of new nipples, and the moment a well-adjusted and previously tried jet plays this trick of this kind there should be no hesitation in announcing a slight interval for the purpose of changing a burner, and this intimation is best made by the lecturer himself from the platform where he is speaking.

It is an old and true saying that every part of a lantern outfit ought to have duplicates always at hand, and, when such be provided, anything that goes wrong with the apparatus is soon readjusted. A few spare nipples should therefore always be carried, and these ought to be identical in pattern and bore, being produced with the same tool and previously tested for silent working under full pressure of gas. Out of a supply of, say, a dozen of such nipples there are certain to be found several blackbirds that will not be silent workers at the required pressure of gas, and no amount of doctoring will ever make them silent; they are best, therefore, broken up with a heavy hammer, so as to be entirely out of harm's way. I often think the nipple is the most important part of a limelight jet; there is no doubt of the trouble and annoyance a bad one will yield. All burners, in my opinion, ought to be fitted to the nozzle tube of the jet by *screwing only;* red lead should never be used, and, when the threads of the screws are properly made, any burner will screw on and off with the fingers without any trouble. For ordinary lantern projection, using a mixing jet which passes from five to six feet per hour, brass nipples are all that can be desired, and a supply of the same, every one of which has been previously tested, will never fail to ensure a silent light, and, when a breakdown does occur of the kind referred to, it is merely a matter of a minute or two for screwing off the old and replacing the same with a new burner.

A fruitful source of damage to the nipple of a jet lies in carelessly turning on the oxygen. A good operator will seldom, or never, treat his audience to the bangs or small explosions frequently heard where lanternists without experience are employed; these small explosions occurring at the nozzle of the jet do more damage than many imagine, especially to those nipples that are perfectly tapered to a thin point at the orifice, and I have known one of these small explosions rupture the aperture of a nipple to such an extent as to render it useless. The turning on of the oxygen requires a very fine touch, and a fair stock of patience. There should be no hurry in this little operation, which is perhaps the most delicate part of all an operator has to undertake in the getting up of a good light.

In previous articles I have expressed an opinion that fine adjustment valves, screwed on to the nozzles of the cylinders, are for single lantern working preferable to the employment of regulators, and I notice very many of the best lanternists, in the West of Scotland at any rate, are now discarding regulators altogether, especially for cinematographic and high-pressure working. What is found most useful in practice is generally worth following, and, once an operator gets into the way of using fine adjustment valves, he will think twice before he resorts to the old-fashioned regulators, with attendant leakage and to a certain extent uncertainty.

A little consideration only is needed to understand that the best point at which to regulate the pressure of the gases in delivering such to the jets is at the mouth of the cylinders without any intermediate mechanism, which is liable to go wrong. By employing these fine adjustment valves this is virtually accomplished, and some day, when the importance of this statement is more thoroughly realised than it is at the present day, it is quite possible we shall have a new form of cylinder constructed in which the nozzles will contain a fine adjustment attachment to the cylinder itself so as to dispense with all accessories in common use as at the present time. During the last fifteen years, there is no doubt, the employment of compressed gases in cylinders has quite revolutionised limelight projection; but during this time there has been little, if any, alteration in the original form of cylinder that was introduced, and any experienced lanternists, or those who have to exercise themselves in lantern work, know what an amount of anxiety there is in connexion with the employment of cylinders that they are unacquainted with. With private cylinders the peculiarities of which are well known there is no such anxiety, for the spindles are easily set to turn at just the proper strain; but, with the general run of cylinders that are nightly hired out to Tom, Dick and Harry, the spanner is too often employed to tighten up, and the valves are in too many instances far too stiff, resulting in the spindle becoming twisted and ruptured before the same can be moved to yield an outlet for the gas.

Inexperienced parties are very liable to cause damage to those cylinders that are difficult to turn, and whenever damage does occur to the spindles, such as the wrenching off of their heads, they stand aghast, not knowing what to do to get a delivery of the gas and so bring about the entertainment that is required. Whenever this trouble arises there is, however, one resort left, and that is to employ a large spanner and unscrew to the left always the large nut; this may require one or two turns, but it generally proves available to lift the spindle and allow the gas to be had. *This must, however, only be looked upon as a last resource,* for in doing such there will in all likelihood be more or less of an escape of gas; but this with full cylinders (and it is generally the full ones that give trouble) need occasion little or no anxiety; the main factor is to get out the gas, and by this means such is possible. In the writer's experience he has on several occasions come to the rescue when blank despair reigned under such a disaster by those who were unacquainted with this means of getting at the gas. Perhaps, however, some day a form of cylinder may be constructed in which these drawbacks or difficulties will be overcome by some simple means of reaching the gas without the liability of the breakdown referred to.

T. N. Armstrong.

COMMERCIAL SLIDES: COLOUR AND FINISH.

It is always a marvel to me to find so few "lantern men" practising wet collodion. Is it laziness, or disinclination, or a feeling that there are extraordinary difficulties to be overcome, that the vast majority of lanternists "fight shy" of the silver bath?

It is almost too late in the century to enter into details about wet collodion studies; but I should like to say that, for ease of working, certainty of results, brilliancy, sparkle, clearness of shadows, colour—the richest of blacks, the finest shades of brown, purples, sepias, and reds—wet collodion is in a class by itself, and well in front of competitors. I do not profess to pose as an authority on the bath process, but can say with truth that many happy hours have been spent with collodion and a full line of chemicals, as gold, platinum, mercury, iridium, and the like, getting all sorts of lovely colours with an ease and celerity almost approaching magic.

Well, we can get a very fair assortment of tones on our modern lantern plates. Whether they are quite so rich or so clear will be largely a matter of opinion and experience as regards other processes; still, taken all round, we may get very satisfactory results with the bromide plate, or, more correctly, the modern lantern plate.

This is a decade particularly rich in developing agents; but for slide work, for greys and blacks, ferrous oxalate will have been deposed in favour of amidol; for possibilities in richer colours pyrogallic acid, good as it is, will never be used to the extent of hydroquinone, and the combination of this with metol. For all that, for quick, accurate work with a good healthy brown colour, pyro-sulphite will be found the most economical and the easiest to manipulate.

All operators should provide themselves with a source of light and an exposure meter, by the use of which a series of plates may be exposed from a negative, the results, with a standard developer and a fixed time for developing, being similar in each case as regards colour and density.

The usual method is, of course, to fit up a shelf in line with a gas bracket, to rule off this shelf into spaces of six, twelve, eighteen, and so on inches. Here we get the distance all right, and can repeat the exposure so far, but that is of little use without a standard light. If gas is used, the burner should certainly be fitted with a bypass, and regulated so that the flame can be at once turned, neither more nor less, to the best illuminating point; this done, the lantern plate will be exposed in contact with the negative at a certain distance, the normal, *i.e.* with a negative of average printing density at, say, two feet, with an exposure of thirty seconds, the plates being of the "slow" class. Very thin or soft negatives will be exposed at a further distance for the same period, and, *per contra*, very dense negatives brought closer to the flame. This method is that usually practised. Now, with the electric lamp, and an arrangement which I much prefer (see Lantern Supplement, November 4), of a fixed distance, with a possible variation only of time of exposure to suit the varying densities of negatives, the same end is attained, but the manipulations are easier and more compact. This is not the time and place to discuss which is best, to expose a thin and weak negative at a variable distance from a constant light with a constant exposure, or to make the exposure at a constant distance for a briefer time. As a matter of fact and practical trial, there is no difference whatever, and we may therefore make convenience the first consideration. However, with either of these arrangements, we may safely proceed to operate, and with the best chances for success.

From the purely commercial point of view, the uniform cool black tone will, as a rule, only be admissible. It is pleasant, however, to know that our inclination towards a higher plane of artistic colour selection may be gratified; we may select a cold tone for our architecture, browns and sepias for our landscapes, reds and purples *ad libitum*, and each to fit the subject—more or less, that is, for individual tastes differ strangely. Almost any developer which the operator may select will give cold black tones provided the exposure has been so timed that, with a developer of normal strength, the plate attains to full strength in from three to five minutes. In other words, there must be an appearance of forcing the development; the accelerating portion of the solution, whatever that may be, must have been at its full strength. In the event of intensification being required owing to slight under development, the chances are that the slide will be of a brownish-black colour. A properly timed exposure and an amidol developer gives beautiful velvet black tones. Pyro-developed slides fixed in a solution of hypo soda to which has been added ferrous sulphate (about one ounce to the pint) take a pleasant blue-black colour (this idea originated with the late Mr. Kennett), which suits a slide very well and clears it up wonderfully. Note, however, that after removal from the pyro solution the slide requires a wash before fixing.

We may ring the changes on various intensifiers or combined baths (toning and fixing). The ordinary lantern plate changes colour only a little in such baths. By *ordinary* I mean the quick bromide plate, but that little gives it a warmer tone. With Thomas's lantern plates, fully exposed, a pyro-sulphite and ammonia developer, the plate cleared and intensified fully with mercury, followed by ammonia, it is possible to get very rich browns and sepia tones.

Note here also the effect of darkening the mercury-bleached image with sulphite of soda solution or one containing metabisulphite of

potash, or by the application of an old hydroquinone developer, lime water (fresh and of full strength), or a weak solution of potassium sulphide. The bromide plates, fully developed, fixed, washed, and placed in one or other of the various toning baths, change colour usually only to a small extent, but that is always an improvement.

With regard to other colours, warm purples and reds, we have to choose a slow plate, one containing chloride and iodide of silver in combination with bromide, or in some cases without. The bromo-chloro-iodide plate is slow enough for our purpose, and will give the tones necessary, but the exposures will have to be lengthened considerably. It is advisable also to adopt the regulation hydroquinone developer, which has, on all sides, proved best fitted for the purpose, viz., hydroquinone with sulphite of soda, or sulphurous acid, caustic soda, and an accelerator, or, as some people call it, the colour-producer, composed of carbonate of ammonia. This latter salt must be fresh and pure; it is an efflorescent salt, and, no matter where you buy it, will, if much exposed to the air, develop a coating of bicarbonate. The best thing to do is to break up a large lump, pick out all the inner crystals, and preserve them in a stoppered bottle. A little melted wax run round the stopper will make it further secure. We may select a formula, one out of many, which may be taken as a fair sample. This is:—

SOLUTION A.

Hydroquinone	80 grains.
Potassium bromide	20 ,,
Potassium metabisulphite	60 ,,

or—

Soda sulphite	400 ,,

or—

Acid sulphurous	40 minims.
Water to	10 ounces.

SOLUTION B.

Caustic soda	80 grains.
Water to	10 ounces,

SOLUTION C.

Ammonium bromide	½ ounce.
Ammonium carbonate	½ ,,
Water to	10 ounces.

The regulation exposures and composition of developer may be put down as follows:—

BROWN.

Exposure.—Sixty seconds, 1 foot from gas flame, or 50 seconds 1 foot from 10 candle-power electric lamp, or 2 inches of magnesium ribbon burnt at 24 inches distant.

Developer.—A, ½ ounce; B, ½ ounce; C, 100 minims; water, to 2 ounces.

Time.—About 5 minutes.

PURPLE-BROWNS.

Exposure.—Ninety seconds, 1 foot from gas flame, or 75 seconds 1 foot from 10 candle-power lamp, or 3 inches of magnesium at 3 feet.

Developer.—A, ½ ounce; B, ½ ounce; C, 200 minims; water, to 2 ounces.

Time.—About 10 minutes.

PURPLE.

Exposure.—Three minutes, 1 foot from gas, or 2¾ minutes from 10 candle-power lamp, or 3 inches of magnesium at 2 feet.

Developer.—A, ½ ounce; B, ½ ounce; C, 250 minims; water, to 2 ounces.

Time.—About 12 minutes.

RED.

Exposure.—Five minutes, 1 foot from gas, or 4 minutes from 10 candle-power lamp, or 5 inches of magnesium at 2 fest distance.

Developer.—A, ½ ounce; B, ½ ounce; C, 300 minims; water, to 2 ounces.

Time.—About 15 minutes.

I take considerable credit to myself, being a busy man and not one of the most patient, for having practically tested the above, and worked it out with the electric arrangement; it is impossible to express *complete* satisfaction, the terms "rich and rare" can hardly be applied to these reds. The length of time taken over developing infallibly means veiling and clogging up of the shadows. In fact, red tones with gelatine plates are not what one can feel entirely proud of; fortunately, we do not see much of this kind of thing in public. Practically, gelatino-bromo-iodido-chloride plates should be restricted to purples, warm browns, and sepias. These are easily obtained with longer, certainly, but practical exposures. Exposures running to minutes are not *practical*, however *interesting* they may be.

Thomas's special formula for purple tones is excellent. If for cold tones, the exposure required is thirty seconds at two feet distance, for *purple*, give thirty seconds at *one* foot. The solution is a very simple one:—

A.

Pyro	1 drachm.
Metabisulphite of soda	1 ,,
Water, to	10 ounces.

B.

Ammon. bromide	1 ounce.
Liq. ammon. (·880)	½ ,,
Water, to	10 ounces.

Use equal parts.

The appearance of the developed image is puzzling at first, but when fixed is fully dense, with a rich deposit which shows up well when dry and varnished. The five per cent. solution of persulphate of ammonium acts efficiently as a reducer of density; a little alum may be added with no disadvantage. Clearing baths should on no account be omitted, and, if the slide is to be intensified with mercury, a previous brief wash in an acidulated bath (with or without alum as the case may be) should always be given.

It is a moot point with many lantern men whether slides should, or should not, be varnished. Mr. Pringle (and there is no better authority) says, Yes; many others agree, but the trouble is, I think, that much of the varnish sold for the purpose is far too thin; let it be fine and crystal, but as thick as ordinary negative varnish. With enamel collodion (slightly thinned, if necessary, with a little ether and alcohol, 3:1) a very fine, clear, structureless coating is to be got; but a satisfactory varnish is made from the "white, hard varnish" sold by oil and colour warehousemen, by thinning it with methylated alcohol; the spirit may be *strengthened* for the purpose by shaking up with it some dry sub-carbonate of potash; let it settle and pour off the clear spirit; the latter is then added to the varnish, which may then be shaken up or digested with a little animal charcoal, and carefully filtered. J. PIKE.

THE CHEMISTRY OF LIGHT.

AT the Leeds Camera Club on Wednesday evening, November 23, Mr. E. R. Dixon, A.P.S. (of Messrs. Reynolds & Branson) gave a lecture on "The Chemistry of Light," illustrated with numerous experiments. In his opening remarks, Mr. Dixon said that on the syllabus "Light and Colour" had been announced as his subject, but he had deemed it advisable, owing to the large number of new members who had not heard his previous lecture to the Society, to divide the subject into two, dealing, in the first place, with the chemistry of light, and on a subsequent evening with that of colour. He gave a brief history respecting the science of light, stating that it was not until the end of last century that any attention was paid to the chemistry of the subject. Previous to the discovery of oxygen by Priestley, and the establishment of the modern theory of combustion by Lavoisier, a remarkable theory had for upwards of fifty years been adopted by chemists, which was the theory of Phlogiston, proposed by Stahl. It was necessary to clearly understand the difference between luminous and illuminated bodies, and the lecturer lucidly explained these terms by illustrations. The attention of the audience was then directed to the cause of luminosity, allusion being made to the various forms of light, as candles, coal gas, acetylene, magnesium, incandescent, electric, and limelight. Sir Humphrey Davy's "solid particle" theory, and Dr. Frankland's "dense gases" theory of luminosity were touched on, the lecturer repeating the interesting experiment of these eminent scientists, supporting their views. Experiments showing the construction of flame with the aid of Professor Smithell's apparatus were also shown, and much appreciated by the members; and the chemical changes taking place in the different zones of the luminous and the non-luminous flames were carefully explained. The invisibility of light rays when all solid particles are removed from the atmosphere was shown by passing a powerful parallel beam of light from a lantern through a sealed glass box from which all particles of dust had been removed, the beam only visible on each side of the box. After having dealt with luminosity, Mr. Dixon said the chemistry of light does not stop at the production of light, but the light so produced is a very important chemical agent, being necessary for the assimilation of carbon by the plant, in the formation of wood and the purification of the atmosphere, thereby benefiting all forms of animal life. In concluding, he drew the attention of the members to the chemistry of the photographic sensitive plate, and briefly explained the difference since Daguerreotype was introduced. He said that, if photographers paid more attention to theoretical photography, they would be well repaid for their study, by obtaining a knowledge of the properties of light upon which are dependent the beautiful impressions they produce.

STORY OF A CINEMATOGRAPH.

LE COUTEUR *versus* THE DUKE OF MANCHESTER.

THIS was an action in which the plaintiff claimed to recover three items of an account; but two of them had been agreed upon in the course of the litigation, and the only item now in dispute was that of 122*l.* 10*s.*, the price of a cinematograph and other articles connected with it, and the question in dispute was whether there had been a sale of the cinematograph to the defendant, or whether it had only been sent to him on hire. Mr. Shee, Q.C., and Mr. Crane were for the plaintiff, and Mr. Carson, Q.C., and Mr. Boxall for the defendant.

Mr. Shee, in the course of opening the case for the plaintiff, said his client was a gentleman who dealt in the cinematographic camera, an instrument which exhibited photographic pictures in motion, or what was commonly called "living pictures." He had in Brook-street, not a shop in the ordinary sense, but an establishment, to which people who went there paid each a guinea.

Mr. Carson.—Two guineas.

Mr. Shee.—Well, that would not break your client, the Duke. Instruction was there given in the higher branches of photography and in science. The defendant became a contributor to the Association in last year, and bought several articles between August and December, which amounted to 21*l.* 5*s.* 2*d.*, the first item claimed in this action, but which was not now in dispute. Subsequently he purchased a cinematograph, but had not paid for it. Repeated applications were made for payment; at one time it was said that the Duke was on his travels round the world, and ultimately the matter was placed in the hands of the plaintiff's solicitor, and then it appeared that the defendant denied that he had ever purchased the cinematograph, but had simply had the instrument on hire.

Mr. William John Le Couteur, the plaintiff, said he had a photographic establishment at 14, 16, and 18, Brook-street, and there there was an Association of ladies and gentlemen. It was a private association, and instruction was given as to photography and scientific research. There was nothing in the shape of a shop or of an advertisement in connexion with the place. He himself gave instruction in advanced photography and science. He first became acquainted with the defendant at Welbeck, where witness had been invited to go and give an exhibition of his own machine, which was considered a good one. This was in August 1897. The Duke after that came to his rooms and joined his Association, and witness gave him instruction. He there saw a cinematograph, and said that it was a very nice thing, and he should like to have one of his own. An appointment was made in Clarges-street, and the defendant said that he should like to see what could be done with a smaller machine in a private house. Witness, therefore, agreed to the exhibition in Clarges-street, considering that the room there would be more suitable than that they could get in an ordinary private house. Witness, therefore, with two of his assistants, went to Clarges-street. During the exhibition the plaintiff said that the things were beautiful, and, at the same time, he said that he should like to have copies of them. Witness was asked to send in an estimate of the cost of a cinematograph. The defendant asked the price of a lamp and film to be adapted to a cinematograph, and witness sent in an estimate. The Duke desired to have certain things made for him. The Duke came to his establishment and practised on the cinematograph, which required some care and skill to manipulate. The Duke referred to the completion of the cinematograph, and said that he should like to have a photograph of himself in character, and witness said that the things were ready, and would be delivered that day. Witness mentioned the fact that he was very hard pressed, and his Grace said that it would be all right, and that he would settle as soon as he could. Witness had frequently sent an account of his claim to the defendant, and had sent personal letters to him, telling him the position in which witness was, and asking him if he would kindly make it convenient to settle the account.

Why did you not send a letter directly asking for payment?—I never press my customers. In my book there is a copy of an account sent to the defendant on March 30. I did not receive any reply to any of my letters. Those letters were sent to Portman-square, the defendant's nominal town address, or to Kimbolton.

Mr. Justice Lawrence.—What is meant by calling it his nominal town address?

Witness.—When I sent letters there, I was told that I must send them to various hotels or other places. I have also sent letters to his Irish address. When a letter was sent to Portman-square, I was told I was to send it to such-and-such an hotel. The defendant said absolutely nothing about hiring a cinematograph, and I never let such things under any condition whatever.

Cross-examined.—He himself was the Photographic Association that was held at his place.

Have you in your Association noblemen and dukes, and other persons higher in rank than dukes?

Mr. Justice Lawrence.—What?

Mr. Carson.—He said that he had in his Association persons higher in rank than dukes; he means, I suppose, Queen's Counsel, my Lord.

Witness, continuing his cross-examination, said the order for the purchase of this cinematograph by the defendant was completed on March 9, but the matter was spread over some time. There was an entry in his book about it on March 3; there was an entry of the order and another of the sale. The Duke of Manchester did not come of age until March 3, and he did not want any entry of the matter before that date, and witness thought that was very honourable of him. Witness did not make entries in his books, because he was asked not to do so, before March 3. The sale was not actually made until March 3.

You first met the Duke when you gave a demonstration at Welbeck?—Yes, unfortunately. I never asked him to join my Association. I never asked anybody to do so. Sometimes, when I sent a letter to Portman-square, the servant would say, "Try Ireland."

Mr. Carson.—That was the best advice I ever heard.

Finally, at a renewal of the hearing, Mr. Shee, after a consultation with Mr. Carson, said that his learned friend had made a proposition to him, and the result was that a satisfactory termination of the action had been arrived at. The plaintiff's claim was in respect of three items, but there was really only one—the price of the cinematograph—that was in dispute. As to that item they had come to an agreement, and the defendant would pay to the plaintiff a sum of money which had been agreed upon, the plaintiff would have the costs of the action, and he would also keep the machine. He hoped that for the future the parties would be good friends.

Mr. Carson said that the Duke of Manchester was certainly under the belief that he had not bought the apparatus; and he (Mr. Carson), having heard the evidence that had been given, had made a suggestion that the best way out of the difficulty would be this, that the Duke should pay to the plaintiff a sum of money that would represent the difference between the original price of the machine and the value of it after it had been used once or twice. The Duke had raised the defence to the action, not because he wished to refuse to meet any obligation that was upon him, but from his being under the impression that the machine was only hired, and that the operations of the Photographic Association worked out in that way. He also hoped the parties would in future be good friends.

A juror was withdrawn upon terms.

A NEW DEPARTURE IN SPECTROSCOPES.

For some months past I have been engaged upon the production of collodion and other films from diffraction gratings, and have now succeeded in obtaining and mounting films which leave very little to be desired.

In my possession are two Rowland's gratings of nearly 14,500 lines to the inch, writes Mr. T. Thorp in *The English Mechanic*, but having different characteristics; in fact, I understand no two are exactly alike. The smaller grating, which has a ruled surface of 1½ inches by ½ inch is faint on one side, but very brilliant on the other, particularly in the second and third orders; whilst the larger one, 2½ inches by 1¼ inches, is much more uniform, but not so brilliant in any of the orders.

In the films obtained from them, these characteristics are somewhat varied, as, indeed, was to be expected, seeing that transmitted and not reflected light is used, for, whilst the larger films are fairly uniform in all the orders, the smaller ones are only bright in the first orders, the rest being very faint indeed. This brightness in the first order is exactly what is to be desired, as nearly all the diffracted light is concentrated therein, and it is for this order that the greatest use for the films is to be found.

With such a film mounted on a good piece of plate glass, and using a thin glass tube full of quicksilver (in place of a slit), placed at about 4 feet distance, in such a position as to reflect the sun's rays to the eye, one is able to just separate the components of the D line, numerous other lines, of course, being also seen from H to below B, the B group being particularly prominent, although, of course, not the individual lines exactly.

It occurred to me, in my investigations, that if a film were mounted on, say, a right-angled prism of crown, or a somewhat smaller-angled flint, I should get direct vision with still greater dispersion; and this is found to be the case, the angle and r.i. of the prism, of course, determining which portion of the spectrum is in the centre of vision.

With such a "grating prism"—to coin a new compound word—one can easily resolve the D lines, and I have already made for my own use a small spectroscope 2 inches in length, which I term my *B-pet*, with adjustable slit, which really answers admirably, and yields a spectrum differing from the one from the ordinary prism form, in that it is very nearly normal, the red, green, and violet occupying apparently equal spaces, and merging into each other to yield the remaining spectral colours. The Frauenhöfer lines are very well defined, and so numerous as to defy counting. The difference in the two spectra is particularly noticeable in observing the low sun, when many lines not usually at all well defined are very prominent and distinct.

The spectrum, however, is scarcely so luminous as the prism spectrum, and the instrument may, on this account, not be so useful in other directions; but for solar and vacuum tube observation nothing better need be desired, giving as it does a spectrum 3 inches in length viewed at a distance of 15 inches.

To give an idea of the perfection to which the films have been brought, I may say that I have a grating prism which, when mounted to replace the usual prism in the table spectroscope, shows clearly at least four lines, besides indications of others, between D^1 and D^2 in the solar spectrum. The Rowland's grating itself shows 12 lines, using the third order, and is admirably suited to prominence work. As yet, however, I have not had the opportunity to test the films for this purpose, though I have no reason to doubt their applicability, except, perhaps, that there may be too much scattered light, owing to the granular texture of the film, which I have not yet succeeded in rendering absolutely transparent and homogeneous.

As a star spectroscope, the want of luminosity is all that can be said against it, as otherwise it answers very well, and the spectra of at least the brightest stars compare very favourably with the ordinary kind, and I have hopes yet of being able to procure a grating in which nearly all the light will be concentrated in the first order on one side. Should this be found possible, then grating films will indeed be in the forefront in scientific research.

For projection work the grating prism should prove very useful, and the form I have devised as being the best is one of flint, having angles of 90°, 60°, and 30°. This prism, as will be seen, can be used both in the table spectroscope and for projection work, as, by simply turning half way round either the 60° prism or the grating prism (the grating film being mounted on the side between the 90° and 30° angles) can be used, the one having about five times the dispersion of the other, besides giving a nearly normal spectrum.

As may be expected, the surface of the glass upon which the films are mounted, as well as the glass itself, must be of a very high order of perfection in order to obtain the best results, and the common prisms sold at a few shillings are of very little good; so that, although the films can be produced cheaply enough, but only at a very slow rate (two per day being the maximum), grating prisms, &c., for useful work will not be able to be supplied to the public so cheaply as could have been desired. For pocket and small spectroscopes, the case is different, as practically no magnification is used, and ordinary optical surfaces are quite good enough. Many of your contributors, including Mr. Caplatzi, have seen these films; in fact, I have given quite a number away, and predict a future for them, so excellent is their performance.

In conclusion, I am quite aware that other and more able experimentalists have been engaged upon the production of films, &c., from gratings, but it has not come to my knowledge that any really good and useful results have been arrived at previously. If such has, however, been the case, I am quite content that the honour should go to the proper quarter, and hope to have the opportunity of testing such films with a view to further improvement, as, after all, perfection is even now not quite attained, and I shall not rest content until I have succeeded in eliminating the lost traces of granular texture, which is the cause of a certain visible scattering of the light when very bright source is under observation.

Since the above was written, I have fitted up one of the grating prisms in place of the compound prism in a prominence spectroscope lent to me by a friend, and have succeeded in seeing prominences, both radially and tangentially, beyond my expectation, as the atmosphere was not good, and the telescope a reflecting one, with a somewhat tarnished speculum.

T. Thorp.

THE LIGHT OF THE FIREFLY.

The light emitted by the firefly has always been an object of interest by reason of the small amount of energy apparently required to produce it. It has been one of the dreams of the scientific man to rival this light in efficiency, says Mr. C. M. Broomhall in the *Scientific American*, even if no practical use followed. In this connexion a short summary of what is known upon the subject may not be out of place.

The first inquiry naturally suggesting itself is as to the character of this light as compared with light from other sources. It has been found that the light of glow-worms contains photographic rays which will pass through aluminium. It has also been found that the rays emitted by fireflies, after filtration through cardboard or through copper plates, will act photographically, and are capable of reflection, and probably refraction and polarisation. This would indicate the presence of rays belonging to the extreme ultra-violet end of the spectrum, since it is known that these extreme ultra-violet rays have the power of passing through bodies opaque to the longer wave-lengths visible to the eye. If this is so, they are probably the same as the invisible rays emitted by uranium and its salts, which have the power of passing through aluminium and cardboard, and are capable of reflection, refraction, and polarisation. These are known as Becquerel's rays. In short, therefore, we may say that the light of the firefly contains invisible photographic rays from the extreme violet end of the spectrum, in addition to the ordinary light rays.

Turning now to the construction of the light-producing apparatus, it has been found by Max Schultz that this organ in the glow-worm consists of a pale, transparent, superficial layer, which gives off the light, and a deep opaque layer, whose function is less obvious. The Italian firefly, in which both male and female are luminous, has been examined by Emery. Here, as in the glow-worm, the organ was found to consist of two layers. It has also been found that the ultimate branches of the tracheæ or air tubes are distributed through the photogenic apparatus; nerve fibres are also present. The luminous organ in the firefly is regarded as homologous to the "fat body" often found in insects.

Now directing attention to the cause of the light, we are met by two very significant discoveries, first, that carbonic acid extinguishes the light; and, second, that oxygen intensifies it. These facts, in conjunction with the known distribution of air tubes in the photogenic body, point very strongly to the theory that the light is the result of some form of slow combustion, while the fatty nature of the luminous cell indicates the probability of fat, with some form of free phosphorus, as the active agent.

It may be added that, as regards light-producing animals in general, it has been found in a large number of them that the luminous organs retain their power after death, and even after desiccation and subsequent moistening. There would, therefore, seem no reason to adopt the theory that we have here to deal with any direct transformation of vital into radiant energy. The most probable explanation of the phenomenon, at least in the firefly and glow-worm, is that it is the result of slow combustion.

And yet, even granting this is the cause of the light, there remains still to be explained why this form of slow combustion produces these extreme ultra-violet rays while other forms of combustion do not. There is some underlying mystery of molecular physics here well worth investigation.

BARBER'S APPARATUS FOR EXHIBITING CYCLORAMIC VIEWS.

Mr. T. W. Barber's improvements relate to optical lanterns, specially designed to project on the interior of a cylindrical screen views representing the whole or part of the horizon.

To exhibit the entire horizon, he constructs a circular lantern (fig. 1),

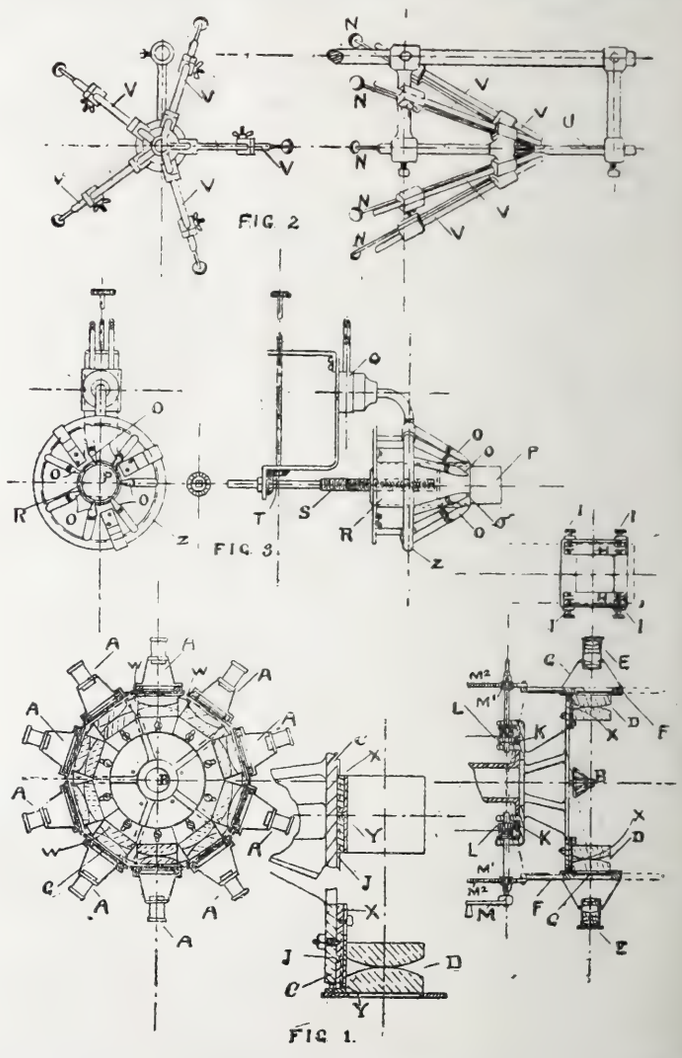


FIG. 1.

fitted with eight or more optical systems, each consisting of a condenser, D, and objective, E, with slide-carrier, F, ranged radially around a central light, B, and provided with adjustable diaphragms, H, for accurately registering the segments of the picture on the screen, also hand gear, K L M, for moving the slide-carriers, F, F, simultaneously to change the pictures.

He makes the condensers, D D, rectangular in form, and fits them loosely in cells, W W, with openings at top and bottom for circulation of air.

The four diaphragms, H, H, consist of thin metal strips placed close to the condenser, D, and between it and the slide-carrier, F; each diaphragm strip has a separate adjustment by thumb screws, I, I, so that the dimensions of the rectangle formed by the inner edges of the four strips can be adjusted, and thus the meeting edges of the separate segments of the picture thrown on the screen be accurately registered, and the top and bottom edges be made to appear continuous. K is a circular rack or

bevel ring, geared with eight or more pinions and shafts, L, any one of which can be revolved by the handle, M. Each shaft also carries a spur pinion, M^1, gearing with the rack, M^2, so that, by revolving any shaft by the handle, M, all the slide-carriers, F, can be raised or lowered together.

The picture slides, G, are inserted in a recess in the slide-carriers, F.

For exhibiting part of the horizon only a segmental cylindrical screen is used, and two or more optical systems arranged radially with one central light.

For facility of adjustment and registration he arranges all the optical systems, A, A—each complete in itself—on a horizontal annular table, C, to which they are firmly bolted by the base plates, X, X, which have angular adjustment round the feather, J, and radial adjustment by the feather, Y.

The central light, B, which must evenly illuminate all the condensers, D, D, is either the electric arc or lime light. In the former case he constructs it as (fig. 2), using a single positive carbon, U, of large diameter and a group of three or more negative carbons, V, V, of small diameter, each of which is provided with its current through separate resistances, and has separate adjustment by the screws, N, N, to the positive carbon.

For lime light he constructs a compound burner (fig. 3), consisting of three or more jets, O, O, or a circular slit branching from a circular main pipe, Z, connected to the mixing chamber, Q, and he employs a cylindrical lime, P, placed in the centre so that the jets form an incandescent zone around the lime. To avoid stoppages to change the limes, he places two or more of them in a vertical tube, R, and raise them up to the jet, as they burn away, by the screw, S, and gear, T, and remove the burnt limes at the top.

For projecting on the screen portions of such cycloramic views in which objects in motion are to be shown, he employs any form of cinematograph, and he masks out of the cycloramic view the exact portion of such view occupied by the picture projected by the cinematograph by means of a piece of opaque material, such as paper cut out to the required shape and placed in front of the photograph in the lantern, using the piece from which it was cut to mask and register the cinematograph photograph projected. If the latter is not on the same scale as the lantern photograph, then the mask is reduced or enlarged by the camera to the required scale.

PAPER ADVERTISEMENT TRANSPARENCIES.

As regards the London transparencies, which are exceedingly handsome, and very useful for various purposes, the *Papier Zeitung* gives some interesting information, from which we cull the following technical details:—

White paper is coated with a liquid whose chief constituent is Iceland moss strongly boiled down in water to which a slight quantity of previously dissolved gelatine is added. In applying the mass, which should always be kept in a hot condition, attention should be paid to cover the paper uniformly throughout. After it has been dried well, it is smoothed on the coated side and used for a proof. The transparent colours to be used must be ground in stronger varnish than the opaque ones. In order to produce a handsome red, yellow lake and red sienna are used; the tone of the latter is considerably warmer than that of the yellow lake. Where the cost is no consideration, aurosolin may also be employed. For pale red, madder lakes should be employed, but for darker shades crimson lakes and scarlet cochineal lakes. The vivid geranium lake gives a magnificent shade, which, however, is not at all fast in sunlight. The most translucent blue will always be Berlin blue. For purple, madder purple is the most reliable colour, but possesses little gloss. Luminous effects can be obtained with the assistance of aniline colours, but these are only of little permanence in transparencies. Light, transparent green is hardly available. Recourse has to be taken to mixing Berlin blue with yellow lake or red sienna. Green chromic oxide may be used if its sober, cool tone has no disturbing influence. Almost all brown colouring bodies give transparent colours, but the most useful are madder lakes and burnt umber. Grey is produced by mixing purple tone colours with suitable brown, but a grey colour hardly ever occurs in transparent prints. Liquid siccative must always be added to the colours, otherwise the drying will occupy too much time. After the drying, the prints are varnished on both sides. For this purpose, a well-covering, quickly drying, colourless, not too thick varnish must be used, which is elastic enough not to crack nor to break in bending.

Frequently the washing of the placards is done with gelatine. This imparts to the picture an especially handsome, luminous lustre. After an equal quantity of alcohol has been added to a readily liquid solution of gelatine, keeping it ready in a zinc vessel, the gelatine solution is poured on the glass plates destined for the transparencies. After a quarter of an hour, take the placard, moisten its back uniformly, and lay it upon the gelatine film, which has meanwhile formed on the glass plate, where it remains two to three days. When it is to be removed from the plate, the edge of the gelatine film protruding over the edge of the placard is lifted up with a dull knife, and it is thus drawn off, while a fine transparent gloss has remained on the placard proper. In order to render the covering waterproof and pliable, it is given a coating of collodion, which does not detract from the transparence. The glass plates and their frames must be cleaned of adhering gelatine particles before renewed use.

ARC LIGHT FOR USE UNDER WATER.

Some interesting experiments have recently been conducted at the New York Navy Yard with a view to ascertaining the practicability of using the arc light under water for the examination of a vessel's sides and interior. Hitherto only the incandescent light has been so employed with success, and the difference in the brilliancy of these two types of lamps in the open air is so obvious that no argument is needed to show the superiority of the former over the latter for submarine work. The incandescent lamp can be immersed in water safely, because the filament is enclosed in an air-tight globe. The glowing thread of carbon, protected from contact with a liquid that would instantly reduce its temperature and quench its light, continues to shine under water. But the arc light, as usually made, is not so shielded. The carbon pencils that compose it are generally so placed that upon immersion the water would instantly touch and cool them. Moreover, when the carbons were wet, the current would flow off into the water and not jump the narrow gap at which the "arc" is formed, so that another obstacle to the operation of the lamp would be afforded.

The first great step toward the use of this powerful illuminating agent under water, then, was to put it in an air-tight globe. If one will observe the arc lights now commonly employed in streets and large buildings, he will discover that two styles are in favour. One has but a single globe, and that is open at both bottom and top. That is the old kind. The other has two globes, the outer one open and the inner one closed. This is a more modern form of arc light, and is not absolutely air-tight, but it is designed to prevent any great amount of air reaching the carbons. Thus combustion, which destroys them, is reduced to a low minimum, and the life of the carbons is prolonged. This is the reason for enclosing the light.

What Messrs. Burdick & Hall, who have conducted the experiments, have done is to take such a lamp and give it an outer globe that is absolutely waterproof. It is not so easy to do this with an arc light as with the incandescent lamp, because it is necessary to open the apparatus at times to renew the carbons, and even after fresh ones are put in an automatic feeding apparatus must be employed to keep pushing the positive pencil down toward the negative as fast as the tip of the former wears away. No such renewal or readjustment is needed with an incandescent lamp. In the old open arc light the carbons are renewed every eight or ten hours, and in the enclosed arc they last for about 100 or 150 hours.

The feeding mechanism, which in ordinary arc lamps is often exposed to the air, is, in the Burdick and Hall device, placed in a water-tight cylinder, forming the upper part of the lamp. Out of the top of the cylinder, passing through a carefully packed aperture, issue two well-insulated wires that are bound together into a cable. These lead the current in and out again, and the two strands are intended to be connected with any suitable electric circuit.

The lower part of the lamp consists of a set of guard rods, outside of everything else, a large glass bell, inverted, and the carbon pencils enclosed in an inner globe, if one may call a vessel that is more elongated than an egg a "globe." The only joint in the lamp is at the junction of the glass bell and the metal cylinder. The two edges that meet there are provided with rubber gaskets or flat rings, like those used in sealing preserved fruit jars. When the lamp is closed, therefore, the joint is perfectly water-tight.

Previous attempts have been made to submerge the arc light, but they have been clumsy and generally unsatisfactory. With the notion that air was necessary to the operation of the light, certain inventors have equipped their apparatus with tubes to convey air down and to allow the gases of combustion to escape. But, in view of the efforts which other men have made to check combustion and thus prolong the life of arc-light carbons, this feature is ridiculous. Messrs. Burdick & Hall are the first persons who have successfully submerged this type of lamp without any such attachment. Their apparatus is provided, however, with a valve for the release of any gas that wants to get out.

The powerful illumination of the arc light is a great aid to photography. Hitherto the only electric light used under water for photography has been of the incandescent kind. Light has been obtained by exploding cartridges of sodium in a globe, but the duration of such a flash is brief. Much greater depths, especially in muddy water, can be penetrated with the arc than with the incandescent light, moreover, so that the achievement of the light here recorded is one of no little practical value.

Our Editorial Table.

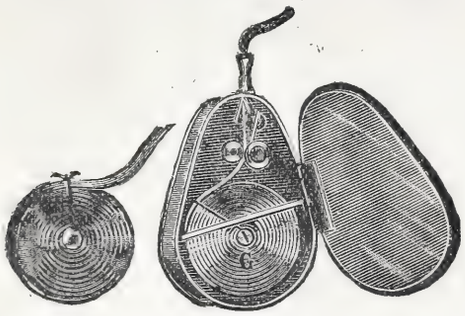
The Minasini Magnesium Pocket Lamp.

Agents: A. Gutteridge & Co., 134, Cheapside, E.C.

An examination of this little lamp shows it to possess a very efficient method of burning magnesium ribbon. It is skilfully made throughout of metal, and the mechanism is simple and certain. In use, the case of the lamp acts as a reflector, the back part opening and turning on a pivot. The instructions for use are: Slightly turn key and release lever to obtain 1 inch or 1½ inches of magnesium before lighting. After

lighting, raise the lever again, and this can be lowered at will when light is to be discontinued. The coils of magnesium are easily placed in position, as shown in the illustration.

The small fastening of the coil is drawn back so as to let off about an inch and a half of magnesium wire, and the coil is introduced beneath the



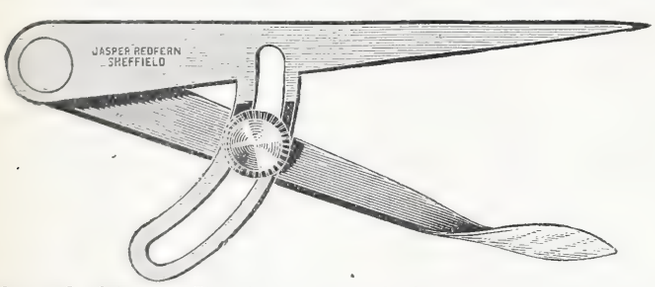
safety rod (which is movable) in such a way that the central space gets in the pivot, and the fastening is on the left side. Then the end of the wire is inserted between the two wheels by slightly turning the larger one, and the fastening can be cut and removed without further displacing the coil.

We can recommend this clever little lamp to those photographers who have a preference for the old plan of burning magnesium ribbon.

A Mask and Mount Cutter.

H. J. Redfern, Surrey-street, and Norfolk-street, Sheffield.

Mr. Redfern has submitted one of these very useful little cutting tools to us for inspection. It is designed for cutting circles, ovals, domes, cushions, moons, crescents, and thousands of fancy shapes, for lantern-slide masks, masks and discs for printing, &c., also for trimming photographic prints to shape, to suit all subjects, and for cutting out plain, fancy, or combination paper mounts on matts for mounting over photo-



graphs and pictures. It cuts up to ten-inch circles, and other shapes proportionately. Almost any design that can be drawn with an ordinary pair of compasses can be cut with this instrument. It is made of best Sheffield steel, tempered and plated. The cutting edge is hollow-ground, thus rendering it easily sharpened to razor-like edge. The illustration shows the design of the little instrument, which is so useful that it should be in the possession of every photographer.

The Magic Lantern.

By J. A. Manton, M.R.C.S. 100 pp., price 6*d*.
London: Iliffe & Son, 3, St. Bride-street, E.C.

We turned over the pages of this little book with anticipations of pleasure, for we know by his former writings that Dr. Manton is completely master of his subject. It is a capital guide to optical lantern work, and the large amount of information it contains has been very skilfully condensed. It has been brought right up to date by a chapter on the "Projection of Amimated Photographs;" acetylene too is discussed in the chapter on "Illuminants." The book has only one fault, there is no table of contents. Otherwise we can scarcely say too much in its favour. It forms one of the publishers' Nutshell series, and lanternists should carry a copy about with them for reference.

Catalogue Received.

Walker & Co., 19, Bridge-street, Aberdeen.

Messrs. Walker are noted for the excellence and success of their cinematographic entertainments, and their catalogue lists some scores of interesting films for the purpose, as well as a large variety of lantern slides for hire, &c

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The largest searchlight in the World is on Mount Echo, in California. It is of 3,000,000 candle power, and can be seen 150 miles out at sea.

Liverpool Amateur Photographic Association.—On November 24 there was a large audience at the monthly meeting of this Society, the special attraction being an illustrated lecture by Dr. T. W. A. Napier on "The Thames Excursion of Easter, 1898." It is the pleasant custom for a member to commemorate in this way the chief excursion of each year, his set of lantern pictures being selected from the best work of the whole party. Dr. Napier's vein of dry humour enabled him to give his audience a very entertaining narrative of the voyage this spring of thirteen prominent members in that "greyhound" of the Thames, the *Alaska*, from Oxford to Windsor. It was, it seems, not a very eventful trip; but, despite the unlucky number of the party, it was a very pleasant and successful outing, and the harvest of pictures was abundant and excellent. At the conclusion of the lecture a vote of thanks to Dr. Napier was heartily accorded on the proposition of the President (Mr. W. Prior Christian.)

O. Noevius has, on purely spectroscopic evidence, given some reasons for suspecting the presence of another undiscovered gas, besides argon and krypton, in the atmosphere. The evidence is not very strong, but appears to deserve further investigation. After eliminating the lines due to electrode matter, the lines due to the spark spectra of nitrogen and argon were catalogued at atmospheric pressure. Some fifteen lines, between wave-lengths 377 and 486 $\mu\mu$, were found to be common to the blue argon spectrum and the nitrogen spectrum, though rather fainter in the latter. The supposition is that they are due to an unknown gas which remains as an impurity in the preparation of argon, and also, but to a lesser extent, in the preparation of nitrogen. The spectrum shows a single coincidence with that of krypton at 473·6. It is not due to carbon impurities.—Noevius, *Wied. Ann.*

Flashlight Advertisements.—"During the ten or twenty seconds in which these lights are turned on they brilliantly illuminate the part of the street in which they are placed. For a few seconds everything is as bright as day. Then in a moment we plunge into what appears to be complete darkness. If we are so unfortunate as to find ourselves in the middle of the roadway when the light is turned off, we have an excellent chance of never reaching the pavement except on a stretcher. The foot passenger cannot see; the drivers cannot see; the horses cannot see; and, moreover, they are often rendered nervous by the sudden change from light to darkness. And if any one is run over it is difficult to apportion the blame. We should like to have the opinion of the policeman on duty at some point where a flashlight advertisement is in operation as to the additional difficulties which it causes him. A constable on duty, say, at the top of Sloane-street, has none too easy a task in regulating the traffic even when all the conditions are favourable, and he has a steady light to see by; but place him at intervals of twenty seconds in the full glare of a powerful electric light, and then in what appears, by contrast, to be total darkness, and he is practically helpless." —*The Lancet.*

In order to render ultra-violet rays visible, we can make use either of photography, which allows us to examine rays down to 100 $\mu\mu$ wave-lengths, or of a spectroscope whose lenses are made of quartz, or of quartz and fluorspar, provided with a fluorescent eyepiece. These apparatus show rays down to 185 $\mu\mu$ wave-lengths, though not so perfectly as the photographic plate; but they are more convenient. A uranium glass plate is placed on the focal plane of the telescope. The parts of the uranium glass which are hit by ultra-violet rays emit visible rays in all directions. To make our eye sensitive to these rays, we must cut off the light coming from the ordinarily visible parts of the spectrum. Soret has done this by turning the Ramsden eyepiece about a horizontal axis through an angle of 45°. In the *Zeitschrift für Instrumentenkunde*, Dr. F. Martens proposes a simpler method. He introduces a stop with two apertures, the one central, the other eccentric; a little lever releases either opening. When we look through the central aperture, we see the rays which regular refraction has sent down the telescope. When we place the eccentric aperture in position, these rays are stopped by the lever upon which they fall, and we perceive only the diffuse light emitted by the fluorescent uranium glass.

Kingston-on-Thames and District Photographic Society.—Despite the unpropitious nature of the elements, there was a large muster of members and friends at the Masonic Hall, Sun Hotel, on the 23rd ult., to take part in the lantern-slide competition, the awards, as in the recent print competition, being made by popular vote. There were about forty entries, the slides being judged by their individual merits, and not in sets. The majority were evidently made by contact, and several entries that had some little claim to pictorial merit were detrimentally affected by the shape of the mats, dome, or "proscenium" shaped horror, being a particular sinner in this direction. Exception, however, must be made in the case of Mr. W. F. Hodgson, who, acting on the advice given by Mr. Hodges in his recent lecture on slide-making, had bestowed great care and thought in the mounting of his work. The result of the poll was that the President of the Society, the Rev. G. J. Swinnerton, was placed first on the list for a fine Swiss view. Mr. A. E. Smith took second honours with one of his framed slides, a view of the pretty little church at Chessington, Mr. W. Montagu Robertson being third with a nicely composed picture of Eashing Bridge, Godalming. After the awards had been announced, the slides were again passed through the lantern, the company indulging in a little helpful and friendly criticism of each competitor's work.

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